SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1

EVERETT

Providers of quality water, power and service at a competitive price that customers value.

April 30, 1996
PUD 20322

Ms. Lois D. Cashell, Secretary
Federal Energy Regulatory Commission
888 1st 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 1995 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 April 30, 1996.

This annual report describes activities conducted during 1995, and activities planned for 1996. 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. In addition, as we promised in our letter dated January 11, 1996, our final progress report on the coarse woody debris issue is attached to the Annual Report (Appendix A).

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 27, 1996, to request comments and discussion on progress to date and planned activities for 1996. 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
J. Jones, Bell and Ingram

CITY OF EVERETT • 3200 Cedar Street • Everett, WA 98201 • (206) 259-8800 • Fax (206) 259-8882
PUD • 2320 California Street • Everett, WA • 98201 • (206) 258-8211 • Fax (206) 258-8222

1995 ANNUAL PROGRESS REPORT

WILDLIFE HABITAT MANAGEMENT PROGRAM

for the

HENRY M. JACKSON HYDROELECTRIC PROJECT

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

April 1996

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1995 ANNUAL PROGRESS REPORT
WILDLIFE HABITAT MANAGEMENT PLAN

1.0 SUMMARY

1.1 MAJOR TASKS ACCOMPLISHED DURING 1995:

- Harvest of two units at Lake Chaplain (Diversion Sale)
- Layout of road system on west side of Lake Chaplain
- Layout of 2 harvest units - Tiki sale
- Snag creation and inventory at Lake Chaplain
- Consultation with agencies on coarse woody debris management
- Monitoring of test plantings in the Spada Lake drawdown zone
- Seeding of the entire power pipeline right-of-way
- Seeding of Diversion units and roadsides
- Installation of new duck nest boxes at Chaplain Marsh and Lost Lake
- Completion of work by contract foresters in support of management prescriptions for the Spada Lake Tract Supplement to the WHMP
- Monitoring activities
- Approval of Lake Chaplain Comprehensive Plan (by City of Everett)

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 1996:

- Setup of the harvest units (Tiki Sale) and road system on the west side of Lake Chaplain
- Continue snag management program on Lake Chaplain, Spada Lake and Lost Lake Tracts
- Continue coarse woody debris management program at Lake Chaplain
- Planting of shrubs in selected locations on the power pipeline
- Plant Diversion sale units
- Continue work on Spada Supplement
- Continue monitoring activities
- Install new duck nest boxes and relocated floating platforms at Spada Lake
- Submit draft Spada Lake Tract Supplement to the WHMP for approval by agencies, District Commissioners and City
- Biosolids application at Lake Chaplain Tract

Problems or changes needed during implementation of 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 Wildlife (WDW), and the Tulalip Tribes. The Washington Department of Natural Resources (DNR) was also consulted.

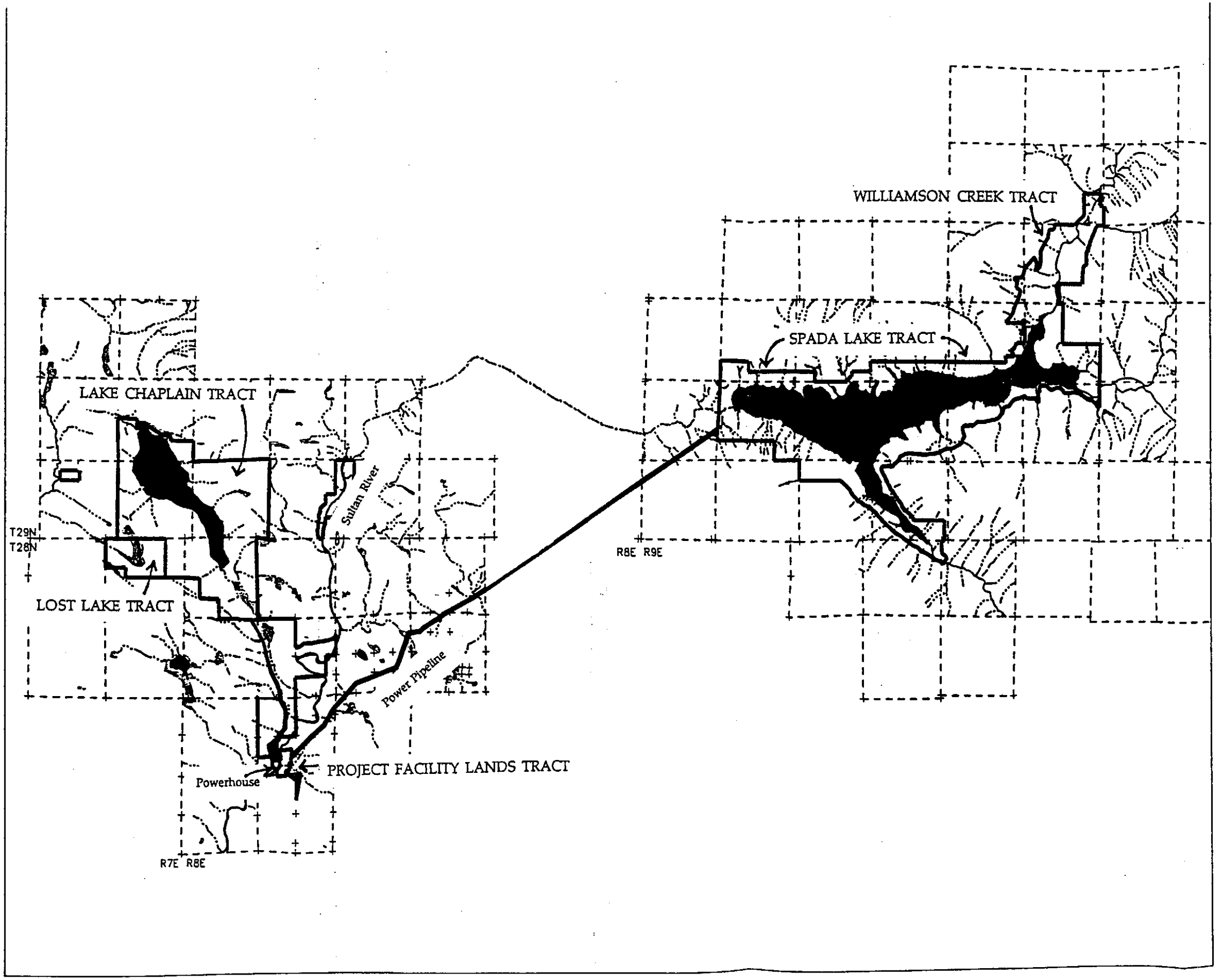
2.0 INTRODUCTION

The 1995 Annual Progress Report on the Wildlife Habitat Management Plan for the Henry M. Jackson Hydroelectric Project (Figure 1) 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 1995 and summarizes activities completed since the management program was initiated in 1988. Activities anticipated for calendar year 1996 are described. 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 Commission.

HENRY M. JACKSON PROJECT
WILDLIFE HABITAT MANEGEMENT PLAN

FIGURE 1. MANAGEMENT TRACT LOCATIO



3.0 WORK COMPLETED DURING 1995

3.1 FOREST VEGETATION MANAGEMENT

3.1.1 Timber Harvest - 1995 Units (Diversion Sale)

The two units of the Diversion Sale, shown in Figure 2, were harvested in July-August 1995. Layout of these units was completed in 1993, as described in the 1993 Annual Report. Harvest was done using a feller buncher, shovel, tracked skidder and log processor at the landings. Using this equipment resulted in very large concentrations of slash at the landings, and these slash piles were burned after harvest was completed. In unit 1 prior to harvest, large vine maple clumps were widespread throughout the unit. Most of these were grubbed out during harvest and deposited in piles scattered through the unit in order to reduce future competition from vine maple with other understory species and tree seedlings. Roads and bare areas in both units were seeded with the same grass/forb seed mix used on previous harvest units, with the exception that the trefoil was eliminated and the proportion of clovers was increased.

3.1.2 Harvest Unit Setup

The next timber sale (Tiki Sale) will consist of four units located on the west side of the Lake Chaplain Tract, and one on the east side(Figure 2). Two of these units have been laid out and marked with boundary tags. A stream buffer zone was measured and marked in one of the units, and green tree areas were identified in both units.

3.1.3 Road System Layout

Road system layout to serve future harvest units on the west side of Lake Chaplain continued in 1995, and portions that are required to serve the upcoming Tiki Sale were finalized (Figure 2). Future sale units will be accessed by extending this road system.

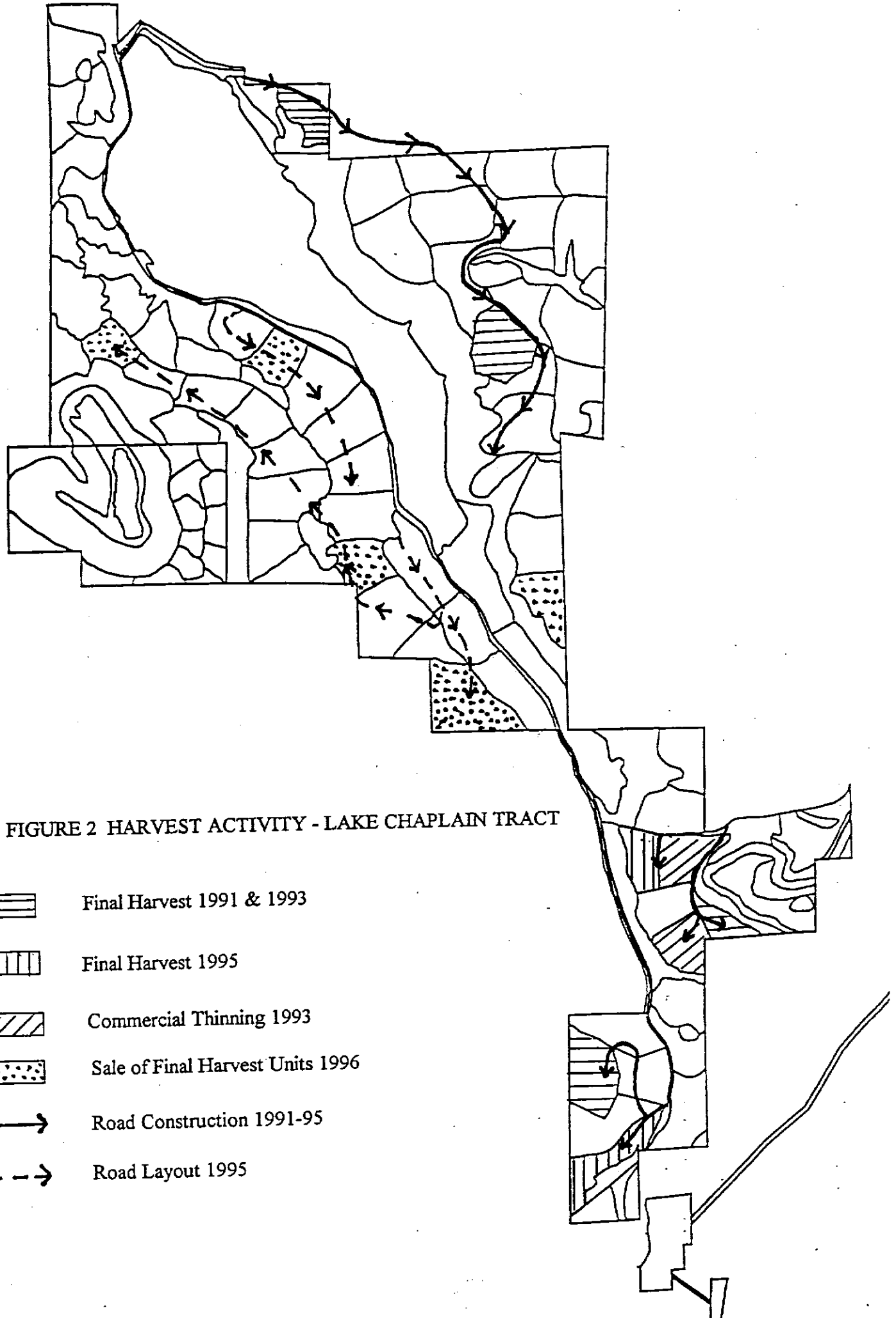


FIGURE 2 HARVEST ACTIVITY - LAKE CHAPLAIN TRACT

3.1.4 Lost Lake Monitoring

Photo documentation stations in the thinned unit at Lost Lake were re-visited in September 1995, approximately four years after the thinning was completed (July 1991) The slash resulting from the thinning remains thick in hemlock thickets, although most small 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 dense 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.

3.2 SNAG MANAGEMENT

Snag inventory and creation for 1995 on the Lake Chaplain Tract is shown in Figure 3. A total of 14 units (about 240 acres) were inventoried, with 12 units requiring additional snags (a total of 287 snags) to meet the WHMP requirements. Of these 12 units, 7 had snags created in them in 1995. A total of 196 snags were created, and the remaining 5 units will be completed during 1996. A summary of the snag component of each of these units is presented in Table 1. Snags were created, as in previous years, by topping live trees and leaving a few branch stubs.

Created snags were mapped and marked with numbered metal tags and a painted stripe 4 feet above the ground.

3.3 COARSE WOODY DEBRIS MANAGEMENT

3.3.1 Implementation of CWD Procedure on Diversion Sale

We reported a procedure for Coarse Woody Debris (CWD) management on harvest units at the annual meeting with the agencies in March 1995 (Appendix A, Exhibit 1). The procedure primarily addresses adequate supplies of decay Class 1 and 2 logs. Details of the procedure were described in the 1994 Annual Report, and it was stated that the procedure would be implemented on future harvest units, including the upcoming Diversion Sale at Lake Chaplain. Additional information on CWD management during the past 6 years is presented in section 4.3.

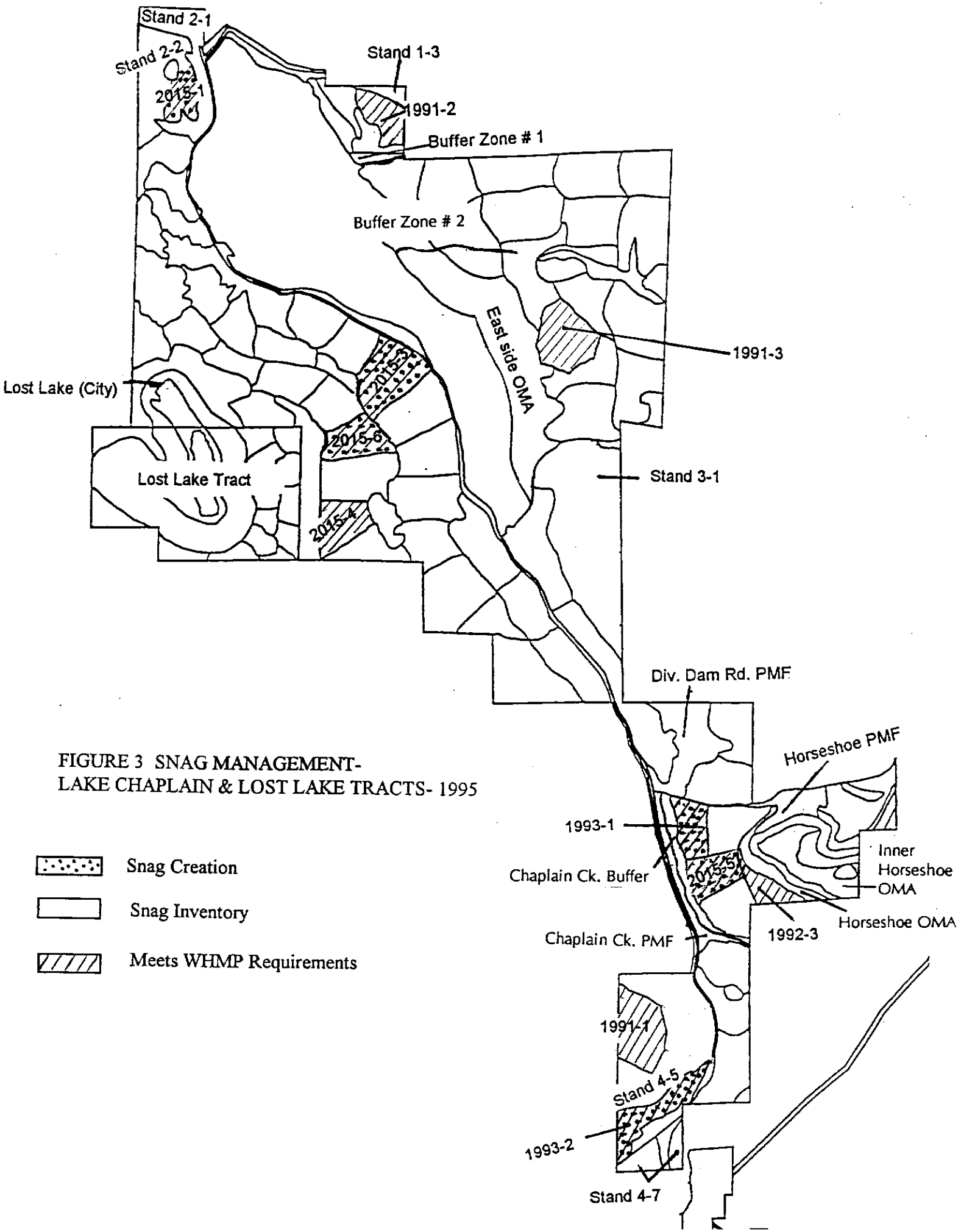


FIGURE 3 SNAG MANAGEMENT-
LAKE CHAPLAIN & LOST LAKE TRACTS- 1995

Table 1. Summary of Snag Management Through 1995

UNIT	ACREAGE	# CREA-TED	AVERAGE DBH (in.)	AVERAGE HEIGHT (ft.)	#/ACRE	NOTES
1991-1	26.0	70	16.6	33.5	3.08	√ Includes natural and created snags
1991-2	15.0	46	16.1	27.4	3.07	√ Includes only created snags
1991-3	24.0	66	18.0	31.0	3.63	√ Includes natural and created snags
1992-3	13.7	42	15.7	31.7	3.07	√ Includes only created snags
1993-1	15.6	41	16.8	50.3	3.08	√ Includes natural and created snags
1993-2	19.7	61	18.3	47.9	3.10	√ Includes natural and created snags
Lost Lake Tract	112.0	43	16.9	49.5	1/	
Lost Lake (City)	46.0	36	16.9	52.4	2/	
Horseshoe OMA	16.7	25	17.1	54.0	1/	
East side OMA	173.6	12	17.3	40 3/	2/	
Stand 1-3 4/	13.8	6	21.5	55.0	2/	
Div. Dam Rd. PMF	33.1	10	16.8	38.5	2/	
Buffer Zone # 1	2.7	20	17.0	40 3/	2/	
Buffer Zone # 2	3.8	10	15.7	40 3/	2/	
Horseshoe PMF	14.7	22	17.0	58.1	2.7	Includes natural and created; Req's 13 add'l snags from 15-16.9" size class.
Stand 2-1	8.9	4	19.5	48.8	2/	
Stand 2-2 4/	30.7	12	19.0	47.9	2/	
Stand 3-1	141.1	10	19.5	51.1	2/	
Stand 4-5 4/	76.1	6	22.5	61.0	2/	
Stand 4-7	14.0	11	18.8	55.0	2/	
Chaplain Crk. Buffer	8.7	5	21.3	56.7	2.7	Includes natural & created; Req's 18 add'l snags from 15.0-16.9" size class.
Chaplain Crk. PMF	12	5	16.4	66	2.8	Includes natural & created; Req's 20 add'l snags from 15.0-16.9" size class.
2015-1	12.2	15	16.1	66.5	4.5	√ Includes natural and created snags
2015-3	18.0	13	16.9	48.4	7.4	√ Includes natural and created snags
2015-4	18.8	0	20.6	46.1	4.7	√ Includes natural snags only
2015-5	17.7	26	16.0	44.1	5.4	√ Includes natural and created snags
2015-6	19.0	45	17.5	55.4	4.0	√ Includes natural and created snags

√ Meets WHMP requirements for size class distribution and number per acre.

