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April 28, 2000
PUD No. 20602

Mr. Gary Engman
Washington Dept. of Wildlife
Region 4
16018 Mill Creek Blvd.
Mill Creek, WA 98012

Mr. Gwill Ging
U.S. Fish & Wildlife Service
510 Desmond Dr. S.E., Suite 102
Lacey, WA 98503

Mr. Al McGuire
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Getchell Work Center
15210 84th St. N.E.
Granite Falls, WA 98252

Mr. Daryl Williams
Tulalip Tribes, Inc.
6700 Totem Beach Road
Marysville, WA 98270

Reference: Wildlife Habitat Management Plan
1999 Annual Report
Jackson Hydroelectric Project – FERC #2157 License Article 53

Gentlemen:

A copy of the 1999 Annual Report on the Jackson Project Wildlife Habitat Management Program is enclosed for your records.

If you have any questions or concerns, please contact me at 425-783-1746.

Sincerely,

Bernice Tannenbaum

Bernice Tannenbaum
Environmental Coordinator

Enclosure
BT:nda

Cc: Mr. Don Farwell, City of Everett
Public Works Department

Bcc: Bruce Meaker
Karen Bedrossian
Mike Schutt

1999 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 2000

1999 ANNUAL PROGRESS REPORT
WILDLIFE HABITAT MANAGEMENT PLAN

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1.0 SUMMARY

1.1 MAJOR TASKS ACCOMPLISHED DURING 1999

- Tiki Sale units planted and seeded (Lake Chaplain Tract)
- Timber salvage along access roads and units adjacent to Tiki Sale units
- Completed work on Linetree Sale layout (Lake Chaplain Tract)
- Sale of Linetree Sale units
- Road constructed and right-of-way seeded for Linetree Sale units
- Donkey Damper Sale setup
- Snag inventory and creation (Lake Chaplain Tract, Lost Lake Tract)
- Snag tree monitoring (Lake Chaplain Tract, Lost Lake Tract)
- Deer forage monitoring (Lake Chaplain Tract)
- Seeding of power pipeline ROW
- Monitoring of vegetation coverage on power pipeline ROW
- Monitoring of test plantings in the Spada Lake drawdown zone
- Monitoring of nest structures
- Monitoring of revegetation and wetland sites
- Monitoring of Williamson Creek Tract
- Monitoring of biosolids application sites (Lake Chaplain Tract)
- GPS data collection on section corners (Lake Chaplain Tract)

1.2 TASKS SCHEDULED FOR 2000

- Harvest Linetree Sale units
- Replant and seed Linetree Sale units
- Complete layout and sale of Donkey Damper Sale units
- Harvest unit stocking monitoring (Lake Chaplain Tract)
- GPS data collection (Lake Chaplain Tract)
- Continue snag management program on Lake Chaplain and Lost Lake Tracts
- Snag inventory on Spada Lake Tract and Williamson Creek Tract
- Monitor nest structures
- Monitor revegetation sites
- Deer forage monitoring (Lake Chaplain Tract)
- Coarse woody debris monitoring on Lake Chaplain harvest units
- Monitor buffer zones and green tree areas in harvested units (Lake Chaplain Tract)
- Precommercial thinning at Spada Lake Tract
- Monitor precommercial thinning units (Spada Lake Tract, Lost Lake Tract)
- Layout of precommercial thinning units at Spada Lake Tract
- Plant shrubs on pipeline ROW
- Monitor vegetation coverage on pipeline ROW
- Biosolids application and monitoring (Lake ChaplainTract)

Problems or changes needed during implementation of the WHMP are discussed in this report, and updated schedules are presented. A cumulative summary of tasks accomplished since the initiation of the Wildlife Habitat Management Plan (WHMP) in 1989 is presented in this report. A draft of this report was submitted for comments to the U.S. Fish and Wildlife Service (USFWS), the Washington Department of Fish and Wildlife (WDW), and the Tulalip Tribes. The Washington Department of Natural Resources (DNR) was also consulted.

2.0 INTRODUCTION

The 1999 Annual Progress Report on the Wildlife Habitat Management Plan (WHMP) for the Henry M. Jackson Hydroelectric Project was prepared by Public Utility District No. 1 of Snohomish County (District) and the City of Everett (City), who 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 1999 and summarizes activities completed since the management program was initiated in 1989. Activities anticipated for the calendar year 2000 are described. Activities, procedures and schedules described in this report are based on the WHMP approved by the Federal Energy Regulatory Commission on May 19, 1989, in accordance with Project License Article 53 and subsequent related orders from the Commission.

3.0 WORK COMPLETED DURING 1999

3.1 FOREST VEGETATION MANAGEMENT

3.1.1 Harvest Unit Planting

The two Tiki Sale units (Figure 2), harvested late in 1998, were replanted with Douglas fir and western red cedar. The planting density was approximately 250 Douglas fir per acre and 50 cedar per acre. The units, which totaled about 45 acres, were also seeded with a grass/forb seed mix.

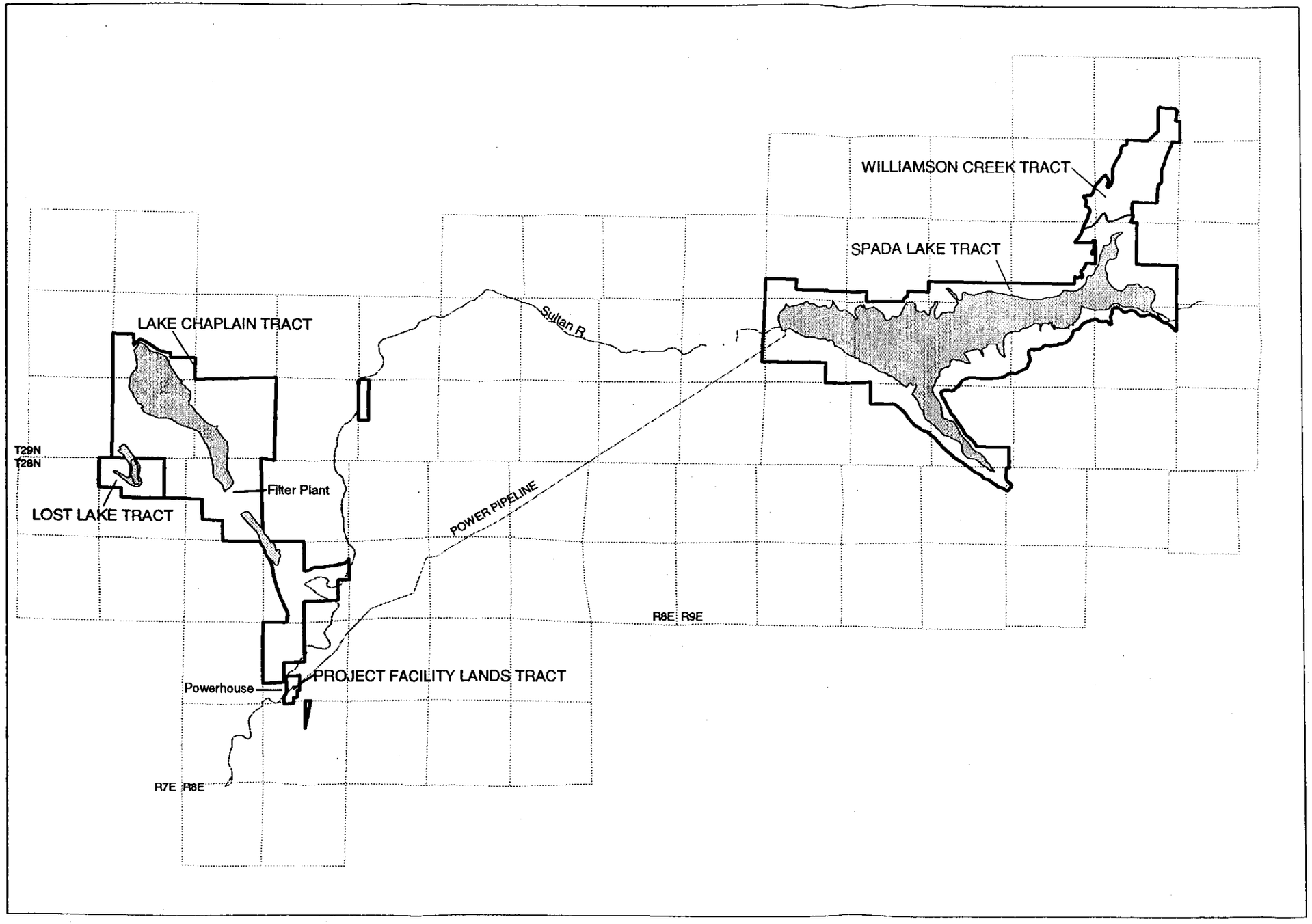
3.1.2 Timber Sales

Near the end of the logging of the Tiki Sale a strong windstorm caused some blowdown which was removed under the sale contract. This was reported in the 1998 Annual Report. After this salvage operation another strong windstorm caused additional blowdown adjacent to both units and their associated roads. This blowdown timber, (called the Blowdown Sale) was sold and removed during the summer of 1999. Upon completion of the salvage logging, the skid trails were seeded with a grass forb seed mix. Five fallen hemlocks were marked for retention as coarse woody debris in the area of the most severe blowdown adjacent to the northeast boundary of Tiki Sale Unit 2 (Figure 2).

Sale layout for the Linetree Sale (consisting of two units on the Lake Chaplain Tract totaling 37 acres) was completed in 1999 (Figure 2). Trees were selected for snag and CWD creation on unit 1 in 1998 and on Unit 2 in 1999, and hardwoods were marked for retention. GTA trees were inventoried in 1999 on both units. The timber on these units was sold to Buse Timber and Sales, Inc. in 1999.

HENRY M. JACKSON PROJECT
WILDLIFE HABITAT MANAGEMENT PLAN

FIGURE 1. MANAGEMENT TRACTS



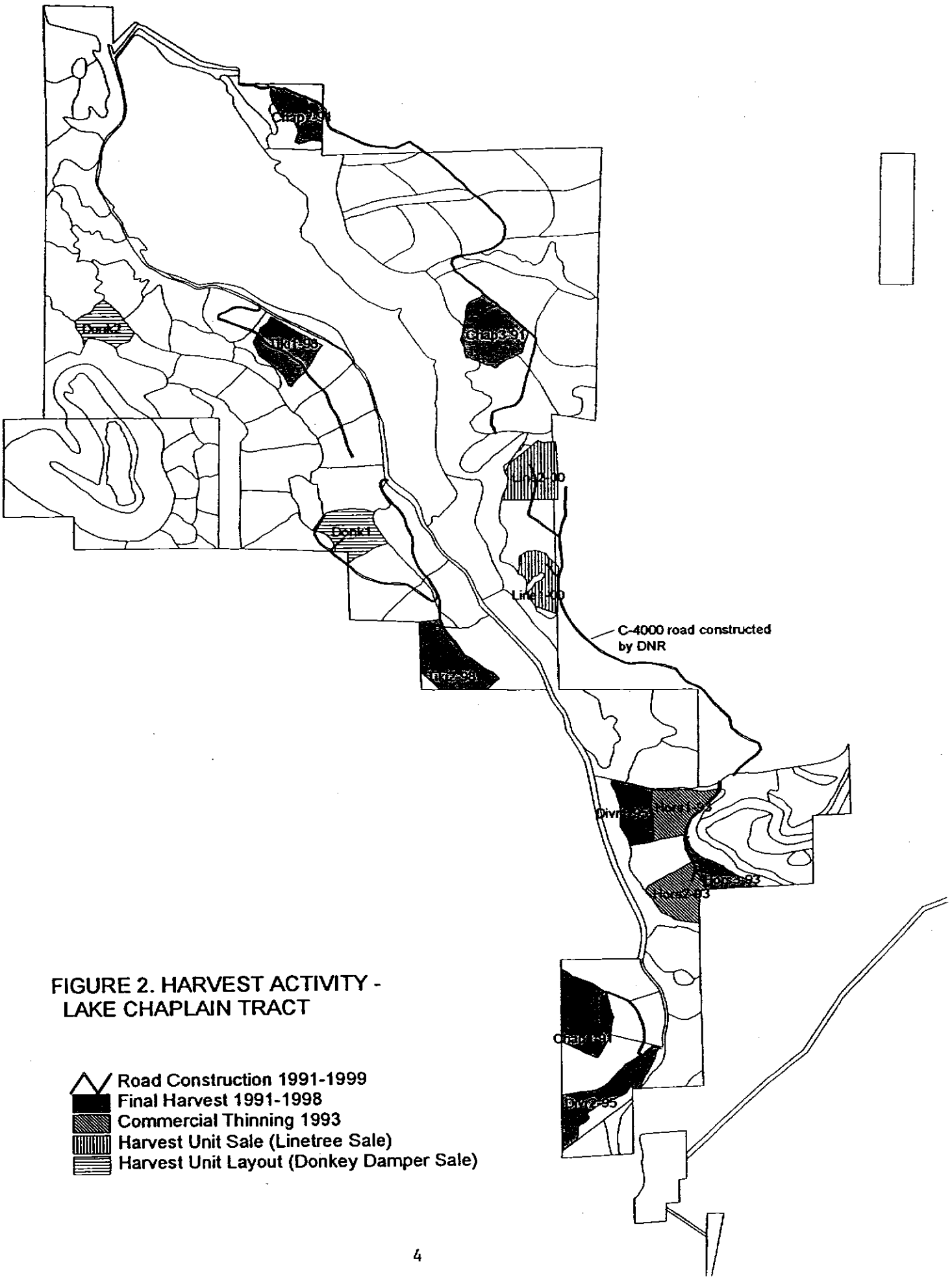


FIGURE 2. HARVEST ACTIVITY - LAKE CHAPLAIN TRACT

3.1.3 Road Construction

Road construction for the two Linetree Sale units was completed during August-September 1999, and harvest is expected to take place early in 2000.

3.1.4 Sale Layout

Preliminary sale layout for two units of the Donkey Damper Sale on the west side of the Lake Chaplain Tract started in 1998 and continued in 1999 (Figure 2). Approximately 90 percent of the road location has been identified for this sale. Activities include marking the boundaries of PMF-1, which is adjacent to the proposed road alignment, and layout of buffer zones and a GTA for unit one of the sale. Layout work on the second harvest unit will be completed in 2000 and the timber will be offered for sale.

3.1.5 Spada Lake Precommercial Thinning Layout

Two units on the Spada Lake Tract totaling about 38 acres were selected for precommercial thinning (Figure 3). The prescription for thinning calls for retaining all hardwoods (other than alder), and thinning conifers to an average spacing of 14 feet. All shrubs and some large alders, plus all snags that are safe to work under, will be retained. The contractor was unable to begin work in 1999 as planned due to snow accumulation on the site, and is expected to complete the thinning early in 2000.

3.1.6 Survey Work

A portion of the north property line of the District's Lost Lake Tract was located, blazed and painted. This work was completed using information provided by the DNR from the survey they completed in the area. This line will be used as a boundary for future timber sales or other management activities.

3.2 SNAG MANAGEMENT

3.2.1 Snag Inventory and Creation

In 1999, 370 snags were created on five units totaling 225 acres on the Lake Chaplain and Lost Lake Tracts (Figure 4, Table 1). Inventories of existing snags were conducted on these units during 1998. Snags had been created in two of the units in previous years, but additional snags were needed to complete the requirement of at least three snags per acre.

As in past years, trees were topped with a chainsaw, typically between 50 and 60 feet high. Alders were occasionally girdled at 30 to 40 feet due to concern for the safety of the tree topper. It is expected that these trees will break off at this point within a year or two. After being topped or girdled, all snags were tagged, painted, and their location mapped for future monitoring.

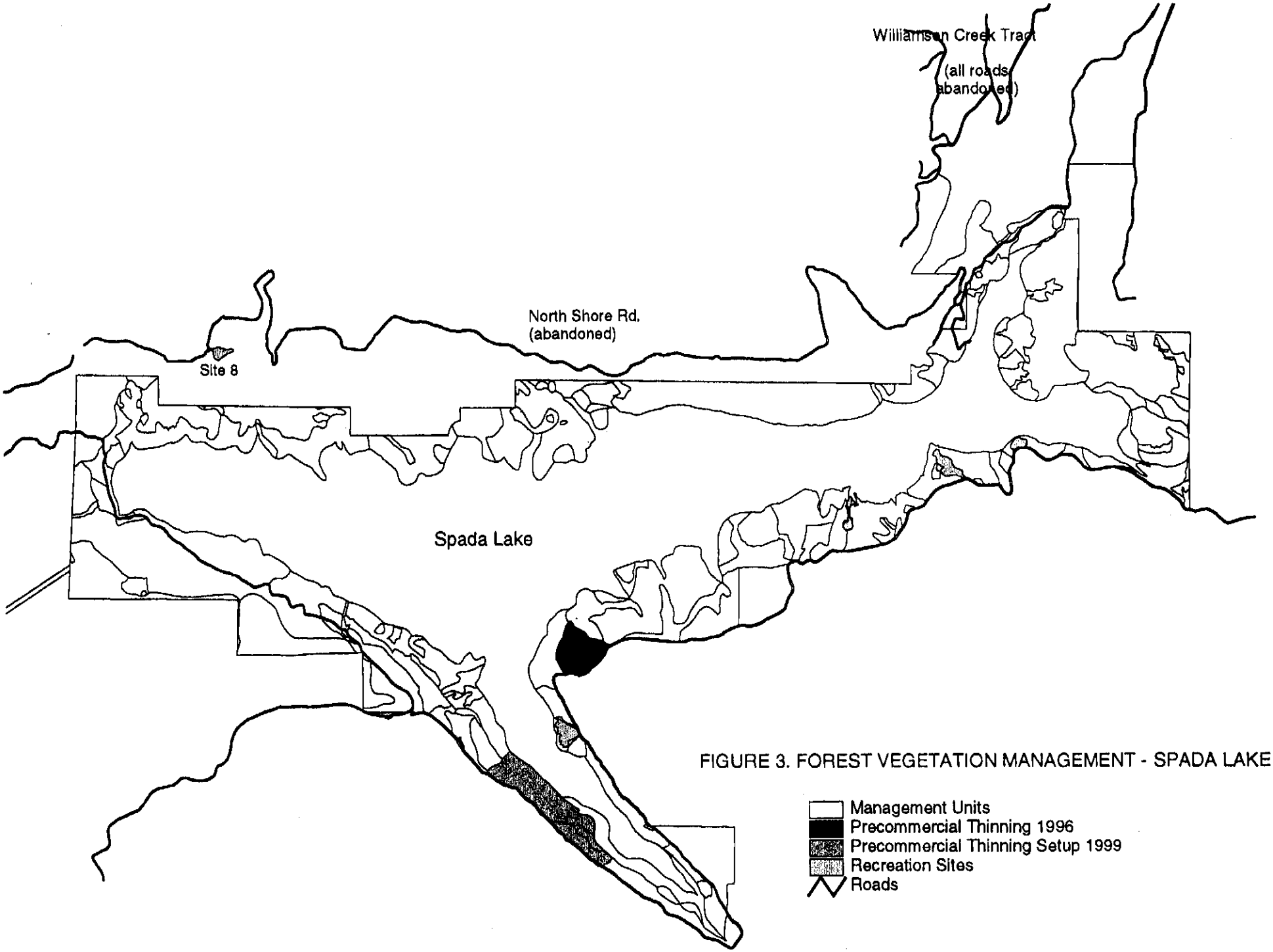


FIGURE 3. FOREST VEGETATION MANAGEMENT - SPADA LAKE

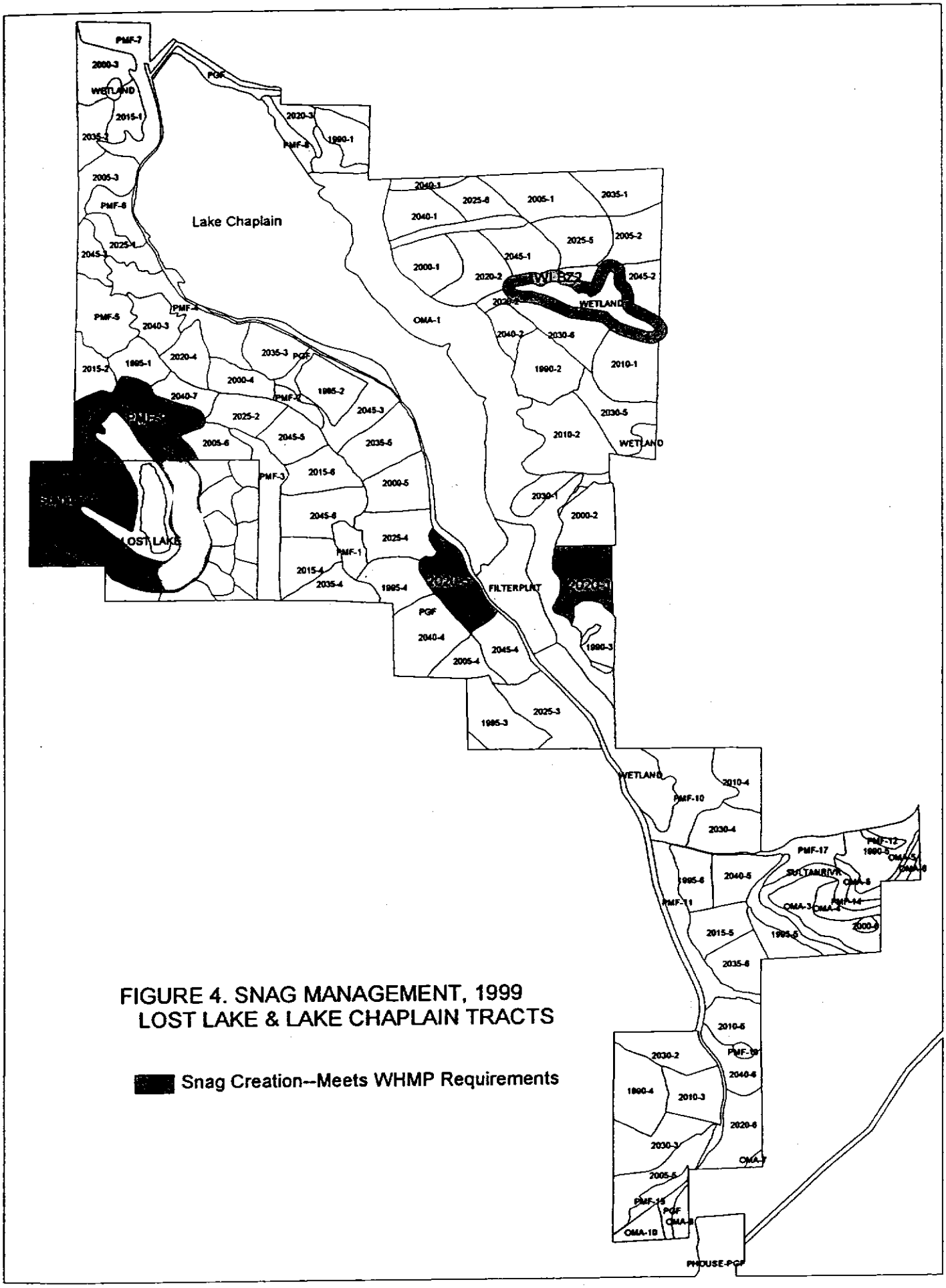


FIGURE 4. SNAG MANAGEMENT, 1999
LOST LAKE & LAKE CHAPLAIN TRACTS

Snag Creation--Meets WHMP Requirements

Table 1. SUMMARY OF SNAG MANAGEMENT IN 1999						
UNIT	ACRES	NUMBER CREATED	AVG. DBH (in.)	AVG. HT. (ft.)	# PER ACRE	NOTES
2020-1	24.0	50	16.9	61.9	4.9	√ Includes natural and created snags
2020-5	19.1	15	19.1	61.4	9.8	√ Includes natural and created snags
Lost Lake 7-1	93.7	205	18.1	62.2	3.3	√ Includes natural and created snags
PMF 9	52.2	35	17.3	54.9	3.1	√ Includes natural and created snags
Wetland Buffer 2	35.5	65	17.2	56.4	3.1	√ Includes natural and created snags
TOTALS	225	370				

3.2.2 Long-Term Monitoring

Long term monitoring of created snag trees continued in 1999 following the procedures that were finalized in 1997. For this monitoring, subsets of snag trees were selected that represent the different species, size classes, position within stands (edge of clear-cut, interior of clear-cut, or interior of forested stand), and time since the snag was created. The effects of these variables on the type of use by wildlife species, and the physical changes in the snags themselves are being tracked.

A subset of 252 snags that were created or that died naturally from 1991 to 1997 was monitored to study wildlife use and other decay processes (Table 2). Each tree will be visited at 3-year intervals; to date, each of the trees in this subset has been monitored once. Most observations were close to the base of the tree and some wildlife use probably went undetected; even with binoculars it is difficult to detect animals under loose bark at the tops of the snags. Within 3 to 5 years from the death of the tree, over 40 percent of trees were used by woodpeckers for foraging and/or nesting. Trees were also used by a variety of insects, including wood-boring beetles and overwintering larvae. Other invertebrates such as spiders, worms and millipedes were present under loose bark.

Decay processes first showed as fungi growing on the bark of otherwise intact trees within 2 to 3 years of the tree's death. The majority of snags in this sample, which covered a 9-year range of ages, were in decay class 1. (Figure 5).

Table 2. WILD USE OF CREATED SNAGS

Snag Age	# snags	Woodpecker use % all trees		Other wildlife use % of all trees	
1	8	12.50		25.00	
3	26	42.31		3.85	
4	59	40.68		10.17	
5	58	43.10		25.86	
6	44	65.91		20.45	
7	26	61.54		0.00	
8	17	88.24		35.29	
9	14	64.29		7.14	
Total	**252**	**51.59**		**15.87**	

3.3 COARSE WOODY DEBRIS MANAGEMENT

Existing CWD in decay classes 3 and 4 were marked and photographed during sale layout on each unit of the Linetree Sale for monitoring post-harvest. The objective of this monitoring is to determine the effects of logging on existing CWD, similar to the monitoring that took place on the Tiki Sale units that were logged in 1998.

Long-term monitoring of created CWD (i.e. live trees felled after harvest to create large logs on the ground) was done on two Lake Chaplain units harvested in 1995, following procedures finalized in 1997. For this monitoring CWD trees were inspected and

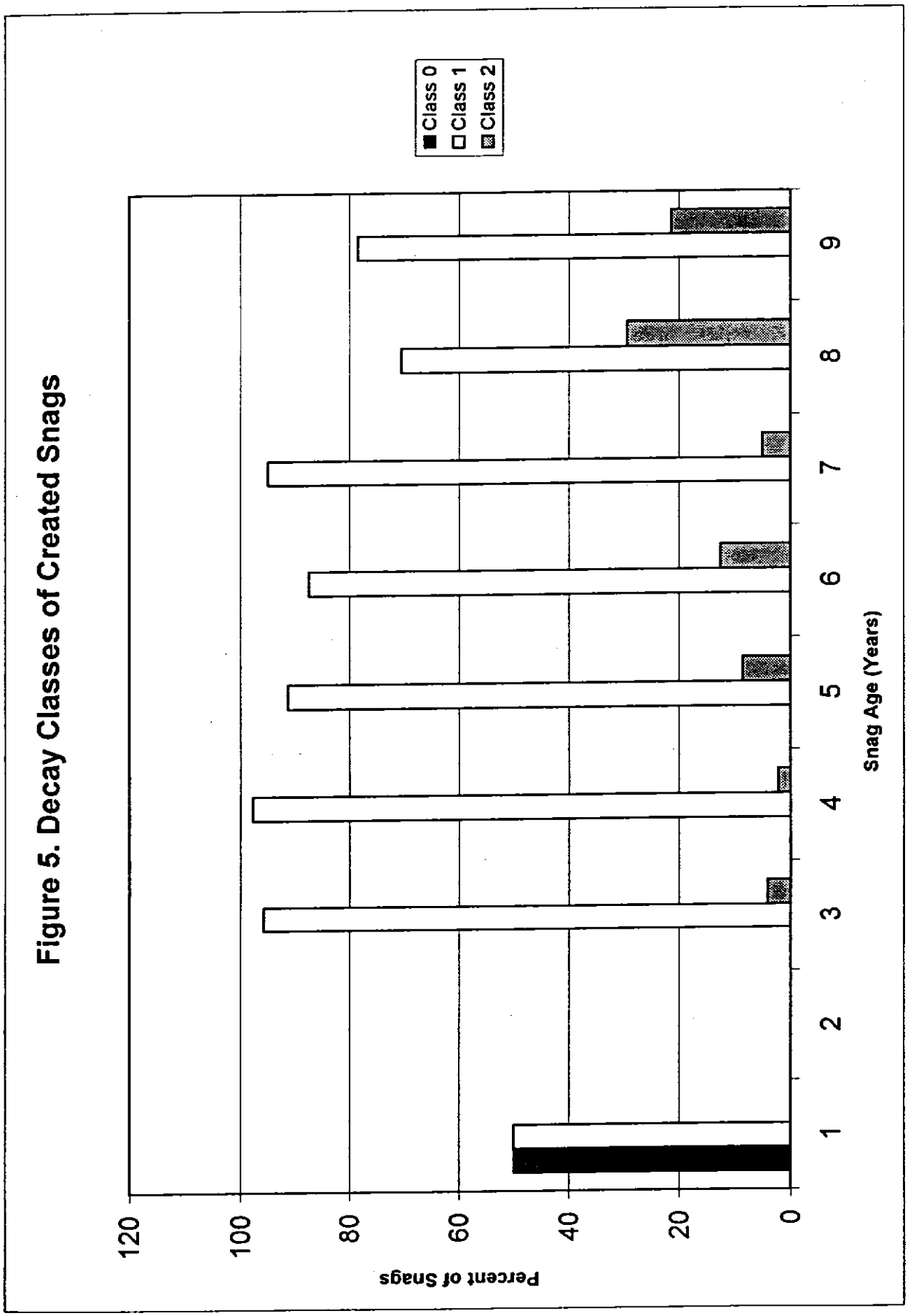


Figure 5. Decay Classes of Created Snags

measured to determine the state of decay processes. Thirty-seven trees were examined in 1999, all of which were in decay class 1. Bark had loosened or split in 18 of the trees, frequently at the edges of a break or other mechanical damage. Sapwood under the loose bark was hard. Seven of these logs hosted various fungi, insect eggs, grubs, cocoons springtails, small worms and centipedes in the moist space between the bark and sapwood. Several trees with intact bark had shelf fungi present, indicating sapwood decay.

3.4 REVEGETATION

Activities in 1999 consisted of monitoring previously revegetated sites, seeding the right of way, and quantitative measurements of the right of way. Details of the original plantings were described in earlier annual reports, and are summarized in Section 4 of this Annual Report.