1/ Incomplete inventories have been done, and some snags have been created, but the target densities have not yet been met.

2/ No inventories have been done in these units.

3/ Estimated heights

4/ Remainder of stand, exclusive of already delineated units.

We implemented the proposed CWD procedure on the two units of the Diversion Sale. Prior to harvest we measured and marked live trees with paint, as well as Class 1 and 2 snag trees and Class 1 logs to become CWD after harvest. The designated snag trees included those that were located within the unit and were likely to be felled or knocked down during harvest. All of the designated trees and logs were measured to determine the number of logs they contained that were at least 20 feet long with large end diameter of at least 16 inches. For operational ease, live trees were sought that provided more than one acceptable log. A number of the selected trees provided as many as four logs. Enough trees and logs were marked to provide an average of eight 20-foot logs per acre (Appendix A, Table A-2).

Designated CWD trees and logs were retained on the units during harvest. The operators found it necessary to fell and move some designated live trees, but most were left standing at the end of the harvest. If a CWD tree was removed from the unit, the operator left standing a comparable live tree in a safer location. The remaining designated live trees were felled after the harvest was completed. Designated snag trees were not felled unless it was necessary to do so for safety during harvest, since it was felt that they already served an important function as snags and would eventually fall and become CWD. A majority of the standing snags which were designated for CWD logs did end up either being felled or knocked down. On unit 2, of the 14 snags designated for CWD logs, 7 were either felled or had tops broken out. This resulted in 5 logs being shorter than the minimum length of 20'. We will keep this result in mind when designating snags for CWD logs in future units, with the aim of selecting more sound snags as CWD sources.

Table 2 summarizes designated CWD trees (or their substitutes) and logs located on the units post-harvest. The majority of designated trees and logs were retained, and the targets of the CWD procedure were met. Complete data on all designated CWD trees and logs, pre- and post-harvest, are included in Appendix A. Additional CWD inputs came from snag tree tops (Appendix A, Table A-5), pre-harvest CWD (Appendix A, Table A-1), and CWD generated by the harvest operation (not inventoried).

Table 2. Summary of Designated Coarse Woody Debris on Diversion Sale Units

# of trees/snags/logs	Avg. Diameter of logs (range)	# logs/acre pre-harvest	Total # logs pre-harvest	# logs/acre post-harvest	Total # logs post-harvest
Unit 1 (15.0 ac.) 30 live trees, 4 snags	22.3 (16 - 36)	8.0	120	8.0	120
Unit 2 (19.7 ac.) 30 live trees, 15 snags, 3 logs	21.5 (16-35)	8.0	160	7.9	155

CWD in decay classes 3, 4 and 5 was sampled prior to harvest (Appendix A, Table A-1), but a post-harvest sample was not conducted. A quantitative or descriptive procedure to evaluate how well specific logs fare during harvest was discussed with agency reviewers in a meeting in December 1995. It was felt that randomly sampling post-harvest inventory of CWD (as has been done on previous harvest units) does not adequately address how harvest operations are affecting CWD, whether harvest operations represent a problem for CWD retention, and what changes could be made if a problem is detected. The new procedure, which may utilize sampling on permanent plots pre- and post-harvest, or marking and evaluating specific logs, will be refined in 1996 and tested on the next set of harvest units.

3.3.2 Agency Consultation on CWD Procedure

During the spring/summer of 1995, the agency representatives reviewed the CWD procedure. Copies of their letters and our responses are in Appendix A, Exhibit 2 of this report. The U.S. Fish and Wildlife Service also wrote to the FERC in August 1995 stating their concerns over the CWD procedure (Appendix A, Exhibit 2). It should be noted that data on implementation of the CWD procedure on the Diversion Sale units were not available at the time these reviews and our responses were written.

The agencies and co-licensees met on December 13, 1995 to resolve outstanding issues and questions, and discuss the implementation of the CWD procedure on the Diversion Sale. Meeting minutes are summarized in Appendix A, Exhibit 3. At this meeting, the co-licensees presented data shown in Appendix A, including complete tallies of all Class 1 and 2 logs designated as CWD prior to harvest, and logs remaining after harvest. In addition, a comparison was made between the volume of CWD left on Diversion Sale unit 1, and the volume of logs that would comprise several different CWD prescriptions (fully presented in Appendix A, Table A-4, and summarized in Table 3). The volume of CWD actually generated on

the units would be approximately equivalent to the volume of 7 logs per acre, with 24 inch diameter at large end, and 20 feet long. In subsequent correspondence, the agencies and the FERC were notified that minutes of these meetings, and CWD compliance data for class 1 and 2 logs on the Diversion Sale would be supplied as part of this Annual Report, and would be discussed at the annual agency meeting.

Table 3 Volume of Designated CWD in Unit 1 of Diversion Sale, and Comparisons with volumes of 24" logs:

CWD Procedure	2 logs/acre	6 logs/acre	8 logs/acre	10 logs/acre
Volumes in board-feet (BF) 34,720 BF	10,500BF	31,500BF	42,000BF	52,500BF
CWD Proc. provides:	331%	110%	83%	66%

3.4 REVEGETATION

3.4.1 Spada Lake Shoreline

Four wetland emergent species were planted, in the form of nursery-grown plugs and root divisions, in late October-early November 1994 in a small bay in the Williamson Creek arm of the lake, and at the North Fork arm. Plants were installed in rows perpendicular to the shoreline between 1430 and 1445 feet elevation, i.e. above the water line at the time of planting.

The test plantings were monitored in March, August and September 1995 at the North Fork site, and August and September at Williamson Creek. Results comparing numbers of plants initially planted at the two locations with numbers still surviving in September 1995 are in Table 4. The two Carex species and Scirpus acutus have performed well thus far between approximately 1440 and 1430 foot elevation. Scirpus microcarpus has survived in some test rows above the 1440 foot elevation, and Sparganium performed poorly in most rows. The impact of wave and debris action at the North Fork site was evident in 12 out of the 20 rows planted. The soil surrounding the roots of some plugs became scoured away in several rows. Other planted rows became buried under debris that floated in while the reservoir elevation was higher. These types of disturbance were not apparent at the Williamson site. The area around one S microcarpus row became occupied by many plants of this species between the planting date and our last monitoring visit, probably due to in-seeding from some other source. We could not easily distinguish between planted seedlings and other plants, and therefore, we did not calculate a survival rate for this

species at Williamson Creek. Survival for the other species at the Williamson Creek site was higher than at the North Fork site, possibly because the Williamson Creek site was less disturbed by debris movement and wave action.

Table 4. Condition of Spada Lake Drawdown Zone Plantings

Site		**Species**				
North Fork	**No. of plants, all species**	***Carex rostrata***	***Carex obnupta***	***Sparganium***	***Scirpus acutus***	***S. microcarpus***
Oct. 1994	501 (20)	111 (5)[1]	103 (4)	81 (3)	96 (3)	110 (5)
Sept. 1995	317 (17)	89 (5)[2]	91 (4)[2]	7 (1)	84 (3)	46 (4)
% surviving	63	80	88	9	87	42
Williamson Creek						
Nov. 1994	317 (12)	0	105 (4)	104 (4)	108 (4)	90 (4)
Sept. 1995	201 (9)	0	101 (4)	11 (1)	89 (4)	TNTC (1)[3]
% surviving[4]	63	-	96	11	82	unknown

A fifth species (Scirpus cyperinus) was broadcast seeded in early September at the North Fork site using seed collected at a local site. S. cyperinus did not appear to germinate and grow where it was broadcast, but appears to have seeded in naturally at several other locations in the North Fork site. Dense pockets of this species measuring 2-3 feet across had appeared by September 1995, growing close to the upper limits of our plantings. S. cyperinus has flourished over the past four years in a stand adjacent to the boat launch area of Recreation Site 3, and currently covers at least one acre of formerly barren mud flat. Exact elevations have not been measured yet, but a portion of this stand appears to be inundated each year. Future monitoring of the Spada shoreline will report whether this species continues to spread through the drawdown zone.

3.4.2 Power Pipeline Right-of-Way

On the power pipeline right-of-way (ROW) stumps and logs were placed at about 150 foot intervals to provide cover and habitat for wildlife, as well as protected areas for plants to become established.

[1] Number of plants (number of rows)
[2] Number of plants increased in some rows.
[3] In one *S. microcarpus* row, we originally planted 24 plants; in 9/95 the plants were too numerous to count.
[4] Not including *S. microcarpus*.

The right-of-way was again seeded with a grass/forb mix to provide cover and forage.

In 1994, boulders were placed along several streams crossing the right-of-way to prevent any off road vehicles (ORV) from damaging those areas. This, combined with gate closures has been very successful and has nearly eliminated this activity.

3.4.3 Revegetation Monitoring

Shrub plantings along the western edge of Chaplain Marsh, including red huckleberry, Nootka rose, serviceberry, western red cedar, English holly, red osier dogwood and red-flowering currant, were done in February 1993 in order to create a vegetative screen between Chaplain Road and the marsh. The area that was planted has not been mowed subsequently. The plantings were monitored in May and September 1995. Mortality among the plantings on this site was negligible, and growth of most species, especially holly, was good (Table 5). Many additional shrubs have grown in this border to the point where it is very difficult to physically reach the planted shrubs. Species that have filled in the border include willows, red alder, hawthorn, salmonberry, trailing and evergreen blackberry, plus forbs and grasses. The vegetation "screen" between the road and the marsh is still generally under 6 feet high, but it has become a broader, denser band.

Table 5. Condition of Shrubs Along Western Edge of Chaplain Marsh

Species	No. Planted	No. Dead or Damaged	Condition of Surviving Shrubs
English Holly	150	3 damaged; 1 apparently dead	Excellent
Western Red Cedar	400	0	Good to excellent
Huckleberry	230	0	Fair to good
Flowering currant	130	0	Fair to good
Nootka rose	130	0	Fair to excellent
Serviceberry	130	0	Fair to excellent
Red-osier dogwood	130	0	Fair to excellent

Shrub and tree plantings at the powerhouse site, also done in February 1993, included Oregon ash, western crabapple, black hawthorn, red-flowering currant, serviceberry, Nootka rose, and red huckleberry. The original plantings consisted of ten tree groups that included 5 trees each, and ten shrub/tree groups that included three trees and 13 shrubs each. Thirty-three more shrubs were added to the shrub/tree groups in September 1994 to replace some that had died. The plantings were monitored in May and September 1995 (Table 6).

All of the tree species (crabapple, ash and hawthorn) performed well on this site. Among the shrubs, only Nootka rose did very well in the 2-1/2 years following planting, although over half of the huckleberries and serviceberries still survived.

Table 6. Condition of Tree and Shrubs at Powerhouse

Species	No. planted	No. Dead	Condition of Surviving Plants	No. Volunteers[1]
Crabapple	39	0	8 excellent, 10 good, 13 fair, 8 poor	-
Oregon Ash	15	1	5 good, 9 fair	-
Black Hawthorn	26	4	10 good, 1 fair, 11 poor	-
Red Flowering Currant	33	30	1 good, 2 fair	-
Serviceberry	52	19	1 fair, 32 poor	3
Nootka Rose	32	0	3 excellent, 10 good, 19 fair	10+
Huckleberry	43	18	3 good, 10 fair, 12 poor,	-

[1] These shrubs were not planted by us.

Plantings of Douglas fir and western red cedar seedlings at the north end of Lake Chaplain, intended to become a visual screen between the lake and the adjacent road, were monitored in February 1995. 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, with only five percent mortality (7 trees) since planting. All of the surviving trees are in excellent condition.

3.5 NEST STRUCTURES

3.5.1 Floating Nest Platforms

The platforms at Lost Lake were monitored by District Staff at least twice per month from April to the end of July for periods of at least 15 minutes. The platforms at Lake Chaplain were monitored at least once per month during the same period. Additional monitoring was performed by Jean Cross, on a weekly basis. There was no observed use by wildlife of any of the platforms. Waterfowl, including loons, grebes, Canada geese, marbled murrelets, and several duck species were observed in Lake Chaplain throughout the spring, summer and fall of 1995. 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 will be moved from Lost Lake in 1996, if suitable sites can be found for them in Spada Lake. The platforms in Lake Chaplain may also be relocated to Spada Lake in 1996.

3.5.2 Nest Boxes

Four additional nest boxes were installed at Lost Lake, and three additional boxes were installed at the north end of Chaplain Marsh early in 1995. All nest boxes were monitored by District staff. We did not attempt to obtain complete counts of eggs prior to hatching 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. Wood duck and hooded mergansers used the nest boxes at Lost Lake and the south end of Chaplain Marsh. Two of the boxes at the north end were apparently used by starlings, judging by nest materials that were brought in and the size and color of the eggs that were deposited in them. The eggs and nest materials were removed from these boxes. Results are summarized in Table 7.

Table 7. Use of Nest Boxes at Lost Lake and Chaplain Marsh

Site	# Boxes	# Boxes with Clutches of Duck Eggs	# Successful Boxes (No. Eggs Hatched)	# Boxes Used by Other Species
Lost Lake	6	3	3 (23-24)	1 - Douglas squirrel
Chaplain Marsh (north)	3	0	0	2 - Starling
Chaplain Marsh (south)	6	5	4[1] (43-44)	0

[1] One additional clutch of 12 wood duck eggs was lost when tree supporting the nest box fell into the marsh.

3.5.3 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 1995. The platform was occupied in 1995 by a pair of osprey, who successfully reared one young through fledging in August 1995. 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 observed regularly at Spada Lake from April through August 1995. From April through June, Jean Cross observed osprey constructing a nest on the platform installed in 1992 near the shoreline east of the South Fork Sultan River. One to two osprey were observed on the nest several times in May and June and the female was observed setting. The nest was deserted in late June. The nest platform installed on the hillside south of the dam has had no obvious use to date. The nest constructed in a tree near Culmback Dam in 1994 was no longer in the tree as of April 1995.

3.6 WHMP SUPPLEMENT FOR SPADA LAKE

The District retained forestry consulting services of Harza Northwest, Inc. in 1994-5 to assist in developing detailed forest management options for the Spada Lake supplemental plan. They performed forest stand inventories, prepared a management program including short-term and long-term management activities, and prepared an estimated cost budget. The consultants submitted their final report in late 1995, and we used their baseline information and recommendations to revise the earlier draft (submitted to the agencies in February 1994) of the Spada Lake Supplemental Plan. The revised plan includes detailed stand prescriptions for the areas proposed for treatment through the year 2005.

3.7 OTHER MANAGEMENT ACTIONS AT LAKE CHAPLAIN

The City of Everett's Council adopted the Chaplain Property Comprehensive Plan, which was reported as under review in the 1994 Annual Report. This plan describes land management policies for City-owned property in the vicinity of Lake Chaplain, with primary focus on land management practices as they relate to water quality.

The City also received approval for a shoreline zone development permit for gravel extraction at two locations on the Lake Chaplain Tract. The gravel will be used for logging road construction on site. Under this proposal, gravel that had been previously stockpiled on the dam at the north end of Lake Chaplain, plus gravel deposits adjacent to the area used for disposal of backwash solids from the filter plant, will be removed. The area in question on the north dam currently supports grasses and forbs, and will be re-seeded with a grass/forb mix following gravel extraction. Gravel extraction from the backwash disposal site will include removing mixed forest vegetation (primarily an alder stand) that measures approximately 180 feet by 130 feet. A suitable replacement area will be identified elsewhere on the Lake Chaplain and designated as permanent mixed forest.

4.0 CUMULATIVE SUMMARY

A summary of all activities completed under the WHMP, from the earliest implementation in 1989 through the end of January 1995, is presented here.

4.1 FOREST VEGETATION MANAGEMENT

4.1.1 Road System Layout and Construction

The main road system for the northeast side of Lake Chaplain and the area south of the Diversion Dam Road has been constructed, as shown in Figure 2. Some spur roads will be constructed to serve individual harvest units in the future, but the major construction in these areas has been completed. We require that openings be left in the slash along rights-of-way at 100 foot intervals to allow wildlife to easily pass through. Deer have been observed using these breaks, and we will continue using this practice in future road construction.

The main road system for the west side of Lake Chaplain has been laid out, and construction is expected to follow as part of the next timber sale, probably in 1996.