3.4.1 Spada Lake Drawdown Zone

Wetland emergent species were planted from 1430 ft. to 1445 ft. in 1994. At that time there was very little vegetation present in this zone at the two planting sites. The sites have been monitored annually since planting, and the results reported in Annual Reports. The test plantings at the North Fork site were monitored in September 1999. As in 1998, five planted rows of sedges (Carex obnupta and C. rostrata) were present and all had volunteer sedges in addition to the planted sedges. We found few sedges anywhere on the site that were not in close proximity to the planted rows. We conclude that most sedges on the site propagated vegetatively from the planted sedges. The sedges, whether planted or volunteers, grew best between 1438-1441 ft. elevation.

Scirpus microcarpus (small fruited-bulrush) plantings survived in one row, in which volunteers were too numerous to count. As we reported in the 1997 Annual Report, this species is so widespread on the site (and elsewhere in the Spada Lake drawdown zone) that we do not attribute its coverage to our plantings. The 1997 Annual Report lists other volunteer species that have become established over time on the North Fork site. The dominant species include Scirpus microcarpus and Eleocharis acicularis (needle spike rush). Phalaris (reed canary grass) has become established at the upper end of the drawdown zone (around 1441 feet) but has not spread to lower elevations.

Plantings at Williamson Creek were monitored in September 1999. Observations were similar to those reported in the 1997 and 1998 Annual Reports. Most of the planted slough sedge (C. obnupta) at Williamson Creek have survived, and volunteers have filled in and adjacent to these rows above the 1436 ft. elevation. Reed canarygrass has become established above 1441 ft. The dominant ground cover species on this site is a horsetail species. Small-fruited bulrush and Carex obnupta are the dominant species among the grasses, similar to the North Fork site.

3.4.2 Power Pipeline Right-of-Way

Areas of bare soil were seeded again this year with the same seed mixture used in previous years[1]. A half-acre area adjacent to manhole P10 was re-seeded after topsoil

[1] Seed mix: 25% annual rye, 25% perennial rye, 20% tall fescue, 30% clover mixture.

was imported and bladed out to about 6 inches deep (Figure 6). The previous soil was composed mainly of small pebbles and sand, and dried out quickly each year, confounding efforts to produce a grass/forb layer

The pipeline ROW was not mowed this year due to other time commitments on the part of the powerhouse staff. Vegetation monitoring was performed in late July to document the effects of ROW management. Results were similar to those obtained in 1998: bare soil (29.9%), grasses (29.8%), asters (15.2%), mosses (10.8%) and trefoils (6.3%) were the most widely represented cover types. The remainder was comprised of various composites, seedlings and small shrub species.

Shrubs were planted in 1997, consisting of 19 plants (6 red-osier dogwood, 7 swamp rose, 6 serviceberry). Additional shrubs were planted in 1999 in groups of 3-4 plants scattered over the entire ROW. These plantings included red-flowering currant, red-osier dogwood, beaked filbert, rugosa rose, and Pacific ninebark.

3.4.3 Chaplain Marsh

Shrubs were planted along the western edge of Chaplain Marsh in 1993 to create a vegetative screen between the Lake Chaplain road and the marsh, and to provide a food source for fruit- and seed-eating birds. Species planted included red-osier dogwood, English holly, huckleberry, serviceberry, Nootka rose, red-flowering currant, and western red cedar. Plantings and volunteer shrubs were counted in June 1999 and compared to the original plantings in 1993 (Table 3).

3.4.4 Powerhouse Site

Ten mast/fruit tree groups and ten shrub/tree groups were established near the Powerhouse in 1993 and 1994. Species included Oregon ash, western crabapple, black hawthorn, red-flowering currant, serviceberry, Nootka rose, and red huckleberry. Five cascara, eight crabapple and one serviceberry were added in the shrub/tree groups in April 1997. The plantings were not monitored in 1999.

3.4.5 North End Lake Chaplain

Douglas fir and western red cedar seedlings were planted in 1992 at the north end of Lake Chaplain to provide a visual screen between the lake and the adjacent road. Red alder trees established in and around the conifer hedgerow over time, and overtopped the western red cedars. Alders growing within ten feet of the planted conifers were cut down in July 1998. The plantings were monitored in September 1999. There has been no mortality of the planted trees since 1998.

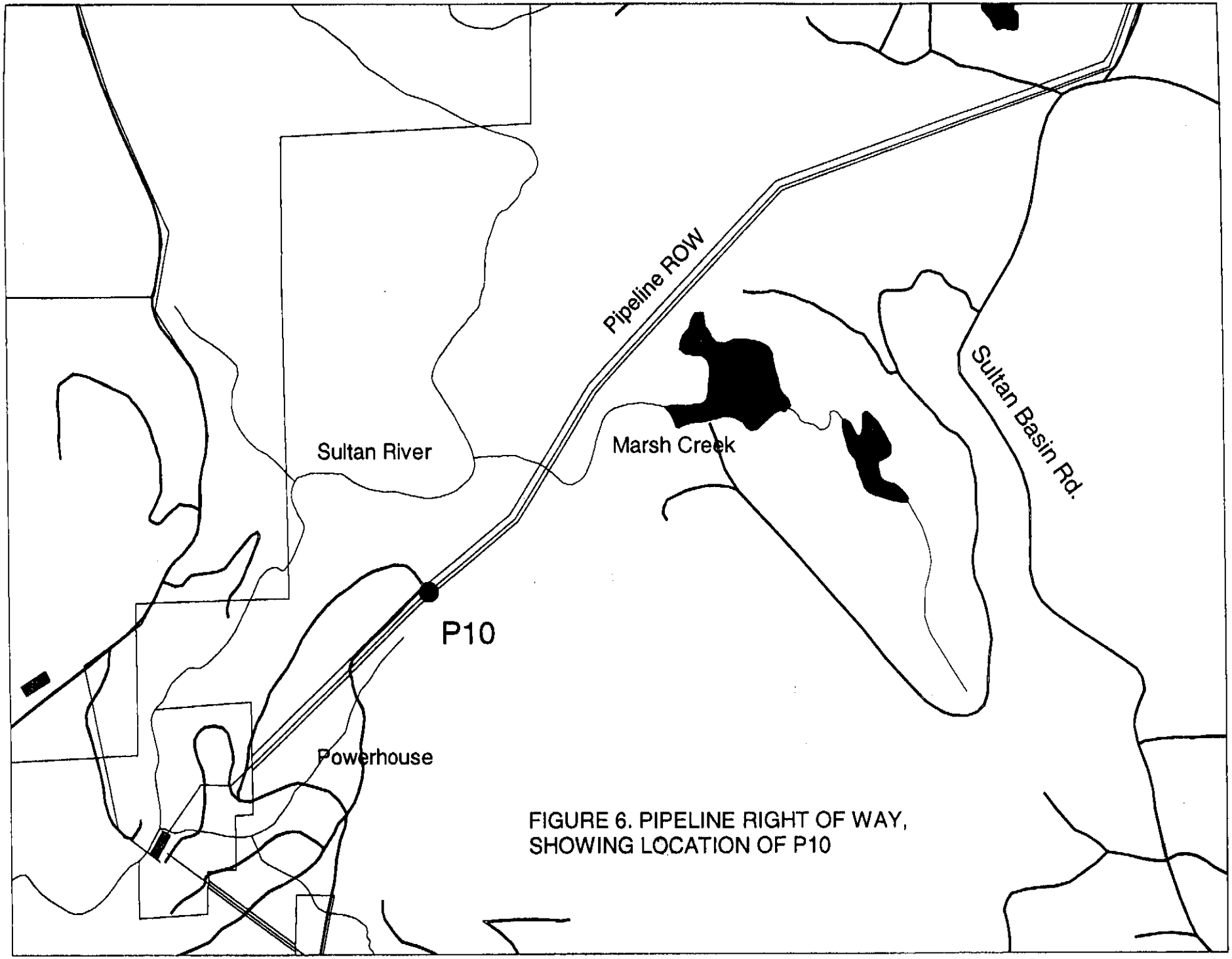


FIGURE 6. PIPELINE RIGHT OF WAY, SHOWING LOCATION OF P10

Table 3. SHRUB PLANTINGS ADJACERNT TO CHAPLIAN MARSH		
Species	**# Planted**	**# Counted in 1999**
Western Red Cedar	400	128
English Holly	150	127
Red Huckleberry	130	147
Serviceberry	130	43
Red-osier Dogwood	130	97
Nootka Rose	130	7
Red-Flowering Current	130	0
Black Hawthorn	Unknown number planted in mid-1980s	65
Vine maple	Unknown number planted in mid-1980s	53
Pacific willow	Unknown number planted in mid-1980s	TNTC
Western Hemlock	Volunteers	9
Douglas fir	Volunteers	3
Big-leaf Maple	Volunteers	19
Twinberry	Volunteers	5
Red-osier Dogwood	Volunteers	TNTC
Serviceberry	Volunteers	TNTC
Spirea	Volunteers	TNTC
Thimbleberry	Volunteers	TNTC
Salmonberry	Volunteers	TNTC
Other willow spp	Volunteers	TNTC
Trailing blackberry	Volunteers	Sparse
Vine Maple	Volunteers	TNTC

3.5 NEST STRUCTURES

3.5.1 Floating Nest Platforms

District staff monitored the two platforms at Lost Lake (Figure 7) and the one platform on the Williamson Creek Arm of Spada Lake (Figure 8). District biologists did not observe wildlife use of any of the floating platforms in 1999 during the monitoring periods or at other times. Canada geese, mallards (with ducklings), hooded mergansers, and bufflehead were observed on Lost Lake. Canada geese and hooded mergansers were observed in 1999 on Spada Lake.

3.5.2 Nest Boxes

The nest boxes at Lost Lake (Figure 7), Spada Lake (Figure 8) and Chaplain Marsh (Figure 9) were maintained and monitored by District staff during the 1999 nesting season. One box in Chaplain Marsh fell down and was moved to Wetland Buffer 2

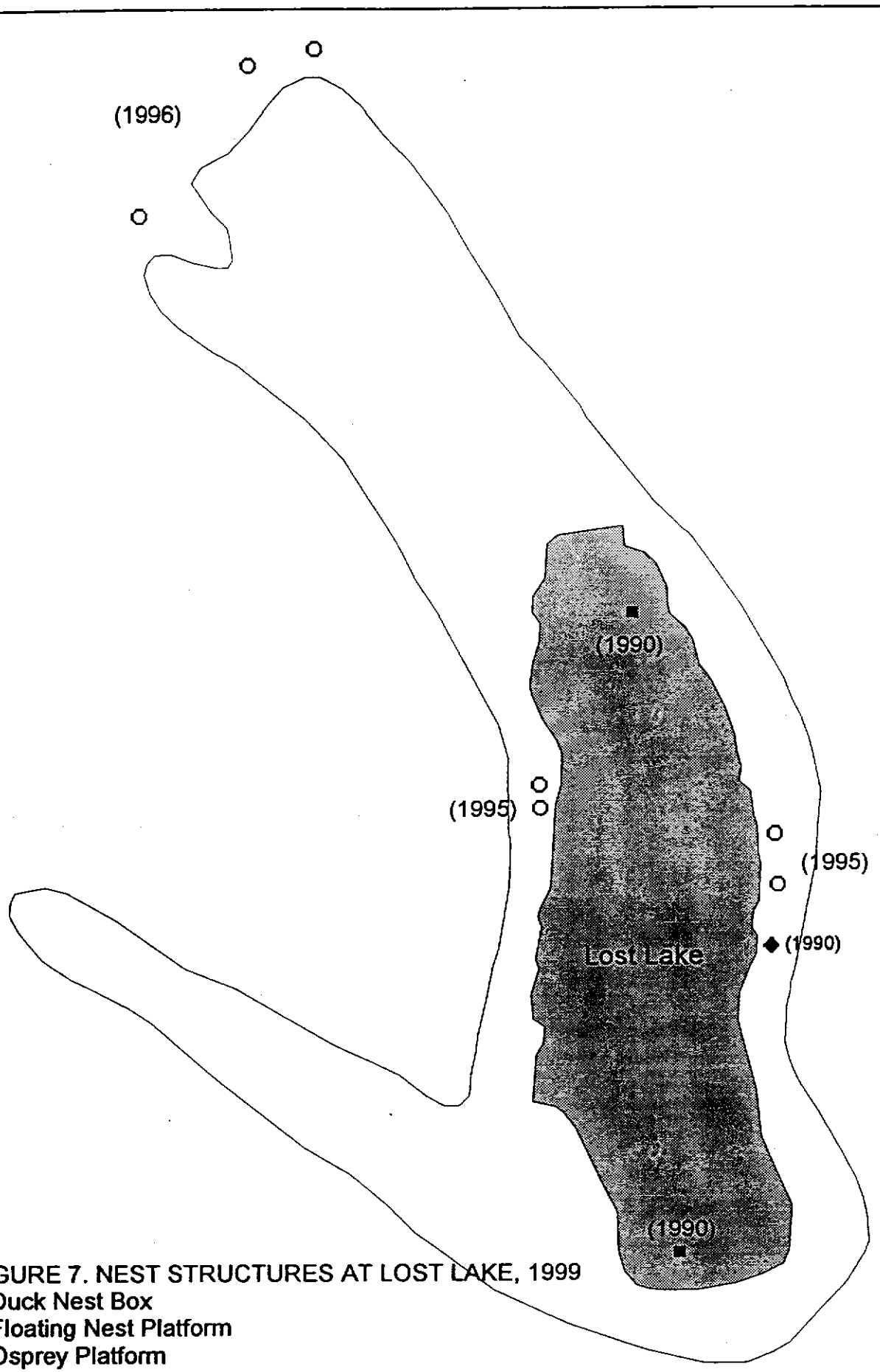
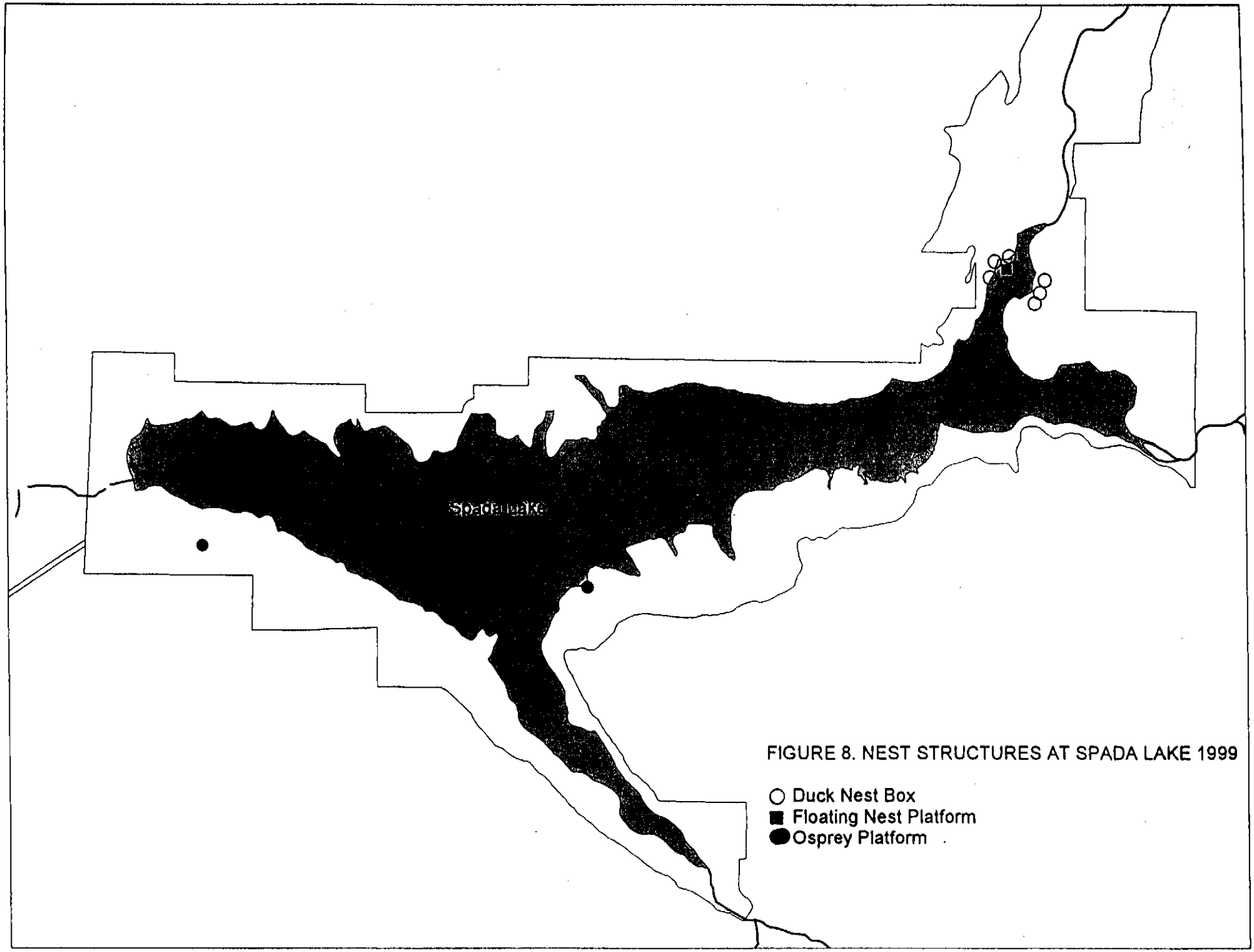


FIGURE 7. NEST STRUCTURES AT LOST LAKE, 1999
○ Duck Nest Box
■ Floating Nest Platform
◆ Osprey Platform


Spada Lake
FIGURE 8. NEST STRUCTURES AT SPADA LAKE 1999
Duck Nest Box
Floating Nest Platform
Osprey Platform

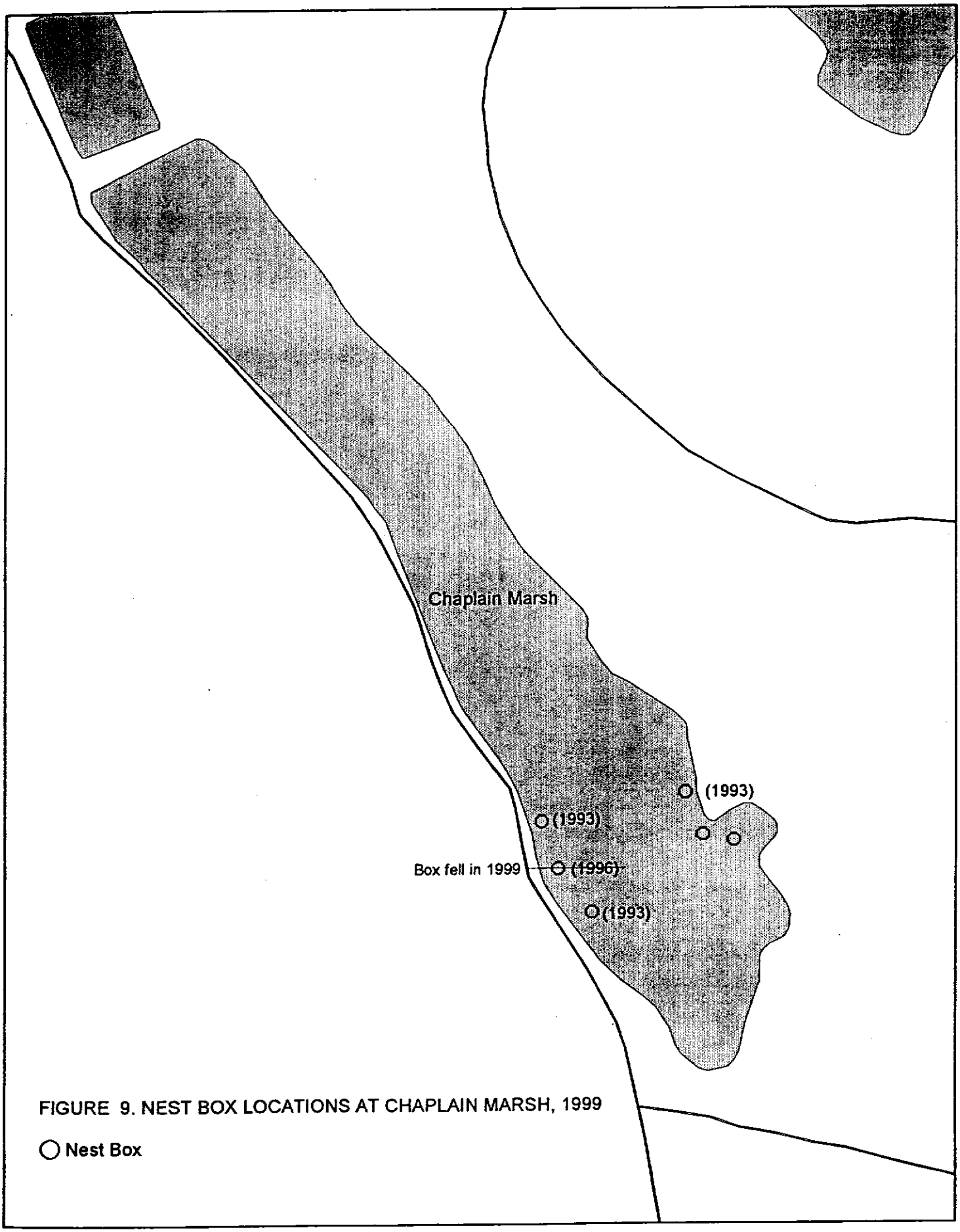


FIGURE 9. NEST BOX LOCATIONS AT CHAPLAIN MARSH, 1999

○ Nest Box

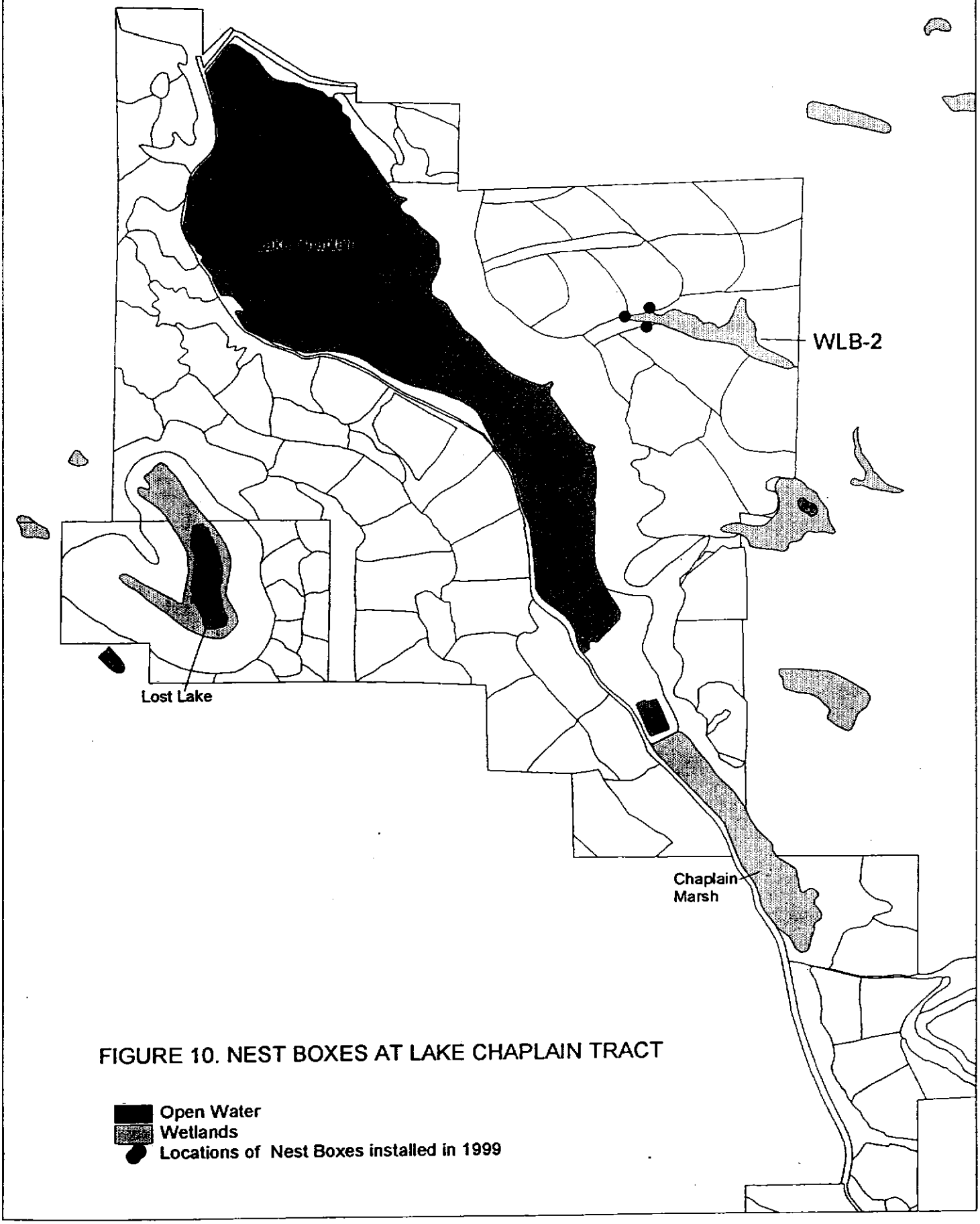


FIGURE 10. NEST BOXES AT LAKE CHAPLAIN TRACT

(WLB-2) on the Lake Chaplain Tract (Figure 10). Two additional boxes were installed at WLB-2; one fell shortly after installation and was not available for nesting for the entire season. Production was estimated by examining eggshell remains in the boxes. A nest box was considered successful if the contents of the box showed that at least one duckling had successfully fledged from the nest box (egg membrane present, no presence of duckling remains).

Nesting results are summarized in Table 4. Wood ducks used one of the boxes at Lost Lake. All of the other nest boxes at Lost Lake except for one had nests dished out in them, but no further use. Wood ducks used two of the nest boxes at Chaplain Marsh, but in one of those boxes, 12 eggs were abandoned before hatching. Similar to Lost Lake, nests were dished out in all of the other boxes at Chaplain Marsh, but no further signs of nesting were observed. No signs of nesting were observed at Spada Lake. During May and June monitoring a screech owl was observed setting on an unknown number of eggs. In August one cold egg was observed in the box. In 1999, 2 boxes were used successfully with 21 ducklings successfully fledged from the nest boxes.

Table 4. USE OF NEST BOXES AT LOST LAKE AND CHAPLAIN MARSH.

Site	Number of Boxes	Number of Boxes with Duck Eggs	Number of Successful Boxes	Number of Eggs Hatched by Species	Number of Boxes Used by Other Species
Lost Lake	7	1	1	8 wood ducks	1 (squirrel nest removed 3/99)
Chaplain Marsh	5	2	1	13 wood ducks	0
Spada Lake	6	0	0	0	1 (screech owl)
Wetland 2	2	0	0	0	0
Totals	20	3	2	21 wood ducks	2

3.5.3 Osprey Nest Platforms

District staff monitored the osprey nest platform at Lost Lake from the opposite side of the lake during spring and summer 1999. A pair of ospreys were observed in the vicinity of the platform in late April. An immature bald eagle was also observed at the same time. One of the osprey was observed chasing the bald eagle. Osprey were not observed on or near the platform during May and June surveys. An immature bald eagle was observed flying past the nest platform and in the vicinity during the 2 June 1999 survey.

No osprey activity was observed on the two nesting platforms at Spada Lake. However, a natural nest in the gorge downstream of Culmback Dam has been occupied since 1996. It was observed during the 1999 surveys that the original nesting snag was gone, but osprey were nesting on a snag further south on the same hill. Because of its distance from vantage-points at Spada Lake and weather conditions, it has been difficult to determine whether the pair has produced offspring.

3.5.4 Bald Eagle Nesting

The bald eagle nest established in 1997 on the Lake Chaplain Tract was occupied again in 1999. Two eaglets hatched at the end of May and were last observed in the nest on August 26th. This date would be very close to the expected date of fledging.

3.6 MONITORING OF BIOSOLIDS APPLICATION SITES

The City of Everett applied biosolids to units Hors2-93 (scheduled for final harvest in 2035) and Hors1-93 (scheduled for final harvest in 2040) in the Lake Chaplain Tract between August 29 and September 21 of 1996. The units and the application procedure were described in the 1996 Annual Report.

Vegetation monitoring was conducted on sample plots established in 1996 in the two application units and control plots southwest of unit Hors2-93. Monitoring procedures were described in detail in the 1996 Annual Report. Understory cover and height were measured in June 1997, late August and September of 1997, mid-September 1998, and mid-September 1999. Percent cover increased in the control and in unit Hors2-93 from September 1997 to September 1999 (Figure 11). Unit Hors1-93 has remained at about 120 percent understory cover. September 1999 data indicate all three stands have approximately 120 percent cover. Analysis of palatable species present on the site showed an increase in total percent palatable species cover from 1997 to 1998 in units Hors2-93, Hors1-93 and in the control units of 23, 14 and 3 percent respectively. Total percent palatable species were not greatly different in 1999. Understory plants increased in height in the treated plots but no increase in average height growth was seen in the control plots (Figure 12).

Water quality data was collected from August 1996 through November 1999. Nitrates in both upstream and downstream sampling points remain low (Figure 13). Nitrate levels at the downstream sampling point were slightly higher than nitrate levels upstream for both pre-and post-application sampling, with the exception of September 1997, March 1999 and June 1999 sampling events. Biosolids application did not appear to affect the seasonal pattern of nitrate concentration in Chaplain Creek. Fecal coliforms also remained low (Figure 14). No biosolids effect on water quality is apparent.