4.1.2 Final Harvest

Five units were scheduled in the WHMP for final harvest from 1990-1995, and five units were scheduled from 1995-2000 (Figure 4). Three of the units in the first group have been harvested. Harvest of a fourth 1990 unit was been delayed pending road construction, and will be included in the upcoming Tiki Sale, expected to be sold in 1996. Harvest of the remaining 1990 unit was deferred, because upon detailed field visits to set up the harvest unit, it was discovered that this unit contained many snags and other habitat characteristics which we are trying to preserve and promote. Another unit was substituted in the Diversion sale, which was harvested in 1995. This substitution will not compromise the WHMP requirement for a 15-year green-up period between the harvest of adjacent units. One 1995 unit was harvested in 1993 as part of the Horseshoe Sale. Four other 1995 units will be included in the Tiki Sale. Thus six units have had final harvests and five are expected to be sold in the next year, compared to the target of five for 1990-1995 in the WHMP schedule, and five for 1995-2000. The WHMP provides flexibility in scheduling final harvest - actual harvest may occur within ten years before or after the target year. Therefore, accomplishments to date are within the acceptable range.

Units that have been harvested are actually smaller than the acreages listed in the WHMP, due to the reconfiguration of roads, unit boundaries, GTA allocations, buffer zones, etc., but represent reasonable decisions based on actual site constraints.

4.1.3 Commercial Thinning

Two units (36 acres) were commercially thinned in 1993 (Figure 4). 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 (Figure 4) have been deferred until roads were constructed to nearby final harvest units (Figure 2). 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 wildlife habitat benefits and operational feasibility.

4.1.4 Precommercial Thinning

Precommercial thinning of approximately 46 acres at Lost Lake was completed as scheduled in 1991 (Figure 4), and photo documentation stations were established to monitor the results annually. As of September 1995, hemlock thickets that were thinned had significant amounts of slash remaining on the ground that would probably limit their use by anything other than small birds and mammals. Alder pockets and trails that were cut through the unit had shrub layers consisting primarily of salmonberry, which were not present prior to thinning. Salmonberry had been lightly browsed at three of the stations.

4.1.5 Management of Roads and Post-Harvest Units

Final harvest units have been seeded with a grass/forb mix after harvest, and replanted with fir and cedar seedlings. Cottonwood cuttings were planted in moist areas of two of the final harvest units. The rights-of-way of new access roads and spur roads were also seeded with a grass/forb mix.

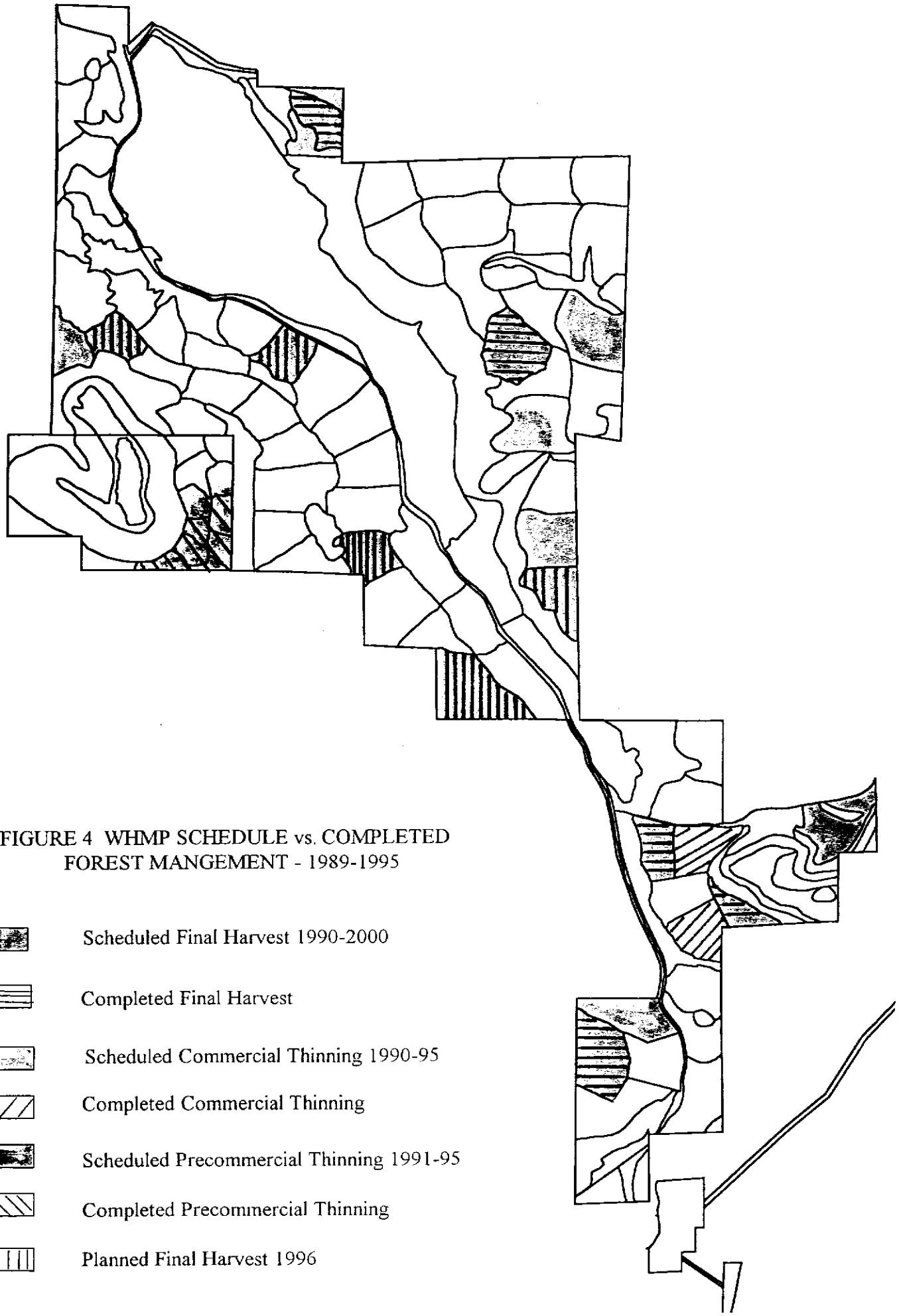


FIGURE 4 WHMP SCHEDULE vs. COMPLETED FOREST MANGEMENT - 1989-1995

In addition to harvest of scheduled units, described in Section 4.1.1, some trees adjacent to the three Chaplain Sale (1991) units were salvaged after being blown down by a major storm in January 1993. The affected areas were replanted with Douglas fir seedlings after harvest, and were added to the adjacent unit for future management. The green tree area of one unit was reduced by the same storm, but the downed trees were not salvaged to avoid damaging surviving trees. The affected area was replanted with Douglas fir seedlings, and will remain part of the GTA.

4.2 SNAG MANAGEMENT

4.2.1 Snag Inventory/Creation

The 1993 and 1994 Annual Reports described the problems that have slowed progress on performing inventories and snag creation as scheduled in the WHMP. 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. Our approach to snag management, described in the 1994 Annual Report, links snag inventorying with snag tree creation. Existing snag trees are sampled in harvest units as they are prepared for sale. Trees are selected prior to harvest to be made into snags post-harvest. Sufficient new snags are created post-harvest to meet the target density and size distribution prescribed by the WHMP. Similarly, existing snag trees are sampled and new ones created, as needed, in 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 can be reasonably well identified . Snag trees are also sampled and created, to meet the target, in units scheduled for harvest (commercial thinning or final harvest) 20 or more years in the future; provided that the boundaries of these units can be reasonably well identified and there is reasonable access.

In the 1994 Annual Report, areas that were targeted for snag management over the next four years (through 1998) were identified. As shown in Figure 5, we have made good progress toward meeting this goal.

For units to be harvested within 20 years, snag requirements will be satisfied promptly after harvest. For buffer zones, wetlands, OMA's and PMF's, and units to be harvested more than 20 years in the future, the target number of snags will be created as soon as boundaries are identified. Snag inventory/creation has been completed in all of the units that have had final harvest, plus all of the units scheduled for final harvest in 2015, except for one unit that may be commercially thinned. These units now have the target density and size distribution prescribed by the WHMP (Figure 5). Snag inventory has been completed for other units as well. Snags have

been created in several stream buffer zones, OMA's, PMF's that have not been inventoried, and it is not known whether the target has been achieved. These units will be given high priority for inventory in the future, and additional snags created, if needed, to reach the target density.

4.3 COARSE WOODY DEBRIS MANAGEMENT

The WHMP called for retaining logs of decay class 3, 4, and 5, and marking logs with unique habitat value for protection during harvest. Monitoring is to be done at the time of harvest to ensure that sufficient CWD (including selected logs) remain post-harvest. Fresh (decay class 1-2) CWD is supposed to be provided while equipment is still present on the units in case more is needed.

Pre- and post-harvest CWD inventories were done on final harvest units of the Chaplain (1991) and Horseshoe (1992) timber sales using a line intercept sampling method. Pre-harvest inventories were done on Diversion sale units using circular plots as described by the WHMP. Post-harvest inventories also were done on the Chaplain and Horseshoe units using circular plots. The variables in the WHMP method - density of logs by diameter, length, species, decay class, and wildlife use - were recorded in all of these surveys. Results obtained by the two methods are compared in Appendix A, Table A-1.

Prior to harvest most CWD is in decay classes 3, 4 and 5 and includes some large old-growth logs from the previous rotation. The post-harvest inventories have shown an increase in the number of logs of all decay classes, with some exceptions, but a decrease in average length and diameter. The increase in CWD density can be attributed to felling snag trees, breakage, and cull logs left after harvest. The decrease in length and diameter may result from breakage of pre-harvest CWD, and the input of tree tops and suppressed trees, which tend to be much smaller than the pre-harvest CWD. Most of the class 1 and 2 logs picked up in the post-harvest inventories have been smaller than the target size (16 inches diameter, 20 feet long).

These inventories were done on randomly-selected transects, with no attempt to re-sample the same plots or transects. At a meeting on CWD in December 1995, agency representatives stated that inventory results were not adequate to help investigate the potential impacts of timber harvest on CWD, especially in the decay classes 3, 4 and 5. An on-site inspection of the Diversion sale units did not show many such logs with evidence of damage. The agency representatives requested that we develop a quantitative monitoring procedure that involved re-visiting the same plot and/or logs before and after harvest. Since the meeting, we have discussed the feasibility of marking and monitoring specific logs, and will implement a procedure in the upcoming Tiki Sale.

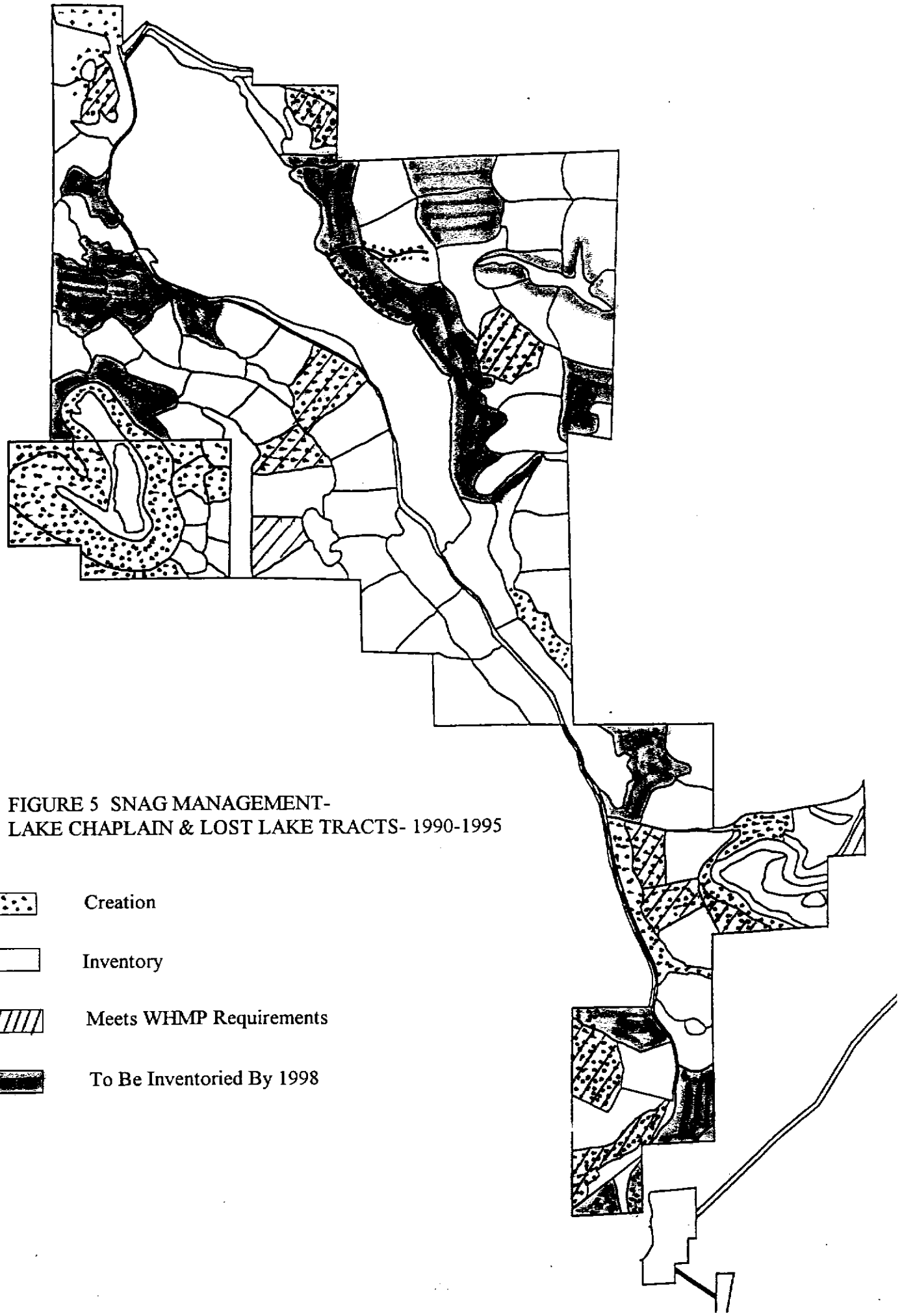


FIGURE 5 SNAG MANAGEMENT-
LAKE CHAPLAIN & LOST LAKE TRACTS- 1990-1995

Attempts have been made on all three timber sales completed to date to retain CWD in classes 3, 4 and 5. For the Chaplain sale, which involved cable-yarding, contract specifications called for leaving and preserving old growth logs and stumps if possible. Horseshoe and Diversion sales, which used ground based logging contract specs, called for preserving and protecting by avoiding running equipment over them, and not piling debris on them. No provisions for retaining specific logs, or providing supplemental logs, were made for this sale because mutually acceptable inventory procedures, target sizes, and quantities of CWD had not yet been developed. Pending resolution of this issue, an interim measure for CWD retention was employed on the final harvest unit of the Horseshoe sale, in which tops of snag trees and brush piles were left in the units in an attempt to satisfy the requirement (see Appendix A; Tables A-1 & A-5). Similar contract language was used to help preserve CWD in higher decay classes. Shovel-logging specifications in the Horseshoe and Diversion Sale contracts stated that operators should avoid disturbing or piling slash on old growth logs and stumps. Some old growth logs were retained by designating the surrounding trees as future snag trees. The City's forester met with the contractors prior to beginning work and generally daily during the harvest to review and reinforce our expectations. Whenever a problem or mistake was detected, the contractors were promptly notified so that it could be rectified. In this way, mistakes were rarely repeated, and the contractors learned to modify their practices to meet our expectations. In one case, for example, the contractor removed some old growth cedar logs from the unit, intending to haul them away. When reminded of the contract requirements he left the logs behind.

A CWD management procedure was worked out by the co-licensees in early 1995 and presented to the agency reviewers at the March 1995 Annual Meeting. This procedure and the ensuing discussion with the agency reviewers is described in detail in Section 3.3 of this Annual Report, and copies of the procedure and related correspondence are located in Appendix A, Exhibits 1 and 2. The CWD procedure was implemented on the two units of the Diversion (1993) Sale, which was harvested in 1995. Pre-harvest CWD inventories were sampled using the circular plot method (see Appendix A, Table A-1), but no post-harvest sampling was done. Instead, as prescribed in the CWD procedure, (and discussed in more detail in Section 3.3), a complete post-harvest inventory of all of the designated CWD trees was done to ensure compliance.

4.4 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 consultant reports attached to the 1991 Annual Report. 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.

4.4.1 North End of Lake Chaplain and West Side of Chaplain Marsh

The required plantings have been monitored at least twice during the growing season at the north end of the lake, and adjacent to Chaplain Marsh since planting (in 1992 and 1993, respectively). Survival of shrubs adjacent to the marsh has been close to 100 percent with generally good growth. Tree saplings at the north end of the lake have also had very good growth, with overall mortality under 75 percent.

4.4.2 Powerhouse

Shrub and tree plantings have been monitored at least twice each growing season since planting in 1993. Survival of tree species has been greater than 90 percent, and growth has been variable: crabapples have had fair to excellent growth, and Oregon ash and hawthorn have had poor to good growth.

4.4.3 Pipeline ROW

Seeding and fertilizing of the pipeline right-of-way has been qualitatively evaluated each year. Sparse growth prior to 1994 made it unnecessary to sample percent grass/forb ground cover, but there was improved coverage in 1995. Quantitative measurements will be made in 1996.

Trees and shrubs were not planted on the power pipeline right-of-way, based on the consultant's recommendation in 1991 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 was seeded beginning in 1994.

4.4.4 Spada Lake Drawdown Zone

Test plots of five wetland emergent species were planted in October/November 1994 and monitored in 1995. Several species, reported in Section 3.4, survived well during the first growing season.

4.5 NEST STRUCTURES

All of the nest structures that were required by the WHMP have been installed and monitored annually thereafter. In 1990, two floating nest platforms were placed in Lost Lake. The required two duck nest boxes were installed at Lost Lake in 1990, and six additional nest boxes were installed in Chaplain Marsh in 1993. 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. We placed six nest boxes in Chaplain Marsh in 1993. In 1995 we placed four additional nest boxes at Lost Lake and three more at Chaplain Marsh. The nest structures have been monitored every year since installation. About 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 one in 1995. A nest was partially constructed at the platform near the South Fork at Spada Lake during 1994 and in 1995 osprey completed a nest and were observed setting prior to nest abandonment in June. The floating platforms have been used for resting and feeding by waterfowl and otters, but no breeding attempts have been noted.