3.7 DEER FORAGE MONITORING

Deer forage availability was sampled in July 1999 on Unit 1 of the Chaplain Sale. This unit was harvested in 1991 and its forage availability was sampled in 1997. An adjacent unharvested stand, sampled in 1997, serves as the control for this unit. The most significant changes since 1997 include decreases in the availability of palatable species including fireweed, *Rubus* species, and various forb species (Figure 15). Conifers and hardwoods, especially Douglas fir, have grown up to the point that the majority of sampled plots contained a tree > 6 ft. Stem counts on five 1/100th acre plots ranged from

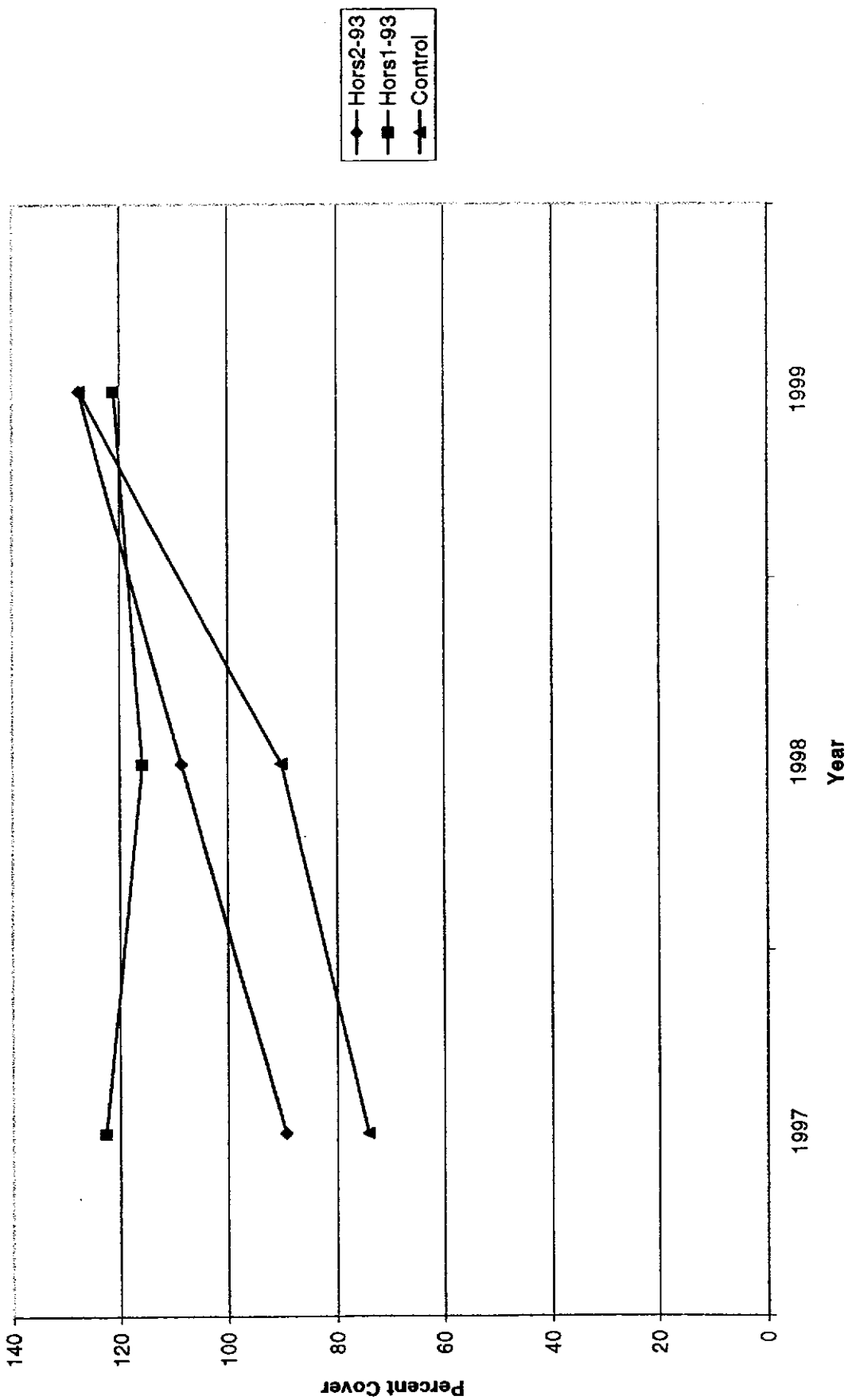


Figure 11. Biosolids Monitoring - Understory Percent Cover

Figure 12. Biosolids Monitoring - 1997-1999 Height Growth

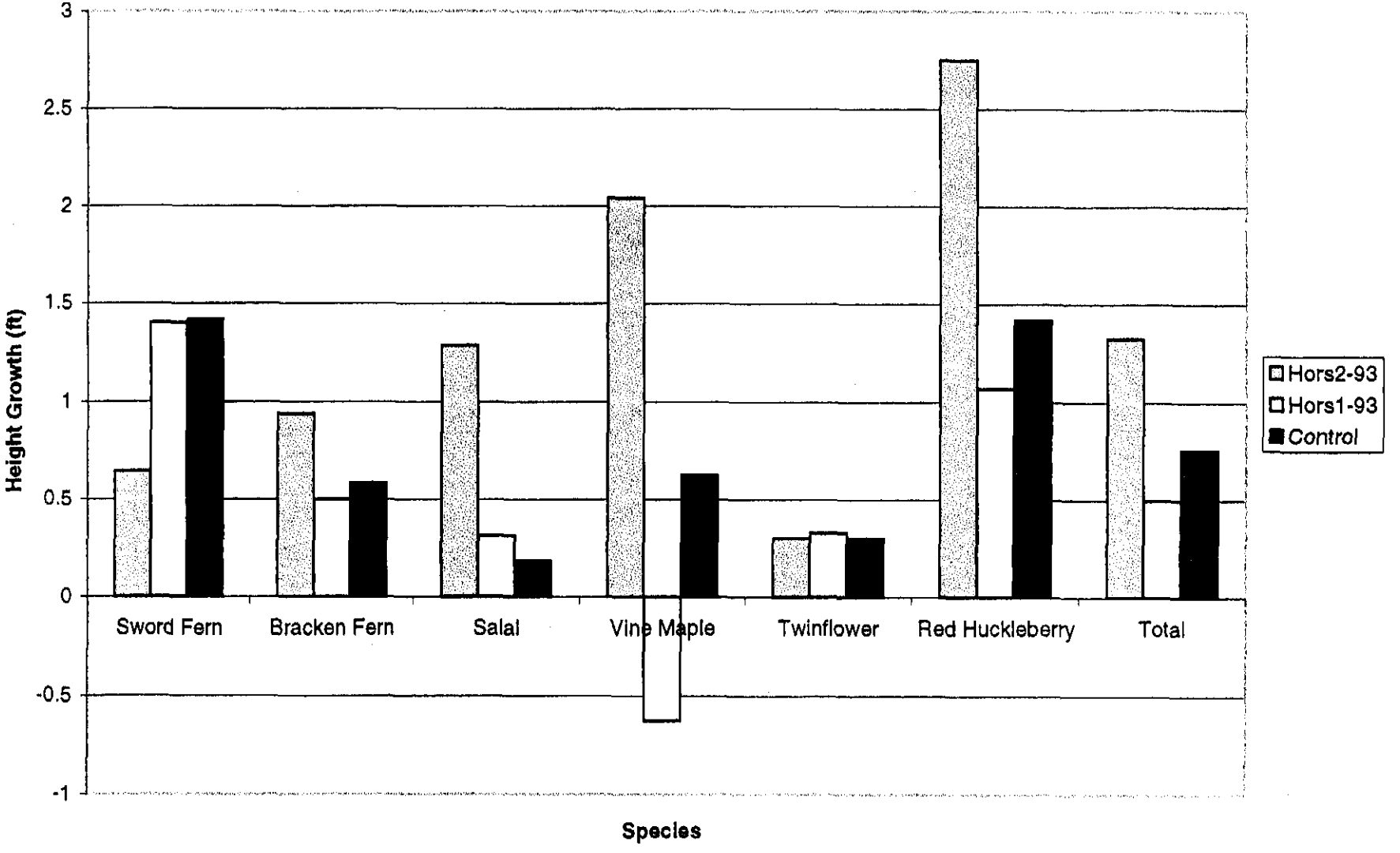


Figure 13. Biosolids Monitoring - Nitrates (mg/L)

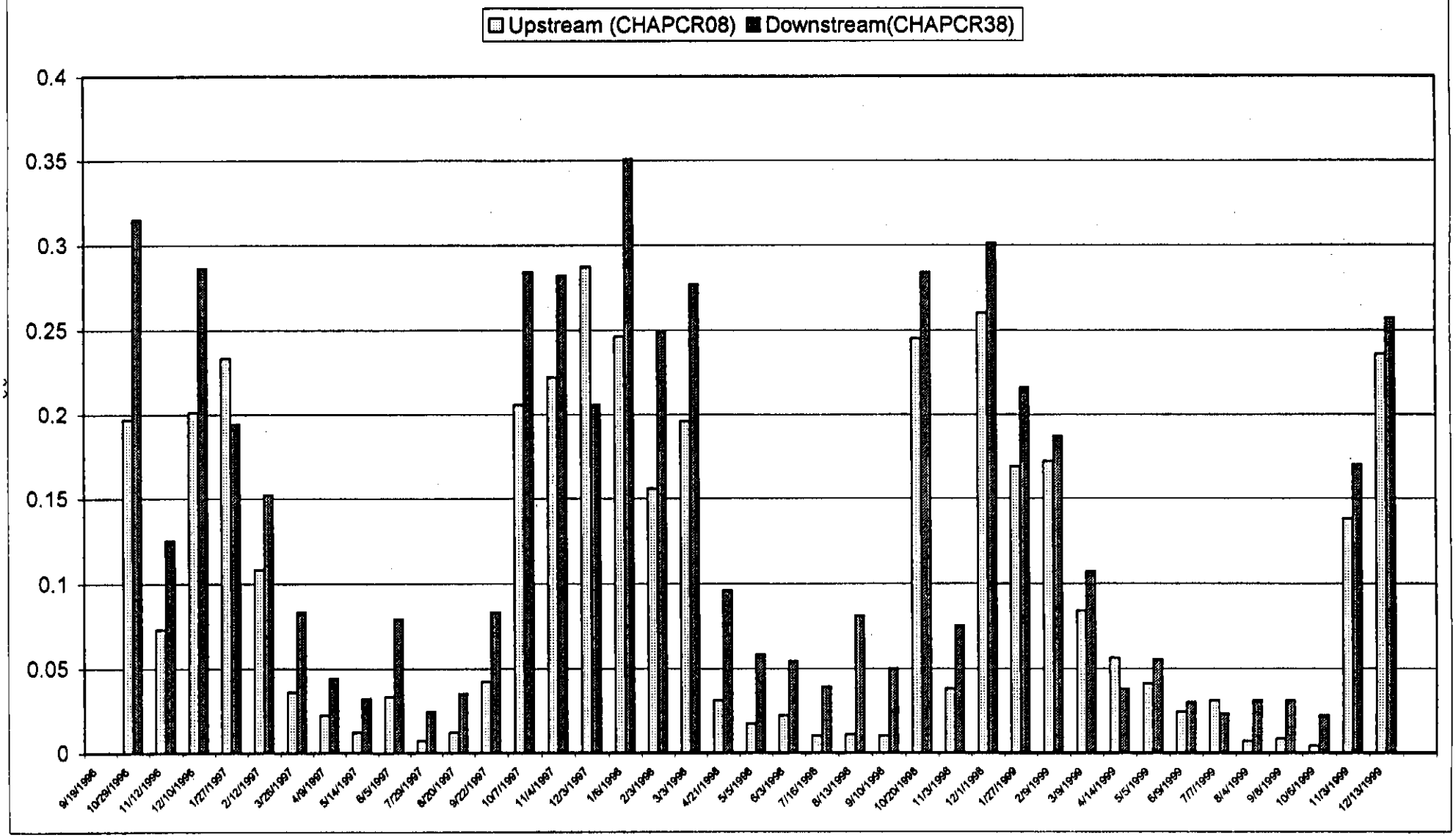


Figure 14. Biosolids Monitoring - Fecal Coliforms (CFU/100mL)

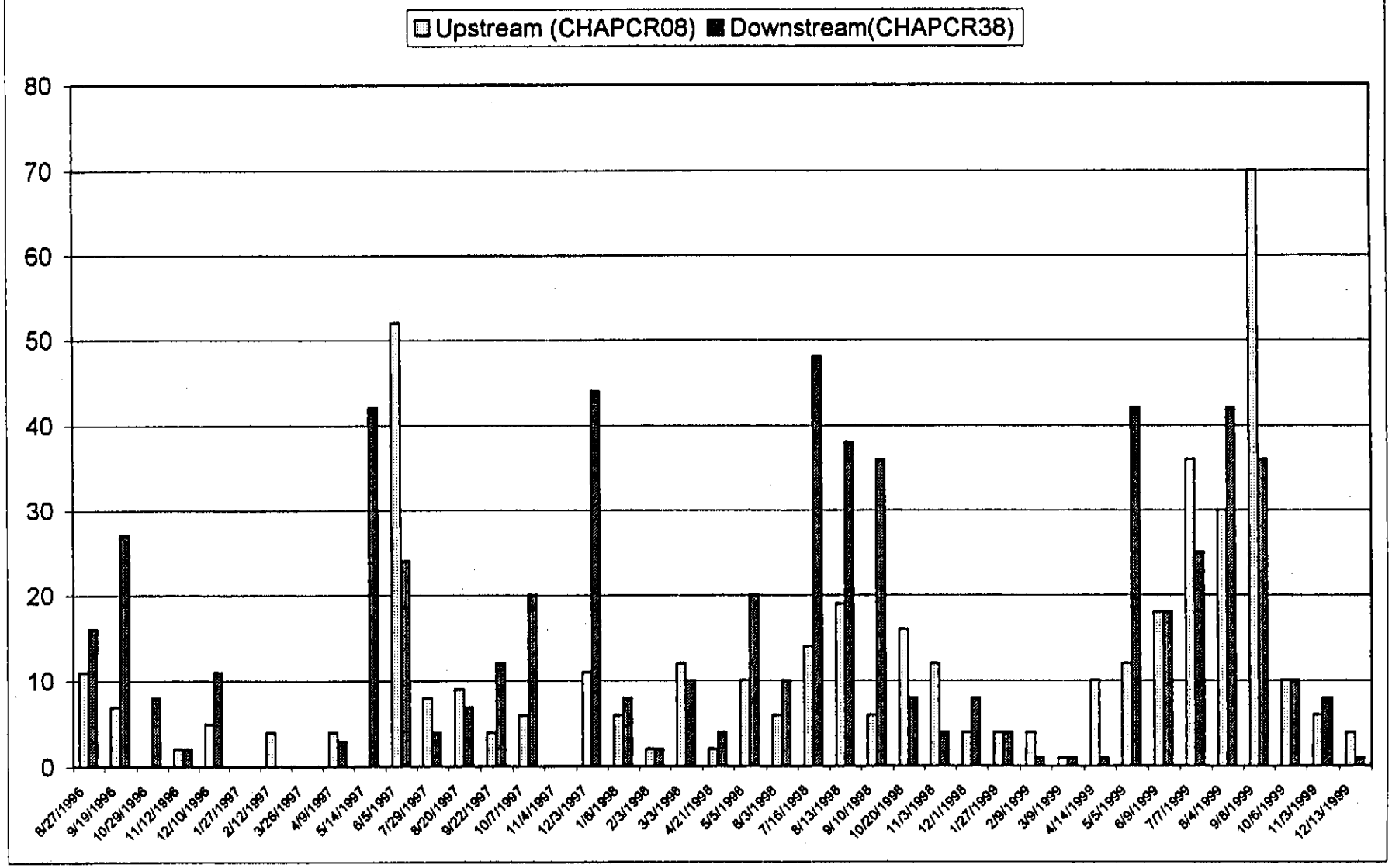
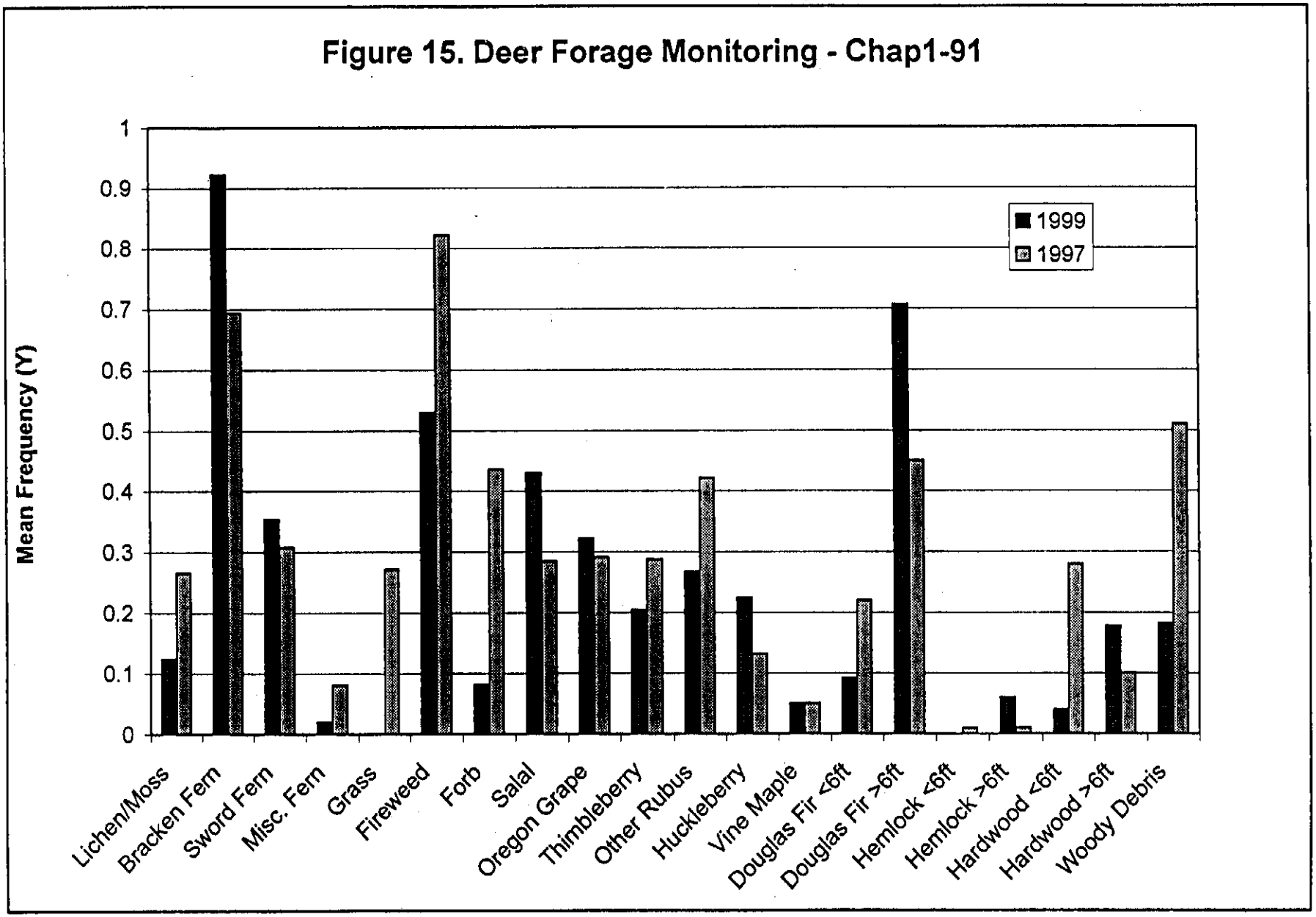


Figure 15. Deer Forage Monitoring - Chap1-91



d:\data\excel\forage\chap1-91

1200 trees/acre to 2800 trees/acre. The frequency of occurrence of bracken fern also increased on the unit since 1997.

Deer forage availability was sampled on Unit 1 of the Linetree Sale in July 1999. Sword fern (80%), moss (71%) and non-vegetated (40%) including woody debris and bare ground were the most frequently-occurring ground covers. These results will comprise the baseline for future post-harvest comparisons on this unit.

3.8 WILLIAMSON CREEK TRACT

An updated boundary and vegetation cover type map (Figure 16) and an updated stand map (Figure 17) were developed and refined for the Williamson Creek property. Both maps are the product of GIS mapping and include the land obtained in the 1991 land exchange (described in Section 4.10). These maps will be used for future management activities in the tract.

In 1999 the DNR abandoned the Northshore Road (P-5000 Road) eastward from a location east of Recreation Site 8 (Figure 3). This abandonment included all of the roads serving the Williamson Creek Tract (Figure 18). During the abandonment process the road was reopened for the first time since 1997, when the road was closed because of slides. District biologists took advantage of the temporary road opening to do baseline inventories in stands where access will be most difficult in the future. Field procedures developed specifically for the Williamson Creek Tract were tested and initial data on two old growth stands and two of the stands acquired in the land exchange were collected (See Table 5).

Table 5. WILLIAMSON CREEK 1999 INVENTORY SUMMARY

Date	Stand #	Old Growth	Snags	CWD	Photo Doc.	Wetlands
7/21/99	10-9	1 transect	1 transect	1 transect	1 transect	
7/28/99	10-15				stand	
8/3/99	10-7	2 transects	2 transects	2 transects	2 transects +	
8/10/99	10-14				stand	photodoc
8/10/99	10-9				retake	
10/5/99	road				abandonment	

Sampling in the two old growth stands included snag and CWD inventory. The standards for sampling these elements were the same as those used for inventorying other forested stands on the Lake Chaplain and Lost Lake Tracts. The minimum size for snags is 10 ft tall and 11 in dbh, and for CWD is 10 ft long and 11 in diameter at the large end. Preliminary data (as of yet, not a large enough sample size) show 10 snags per acre and 22 to 51 CWD per acre. Pacific silver fir and hemlock dominate the overstory with huckleberry,
deer fern, hemlock under 6 feet tall and moss seen most often in the understory plots (Figure 19).

The second growth stand (10-15) was obtained in the land exchange and is not part of the original Williamson Creek Tract. It is also dominated by pacific silver fir and hemlock, is about 25 years old and has been precommercially thinned (Figure 20). The understory is sparse in many areas with suppressed huckleberry observed. The trees range

Figure 16. Current Tract Boundaries and Cover Types - Williamson Creek Property.

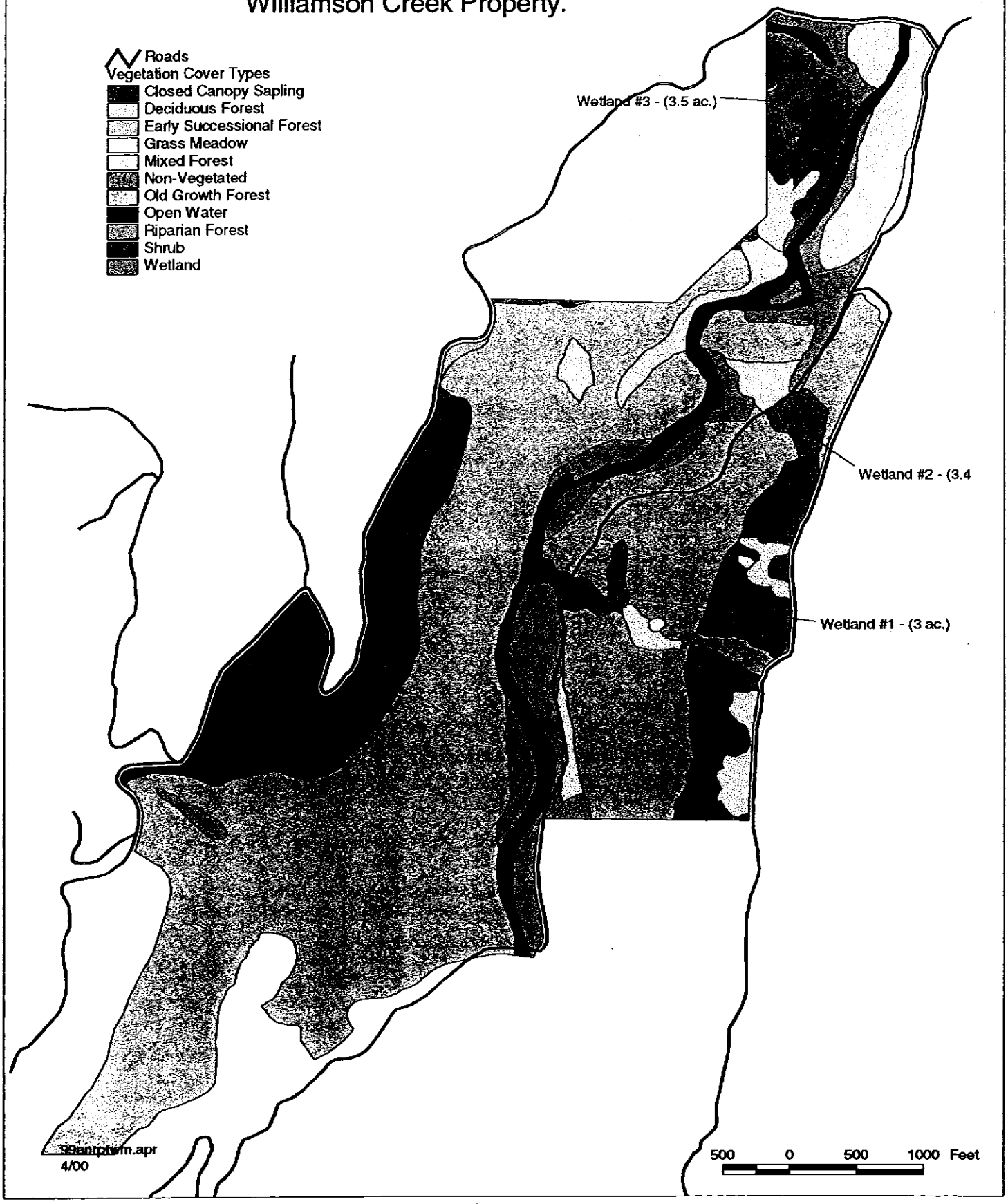


Figure 17. Stand Numbers - Williamson Creek Property.

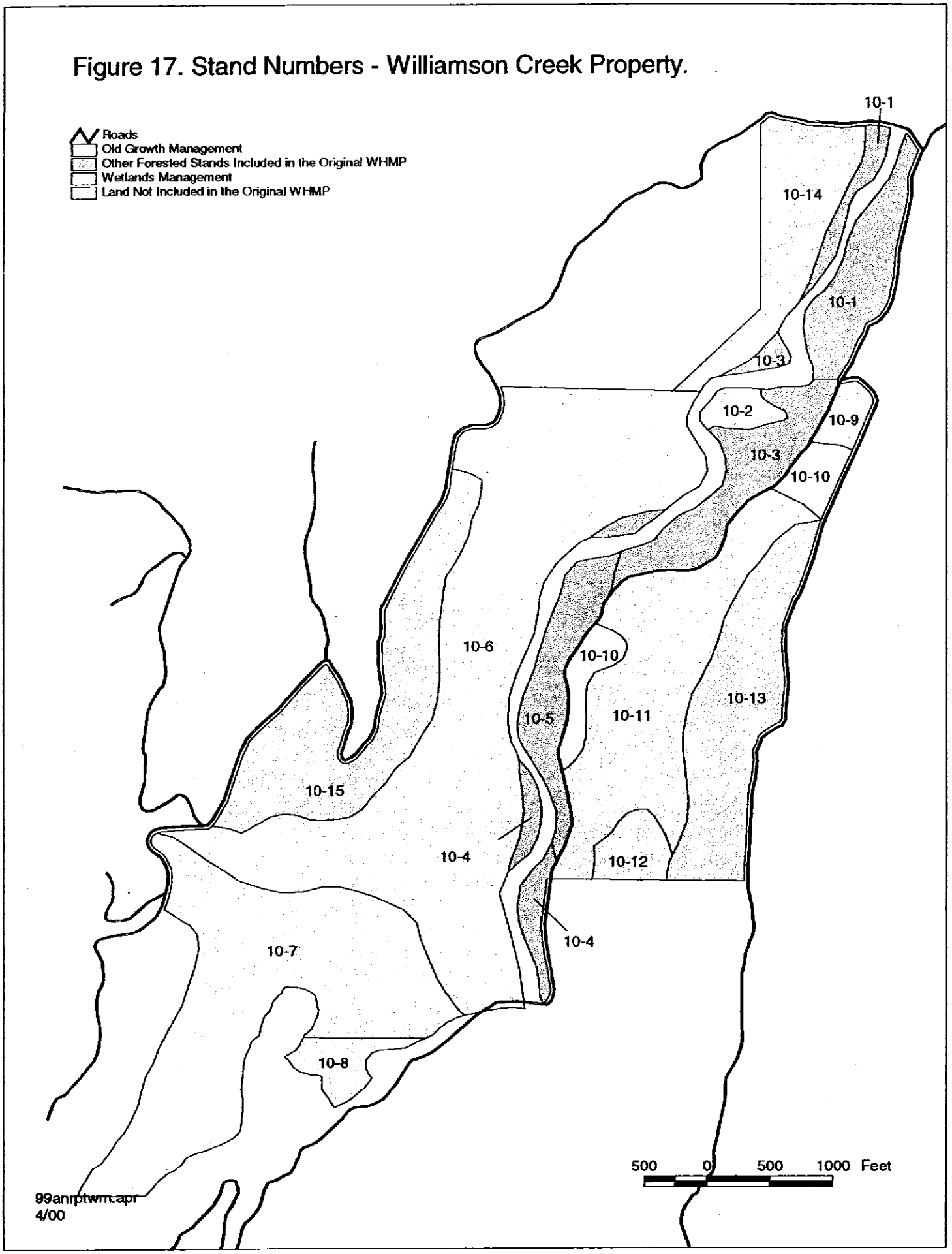


Figure 18. Road Abandonment on P-5000 Road Adjacent to Williamson Creek

Figure 19. Old Growth Stand (10-7) on Williamson Creek Property

Figure 20. Second Growth Stand (10-15) Obtained in 1991 Land Exchange

Figure 21. A Portion of the High Quality Wetland in Stand (10-14)

in size considerably, with the average of about 10 to 16 inches dbh. This stand is on a steep slope. Bear damage appears significant, some of which has resulted in snags. Snags and CWD were noted throughout the stand.

Stand 10-14 at the north end of the tract was also obtained by the PUD in the land exchange. It contains second growth, riparian, deciduous, shrub and wetland habitat. The high quality wetland is quite extensive with numerous open water pockets (Figure 21).

3.9 FERC ENVIRONMENTAL INSPECTION

The co-licensees conducted a tour of the WHMP lands and Spada Lake recreation sites for a FERC inspector on July 20, 1999. A summary of the tour is provided in Appendix 2.

4.0 CUMULATIVE SUMMARY

A summary of all activities completed under the WHMP, from the earliest implementation in 1988 through the end of December 1999, is presented in this section. Appendix 1 lists milestones of WHMP implementation to date, with a reference to the location in past annual reports of discussions of each activity. This Appendix is included in this Annual Report as a method of cross-referencing reports of past activities without repeating the complete details of information presented in previous reports. For complete discussion of a particular subject, the reader should refer to the referenced annual reports.

4.1 FOREST VEGETATION MANAGEMENT AT LAKE CHAPLAIN TRACT

4.1.1 Road System Layout and Construction

The main road systems for the northeast side of the Tract, the area south of the Diversion Dam Road, and portions of the west side of the tract have been constructed, as shown in Figure 2. Spur roads were constructed to provide access to harvest units east of the filter plant. Layout work continued in 1999 for additional portions of the road system on the west side of the tract.

4.1.2 Timber Harvest

Harvest activity to date is depicted in Figure 22. All of the units' boundaries have been reconfigured somewhat to improve operational feasibility, reduce impacts to streams and wetlands, and reduce the length of access roads. As part of the process, boundaries of permanent mixed forest stands, stream and wetland buffer zones, and old growth management areas have been established. There have been some substitutions of final harvest units, as summarized below in Table 6. However, the final harvest program is in compliance with the WHMP's schedule and requirements including the restriction on harvest unit size and the required green-up period for adjacent harvest units.