4.6 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.

Forage availability was sampled from 1991 and 1992 on 5 square meter 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 line-intercept measurements along fifteen 100-meter transects. 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 adopted in 1994.

No monitoring was performed in 1995 because a mutually satisfactory inventory method has not been developed. We are in the process of developing a Standard Operating Procedure (SOP) for deer forage monitoring, which will include improvements in the sampling method for understory vegetation, and estimating deer utilization of available forage.

4.7 FOREST LAND CHANGES SURROUNDING LAKE CHAPLAIN TRACT

Timber harvest has occurred on some of the state forest and private lands adjacent to the Lake Chaplain Tract. The forest stands at Lake Chaplain, most of which are now over 60 years since origin, have become increasingly isolated from other such stands in the vicinity, and the trend is expected to continue. Figure 6 shows harvest activity over the past five years on the Lake Chaplain Tract and surrounding areas. Although the WHMP does not address how its prescriptions relate to adjacent land use changes, we have tried to respond appropriately by re-configuring our final harvest units to avoid placing our final harvest units next to adjacent owners' final harvest units.

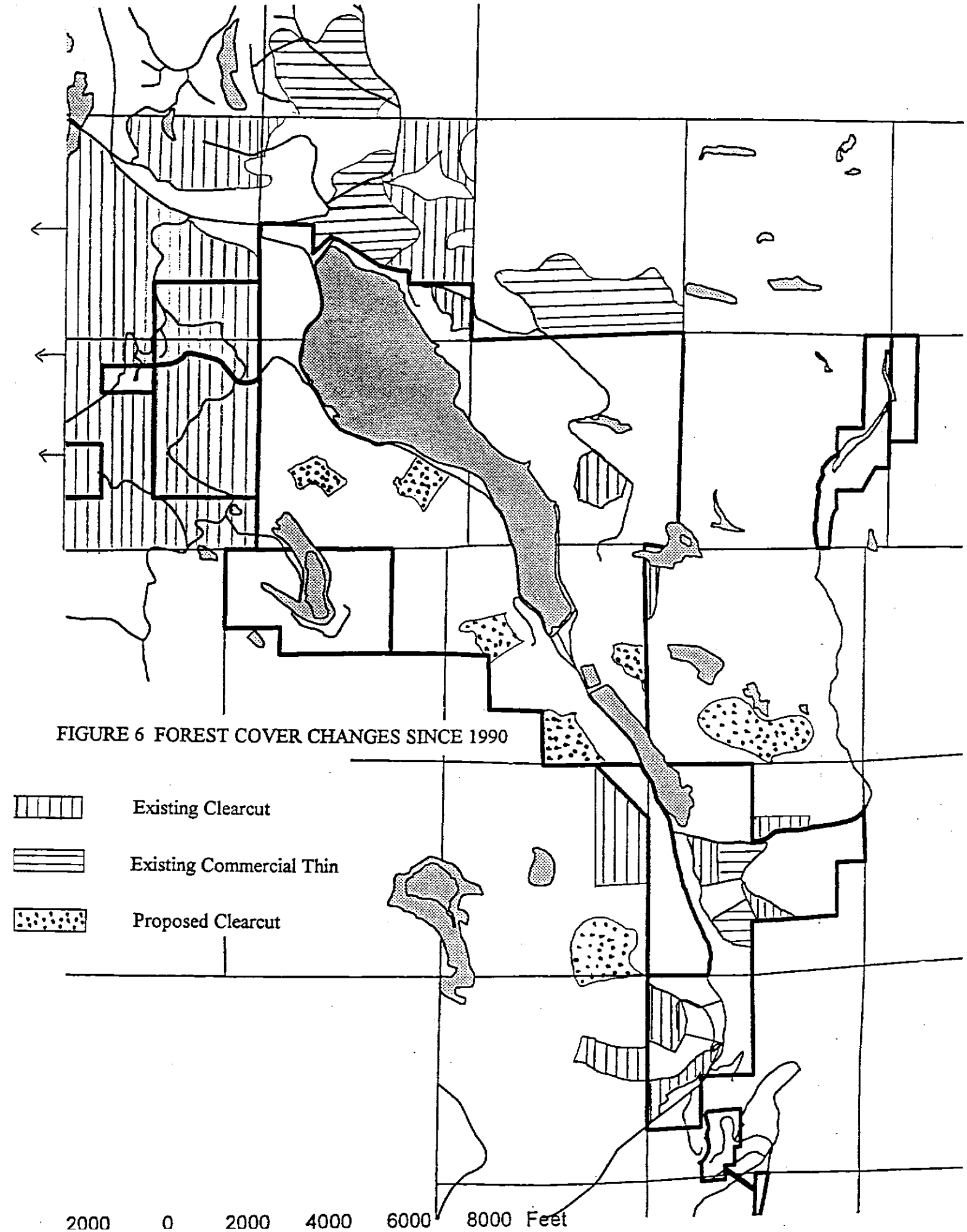


FIGURE 6 FOREST COVER CHANGES SINCE 1990

5.0 WORK PLANNED FOR 1996

5.1 FOREST VEGETATION MANAGEMENT

5.1.1 Harvest Units

Four final harvest units in the Tiki Sale will be laid out and sold on the west side of Lake Chaplain. A fifth unit on the east side of the lake will be included in the sale. Additional road layout work will be done to reach all of the final harvest units on the west side of the lake.

The Diversion Sale units will be replanted in March 1996 with approximately 300 trees per acre. In Unit 1, Douglas fir will be planted. In Unit 2, several moist pockets will be replanted with a 50:50 mix of Douglas fir and western red cedar.

5.1.2 Lake Chaplain Plantation Monitoring

During 1996 or 1997, plots will be put in the Chaplain Sale units(1991) to check whether hardwood density is sufficient. The plantings of Douglas fir appear to be in good condition, averaging about three feet of growth per year. Some of the western red cedar seedlings have been browsed by deer, but the remainder appear to be growing well.

5.1.3 Buffer Zone and Green Tree Area Management

Buffer zones (BZ's) and green tree areas (GTA's) that have been established as part of past timber sale layout on the Lake Chaplain Tract will be monitored during 1996. We also plan to develop management plans for GTA's, which may involve snag creation and light thinning. The management objective for GTA's is to preserve trees for future snag creation needs of the associated harvest unit. In some cases a light thinning, interplanting, or other measures may improve growth rates of the trees that are retained in the GTA, as well as other habitat values. The feasibility of making such improvements on established GTA's will be explored during 1996.

5.2 SNAG MANAGEMENT

Inventory of existing natural snags in the Lake Chaplain Tract will continue in 1996 in conjunction with planning harvest units, and in OMA's and PMF's. Inventory areas for 1996 will be among those shown in Figure 5. Snag creation on units inventoried in 1995 will continue, so that these will have the target density and size distribution stated in the WHMP by the end of 1996. The long-term monitoring procedure to evaluate wildlife use and evidence of decay in snag trees will be developed, and will be used on a subset of the created snags.

5.3 COARSE WOODY DEBRIS MANAGEMENT

In 1996 we will continue using the CWD Procedure (Appendix A, Exhibit 1) in setting up harvest units of the Tiki Sale. A procedure for evaluating the impacts of harvest on logs in decay classes 3, 4 and 5 will be developed for use in this sale. The details of a long-term monitoring procedure will be completed and logs on the Diversion Sale units (harvested in 1995) will be marked for long-term monitoring.

5.4 REVEGETATION

The areas that were previously planted (powerhouse site, Chaplain Marsh, north end of Lake Chaplain, Spada Lake drawdown zone, and pipeline right-of-way) will be monitored. Shrubs and trees will be replaced if there is significant mortality. The pipeline right-of-way will be seeded and fertilized prior to June or after rainy weather begins in Fall 1996. 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.

An access road to allow for more direct and expeditious examination of the pipeline is being designed. This will likely include several stream crossings which may be culverts or bridges, but in any case ORV access through streams will be prevented.

5.5 NEST STRUCTURES

Floating nest platforms in Lake Chaplain and Lost Lake will be relocated to Spada Lake. 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.

Nest boxes and platforms and any new osprey nests at any of the lakes will be monitored following the procedure in the 1991 Annual Report.

5.6 DEER FORAGE MONITORING

As stated in Section 4.6, we are working to improve our sampling procedure for understory vegetation, which will be employed during the summer of 1996. In addition, we will refine methods for estimating utilization of forage by deer during 1996.

5.7 WHMP SUPPLEMENT FOR SPADA LAKE

District staff will seek review comments from the agencies, District's commissioners and the City on the draft Supplemental Plan for Spada Lake.

5.8 BIOSOLIDS APPLICATION AT LAKE CHAPLAIN

The City will apply biosolids obtained from its sewage treatment plant in Everett to the two commercially thinned stands of the Horseshoe sale during the summer of 1996 (Figure 4). The stands were thinned in 1993 with the objective of improving the availability of forage (understory plant species) and to hasten the growth of retained trees into large saw timber coniferous forest.

5.8.1 Silvicultural Prescription

The stands will be fertilized with agronomic rates (approximately 90 pounds available nitrogen per acre or up to 23 dry tons of Everett biosolids) of organic nitrogen in the form of class A biosolids. The objective of this treatment will be to increase deer forage in the understory, increase the protein content of the deer forage in the understory, accelerate stand stratification and attainment of multistoried canopy, and accelerate the growth rates of the dominant and codominant trees on the site. No sludge or other waste products will be used in this fertilization treatment.

Biosolids will be applied in semi-solid form (> 25% solids) using a side discharge spreader. The material will be transported to the site in 30 yard long haul trailers. Biosolids will be end dumped from the trailers onto portable landing/transfer bays. The application vehicle will be a modified Rottne forwarder fitted with a side discharge spreader box and clam shell type shovel. The Rottne is designed to maneuver along skid trails without the benefit of developed roads. The Rottne will travel along skid trails created during the recent thinning operation. The side discharge spreader will throw the semi-solid material into the stand as the forwarder travels along the skid trail.

5.8.2 Prognosis

Biosolids fertilization will increase the diameter and height growth of the overstory trees. Stand differentiation and stratification will be accelerated. Suppressed trees are likely to die and become snags at an accelerated rate. An initial pulse of understory growth is expected, but the overstory canopy will close rapidly and understory growth rates will begin to decline in approximately 5 years.

5.8.3 Future Treatments

Understory composition, health, and density should be monitored annually. Overstory tree growth and stand stratification should be monitored every 5 years. It is anticipated that canopy closure will occur within 5 years. A commercial thinning may be necessary at this time to maintain or increase understory growth.

5.8.4 Monitoring Program

The geological setting of the site allows Chaplain Creek to be used to detect potential contaminants of surface and shallow ground water. The remoteness of the site and the limited potential for movement of contaminants to aquifers below those supporting Chaplain Creek makes sampling of deep groundwater unnecessary. Two sites have been chosen for monitoring; Chaplain Creek at the northwest corner of the site (control station), and Chaplain Creek below the southeast corner of the site.

Performance monitoring of the treatment will be necessary to determine the effectiveness of the fertilization treatment and to prescribe any additional treatments that may be necessary. Overstory diameter growth and stand diameter distribution will be monitored to ensure that treatment is accomplishing the stand development objectives. Understory quality and quantity will be monitored to determine if forage production targets are being met.

6.0 SCHEDULE OF ACTIVITIES FOR 1996

Activities scheduled for 1996 are reported, by management unit, in Table 8.

Table 8. Habitat Management Activity Schedule for 1996

Major Activities	Location	Quantity
Final Harvest		
Layout and Sale	Tiki Sale; see Fig.2	5 units (approx. 90 ac.)
Reforestation	Diversion Sale units, see Fig. 2	2 units (35 ac.)
Road Layout	West side of L. Chaplain, see Fig. 2	Approx. 16,000 ft.
Snag Creation	Units inventoried in 1995 that do not yet meet WHMP targets (see Fig. 3)	6 units (approx. 90 snags)
Snag Inventory	Areas shown in Fig. 5	TBD
Revegetation		
Grass seeding/fertilizer	Pipeline ROW	Entire length, per fertilizer restrictions
Revegetation Site Monitoring/Maintenance	West side, Chaplain Marsh North end, L.Chaplain Powerhouse site Spada L. drawdown zone Pipeline ROW	Monitoring of all planted/seeded areas. Maintenance as needed: Weeding, brush thinning, etc.
Monitoring		
Deer Forage	Chaplain Sale and Horseshoe Sale units	2 FH and 2 CT units
Coarse Woody Debris	Diversion Sale units	2 units (35 ac.)
Created Snag Trees	TBD	TBD
Nesting Structures	Lost Lake, Spada Lake, and L. Chaplain	Move floating platforms to Spada L. Monitor all structures
GTA and BZ Management	All established units	Monitor and develop long-term management plans
Spada Lake Supplemental Plan	Spada Lake Tract	Complete review of draft plan by agencies and co-licensees' management

7.0 AGENCY COORDINATION

The co-licenses submitted a draft version of this report to the following reviewing agencies, U. S. Fish and Wildlife Service, Washington Department of Fish and Wildlife, Tulalip Tribes. A copy was also sent to the Department of Natural Resources. A meeting was held on March 27, 1996, to discuss progress to date and future plans for WHMP activities.

The issues surrounding management of coarse woody debris on harvest units were resolved with the co-licensees' submittal of procedures and data (Appendix A) and the ensuing discussion at the annual meeting (see meeting minutes in Appendix B).

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.

APPENDIX A - COARSE WOODY DEBRIS

Exhibit 1. General Procedures for Managing Course Woody Debris on Harvest Units

Exhibit 2. Correspondence

Exhibit 3. Meeting Minutes

Exhibit 4. Data

Table A-1 CWD Surveys on Harvest Units
Unit 1
- Figure A-1 Map of Designated CWD on Diversion Dam Unit 1
- Table A-2.1 CWD Designated Trees on Diversion Sale in Unit 1
- Table A-3.1 CWD Compliance on Diversion Sale in Unit 1
- Table A-4.1 Volume of Designated CWD in Unit 1

Unit 2
- Figure A-2 Map of Designated CWD on Diversion Dam Unit 2
- Table A-2.2 CWD Designated Trees on Diversion Sale in Unit 2
- Table A-3.2 CWD Compliance on Diversion Sale in Unit 2
- Table A-4.2 Volume of Designated CWD in Unit 2

Table A-5 CWD Inputs from Created Snag Tree Tops in Unit 2

Exhibit 1.

General Procedures for Managing Course 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 survey of logs will be performed to identify and mark the logs on each unit that meet the minimum criteria for Class 1 and 2 logs. Diameter, length, species, decay class and evidence of wildlife use will be recorded. The system used to identify decay classes of logs (Maser et al., 1979) will be field-reviewed. A subset of Class 3, 4 and 5 logs will be measured, marked, and mapped to assist in assessing their condition post-harvest and to monitor them over the long term.

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 survey will be performed to ensure compliance with the target number and sizes of Class 1 and 2 logs, per this Procedure. A subset of the Class 1 and 2 logs will be marked and mapped for long-term monitoring. Previously-marked Class 3, 4 and 5 logs will be revisited and re-measured, and their condition will be evaluated as follows: Loss of total length will be calculated as a percent of the original length, damage to the log due to crushing will be measured and the probable cause of damage identified, and any relocation of the log will be noted. Photo-documentation will be used to assist comparisons of pre- and post-harvest condition of these logs. The effects on site conditions of leaving this CWD will be evaluated, including soil disturbance, the amount and distribution of slash, 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.
7. CWD on harvest units will be re-sampled at 20-year intervals, per the WHMP, to establish whether the target density and sizes are being maintained over time.
8. Monitoring of the marked subsets of CWD logs will be conducted per the WHMP.

Exhibit 2.

Correspondence

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 usé 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

Bernice Tannenbaum
Environmental Coordinator

Don Farwell

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

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

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

July 21, 1995
PUD 20234

Julie Stofel
Tulalip Tribes
11746 20th Avenue NE
Seattle, Washington 98125

Dear Julie:

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

This letter is intended to follow up on our conversation yesterday regarding some of the issues in our 1994 Annual Report that you previously commented upon in your letter dated March 28, 1995. We previously responded to some of the issues in our follow-up letter dated May 25, 1995, but agreed yesterday to clarify the sizes of snag trees that we have created, and the methods we are using to sample deer forage. In addition, we also discussed achieving closure on the issue of coarse woody debris on harvest units.

Snag Trees. With regard to created snag trees, the data presented in the 1994 Annual Report includes only those snags created in 1994, and does not represent all of the snags created since implementation of the WHMP began. Your analysis of the diameters of snag trees is based on the 1994 data, and we agree that these results do not conform to the targets stated in the WHMP. However, we have been creating snag trees at Lost Lake and Lake Chaplain since 1990, and the size distribution of all of the snag trees created on harvest units does comply with the targets listed in the WHMP. We are working on compiling our data on created snags, and will send you the results with a comparison of the WHMP's targets.

Forage Assessment Methods. Our forage surveys consist of two separate activities. We sample forage availability using a quantitative method, and evaluate browse intensity with a qualitative visual assessment method. We have used both a line-intercept and a plot-based method to sample forage availability and are in the process of determining which method will provide the most accurate data. The evaluation method for browse intensity is also being fine-tuned, as I discussed in our May 25th letter, but we believe it is the most appropriate method for this project.

Coarse Woody Debris. You have received a copy of our General Procedures for Managing CWD on Harvest Units, but have not commented on it yet. We recently selected and marked CWD trees on the two units of the City's current timber sale (to be harvested in the near future), according to these procedures, and believe that the results will comply with the WHMP prescriptions. The CWD trees are well-distributed through these units, and log diameters average 21.5 inches and 22.2 inches.

At this point we request your comments and concurrence on our procedures, particularly with regard to CWD management, in order to resolve the issues that were raised at our annual meeting and in subsequent correspondence. Achieving closure on these issues is particularly important in our review by the Federal Energy Regulatory Commission. We will be glad to work with you on resolving any outstanding concerns, for example, by providing additional data, discussions, or on-site inspections.

We prefer written comments for the benefit of our FERC review process, but of course always invite other comments as well.