Commercial thinning scheduled in the WHMP (Figure 22) from 1990 to 2005 has been under consideration for several reasons, including potential problems related to access, soil type and timber type. These issues were discussed more fully in the 1996 Annual Report (Section 4.1.3). After on-site evaluation, it has been determined that several units

will be eliminated from the commercial thinning schedule. The units, and the reasons for not thinning them, are listed in Table 7.

Table 6. MODIFICATIONS OF THE FINAL HARVEST (FH) SCHEDULE ON LAKE CHAPLAIN TRACT

New Unit Name (see Fig. 20)	Scheduled FH	Reasons for Modification
2005-5 ("Gold Camp" unit)	1990	Existing wildlife habitat value is high. Unit Divr2-95 (portions of units originally scheduled for FH in 2005 and 2030) was harvested instead of 2005-5 in 1995
2030-3	2005 (part) and 2030 (part)	Units originally scheduled for FH in 2005 and 2030 reconfigured into Divr2-95 and 2030-3

Two units that were not scheduled in the WHMP were thinned in 1993 (Table 7). Additional opportunities for commercial thinning will be evaluated in the northeast and northwest corners of the Lake Chaplain Tract.

Table 7. MODIFICATIONS OF THE COMMERCIAL THINNING (CT) SCHEDULE ON LAKE CHAPLAIN TRACT

Unit	Scheduled CT	Reasons for Modification
2010-1	1990	Wet soil; timber type (hemlock) not suited to CT
2010-2	1990	Wet soil; timber type (hemlock) not suited to CT
2015-2	1995	Wet soil
2020-1	1990	Wet soil
2030-2	2005	Steep slope
2030-3	1990	High potential for blowdown; no benefit expected from CT
Hors1-93*	Not scheduled	Opportunity to improve understory vegetation; CT operationally feasible; FH scheduled in 2040
Hors2-93*	Not scheduled	Opportunity to improve understory vegetation; CT operationally feasible; FH scheduled in 2035

* Thinned in 1993

4.1.3 Management of Roads and Post-harvest Units

All final harvest units have been seeded with a grass/forb mix on bare areas, and replanted with Douglas fir and red cedar seedlings. Road ROW's have also been seeded, and access roads outside the closed watershed have been gated to prevent vehicular access by the public. Small timber salvage sales were held associated with final harvest of some units:

1) adjacent to a 1991 harvest unit following a major storm in January 1993 and,
2) adjacent to two 1998 harvest units and access roads in 1998 and 1999.

Monitoring of stocking levels in post-harvest units was started in 1997. Results in unit Chap2-91 showed excessive conifers, adequate overall density of hardwoods, but distribution of hardwood species is clumped. In 1998 some hardwood removal and replanting was done in this harvest unit.

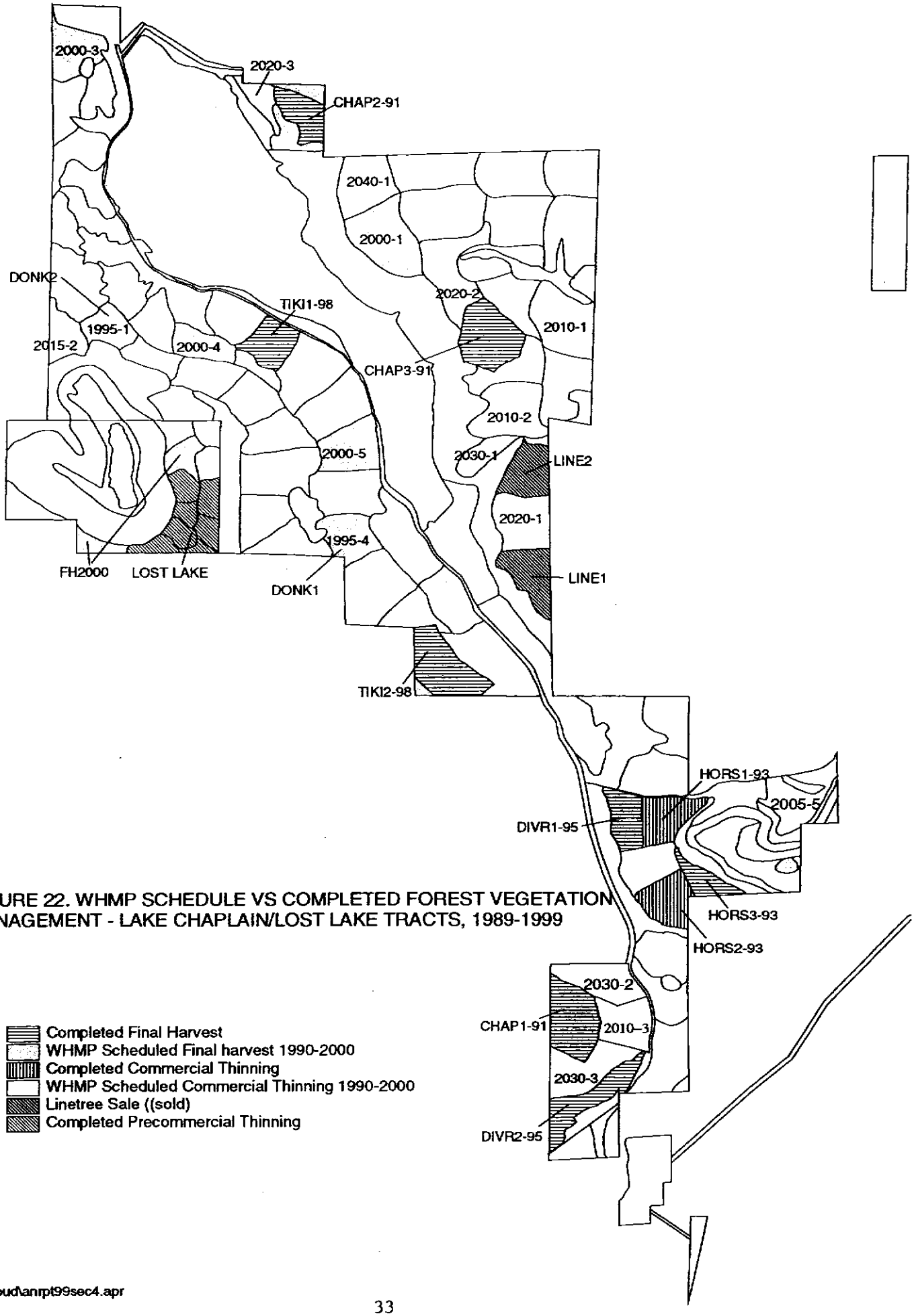


FIGURE 22. WHMP SCHEDULE VS COMPLETED FOREST VEGETATION MANAGEMENT - LAKE CHAPLAIN/LOST LAKE TRACTS, 1989-1999

4.2 FOREST VEGETATION MANAGEMENT AT LOST LAKE TRACT

As described in the 1996 Annual Report, the stand that was precommercially thinned in 1991 has been monitored annually with photo documentation. The slash has begun to decompose, and access through the stand has gradually improved over time. The shrub layer, especially salmonberry, has responded to the reduction in the tree canopy, and signs of deer browsing have been observed. Field reconnaissance of two units scheduled in the WHMP for final harvest in 2000 began in 1998 (Figure 22).

4.3 FOREST VEGETATION MANAGEMENT AT SPADA LAKE TRACT

The Spada Supplement, a plan for lands surrounding Spada Lake that were acquired in 1991, was approved by the FERC in 1997. The Spada Supplement calls for commercial and precommercial thinning of some forest stands on the Tract. Three young second growth stands (totaling about 30 acres) on the south shore of Spada Lake were precommercially thinned in September 1996. Two second growth stands totaling about 38 acres were set up for precommercial thinning in 2000 (Figure 3).

The DNR completed abandonment of the North Shore Road and its tributary roads from a point east of Recreation Site 8 during the summer 1999. The road had become inaccessible east of Recreation Site 8 due to a massive landslide in 1997. Some of the planned forest management activities, including commercial thinning and precommercial thinning, in units formerly served by this road therefore will be affected. With the loss of road access, the most promising option for future commercial harvest north of the lake will be helicopter logging. Some information was obtained from a contractor who does helicopter logging, but additional consideration will be necessary to advance the plan. Until the feasibility of future commercial thinning can be determined, the emphasis in forest management will be on stands that are accessible by road.

4.4 SNAG MANAGEMENT

Snag management activity from the beginning of implementation in 1989 through 1999 is shown in Figure 23 and summarized in Table 8. A target was established in the 1994 Annual Report to complete snag inventories in a large number of units on the Lake Chaplain and Lost Lake Tracts by the end of the 1998. This target was achieved in 1998, with the exception of four units that were removed from the inventory following the decision to commercially thin them in the near future (see Section 3.2.1 of the 1998 Annual Report). Snag creation on these four units will follow the harvest to achieve the WHMP's required size distribution. On all other targeted units, if sufficient snags to comply with the WHMP's requirements did not exist, snags have been created to meet the requirements. Snag inventory/creation has been completed on all units that have been harvested or thinned, as well as all units scheduled for harvest by 2020, except one scheduled for commercial thinning within 20 years.

Natural snags have been inventoried on nearly 1,100 acres (43 units) of the Lake Chaplain and Lost Lake Tracts to date. Of those acres, over 800 (37 units) have been verified as meeting the WHMP's requirements for snags. Over 1,500 snags have been created on these two management tracts since 1990.

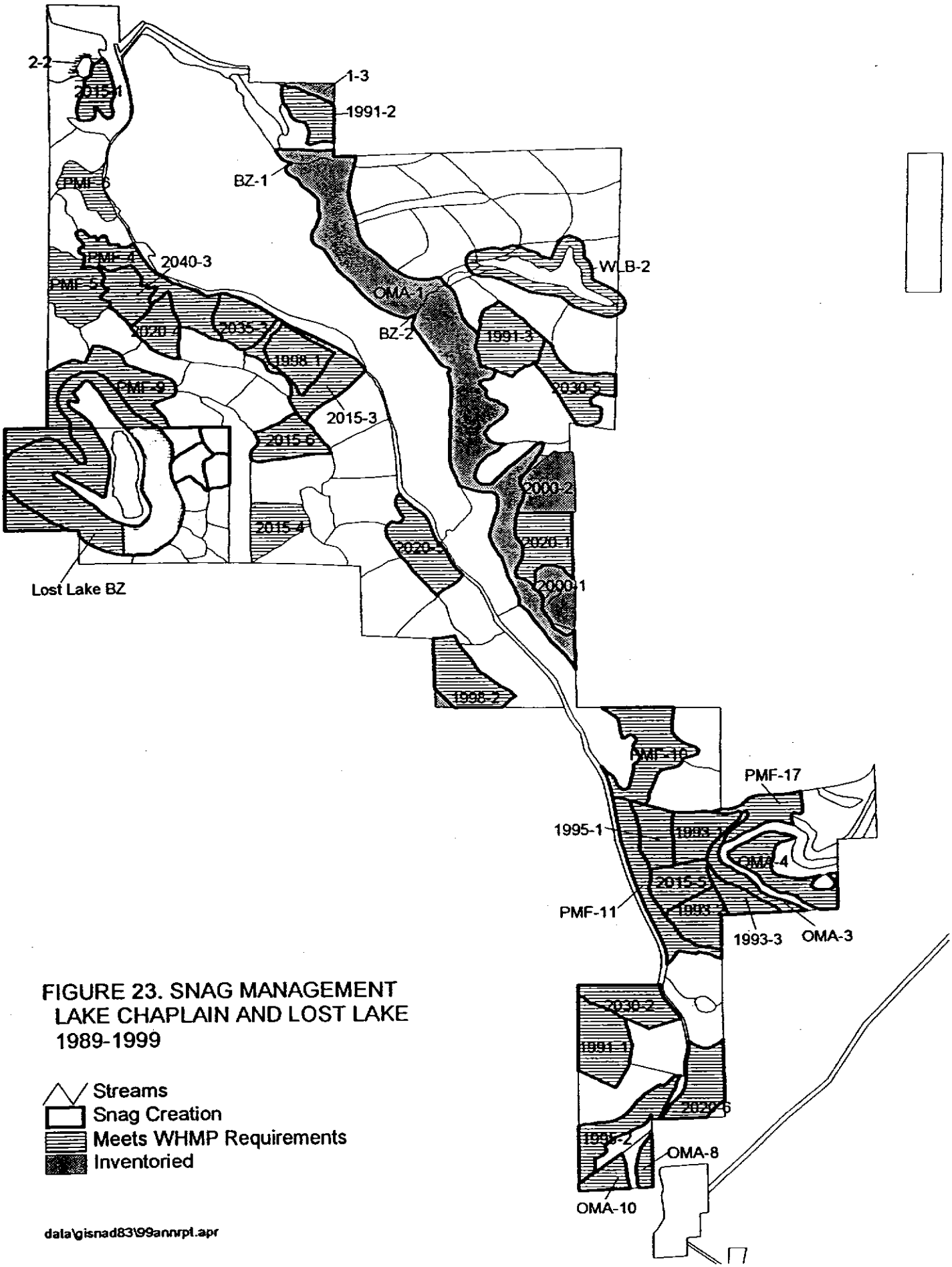


FIGURE 23. SNAG MANAGEMENT
LAKE CHAPLAIN AND LOST LAKE
1989-1999

Streams
Snag Creation
Meets WHMP Requirements
Inventoried

dala\gisnad83\99annrpt.apr

Table 8. SUMMARY OF SNAG MANAGEMENT THROUGH 1999						
UNIT	ACRES	NUMBER CREATED	AVG. DBH (in.)	AVG. HT. (ft.)	# PER ACRE	NOTES
2020-1	**24.0**	**50**	**16.9**	**61.9**	**4.9**	**√ Includes natural and created snags**
2020-5	**19.1**	**15**	**19.1**	**61.4**	**9.8**	**√ Includes natural and created snags**
Lost Lake 7-1	**93.7**	**234**	**18.1**	**62.2**	**3.3**	**√ Includes natural and created snags**
PMF 9	**52.2**	**71**	**17.3**	**54.9**	**3.1**	**√ Includes natural and created snags**
Wetland Buffer 2	**35.5**	**65**	**17.2**	**56.4**	**3.1**	**√ Includes natural and created snags**
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
2020-4	15.3	36	17.0	49.3	4.4	√ Includes created snags only
2020-6	12.0	26	17.7	50.5	6.3	√ Includes created snags only
2030-2	22.1	60	17.0	50.3	3.1	√ Includes natural and created snags
2030-5	24.0	48	18.0	50.0	3.2	√ Includes natural and created snags
2035-3	18.5	30	18.0	55.0	4.9	√ Includes natural and created snags
2040-3	16.3	14	21.4	50.0	6.9	√ Includes natural and created snags
Buffer Zone 1	2.7	20	17.0	40 3/	2/	
Buffer Zone 2	3.8	10	15.7	40 3/	2/	
Buffer Zone 3	8.7	23	16.6	46.6	4.5	√ Includes natural and created snags
CHAP1-91	26.0	70	16.6	33.5	3.1	√ Includes natural and created snags
CHAP2-91	15.0	46	16.1	27.4	3.1	√ Includes created snags only
CHAP3-91	24.0	66	18.0	31.0	3.6	√ Includes natural and created snags
DIVR1-95	15.6	41	16.8	50.3	3.1	√ Includes natural and created snags
DIVR2-95	19.7	61	18.3	47.9	3.1	√ Includes natural and created snags
HORS1-93	20.0	0	14.5	89.0	11.5	√ Includes natural snags only
HORS2-93	18.0	23	16.9	55.2	4.6	√ Includes natural and created snags
HORS3-93	13.7	43	16.0	33.8	3.1	√ Includes natural and created snags
Lost Lake 7-2	34.0	5	14.8	54.0	1.0 1/	Includes natural and created snags
OMA 1	173.6	23	17.3	40.0	1/	Includes natural and created snags
OMA 10	8.6	4	20.0	56.3	18.4	√ Includes natural and created snags
OMA 3	11.8	27	16.2	63.6	6.3	√ Includes natural and created snags
OMA 4	26.5	22	16.1	54.5	6.7	√ Includes natural and created snags
OMA 8	5.3	7	18.1	54.3	18.4	√ Includes natural and created snags
PMF 10	34.1	56	18.3	45.1	4.5	√ Includes natural and created snags
PMF 11	12.0	25	16.8	43.7	4.3	√ Includes natural and created snags
PMF 17	14.7	35	17.0	58.1	4.4	√ Includes natural and created snags
PMF 4	31.8	54	16.5	46.2	4.9	√ Includes created snags only
PMF 5	27.4	0	23.5	47.3	5.3	√ Includes natural snags only
PMF 6	13.3	0	23.9	64.3	6.0	√ Includes natural snags only
PMF 7	8.9	4	19.5	48.8	2/	
Stand 2-2 3/	30.7	12	19.0	47.9	2/	
TIKI 1-98	21.0	54	55.6	17.5	3.1	√ Includes natural and created snags
TIKI 2-98	23.8	73	18.0	56.1	3.1	√ Includes natural and created snags
TOTALS	**809**	**1478**	Totals for those units which meets WHMP requirements (37 units).			
	1063	**1552**	Totals for all units having snag management activity to date (43 units).			
BOLD denotes those units where snag management activity occurred in 1999.						
√ 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/ Remainder of stand, exclusive of already delineated units.						