Sincerely,

Michael J. Schutt
for Bernice Tannenbaum

Bernice Tannenbaum
Environmental Coordinator

BT:dkw

cc: G. Engman
G. Ging
R. Young

bcc: K. Bedrossian
D. Farwell, City of Everett
B. Meaker
M. Schutt
B. Tannenbaum

Bernice Tannenbaum
Environmental Coordinator
Snohomish County P.U.D
P.O. Box 1107
Everett, WA. 98206-1107

Julie Stofel
Tulalip Tribes
(Pentec Environmental)
11746 20th Ave. NE
Seattle, WA. 98125

Dear Bernice:

July 27, 1995

Thank you for your letter of July 21 clarifying some of the issues we discussed at our meeting in the Spada Lake watershed on July 11. I feel more confident in the snag management program since our conversation, and I look forward to seeing the full data and analysis of your snag management/snag creation program when it is compiled.

I was also pleased with our discussion of the deer forage assessment methods as I had misunderstood some of the verbal comments made during the March 9 meeting. My main concern was over replacing line-intercept cover estimation with plot based cover estimation, because I feel that the latter method is more subject to observer bias and inter-observer variability than the former. However, you explained that your dissatisfaction with the line-intercept results was based on the fact that, at the time, only the preferred browse species were being tallied so that the method gave the impression of underestimating the total cover. Your May 25 revised Annual Report (p. 10) makes this distinction clear by adding the estimated total cover (75-80%) as well as total cover of preferred browse species (3% cover before harvest, 20% cover after harvest). I think that this is an appropriate way of handling the presentation of the data.

As we discussed, assessing browse intensity is always difficult: quantitative measures are extremely time-consuming and inappropriate for an extensive monitoring program such as yours, yet qualitative measures have not been developed that are consistent and easily communicated to a reader not familiar with the site. Your simple description of apparent changes in browse intensity, and the relationship of browse intensity to game trails and skid roads, seems to be quite appropriate for purposes of the monitoring program and for communicating your professional opinions about browse intensity. However, if you, Karen Bedrossian and Mike Schutt feel that you have found or developed a good, repeatable, non-biased, rapid qualitative assessment procedure, please let me know!

I have read Appendix A carefully to review the procedures for ensuring adequate coarse woody debris on harvest units. It seems to me that the primary stumbling block to seeing compliance with the Wildlife Habitat Management Plan is the definition of the word "log" and the interpretation of "minimum acceptable diameter" and "preferred diameter".

In order to try to put to rest some of the arguments over the number of green logs left on site following harvest, we should probably talk about a goal of an average total length of 160 ft of downed wood per acre, rather than a goal of an average total number of 8 "logs" per acre. This

will communicate what is actually being left on the ground without creating needless conflict between a wildlife biologist's definition of a log (the bole of a tree lying on the ground) and a forester's definition of a log (a length of tree bole measuring 20 ft long, that will fit on a logging truck). I am sure that neither Gwill Ging nor I will ever accept that a "log" is defined as a 20 foot length of bole, yet I'm sure we can agree that eight 20 foot logs contain approximately the same volume of wood as two 80 foot logs of similar diameter (disregarding the effects of taper).

I think that there are several misunderstandings regarding the target and minimum sizes of coarse woody debris. In particular, the minimum acceptable size is defined as 16 inches. However, how that minimum is defined is unclear. In the General Procedure described in Appendix A of the Revised 1994 Annual Progress Report, the minimum acceptable size is defined as 16" at the largest end.

> "Diameters of ... logs will average 20 inches (large end) ... **minimum (acceptable) diameter of 16 inches (large end)...**" page 1: 4/17/95

> "If available, trees that will produce three or four logs **greater than or equal to 16 inches in diameter, large end** [sic] will be selected." page 2: 4/14/95

Yet in the letter from Don Farwell and Bernice Tannenbaum to Gwill Ging (4/21/95), the overall minimum size is described as 16" diameter. This is, by definition, the diameter at the smallest end.

> "The general procedure states that logs will average 20 inches in diameter, and that the **minimum acceptable size will be 16 inches.**"

In the first case the *average* diameter of the log is less than 16 inches. In the second case the average diameter of the log would be greater than 16 inches.

You go on to say that the justification for the minimum acceptable size is based on results of research on decay rates of CWD in the Pacific Northwest, citing Spies et al. 1988 "Coarse woody debris in Douglas-fir forests of western Oregon and Washington", Ecology 69:1689-1702.

> "These results indicate that green logs **greater than or equal to 16 inches in 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."

If the interpretation of Appendix A is used, then it appears that the intention of providing CWD over the 60 year rotation may not be met, at least according to the research results you cited in your letter to Mr. Ging.

To further complicate matters, my reading of Spies et al. 1988 does not lead me to reach any conclusion about the minimum acceptable size of CWD left on site following harvest. I would be eager to hear your interpretation if it is convenient.

It would simplify everyone's interpretation of intent and compliance if a single definition were established and adhered to. I suggest that the easiest method would be to define **an overall minimum acceptable diameter of 16 inches** (if this is what the best available information suggests) and a **target total volume or a target total length** of logs that meet this minimum. In that case there would be no misinterpretation of log diameter or length, and the CWD distribution would correspond with the best available information.

This discussion may seem unnecessary and merely semantic. However, the WHMP is a legal document. Representatives from the agencies and tribes are required to review and approve this document and compliance with it. It is very difficult to determine compliance when the standards are subject to different interpretations. As I said in our discussion on July 11, I don't feel that it's appropriate or relevant for me to make particular suggestions about the standards set forth in the WHMP several years before I became involved in the project. I see my role as one of examining the existing standards and the data produced in order to evaluate whether the standards appear to be met. That is why I feel it is especially important for P.U.D. and the City of Everett to clearly define the standards and to provide the most complete data possible.

On the whole, I feel that the General Procedure described in Appendix A is a good procedure that will enable initial CWD to be inventoried, and it appears to enable adequate CWD to be created during harvest. The plan to monitor logs over time will provide very valuable information over the life of the WHMP.

Sincerely,

Julie Stofel
Wildlife Biologist
Tulalip Tribes, Pentec Environmental

FISH AND WILDLIFE SERVICE
North Pacific Coast Ecoregion
Western Washington Office
3704 Griffin Lane SE, Suite 102
Olympia, Washington 98501-2192
(360) 753-9440 FAX: (360) 753-9008

August 21, 1995

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

Re: Jackson Hydroelectric Project/Wildlife Habitat Management Plan
FERC No. 2157

Dear Ms Cashell:

The U.S. Fish and Wildlife Service (Service) wishes to clarify its position with regard to the coarse woody debris (CWD) objectives, as described in the Wildlife Habitat Management Plan (WHMP). My staff has been in contact with Ms. Rebecca Martin of your staff, and with representatives of the Snohomish County Public Utilities District No. 1, and the City of Everett, the joint licensees for this Jackson Hydroelectric Project.

The Service does not concur with the licensees' proposed modification to the WHMP regarding the criteria for selecting CWD. The WHMP states that "Logs with a minimum diameter of 24 inches and a minimum length of 20 feet are preferred." Flexibility was included in the WHMP because of the uncertainty over the availability of large trees that would meet a specified criteria if made too rigid. Nonetheless, the intent was to use trees that would produce logs with at least a minimum diameter of 24 inches, if available. The licensees have proposed that the criteria be modified to target a 20-inch diameter, on the average. This change would represent at least a 44% reduction in the size of the log when measured by volume, and therefore, would provide significantly less habitat for wildlife species that require decaying logs. The Service believes the existing criteria in the WHMP is still appropriate and should not be weakened.

The Service also requests that the period for evaluating the WHMP be extended for two years to adjust for the delay in the implementation of the WHMP. The extension is needed to insure that the anticipated five year period of evaluation, including annual reports and meetings, occurs and that any outstanding issues can be addressed in the proper forum.

If you have further questions, please contact Mr. Gwill Ging at (360) 753-6041 or the letterhead phone/address.

Sincerely,

John Englbring

for David C. Frederick
Supervisor

gg/jmc
FERC 2157/Jackson, Henry M.
c: FERC, Portland
WDFW, Mill Creek (Engman)
Tulalip Tribe, Marysville, (Stofel)
Snohomish PUD - No.1, Everett (Tannenbaum)
City of Everett, (Farwell)

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1

EVERETT

Providers of quality water, power and service at a competitive price that customers value.

September 28, 1995
PUD 20267

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

Re: Jackson Hydroelectric Project (FERC No. 2157) License Article 53 - Wildlife Habitat Management Plan

Dear Ms. Cashell:

On August 21, 1995 the U.S. Fish and Wildlife Service (Service) wrote to the Federal Energy Regulatory Commission (FERC) to clarify its position regarding coarse woody debris (CWD) objectives, as described in the Wildlife Habitat Management Plan (WHMP). This is the reply of Snohomish County Public Utilities District No. 1, and City of Everett, Washington, the joint licensees for the Henry M. Jackson Hydroelectric Project.

It is the position of the licensees that our procedures for selecting CWD are in compliance with the WHMP. No CWD modifications of the WHMP have been proposed by the licensees. Our previous efforts to achieve agreement on the CWD issue via the annual meeting, annual report and additional correspondence have thus far been unsuccessful. We will continue working with the Service to resolve issues surrounding the coarse woody debris prescription and ongoing implementation.

We are initiating such efforts with the Service. A progress report will be made to the FERC on the issue by December 1, 1995.

Very truly yours,

N. Craig Thompson
Assistant General Manager
PUD Water Resource Division

Clair Olivers
Everett Public Works Director

cc: FERC, Portland
WDFW (Engman)
Tulalip Tribe (Stofel)
Snohomish PUD (Meaker, Tannenbaum)
USFWS (Frederick)
Everett (Farwell, Lowell, Metzgar, Miller)

RM:LM466LTR (PC:9/27/95)

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

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1

EVERETT

Providers of quality water, power and service at a competitive price that customers value.

November 21, 1995 PUD #20286

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

Re: Jackson Project (FERC No. 2157) License Article 53
Wildlife Habitat Management Plan
Progress Report - Coarse Woody Debris

Dear Secretary Cashell:

Our letter of September 28, 1995 to the Federal Energy Regulatory Commission (FERC) specified that a progress report on coarse woody debris would be made to the FERC on the subject by December 1, 1995. In reply (2157-099) dated October 17, 1995 our proposal was accepted by the FERC. Additionally, the licensees were encouraged to include the Tulalip Tribes and Washington Department of Fish and Wildlife (besides the U.S. Fish and Wildlife Service) in the resolution process because of their similar concerns.

A field meeting was scheduled for November 16, 1995 with those three agencies. The agenda was to include an on-site inspection of harvested units at the City's Lake Chaplain Tract. Regrettably, because of the Federal budget problems, the Federal agency representative had been furloughed and was unable to attend. After conferral with the other two resource agency representatives it was mutually agreed that the field trip and meeting should be postponed until a later date when all agencies could be present. That date has yet to be determined. Therefore, the licensees and resources agencies regret that there is no progress to report at this time.

Upon resolution of the Federal budget impasse we will reschedule the field trip and meeting with the agencies. When that date has been set with the agencies we will notify the FERC with an addendum to this report. Further, we propose a progress reporting date of 30 days after that meeting date.

Very truly yours,

N. Craig Thompson
Assistant General Manager
PUD Water Resource Division

Clair Olivers
Everett Public Works Director

cc: FERC, Portland
USFWS (Frederick)
Snohomish PUD (Meaker, Tannenbaum)
Everett (Farwell, Lowell, Metzgar, Miller)
WDFW (Engman)
Tualip Tribe (Stofel)

CITY OF EVERETT • 3200 Cedar Street • Everett, WA 98201 • (206) 259-8800 • Fax (206) 259-8882
PUD • 2320 California Street • Everett, WA • 98201 • (206) 258-8211 • Fax (206) 258-8222

RECEIVED

JAN 0 8 1996

MANAGER'S OFFICE

FEDERAL ENERGY REGULATORY COMMISSION

WASHINGTON, D. C. 20426

0 3 JAN 1996

Project No. 2157--Washington
Henry M. Jackson Project
P.U.D. No. 1 of Snohomish County

RECEIVED

JAN 1 0 1996

WATER DEPT.

Mr. Richard Johnson
P.U.D. No. 1 of Snohomish County
P.O. Box 1107
2320 California Avenue
Everett, WA 98206

Dear Mr. Johnson:

This is in reference to your letter dated November 21, 1995, stating you have been unable to meet with the resource agencies regarding the Revised Wildlife Habitat Management Plan issued May 19, 1989 because of the government furloughs. You propose to file a progress report within 30 days of meeting with the agencies.

Thank you for keeping us informed of your attempts to consult with the agencies. If you have any questions concerning this matter, please call Ms. Rebecca Martin at (202) 219-2650.

Sincerely,

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

RECEIVED		
JACKSON PROJECT		
1-18-96		
	Orig.	Copy
C. Thompson		
B. Hooker		X
K. Bedrossian		X
E. Tannenbaum		X
D. Miles		
N. Johnson		
M. Schuh		X
M. Schuh		X
B. Maxwell		
PNP 2-14-15-7	X	
PUD 20207		-

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1

EVERETT

Providers of quality water, power and service at a competitive price that customers value.

January 11, 1996 PUD 20303

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

Re: Jackson Project (FERC No. 2157)
License Article 53 - Wildlife Habitat Management Plan
Progress Report No. 2 - Coarse Woody Debris

Dear Secretary Cashell:

In our first progress report (dated November 21, 1995) we stated that we would notify the Federal Energy Regulatory Commission (FERC) with an addendum to that report when a meeting had been set with the agencies. Further, we would submit to the FERC a progress report within 30 days after that meeting (which occurred on December 13, 1995). This letter fulfills those commitments.

Our letter of November 21, 1995 to the FERC reported a delay in a scheduled field trip and meeting with the agencies (U.S. Fish and Wildlife Service and Washington Department of Fish and Wildlife) and the Tulalip Tribes. Due to Federal Government furloughs the meeting had to be re-scheduled and was held on December 13, 1995 with representatives of those three entities. The agenda included an on-site inspection of harvested units at the City's Lake Chaplain Tract and an office meeting. Representatives from the two agencies and tribal governmental were in attendance. As a result of the field trip and meeting they requested additional inventory information from previously harvested units and clarification of licensees' proposal. The licensees will be providing that information and clarification to them. Additionally, notes of the meeting are being prepared as a partial basis for issue resolution.

Recognizing that Project 2157's FERC License Article 53 annual reporting process is pending in three months, it seems likely that will be the time needed to attempt closure on coarse woody debris among the parties that are involved. Accordingly, the licensees propose that the next coarse woody debris issue progress report will be within the pending annual report. This report would be due to the FERC on April 30, 1996, if our recent extension of time request (PUD 20289) should be granted.

Very truly yours,

N. Craig Thompson
Assistant General Manager
PUD Water Resource Division

Clair Olivers
City of Everett
Public Works Director

cc: FERC, Portland
USFWS (Frederick)
Snohomish PUD (Meaker, Tannenbaum)
Everett (Farwell, Lowell, Metzgar, Miller)
WDFW (Engman)
Tulalip Tribes (Stofel)

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

Exhibit 3.

Meeting Minutes

SUMMARY OF COARSE WOODY DEBRIS MEETING
DECEMBER 13, 1995

PRESIDING: Don Farwell, City of Everett

THOSE PRESENT: Julie Stofel, Tulalip Tribes
Gary Engman, Washington Department of Fish & Wildlife
Gwill Ging, U.S. Fish & Wildlife Service
Bernice Tannenbaum, Snohomish County PUD

I. Review of various interpretations of CWD requirements.

A brief history of course woody debris (CWD) issue was presented by Don Farwell. The key points were:

1. Co-licensees are not trying to change the WHMP's, CWD Prescription.

2. There has been different interpretations of the WHMP prescriptions for CWD on harvest units. The City "bought-off" on the number shown in the Economic Analysis- 2 logs per acre. The monitoring section of the WHMP states 6-10 logs per acre but it isn't clear which decay classes are meant by this. The habitat enhancement section of the WHMP says 6-10 logs from decay classes 1 or 2 will be left during harvest.

3. The City and PUD worked out the CWD Management Procedure to provide details on how the WHMP's prescriptions would be met, and presented it to the agencies at the March 1995 Annual Meeting. We implemented this proposal and will look at the results.

Gwill and Gary both stated that they believe the intent was to have 6-10 logs per acre.

Gwill and Gary also stated that the term "preferred" size of 24 inches (diameter) was used in the WHMP in case the size wasn't available, not when it was convenient.

Gwill then brought up the question of "what constitutes a piece". He agreed that a 20' log meets the criteria. He was concerned that if a 40' log was called 2 pieces and we selected logs less than 24 inches in diameter at the large end because larger ones aren't easily available, then we would be stretching the criteria.

II. Proposed Solution :

A discussion of how to quantify the comparison between the WHMP preferred size and the co-licensee's proposal followed. Don explained that in order to determine compliance, a method of measurement must be agreed upon. The WHMP and Economic Analysis both used 20 foot long pieces and 24" diameter at the large end.

Don presented a table showing the number of trees/logs, diameters, length and Scribner volumes of the logs actually left as CWD on the two harvest units (Diversion sale). Then he did a comparison of volumes in 20 foot logs with 24" (big end) diameters. Don's table showed log volumes resulting from CWD procedure implementation and the volumes that would be obtained with other interpretations of the WHMP prescriptions. The following table summarizes these comparisons between the recent CWD procedures and various interpretations of the WHMP

Interpretation	**Proposed Procedure Provides**
2 logs per acre*	331% of this interpretation
6 logs per acre*	110% of this interpretation
8 logs per acre*	83% of this interpretation
10 logs per acre*	66% of this interpretation

* Log considered to be 24" diameter at large end and 20' long.

This comparison only considers inputs from trees specifically designated as CWD sources. It does not include any additional CWD that is created during logging or snag creation, i.e. snag tree tops.

Spatial distribution and orientation of logs on harvest units was discussed. It was decided to fall the designated CWD trees towards roads or landings on ground that may be ground-based thinned in the future, and parallel to the contours on ground that will be cable logged.

Bernice pointed out that she believed there is some biological basis for the sizes of designated CWD in our proposal. She mentioned on-going research being done by Mark Harmon of OSU and Dave Hayes of WA. Dept of Fish & Wildlife. They have told us to consider decay rates of logs, the rotation length and how decayed we are willing to see it become by the end of the rotation. Based on their information, we came up with a minimum of 16" diameter. This size should persist in useful condition through a 60 year rotation.

The agency representatives then asked for a time to meet without the Co-licensees present so they could discuss our proposal.

After the break, Gwill asked how are we protecting existing Class 3, 4, & 5 CWD. Don explained that specific logs aren't marked for protection but we do look for opportunities to avoid working over areas with concentrations of CWD and we don't scarify or burn the logged units. Gwill and Gary asked for some assurance that class 3, 4, & 5 are being protected. Don asked for Bernice's impressions on the effects on classes 3, 4, & 5 on past harvest units. The Horseshoe Sale units logged with ground-based equipment had good results. The clearcut unit in this sale had brush piles left in it and although the unit didn't have a large number of old logs in it, the operators avoided them. The cable-yarded units were more difficult, a lot of the ground had logs dragged over it and old logs get beaten up. Don explained that between yarding roads out at the far end, there is some relatively undisturbed ground but closer to the landing there is more disturbance.

Don explained how a sale is set up and how logging systems are decided upon and their impacts on CWD. Contract wording and contract supervision were explained. Julie expressed a concern that none of the details discussed are written up in the annual report. She wanted to know what the results were so that she had some basis for judging compliance.

Bernice summarized by saying that it sounds like the agencies are asking for some measurement of compliance with regard to preservation of existing Class 3, 4, & 5 CWD. The agencies agreed and continued to discuss what they would like to see and how to do it. They would like a presentation of how the decay classes 3, 4, & 5 are surviving harvest. Bernice said that the pre- and post- harvest CWD were sampled on the first two sales, but that the same individual logs were not necessarily revisited. Julie said that we needed to determine whether the logs seen before harvest were present afterward.

Bernice was asked to provide some procedures for monitoring the survival of Class 3, 4, & 5 CWD through harvest. A permanent plot system may be a possible solution . The variables of interest to the agencies: number, diameter, length, decay class, 16" minimum diameter. Gwill said the objective of this exercise is to improve operations to protect class 3, 4, & 5 logs. He wants to see the annual report state what was done, the results, and whether we were going to make any changes in the future.

Slash pile size and location and numbers were brought up by Gwill. He would like to see some, but they are not to be replaced logs. Slash piles at the landing would be OK. Bernice stated she wanted small slash piles scattered through the unit.

Don explained the various logging systems that are commonly used and how the slash piles could and could not be generated. In shovel logging you can get slash piles in the unit and on the landings. Don also discussed the trade-offs of various slash management styles. The WHMP assumed scarification and burning. This would destroy most Class 3, 4, & 5 CWD. Instead, whole tree yarding, tops being yarded and slash piling have been used. This procedure alone has saved much

existing Class 3, 4, & 5 CWD. Contract supervision also saves a lot of CWD from disturbance

III. Field Tour of Diversion Units

A field trip was taken to both units of the Diversion Timber Sale. This field trip demonstrated all of the previously discussed CWD proposal details.

The agencies wanted more slash piles left on the units if possible. The condition of the ground (skid trails) was acceptable. It is OK to leave designated CWD trees standing. Old stumps looked OK. There weren't many class 3, 4, & 5 logs on these units, so it was hard to tell whether they're getting damaged during harvest. The agencies would like to see a proposal for small log harvest on other units, if the Co-licensee's wish to pursue this option.

IV. Discussion and Decision on CWD Issue

Upon return, Don asked for a decision on the CWD issue. The agencies asked for some time without the presence of the Co-licensees.

Gwill began the discussion with a statement that the proposed designated CWD distribution (40 pieces per 5 acres or 8 per acre) appeared to be acceptable.

He wanted the designated CWD data analyzed upon completion of harvest to ensure compliance. Clustering of logs (i.e. leaving designated CWD trees whole) is good. Otherwise spread them out as conditions permit. Don would like to keep the CWD (designated trees) to the outer 1/3 of cable-yarded units. Agencies had no objection.

Orientation of designated CWD was agreed to as previously discussed (pointed toward the landing on the flat ground < 30%+/- and parallel to the contour of the steeper ground).

Gwill wanted permanent plots for monitoring survival of logs and asked Bernice to provide a plan.

Bernice asked their opinions of Don's proposal to make some 100- acre harvest units. At the next annual meeting we could discuss what DNR is doing. Gary said to discuss a pilot project- are there some sites we have in mind?

Don asked if a resolution of the CWD issue had been reached, and if so, would Gwill write to FERC and address the comments he made in the previous letter. Gwill agreed to do this.

Gary wanted to see everything in writing, both in draft and final form. Julie wanted to see all the CWD inventory from the past, presented in a manner that would show compliance. Don and Bernice pointed out that only the last sale was

in compliance with the CWD procedure (for Class 1 & 2). Bernice agreed to present all pre- and post- harvest data on previous sales together in one place. These previous sales did not have CWD supplementation other than snag tops and brush piles. Don pointed out that several methods of harvest were used on different units and therefore, post harvest data from previous units may not support assumptions on what is going on elsewhere.

Bernice commented that she is working on the sampling methods with a forester from the University of Washington.

V. Discussion over Additional Annual Reports

Gwill expressed his desire for additional annual reports (WHMP required annual reports during the implementation phase through 1995). Bernice stated that she believed the up-coming report (1995) would be the 5th report. The first annual report was for activities done in 1989. Different opinions were expressed, but the most conservative count would be that the up-coming report for 1995 would be the 5th report since the plan became fully operational, (i.e. first timber harvest occurred in 1991).

Gwill said he would like to have annual reports until he felt comfortable with what we are doing. Gary agreed. They stated that the on-site visits were helpful, but did not substitute for written reports.

Exhibit 4.

Data

Table A-1 COARSE WOODY DEBRIS SURVEYS IN HARVEST UNITS

UNIT 1991-1

	CLASS 1 & 2				CLASS 3, 4, & 5		
	Logs/Acre	Ave Dia/Range (Inches)	Ave Lng/Range (Feet)	Logs/Acre >16" Dia[2]	Logs/Acre	Ave Dia/Range (Inches)	Ave Lng/Range (Feet)
Pre-Harvest[3]	0[1]	0	0	0	8.8	20 (11-30)	30 (10-50)
Post-Harvest[3]	11.3	15.3 (12-22)	11.6 (10-20)	0	17.7	15.4 (11-28)	24.5 (10-35)
Post-Harvest[4]	8.2	11.8 (10-16)	14.6 (10-25)	0	6.3	17.7 (10-52)	17.9 (10-47)

UNIT 1991-2

	CLASS 1 & 2				CLASS 3, 4, & 5		
	Logs/Acre	Ave Dia/Range (Inches)	Ave Lng/Range (Feet)	Logs/Acre >16" Dia[2]	Logs/Acre	Ave Dia/Range (Inches)	Ave Lng/Range (Feet)
Pre-Harvest[3]	8.3[1]	10.7 (10.11)	46.7 (30-70)	0	0.9	45 (45))	110 (110)
Post-Harvest[3]	6.8	13 (13)	15.0 (15)	0	56.4	29.6 (10-50)	20.8 (10-50)
Post-Harvest[4]	2.5	15.5 (11-25)	10 (10)	0	28.1	21.6 (10-46)	18.6 (10-91)

UNIT 1991-3

	CLASS 1 & 2				CLASS 3, 4, & 5		
	Logs/Acre	Ave Dia/Range (Inches)	Ave Lng/Range (Feet)	Logs/Acre >16" Dia[2]	Logs/Acre	Ave Dia/Range (Inches)	Ave Lng/Range (Feet)
Pre-Harvest[3]	0[1]	0	0	0	24.5	45.3 (14-110)	35 (10-70)
Post-Harvest[3]	3.0	14.5 (14-15)	15 (10-20)	0	29.7	29.7 (14-50)	26.8 (10-90)
Post-Harvest[4]	1.9	14.6 (12-17)	16 (10-20)	0.4	24.6	23.8 (11-53)	17.7 (10-45)

Table A-1 COARSE WOODY DEBRIS SURVEYS IN HARVEST UNITS

UNIT 1992-3[5]

	CLASS 1 & 2				CLASS 3, 4, & 5		
	Logs/Acre	Ave Dia/Range (Inches)	Ave Lng/Range (Feet)	Logs/Acre >16" Dia[2]	Logs/Acre	Ave Dia/Range (Inches)	Ave Lng/Range (Feet)
Pre-Harvest[3]	0	0	0	0	40.6	17.1 (10-29)	22.9 (10-50)
Post-Harvest[3]	2.5	14 (14)	10 (10)	0	12.8	14.9 (11-21)	17.9 (10-45)
Post-Harvest[4]	6.9	12.9 (10-16)	12.2 (10-15)	0	11.5	13.0 (12-28)	14.9 (10-25)

UNIT 1993-1

	CLASS 1 & 2				CLASS 3, 4, & 5		
	Logs/Acre	Ave Dia/Range (Inches)	Ave Lng/Range (Feet)	Logs/Acre >16" Dia[2]	Logs/Acre	Ave Dia/Range (Inches)	Ave Lng/Range (Feet)
Pre-Harvest[4]	0.7	13.5 (12-15)	20 (15-25)	0	9.3	26.7 (12-44)	24.4 (10-45)
Post-Harvest	No survey performed, see "Designated CWD" Table A-3						

UNIT 1993-2

	CLASS 1 & 2				CLASS 3, 4, & 5		
	Logs/Acre	Ave Dia/Range (Inches)	Ave Lng/Range (Feet)	Logs/Acre >16" Dia[2]	Logs/Acre	Ave Dia/Range (Inches)	Ave Lng/Range (Feet)
Pre-Harvest[4]	3.9	15.4 (12-18)	53.6 (25-90)	3.3	17.2	24.4 (12-55)	20.5 (10-50
Post-Harvest	No survey performed, see "Designated CWD" Table A-3						

[1] Includes blowdown trees. Does not include treetops from snag creation, which are tallied in Table A-5.

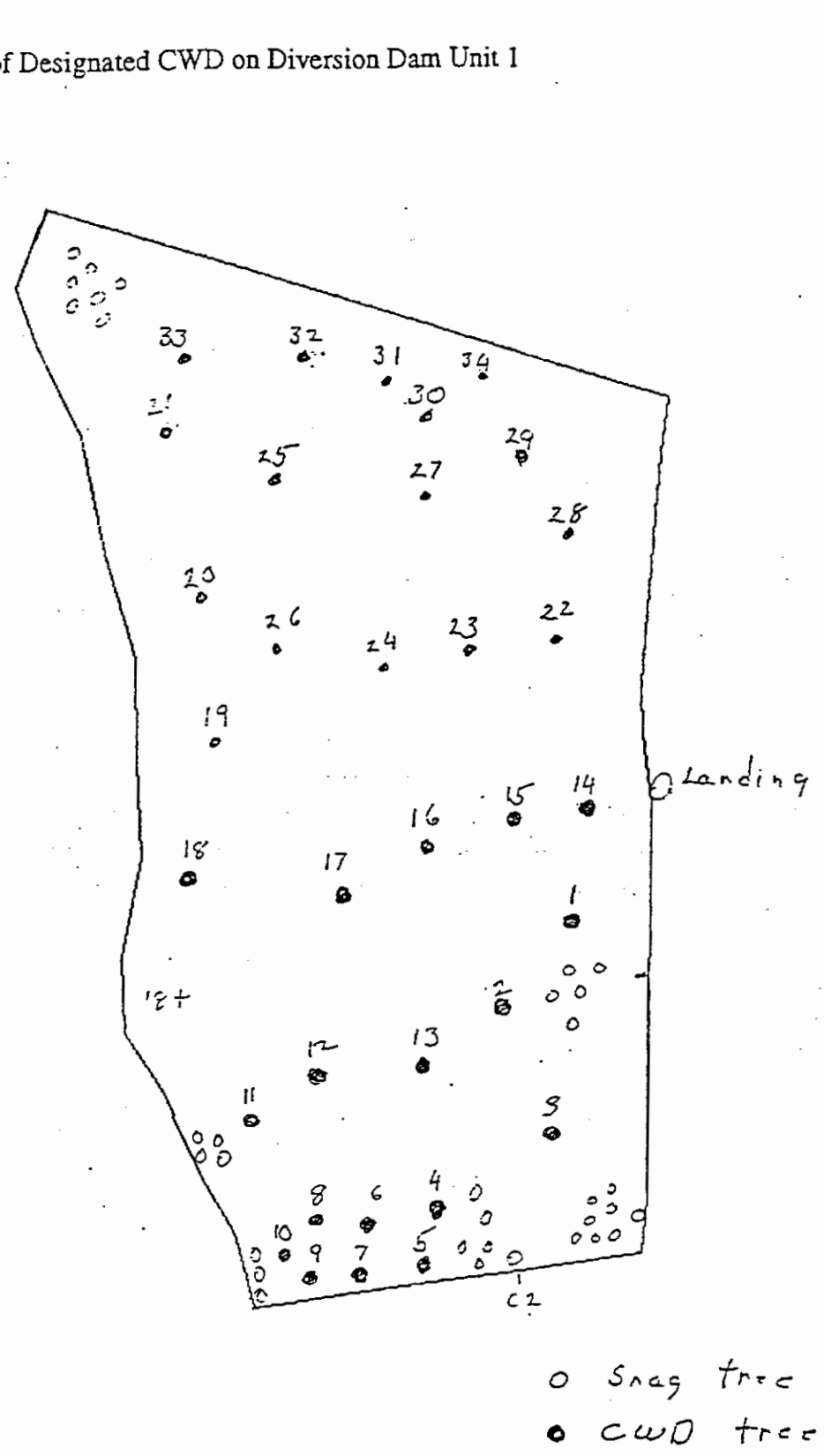
[2] Acceptable *per* CWD Procedure (see Appendix A, Exhibit 1).

[3] Line Intercept Method measures diameter and length of logs intercepted by a series of 100 ft. transects. Density of logs is calculated as follows: {(43,560xpi)/2L}x(sum inverse log lengths), where L = sum of transect lengths. All logs are measured at the large end.

[4] This method measures diameter and length of logs encountered in 1/10th acre circular plots. Sufficient plots are sampled to account for at least 10% of the area of the unit being sampled. All logs, whether entirely or only partially within the plot, are tallied. All log diameters are measured.

[5] Post-harvest survey (1/10th acre plot) found 16.2 brush piles per acre. Average pile was 11 feet in diameter x 4.4 feet in height.

Figure A-1 Map of Designated CWD on Diversion Dam Unit 1



Diverson Unit one

SCALE: 200 ft/in

TABLE A-2.1. DIVERSION TIMBER SALE UNIT #1 CWD PRE-HARVEST

Tree #	DBH	D1	D2	D3	D4
1	24	28	21	18	16
2	23	30	19	17	
3	23	26	21	18	16
4	28	30	22	20	
5	25	27	22	19	17
6	27	29	23	20	18
7	24	26	20	18	
8	27	28	23	20	17
9	27	30	23	20	18
10	28	30	24		
11	24	27	21	18	16
12	24	26	21	18	16
13	23	25	19	17	
14	27	31	23	20	17
15	26	28	23	20	16
16	26	29	23	20	
17	27	30	23	20	17
18	32	34	27	23	16
19	21	23	18		
20	30	36	27	24	20
21	18	20			
22	24	27	21	18	16
23	25	28	22	19	17
24	28	30	24	22	18
25	27	29	23	21	17
26	19	22	16		
27	25	27	22	19	16
28	26	28	23	20	17
29	27	30	23	20	16
30	28	31	24	21	16
31	18	20	16		
32	29	33	23	21	17
33	29	32	24	21	18
34	26	28	23	20	17
TOTAL	865	958	727	572	405
AVG DIA	25.44	28.18	22.03	19.72	16.88

AVERAGE DIAMETER ALL LOGS 22.18 TOTAL LOGS 120

DBH - Diameter breast high

D1 - diameter of large end, first log

D2 - diameter of large end, second log

All logs caluclated 20 feet long

D3 - diameter of large end, third log

D4 - diameter of large end, fourth log

TABLE A-3.1. DIVERSION TIMBER SALE UNIT #1 - POST HARVEST CWD
August 1995

Tree #	Species	# of logs[c]	Comments
1	fir	4	Painted (Designated CWD, see Table A-2)
2	fir	3	Painted
3	fir	4	Painted
4	fir	3	Painted
5	fir	4	Painted
6	fir	4	Painted
7	fir	3	Painted
8	fir	4	Painted
9	fir	4	Painted
10	fir	2	Painted
11	fir	4	Painted
12	fir	4	Painted
13	fir	3	Painted
14	fir	4	Painted
15	fir	4	Painted
16	fir	3	Painted
17	fir	4	Painted
18	fir	4	Painted
19	hemlock	2	Painted, class 1 snag
20	fir	4	Painted
21	fir	1	Painted, class 2 snag
22	fir	4	Painted
23	fir	4	Painted
24	fir	4	Painted
25	fir	4	Painted,
26	fir	2	Painted, Class 1 snag
27	fir	4	Painted
28	fir	4	Painted
29	fir	4	Painted
30	fir	4	Painted
31	fir	2	Substituted a fir with 2 logs for a designated snag with 2 logs
32	fir	4	Painted
33	fir	4	Painted
34	fir	4	Flagging, no paint
Total Logs		120	All designated CWD accounted for post-harvest

TABLE A-4.1.
VOLUME IN BOARD FEET OF DESIGNATED CWD IN UNIT #1 OF DIVERSION SALE, PRE-HARVEST

Diameter *	Number of Logs	Volume/Log # **	Total
12	6	100	600
13	5	120	600
14	11	140	1,540
15	8	180	1,440
16	13	200	2,600
17	13	230	2,990
18	11	270	2,970
19	5	300	1,500
20	14	350	4,990
21	9	380	3,420
22	5	420	2,100
23	13	470	6,110
24	5	500	2,500
25	0	570	0
26	0	620	0
27	2	680	1,360
28	0	730	0
	120		**34,720**

Designated CWD comparison *** with various WHMP interpretations:

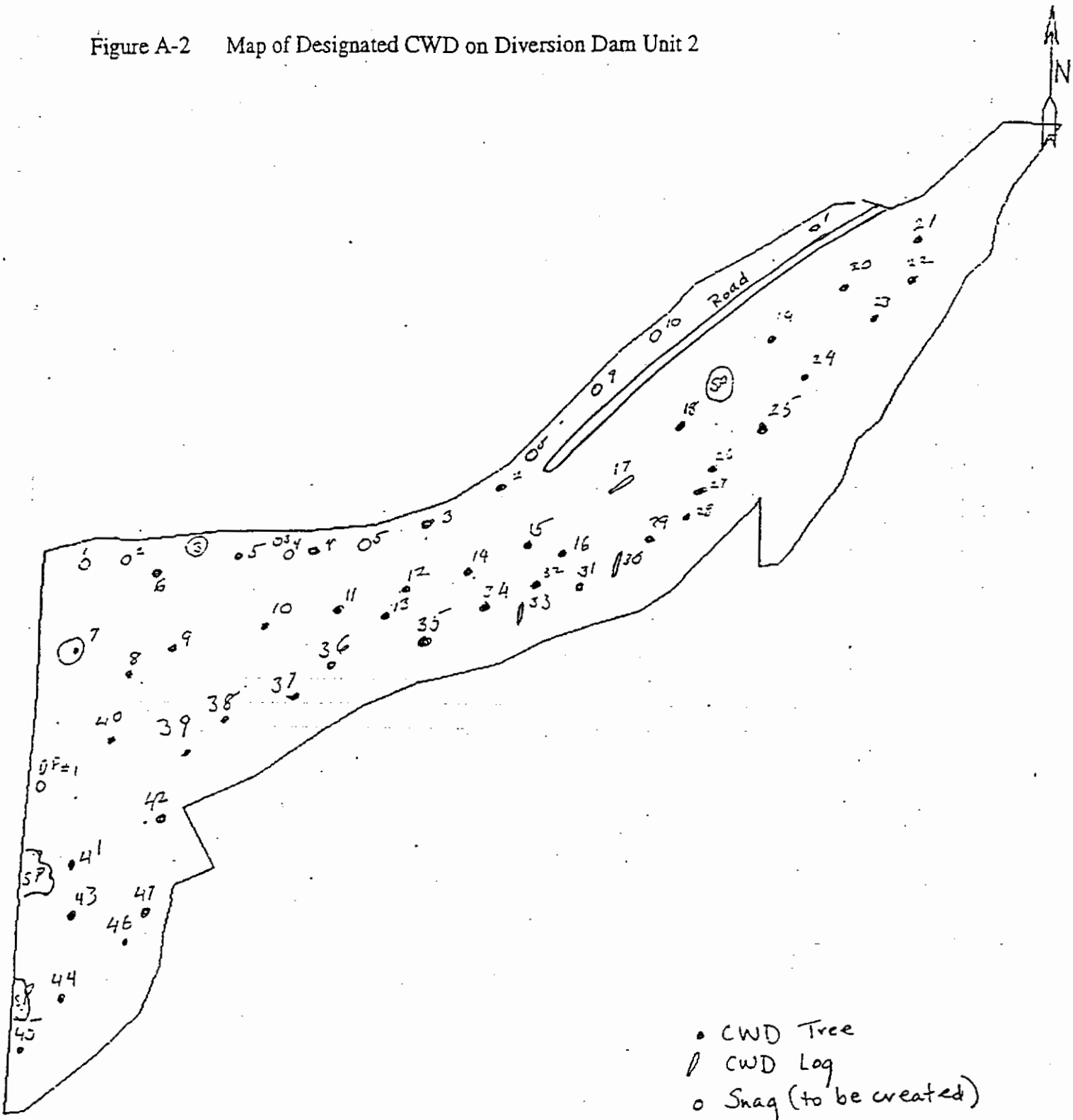
- 2 logs per acre (Economic Analysis)	= 10,500	331%
- 6 logs per acre	= 31,500	110%
- 8 logs per acre	= 42,000	83%
- 10 logs per acre	= 52,500	66%

* Diameter at small end of log.

** Volume of 20' log in board feet

*** Comparison based on 15 acre harvest unit and logs 24" diameter large end and 20 feet long.

Figure A-2 Map of Designated CWD on Diversion Dam Unit 2



Diversion Unit two

SCALE: 250 ft/in

TABLE A-2.2. DIVERSION TIMBER SALE UNIT #2 CWD
PRE-HARVEST

Tree #	DBH	D1	D2	D3	D4	D5	Comments
1	27	30	23	20	17		
2	23	26	21	18	16		
3	25	29	22	19	16		
4	24	26	21	18	16		
5	26	30	23	20	17		
6	28	30	24	22	17		
7	22	24	20				snag
8	22	24	20				snag
9	26	27	23	20	16		
10	27	30	23	20	17		
11	29	32	24	21	18	16	
12	25	29	22	19	17		
13	20	22					snag
14	25	28	23	20	17		
15	28	31	24	20	17		snag
16	24	27	21	19	16		snag
17	21	21	18	16			down log
18	24	26	21	19	17		
19	23	25	21	18	16		
20	27	30	23	20	17		
21	27	31	23	20	17		
22	17	19					snag
23	25	28	21	18	16		
24	25	28	21	18	16		
25	24	26	21	18	17		
26	17	19					snag
27	20	22	18				snag
28	21	23	18	16			snag
29	19	21	16				snag
30	18	19					snag
31	19	20					snag
32	23	25	20	17			snag
33	19	23	17				snag
34	25	26	22				snag
35	27	29	23				snag
36	25	27	23	20	17		
37	26	29	23	20	18		
38	16	18					snag
39	24	26	21	18	16		
40	26	28	23	20	17		
41	32	35	28	24	20	16	
42	28	31	25	22	19	16	
43	25	28	22	19	17		
44	24	27	21	18	16		
45	27	30	23	20	17		
46	25	27	22	19	16		
47	25	27	22	19	17		
48	26	30	23	20	17		
TOTAL	1151	1269	913	675	540	48	
AVG DIA	23.38	26.44	21.74	19.29	16.88	16	

AVERAGE DIAMETER ALL LOGS 21.53 TOTAL LOGS 160

DBH - Diameter breast high D1 - diameter of large end, 1st log D2 - diameter of large end, 2nd log D3 - diameter of large end, 3rd log

All logs calculated 20 ft long D4 - diameter of large end, 4th log D5 - diameter of large end, 5th log

TABLE A-3.2. DIVERSION TIMBER SALE UNIT #2 - POST HARVEST CWD
September 1995

Tree #	Species	Butt log[a]	DBH[b]	# of logs[c]	length of logs[d]	Comments
1	fir		27	4		Painted (Designated CWD, see Table A-2)
2	fir		27	4		Painted
3	fir		25	4		Painted
4	fir		24	4		Painted
5	fir		26	4		Painted
6	fir		28	4		Painted
7	fir		22	2		Standing painted snag
8	fir		22	2		Standing painted snag
9	fir		26	4		Painted
10	fir		27	4		Painted
11	fir		29	5		Painted
12	fir		25	4		Painted
13	fir		20	1		Standing painted snag
18	fir		29	4		Painted
19	fir		23	4		Painted
20	fir		20	4		Painted
21	fir		27	4		Painted
22	fir	19		1	17 ft long	Snag - Broke when felled.
24	fir		25	4		Painted
25	fir	25		4		Painted, felled
26	fir			0		Painted snag broken into fragments when felled.
27	fir		20	2		Standing snag
28	fir		21	3		Standing snag
29	fir		19	2		Standing painted snag
32	fir		23	3		Standing painted snag
41	fir		32	5		Painted
42	fir		28	5		Painted
43	fir		25	4		Painted
44	fir		24	4		Painted
45	fir		27	4		Painted
46	fir		25	4		Painted
A	fir		30	5		No paint
B	fir		26	4		Painted
C	fir		22	3		No paint
D	fir		25	4		Painted
E	fir		25	4		Painted
F	fir		25	4		Painted
G	fir			2		No paint; 2 separate logs
H	fir	24		4	Last log is 16' long	Painted snag, top broke off when felled.
I	fir	26		4	Last log is 19' long	Painted snag? Top broke when felled.

TABLE A-3.2. DIVERSION TIMBER SALE UNIT #2 - POST HARVEST CWD
September 1995
(continued)

Tree #	Species	Butt log[a]	DBH[b]	# of logs[c]	length of logs[d]	Comments
J	fir	19		2	Last log is 15' long	Painted snag. Top broke.
K	fir	30		2	Last log is 26' long	Painted snag. Top broke.
L	fir	19		2	Last log is 13' long	Snag--top broke off. Nearby stump has blue paint & DBH= 19".
N	fir	?		Assume 4		Unpainted
O	cedar	?		Assume 4		Unpainted
			Total Logs	155		

[a] Measured on downed trees only. Large end was measured.
[b] Measured on standing trees only.
[c] Number of acceptable logs was measured on felled trees, and estimated on standing trees.
[d] All logs are at least 20' long, unless otherwise noted.

TABLE A-4.2.
VOLUME IN BOARD FEET OF DESIGNATED CWD IN UNIT #2 OF DIVERSION SALE, PRE-HARVEST

Diameter *	Number of Logs	Volume/Log # **	Total
12	14	100	1,400
13	9	120	1,080
14	15	140	2,100
15	0	180	0
16	24	200	4,800
17	20	230	4,600
18	14	270	3,780
19	8	300	2,400
20	18	350	6,300
21	11	380	4,180
22	8	420	3,360
23	13	470	6,110
24	4	500	2,000
25	1	570	570
26	0	0	0
27	0	0	0
28	1	730	730
	160		43,410

Designated CWD comparison *** with various WHMP interpretations:

- 10 logs during harvest	= 3,500	1,237%
- 2 logs per acre (Economic Analysis)	= 14,000	311%
- 6 logs per acre	= 42,000	103%
- 8 logs per acre	= 56,000	78%
- 10 logs per acre	= 70,000	62%

* Diameter at small end of log.

** Volume of 20' log in board feet

*** Comparison based on 20 acre harvest unit and logs 24" diameter large end and 20 feet long

TABLE A-5. CWD INPUTS FROM CREATED SNAG TREE TOPS[1]

Final Harvest Unit No.	Avg. Diameter inches (range)[2]	# Class 1-2 Logs/Ac.[2]
1991-1	16 (16)	0.04
1991-2	20.8 (16-18)	0.3
1991-3	18.5 (16-23)	0.9
1992-3	16.5 (16-24)	1.2
1993-1	17.5 (16-23)	1.0
1993-2	20.9 (16-28)	0.8

[1] Assumptions:

- Logs are 20 ft. long, minimum 16 in. diameter, large end.
- Data for log diameters for trees up to 28" dbh taken from Douglas fir on Chaplain Sale tree edit list.
- For trees>28 in. dbh, assume 3 in. taper per 20 ft. log; except cedar, which has greater taper.
- Log diameters measured inside bark, large end of log.
- First log in each tree remains standing as 20 ft. tall snag, except for on 40 ft. tall snag/unit.
- Logs from conifer species are included; logs from hardwood species are not included.
- Treetops are perfectly form (i.e. no double or broken tops, or other formations that might reduce diameter.

APPENDIX B - AGENCY COORDINATION - ANNUAL MEETING MINUTES AND CORESPONDANCE

Wildlife Habitat Management Plan

Annual Meeting Agenda
March 27, 1996
at the Electric Building

1. Introductions
2. Progress Since Beginning of WHMP Implementation
   a. Lake Chaplain Tract
   b. Landowner Management Adjacent to Lake Chaplain Tract
   c. Biosolids Application on Lake Chaplain Tract
   d. Lost Lake Tract
   e. Project Facilities Tract
   f. Spada Lake Tract Supplemental Plan
   g. Sultan Basin Natural Resource Conservation Areas (NRCA's)
   h. Williamson Creek Tract
3. Future Reports/Meetings
4. Problems and Concerns
5. Summary

Wildlife Habitat Management Plan

Annual Agency Meeting
March 27, 1996
Snohomish Co. PUD, Electric Building

In attendance:
PUD - Karen Bedrossian, Bruce Meaker, Mike Schutt, Bernice Tannenbaum, Diana Woge
City of Everett - Don Farwell, Kathie Joyner, Roy Metzgar, Dan Thompson
WDFW - Gary Engman
DNR - Lisa Egtvedt, Karen Egtvedt, Al McGuire, Dean Warner
Tulalip Tribes - Julie Stofel
USFW - Gwill Ging

Introductions

Bernice opened the meeting and introductions were made. She explained that the agenda covered two documents (the WHMP Annual Report and the Spada Lake Tract Supplemental Plan.

Progress Since Beginning of WHMP Implementation

Lake Chaplain Tract

1991 (Chaplain) and 1992 (Horseshoe) Sales

Don presented the Timber Management Activities by giving a history of the timber sale program. Don described efforts to locate property lines and section corners, cutting line agreements with neighboring landowners, the land exchange with DNR in 1992, and timber sale layouts.

Gwill - Is a cutting line different from a property line.?
Don - Yes, a cutting line is a line between two ownerships that both parties agree to, for management purposes, but the actual property line may be different.

Don explained in detail the 1991 (Chaplain) and 1992 (Horseshoe) sale layouts. He reviewed the road system, layout of harvest units, harvest operations, reforestation, revegetation on roadsides and in units. These sales included four final harvest units, two commercial thinning units. Snag creation and reforestation were completed for the final harvest units. All units were reseeded. A salvage sale was conducted in 1993 at the edges of 3 final harvest units, following a severe windstorm in 1992. In 1996/1997 reproduction

surveys will be done to determine the percent of hardwoods and possible need for precommercial thinning.

1993 (Diversion) Sale

One unit scheduled for harvest in 1990 (Stand 5-8) was deferred in exchange for a 2005 unit (Stand 4-5) due to high habitat values already present in the 1990 unit. We will revisit the 1990 unit in 2005 and determine what to do at that time.

Two units were sold under the 1993 sale (Diversion). The coarse woody debris (CWD) procedure presented during the 1994 Agency meeting was implemented. Entire trees were marked to provide CWD for the units. The sale had already been sold, so the City had to buy back the trees from the purchaser, at a total cost of $47,000. Harvest took place in the summer of 1995. The marked trees were left standing by the cutters; after yarding was completed the trees were felled but not bucked. In December 1995 a meeting between the Agency representatives, PUD, and City was held. They looked at the Diversion sale units and were given data on log lengths and diameters resulting from the implementation of the CWD procedure. The data are included in Appendix A of this report.

These units were seeded in the summer of 1995 and replanted in March of 1996. Trees to be made into snags as well as the green tree area (GTA) were marked prior to harvest. Most snags were clumped in groups of five to eight, but some were dispersed throughout the unit. Unit 2 also has a large clump of snags surrounding the perennial drainage. These snags were made at the end of 1995 and are reported in Table 1 as 1993-1 and 1993-2. Along Unit 2 and the adjacent permanent mixed forest (PMF), trees to be removed due to power line safety were instead made into snags.

1996 (Tiki) Sale

The next sale will consist of five 1995 units, most of which are located on the west side of Lake Chaplain. Some roads to serve this area have been located and staked out. Two of the harvest units are laid out on the ground, and some work has been done on others. The sale should be in late 1996 or early 1997.

Revegetation

Bernice - Revegetation was done in two locations at Lake Chaplain in 1992. Douglas fir and western red cedar seedlings were planted in a row at the north-end of the lake, with the objective of providing a visual screen between the road and the lake shore. Survival has been 95% for Douglas fir and 78% for western red cedar, and growth has been fair to good for the cedar and excellent for the fir.

Shrubs were planted on the west-side of Chaplain Marsh, with the purpose of providing a visual screen between the road and wetland. The survivorship is nearly 100 %, and growth has been good to excellent.

Snag Creation

Bernice - Most of the existing snags on harvest units have been felled during harvest operations. These are replaced by snag trees created from live trees on the edges of the units, or scattered in the units. All final harvest units that have been completed to date have the density and size distribution prescribed in the WHMP. Snag inventories have also been done within units that have not been harvested, and we have created snag trees to achieve WHMP prescriptions. Bernice showed the areas in the Lake Chaplain Tract that now meet the WHMP targets. See Table 1 in the Annual Report for snag inventory and distribution done in 1995.

Gwill - Briefly summarize what you have learned regarding techniques (for creation or inventory); which ones are better or would you do differently?

Mike - We are currently working on developing the standard operating procedure for snag inventory and will include details for snag creation. For the past five years it has been topping live trees with a chainsaw. We have started leaving limbs and simulating natural snag features (i.e. bat flanges, cavity starts, and sap wells). As far as inventorying, that will be the main focus of the standard operating procedure. The statistician we have hired is working on sampling procedures. We are looking for a system that will tell us what sampling intensity we need and how we want to lay out sample plots. Currently we have 10% sampling of units (1- 1/10th acre plot per acre).

Gwill - On the snag creation, is leaving limbs now part of the standard procedure?

Mike - Yes, it is stated in the contract to leave dead limbs and/or live limb stubs.

Bernice summarized the inventories of Lake Chaplain units and created snags (Table 1). To date, we have created 650 snags and an additional 100 snags will be created in the next few weeks. We are well above the minimums for height and diameter prescribed in the WHMP, and we have the necessary number of snags in each diameter category.

Gwill - Will the tables be updated in the future?

Bernice - Yes, Table 1 is the cumulative information for all activities so far. During inventorying, Mike found that class size 15-17 is really deficient in most timber stands in the Lake Chaplain Tract. The smaller size class is far more numerous, but these snags don't last very long. We are supplementing snags in those stands by creating snags in the 15"-17" size class. The result is that we often end up with more than 3 snags per acre, the minimum density required by the WHMP. The table shows all of the snags that currently meet the WHMP prescriptions for snag density, diameter and height.

Nesting Structures

Bernice - We put in nesting structures for wood ducks and waterfowl at Lake Chaplain. These structures (wood duck boxes and floating next platforms) are not a requirement of the WHMP, but there were good opportunities here. There has been no use of the floating platforms for breeding by waterfowl, so we will be moving them up to Spada Lake this year. The duck nest boxes at Chaplain Marsh have been very successful. A total of nine boxes have been installed and five of them were used successfully last year.

Gwill - What species are in that area?
Bernice - Woodducks.

Monitoring of Green Tree Area

There was windstorm damage to one GTA in 1992, and it was replanted. We also monitor buffer zones along water courses that are in harvest units or adjacent to them.

Gwill - Are you looking for anything else besides seeing if the trees are still up?
Bernice - It hasn't been quantitative.

Monitoring of Deer Forage

Bernice - There was no activity in this area in 1995. We have tried several methods and now know which ones we prefer. We will be fine tuning our method for estimating availability and utilization of forage by deer this summer.

Gwill - Will you be sending out the plan of monitoring methods you will use?
Bernice - Yes. The method we will be using to evaluate availability of deer forage will be plot based, and the method used to determine deer use will be a non-quantitative procedure, evaluating browse intensity.

Landowner Management Adjacent to Lake Chaplain Tract/Lost Lake Tract

Al McGuire - Road systems have been designed to minimize the amount of road in the area - adjacent landowners may use them. Several recent timber sales have been planned and harvested in recent years. DNR has been successful in planting and growing western red cedar on units near the Horseshoe Bend area. A wildlife corridor has been established connecting Lake Ida with the Sultan River. The Hard Luck sale was configured to avoid placing DNR's clearcuts immediately adjacent to City's clearcuts. Two GTA's - one on City clearcut and the other on DNR clearcut - were configured to form one contiguous GTA. The south boundary of the Lake Tract will be surveyed in 1997 for a future 1998 sale. Property immediately north of Lake Chaplain may be acquired by DNR.

Biosolids Application on Lake Chaplain Tract

Dan Thompson gave an presentation on the City's biosolids application program. The objective of the proposed application at Lake Chaplain is to improve forest stand growth and stratification, and understory development.

Gwill - Given that it is the first time we've seen the present proposal, I'd like time to review and talk to people. We weren't keen on the proposal we heard five years ago. Another concern is, there was an expectation on the timber rotation, related to snags and CWD. If the trees grow faster and are harvested sooner, how will it affect snag and CWD management?

Don - Biosolids will grow trees faster - one of the goals of the WHMP was to get to large saw timber faster. Our harvest schedule is not set by size, it is set by date. There is no proposal to change the scheduled harvest dates or rotation length. The trees will be larger, and it will be easier to get CWD and snags of the appropriate size. The harvest dates have not changed.

Dan - Economic benefit at the end of the rotation is a side benefit. The principal purpose of the silvicultural prescription is to benefit wildlife. It wouldn't make sense to shorten the harvest dates unless that benefited wildlife.

Gwill - I don't see a problem if you will commit to keeping the rotation. My concern is that some of the Class 1 and 2's (logs) won't make it to Class 3, 4 and 5 if the rotation is shortened. Some snags might have to be removed for safety reasons, and that would be a concern. With regard to changing objectives because of economics, I don't know who's going to make that decision for the City. The WHMP says that wildlife habitat will be the priority versus timber revenues. We went through that issue with CWD. While we may have a difference of opinion, from my perspective, wildlife habitat wasn't strictly the first priority.

Dan - We're looking at fertilization as a tool to accomplish wildlife habitat objectives; any side benefit we get is extra.

Don - Fertilization is provided for in the WHMP.

Dan - Under standard timber management, fertilization would lead to shortening the rotation. But this is not standard management. Also, this is a 1996 proposal - other than monitoring, it doesn't go beyond that. We have 36 acres total in the project area, with a total of 750 dry tons of biosolids.

Gwill - Which areas are you doing the application on?

Bernice - (Pointed them out on the map). Two stands were lightly thinned. They are not young stands. Canopies are fairly dense.

Dan - One will probably give a good understory response; the other may not.

Gwill - Is this a pilot?

Dan - If it works, yes. There is a potential to apply biosolids to younger stands.

Ging - I'd be less concerned with stands that are flat.

Dan - The equipment can be used on slopes up to 30 percent. The flatter the land the better.

Gwill - What kind of monitoring will you do?

Dan - We will monitor tree growth and water quality including fecal coliforms, electrical conductivity, and nitrates.

Mike - What about metals?

Dan - Nitrates are the most mobile compounds there. If we see any movement of nitrates, that'll trigger monitoring, but it's really unlikely because metals are not very mobile. In sites that are like these, at higher application rates, they haven't been any significant migration of metals in over 20 years.

Mike - What about accumulation on-site?

Dan - We can calculate from data that we have, just what the increase of metals would be above background. I know that it will not be statistically significant, at the concentrations present in the biosolids.

Gwill - Is there any bio-accumulation?

Dan - No. UW has done some studies. They found increased Cd content in livers of animals living in direct contact with the soil. No effects were found on organisms, though. If you're looking for bioaccumulation, you'd need a predator like raptors or coyotes. They forage over wide ranges so significant accumulation is unlikely.

Gwill - What about shrews with a home range inside the biosolids plots?

Dan - Yes, there is bioaccumulation in shrews, but it would stop there.

Gwill - What is the City's position on application upslope of Lake Chaplain?

Roy - There would be no problem other than public perception.

Mike - Will there be closure of land to the public?

Dan - Restriction for Class B biosolids was changed from 1 year to 30 days (in 1993), but our Class A biosolids will not result in any restriction.

Karen - There is a possibility of another thinning in these units, depending on the outcome of biosolids application.

Gwill - Wants a copy of silviculture proposal. (This was provided.)

Bernice/Dan - Monitoring of vegetation in stands will be developed later this year.

Gwill - Would like a copy of the procedures.

<u>Lost Lake Tract</u>

Bernice - The WHMP called for pre-commercial thinning a portion of the tract, which we did 1991. We monitor in late summer each year. There is still a lot of slash obstructing access into the units. We cut wildlife trails through the unit at 200 foot intervals. These trails are filling up with salmonberry which is being browsed by deer. We are also required to install an osprey platform. This was done in 1990. In 1994 and 1995, the osprey successfully reared a young osprey to fledging. Floating platforms, also required, were installed in 1990; however, these have not been used by breeding waterfowl. Two required duck nest boxes were installed in 1990, and four additional duck boxes were installed in 1995. Half of the boxes have been used each year. Hooded mergansers use Lost Lake nest boxes.

Project Facilities Tract

Pipeline Right-of-way

Our goal is to allow shrubs to be established. Due to off road vehicles (ORV) damage to the ground, stumps were placed on the ROW in 1988. Additional stump piles were placed at 150' intervals on the lower ROW in 1995 to discourage ORV's and encourage the establishment of shrub and small mammal habitat. In 1994, boulders were placed along Marsh Creek, to prevent ORV damage. Those areas damaged by ORV's were replanted.

The PUD plans to re-route the pipeline access road to be directly over the pipeline. This will facilitate inspection of the pipeline during an emergency or darkness. Three streams will be crossed using box culverts. Construction will take place this coming summer or next.

The pipeline right-of-way has been seeded annually since 1991 and fertilized in 1992 and 1993. The upper right-of-way had not been seeded until 1994 when a gate was installed to reduce ORV use of the area and garbage dumping. We plan to seed and fertilize the right-of-way again in 1996, and begin quantitative monitoring of vegetative cover.

The WHMP calls for planting trees and shrubs along the right-of-way. This has not been done because our consultants recommended that we try first to develop a sod layer to improve soil quality. We will look into putting in some trees and shrubs. However, we have already gotten some volunteer shrubs. We protect shrubs during mowing, which occurs about every three years to remove alders and firs. We will be moving this year or next.

We only mow a 30 foot wide strip centered over the pipeline along the lower four miles of the right-of-way. The ROW outside of this 30' strip is allowed to grow as a thicket of alders and shrubs.

Powerhouse Site

In 1993, 10 tree groups and 10 tree/shrub groups were planted, primarily to provide forage for wildlife species. In the first year following planting, dead shrubs were replaced. These trees and shrubs are monitored every spring and fall. Mortality varied, depending on the species, as listed in Table 6 in the Annual Report.

Spada Lake Tract Supplemental Plan

Karen - Our forestry consultants submitted their report to us in late November. We used their information and recommendations to revise the earlier draft of the Spada Lake Supplemental Plan, which was distributed to agency representatives at the annual meeting held in 1994. The revised plan includes more detailed information on enhancement

measures and detailed stand prescriptions for the area specifically proposed for treatment through the year 2005.

We have presented a briefing paper to our commission letting them know that we have submitted this plan to you and you are in the process of reviewing it. We gave them a general summary of what we are proposing to do. They did not express any concern over what we are doing. They have not been presented with the entire plan and have not officially approved it at this point. We want to get agreement among all of us prior to proceeding further with final approval.

An overview of each section of the plan was provided. The result of future field reconnaissance and management planning may indicate that some stands scheduled for treatment in this supplemental plan should be treated differently, or not at all. We have indicated in the prescriptions where we have concerns. It should be understood that prescriptions developed for this plan are subject to change, based on additional information that may be obtained in the future.

Bruce - The March 3, 1996 cover letter stated that all comments should be sent to FERC. However, he requested that the Agency's send the comments to the District so we can incorporate them into the report.

Gary - What is the report schedule?

Karen - We request agency comments by April 19th. Then the report will be submitted to the PUD's management, then on to the FERC.

Al - DNR has concerns regarding the consultants' approach. Road construction costs were included but not maintenance. The consultant did not evaluate helicopter logging, which Al believes is the best option there. The North Shore Road could be used as a landing, eliminating a lot of road construction/reconstruction costs, and avoiding problems due to soils and steep slopes. He suggested evaluating economic feasibility of helicopter logging.

Spada Lake Management Activities

Bernice - Other activities required at Spada Lake were the installation of osprey nesting platforms and experimental plantings of wetland species in the drawdown zone. Two nest platforms were installed; nest construction has occurred on one of them, but the pair abandoned it in the past two years midway through the breeding season. Experimental shoreline plantings were done in late 1994 in the drawdown zone at the North Fork area and along a small bay in the Williamson Creek arm of the reservoir. Five wetland species were planted with good results in three species. The plantings were monitored twice during the growing season. Monitoring will continue in 1996.

Williamson Creek Tract

Bernice - No significant changes occurred in this tract in 1995.

Sultan Basin Natural Resource Conservation Areas (NRCA's)

Al - There are three natural resource conservation areas in the Spada Lake drainage area: Mt. Pilchuck, Morning Star and Grider Lakes. In 1994 the Pilchuck NRCA was expanded down to the PUD property line. There is a state-wide management plan that covers all NRCA's, which is very generic and leaves management of an area open for interpretation. No specific plans have been prepared for the NRCA's in the Sultan Basin.

The North Shore road is not in the NRCA. A 200 foot wide strip including the road was retained as DNR trust land. This area was left out of the NRCA because it accesses other trust lands around Stoney Creek. There are no management funds for roads within NRCA's, so there is no way of dealing with road maintenance problems. By keeping it in the State trust lands system, maintenance funds are available.

There a two trails, one to Boulder Lake and one to Greider Lake, which DNR maintains for recreation purposes. Both trails are in the Greider Lake NRCA with the exceptions of the upper and lower end of the trails. Closure of roads is proposed this year in the North Fork drainage and potentially the Stoney Creek drainage. No funding is available this year because the legislature did not act upon the capital budget but it is expected to be submitted in the next legislative session.

Mike asked about the acreage of the land surrounding the proposed road closures. Al said it would be four to five thousand acres. Mike asked if it would be a separate NRCA? Al said this would be an expansion of Morning Star.

Of concern for the WHMP (and Spada Supplemental Plan) is the future status of the North Shore Road. Currently part of the trust land system, it accesses potential additions to a NRCA. Continued maintenance then would become a problem, as it's hard to justify maintaining the road unless it serve trust lands.

Mike asked about the activities permitted within the NRCA's. Al explained that there is no specific direction. The state-wide NRCA plan calls for the existing roads to be closed and no new roads will be constructed since motorized use is limited.

Road Management and Abandonment

Dean - DNR plans to abandon all of the roads beyond Everett Creek along the Williamson Creek road. Expect everything beyond the last concrete bridge to be abandoned within the next 2 years.

The Stoney Creek road system has already been abandoned.

Mike - What does abandonment consist of?
Al/Dean - It means to take back to natural state. If there is over 50% slope/side hill, DNR will pull back the fill and put it back in place, removing all structures, pipes, bridges

(cement, log stringer, and cable), installing non-drivable water bars and triple tank traps at the beginning of the road, and revegetating the area.

The Cement Bridge Road going up the South Fork is also planned for abandonment. The 4910 road, and the system on the other side of Elk Creek, including and beyond the bridge, the spurs off the Kromona Mine road will be abandoned.

Karen - What about the time table?
Dean - All of this will be done before August. None of these changes will affect PUD's plans, but if PUD proposes any new construction, DNR will evaluate it very critically. Al explained according to Forest Practices you either abandon or maintain a road, if abandonment occurs then no liability is present.

The North Shore road from recreation Site 8 will be considered for abandonment. DNR desires shared maintenance of the road (with other property owners, i.e. PUD). Currently there is a slide across the road before Williamson Creek bridge. DNR needs to repair it to access roads they're planning on abandoning. It will be done before August.

Two other road failures include: One near recreation Site #5 near Bear Creek and one near recreation Site #2 near the repair made last year. The road is about 1/3 gone and the pipe will be replaced. DNR will be working with the PUD and County on the first project.

Future Reports/Meetings

Bernice asked agency representatives if they want annual reports/meetings to continue. Bruce mentioned that we will have annual reports each year as a management tool. This way it keeps us up to speed. Gwill stated that it is very helpful in tracking how things turn out and what changes have been made. He'd like to continue with annual reports and meetings. Bernice verified the agencies expectations regarding future reports and meetings. The District will send the agencies an annual report and if the agencies request it we will hold a meeting. Karen reminded the agencies that they are always welcome to call and come out on site.

Problems and Concerns

<u>Coarse Woody Debris</u>

Bernice explained that the PUD/City would like to get some closure on this issue. Bernice stated that the agencies have received the data promised at the December 1995 meeting, as part of the draft Annual Report.

Gwill stated that he felt comfortable with the procedure. It is not all that was envisioned previously in 1988, but as a compromise it is acceptable.
Don asked if the proposal was acceptable to all agencies. All the agencies were in agreement.

Bruce stated that there were a couple of things requested by the agencies (including a plan to monitor the survival of CWD on harvest units). He asked if they were comfortable with what they had received.

Gwill said the information provided was good. He expected there would be follow up, where we would mark some trees and monitor them long-term. He wants more details on this.

Bernice expanded on monitoring of CWD survival during harvest operation. We will be marking individual old growth logs and mapping them. The PUD has retained the services of a consultant for sampling design. Bernice is hoping to have this procedure well defined before the upcoming sale.

Gwill asked what number (of logs) we are looking at? Gwill does not expect to do every one on the site but concentrate on the more valuable ones. Will there be any photo documentation?

Bernice - We will be looking at the larger ones and probably should do photo documentation. We are using Prof. Edmonds from the UW, who has a particular interest in forest decay process, CWD surveying, and long-term monitoring.

Gwill - Do you expect to come up with a draft plan for our review before implementation?

Bernice - Yes, it will be put into writing and it will be part of the CWD management procedures.

Don asked Gary/Gwill if he/they would be writing a response to the FERC regarding CWD since the first response letter (from USFWS) went to FERC.

Gwill - Yes, a follow-up letter will be written. Bruce asked that the letter be sent to the PUD as a response to the annual report.

Summary

Bernice - Items covered in this meeting included a summary of WHMP activities, tract by tract, presentation of the City's biosolids application projects, the draft Spada Supplemental Plan, management and access concerns at Spada Lake. The co-licensees will submit an annual report to the agencies next year, and we will discuss the meeting agenda at that time.

Bernice Tannenbaum
Environmental Coordinator
Snohomish County PUD
PO Box 1107
Everett, WA. 98206-1107

Julie Stofel
Tulalip Tribes
(Pentec Environmental)
120 Third Ave S, Ste 110
Edmonds, WA. 98020

April 22, 1996

Dear Bernice:

I have reviewed the 1995 Annual Report for the Jackson Project Wildlife Management Program and the draft Wildlife Habitat Management Plan Supplement for Spada Lake. The revised Annual Report substantially addresses the concerns that I expressed in my letters of March 28 and July 27, 1995.

I appreciated the cumulative summary presented in Section 4. The snag data are presented well in table 1, which documents areas that do and do not meet WHMP size and number goals. Out of 27 stands listed, 14 had been fully inventoried. Of those, eleven (78%) met WHMP goals. It is apparently still too early to assess the success of snag creation efforts, including decay processes, use by primary excavators, and the likelihood of blowdown. A review of this information should eventually be included in annual reports. It would be nice if alternate methods of snag creation, including direct inoculation with heart rot, could be compared over time.

The new method of evaluating CWD amount, recruitment, and survival was developed using suggestions from the agency reviewers. I think this method will provide useful data in the future. I found the comparison of results using line intercept vs. plot measures to be interesting. It would be nice to see more comparative data like this, but this is more a question of academic interest than a management imperative.

There has not yet been a satisfactory method of evaluating deer browse developed for this project. A method that combines accuracy, repeatability, and ease and speed of use is difficult to find or develop. I will be very interested to see what you come up with.

Other parts of the WHMP appear to be quite successful, including revegetation, nesting boxes, and osprey nest platforms.

The draft Wildlife Habitat Management Plan Supplement for the Spada Lake tract is very detailed and appears appropriate. The monitoring methods for Spada Lake will follow the monitoring protocols developed for the WHMP. The Spada Lake supplement specifically mentions revisiting the snags every 3 years to assess condition and use. The standard operating procedure for this assessment is still in development and was not available at the time of the March 27 meeting.

The WHMP Annual Report and, to a lesser extent, the Spada Lake Supplement, illustrate

that it is difficult to manage for wildlife and timber at the same time. Even though wildlife is nominally given a predominate place in management decisions in the WHMP, the importance of timber production is reflected in the structure of the Annual Report, which is primarily a timber harvest activity report with additional information on wildlife issues. All of the Spada Lake Supplement is devoted to timber management, with only the briefest mention of monitoring the effects of the timber management plan on wildlife habitat effectiveness. It might be preferable to change the emphasis of annual reports so that wildlife-related issues (including snag and CWD inventories, revegetation monitoring, and nesting success) are presented first and in detail, while timber-related issues (including harvest and road scheduling) are presented secondarily and in less detail.

Sincerely,

Julie Stofel

Julie Stofel
Wildlife Biologist