A detailed discussion of modifications to the snag management program was presented in the 1994 Annual Report (Section 4.2). In 1996 the inventory/monitoring methods for snags were revised. Methods were field tested in 1997 and revised in 1998. Long-term monitoring of created snags was conducted in 1998 and 1999.

4.5 COARSE WOODY DEBRIS MANAGEMENT

The 1995 Annual Report described the first inventories of CWD on the Lake Chaplain Tract, and the subsequent development of the CWD management procedure to ensure compliance with WHMP targets. The procedure was implemented on the 1995 Diversion Sale and the 1998 Tiki Sale. The 1995 and 1996 Annual Reports describe more fully the earlier inventories and consultations with the agencies regarding standards for compliance. In 1996, the inventory/monitoring methods were revised following a consultant's review of the procedures, as described in the 1996 Annual report. The methods were finalized in 1997, field tested, and implemented on the units of the 1998 Tiki Sale, the Linetree Sale,
and all future harvest units. Created CWD on two units of the 1995 Diversion Sale was monitored in 1999 *per* the CWD management methods.

4.6 REVEGETATION

4.6.1 Spada Lake Drawdown Zone

Test plots of five wetland emergent species were planted at two sites in October/November 1994 and monitored each following year. Two sedge species became well established and spread vegetatively at Williamson Creek. Most plantings at the North Fork site were damaged by wave action and floating debris. Slough sedge (*Carex obnupta*) recruitment on the sites may be the result of the 1994 plantings since most of these plants are in or among the planted rows (1998 Annual Report, Section 3.4.1). However, natural in-seeding of wetland plants on both sites, especially small-fruited bulrush, horsetails and other herbaceous species, has been far more successful in covering the ground than the test plantings so far. The 1997 Annual Report (Section 4.6.1) describes the response of wetland plantings and natural recruitment on these sites with respect to the management of lake elevation.

4.6.2 Power Pipeline Right-of-Way

The pipeline ROW has been seeded annually, all or in part, since 1990. There are very few large areas of unvegetated soil remaining, with smaller patches being more prevalent. Areas of sandy and gravelly soil have proven to be the most difficult. Quantitative sampling of vegetative cover on the ROW was performed in 1998 and 1999. Bare soil and grasses each cover approximately one-third of sampled areas of the ROW. Shrubs and trees were planted in 1998 and 1999, and most have survived but are slow to spread due to poor soils.

Work on rebuilding a portion of the access road and replacing a washed out culvert has been completed (Figure 6).

4.6.3 North End of Lake Chaplain and Chaplain Marsh

The required plantings at the north end of Lake Chaplain were monitored twice annually from the time of planting in 1992 through 1995, and once in the following years. Survival of western red cedar at the north end of the lake from the time of planting to 1998 was 80 percent. Alders growing among the planted conifers were cut down in 1998 to release the western red cedars from competition. Douglas fir saplings have had excellent growth, with overall survival over 90 percent.

The required plantings adjacent to Chaplain Marsh were monitored twice annually from the time of planting in 1993 through 1995, and once in the following years. Alders growing among the plantings were cut down in 1998 to release the planted shrubs from competition. As a result, the density of the vegetative screen between the Lake Chaplain Road and the marsh decreased, but it will increase in effectiveness as the shrubs continue to grow.

4.6.4 Powerhouse Site

Shrub and tree plantings were monitored at least twice each growing season between planting (in 1993) and 1995, and once from 1996-1998. In 1997, we planted a small number of cascara saplings to test whether this species is suitable for the site. Survival of the tree species has been greater than 90 percent, and growth has been variable: crabapples have grown more than ash and hawthorn. Of the shrubs, only Nootka rose has survived and grown well on this site. Many huckleberries and serviceberries have persisted, but have grown very slowly.

4.7 NEST STRUCTURES

All of the nest structures that were required by the WHMP have been installed and monitored annually thereafter (see the 1998 Annual Report for a summary of past nest structure locations.) In 1990, two floating nest platforms were placed in Lost Lake. The required two duck nest boxes were installed at Lost Lake in 1990. One osprey platform was installed at Lost Lake in 1990 and 2 at Spada Lake in 1992.

In addition to the required nest structures, we placed two floating platforms (one of these in place of the third platform required at Lost Lake), in Lake Chaplain in 1990 in hopes of recruiting loons. In February 1996 the floating platforms at Lake Chaplain were moved to Spada Lake. One was destroyed in late 1996 or early 1997 by unknown causes, and the other floated away from its anchor. The latter was placed at a different location on Spada Lake, in the Williamson Creek area in 1998.

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 the north end of Chaplain Marsh. In 1996 we removed the three boxes from the north end of Chaplain Marsh because starlings were using them. One tree with a nest box fell at Chaplain Marsh in 1999, leaving five boxes. Three new boxes were installed at Lost Lake in 1996, bringing the total to 7 boxes. Three nest boxes were put up at Williamson Creek in the Spada Lake Tract in summer

1996, and three new boxes were added in March 1998. Three boxes were installed at Wetland 2 in the Lake Chaplain Tract in 1999.

The nest structures have been monitored every year since installation. Ducks used over half of the boxes each year (61% in 1997) until 1998, when nest box success was 16 percent. Nest box success was only 10% in 1999. The osprey platform at Lost Lake produced one fledgling in 1994 and one in 1995. Nesting was attempted in 1996, 1997, 1998, and possibly in 1999, but was not successful. 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. Nesting has not been observed on the osprey platforms at Spada Lake since then. A nest has been actively used from 1996 through 1998, downstream from Culmback Dam. That nesting site was replaced by another nesting site on the same hillside, which was actively used by osprey in 1999. The floating platforms have been used for resting and feeding by waterfowl and otters, but no breeding attempts have been noted.

4.8 BIOSOLIDS APPLICATION

The City of Everett applied biosolids to units Hors2-93 (2035-6) and Hors1-93 (2040-5) in the Lake Chaplain Tract in August and September of 1996, as described fully in the 1996 Annual Report (Section 3.8). One half of the prescribed amount of biosolids (based on measured nitrogen requirements) was applied at that time. The ultimate intention is to apply the remainder when sufficient material is available for application at this site. Based on the positive response of the understory, the City will finish the prescribed biosolids applications in Stands 2035-6 and 2040-5.

Two water quality monitoring sites were established on Chaplain Creek. Creek waters were sampled monthly beginning in August 1996 through the end of 1999 (Table 9). Parameters examined were nitrates, phosphorus, fecal coliform, ammonia, and chloride. Water quality monitoring has indicated no deleterious biosolids effect on the water quality parameters measured.

4.9 DEER FORAGE MONITORING

A revised sampling procedure was finalized in 1997, after several other procedures proved unsatisfactory in previous years. The 1997 procedure has been used in monitoring the following Lake Chaplain Tract units:

Table 9. SUMMARY OF DEER FORAGE MONITORING SCHEDULE

Unit Name	Harvest Year	Pre-Harvest Monitoring	Post-Harvest Sampling	
Chap1-91	1991	1997 (2010-3)	1997	1999
Divr1-95	1995	1997 (2015-5)	1997	
Tiki1-98	1998	1998		
Tiki2-98	1998	1998		
Line1-00	2000	1999		

Table 10. Water Quality Sampling at Biosolids Application Site - Lake Chaplain Tract

Sample Date		8/27/1996	9/19/1996	10/29/1996	11/13/1996	12/10/1996	1/29/1997	2/12/1997	3/26/1997	4/9/1997	5/14/1997	6/5/1997	7/29/1997
Analyte/Sample Site	Units	Results											
Ammonia (NH3)													
Upstream (CHAPCR08)	mg/L	0.020	0.005	<0.003	<0.003	0.004	0.011	0.028	0.028	0.057	0.009	0.014	0.037
Downstream(CHAPCR38)		0.008	<0.005	<0.003	<0.003	0.005	0.011	0.017	0.016	0.022	0.011	0.022	0.028
Nitrate (NO3)													
Upstream (CHAPCR08)	mg/L	not sampled	<0.002	0.197	0.073	0.201	0.233	0.108	0.036	0.022	0.012	0.033	0.007
Downstream(CHAPCR38)		not sampled	<0.002	0.315	0.125	0.286	0.194	0.152	0.083	0.044	0.032	0.079	0.024
Total Phosphate													
Upstream (CHAPCR08)	mg/L	0.010	<0.005	0.006	0.005	<0.005	<0.005	0.007	0.007	0.016	0.017	0.019	0.019
Downstream(CHAPCR38)		0.009	<0.005	0.006	0.005	<0.005	<0.005	0.007	0.007	0.014	0.021	0.023	<0.016
Chloride													
Upstream (CHAPCR08)	mg/L	2.2	2.5	1.5	1.4	1.7	1.5	1.6	1.3	1.6	1.4	1.5	1.6
Downstream(CHAPCR38)		2.1	2.2	1.7	1.8	1.7	1.4	1.7	1.4	1.6	1.5	1.5	1.5
Fecal Coliforms													
Upstream (CHAPCR08)	CFU/100mL	11	7	<2	2	5	<2	4	<2	4	<2	52	8
Downstream(CHAPCR38)		16	27	8	2	11	<2	<2	<2	3	42	24	4
pH													
Upstream (CHAPCR08)	s.u.	6.8	6.8	6.5	6.5	6.4	6.6	6.6	6.5	6.6	6.5	not sampled	6.6
Downstream(CHAPCR38)		7.1	7.1	6.6	6.6	6.6	6.6	6.8	6.7	6.8	6.6	not sampled	7.0

Sample Date		8/20/1997	9/22/1997	10/7/1997	11/4/1997	12/3/1997	1/6/1998	2/3/1998	3/3/1998	4/21/1998	5/5/1998	6/3/1998	7/16/1998
Analyte/Sample Site	Units	Results											
Ammonia (NH3)													
Upstream (CHAPCR08)	mg/L	0.039	0.048	0.016	0.032	0.017	0.035	0.010	<0.004	0.025	0.035	0.015	0.015
Downstream(CHAPCR38)		0.038	0.053	0.012	0.034	0.020	0.032	0.009	<0.004	0.016	0.029	0.016	0.011
Nitrate (NO3)													
Upstream (CHAPCR08)	mg/L	0.012	0.042	0.206	0.222	0.287	0.246	0.156	0.196	0.031	0.017	0.022	0.010
Downstream(CHAPCR38)		0.035	0.083	0.284	0.282	0.206	0.351	0.249	0.277	0.096	0.058	0.054	0.039
Total Phosphorus													
Upstream (CHAPCR08)	mg/L	0.029	<0.016	<0.016	<0.016	<0.016	0.005	0.008	0.007	0.010	0.013	0.009	0.013
Downstream(CHAPCR38)		0.026	<0.016	<0.016	0.018	<0.016	0.005	0.004	0.006	0.008	0.010	<0.002	0.010
Chloride													
Upstream (CHAPCR08)	mg/L	2.7	2.2	1.8	2.1	1.7	2.0	1.6	1.6	1.0	1.2	1.0	1.7
Downstream(CHAPCR38)		2.1	2.3	2.0	1.9	1.9	1.2	1.8	1.8	1.1	1.3	1.3	1.7
Fecal Coliforms													
Upstream (CHAPCR08)	CFU/100mL	9	4	6	<2	11	6	2	12	2	10	6	14
Downstream(CHAPCR38)		7	12	20	<2	44	8	2	10	4	20	10	48
pH													
Upstream (CHAPCR08)	s.u.	6.6	6.4	6.6	6.6	6.5	6.6	6.6	6.5	6.6	6.5	6.7	6.6
Downstream(CHAPCR38)		7.1	6.8	6.6	6.6	6.6	6.6	6.8	6.7	6.8	6.6	6.6	7.0

Table 10. Water Quality Sampling at Biosolids Application - Lake Chaplain Tract

Sample Date		8/3/1998	9/10/1998	10/20/1998	11/3/1998	12/1/1998	1/27/1999	2/9/1999	3/9/1999	4/14/1999	5/5/1999	6/9/1999	7/7/1999
Analyte/Sample Site	**Units**	**Results**											
Ammonia (NH3)													
Upstream (CHAPCR08)	mg/L	0.021	0.015	0.016	0.009	0.024	0.006	0.009	0.007	0.011	0.005	0.007	0.006
Downstream(CHAPCR38)		0.013	<0.004	0.012	<0.004	0.027	0.006	<0.004	0.014	0.008	0.008	<0.004	0.006
Nitrate (NO3)													
Upstream (CHAPCR08)	mg/L	0.011	0.010	0.245	0.038	0.260	0.169	0.172	0.084	0.056	0.041	0.024	0.031
Downstream(CHAPCR38)		0.081	0.050	0.284	0.075	0.301	0.216	0.187	0.107	0.038	0.055	0.030	0.023
Total Phosphorus													
Upstream (CHAPCR08)	mg/L	0.013	0.010	0.006	0.005	0.005	0.003	0.003	0.004	0.007	0.007	0.008	0.006
Downstream(CHAPCR38)		0.016	0.010	0.005	0.003	0.004	0.002	0.002	0.004	0.006	0.007	0.008	0.006
Chloride													
Upstream (CHAPCR08)	mg/L	<1.0	1.5	2.5	3.0	1.6	1.4	1.2	1.2	1.2	1.5	1.3	1.1
Downstream(CHAPCR38)		<1.0	1.6	2.6	2.8	1.2	1.2	1.0	1.2	1.3	1.2	1.1	1.0
Fecal Coliforms													
Upstream (CHAPCR08)	CFU/100mL	19	6	16	12	4	4	4	1	10	12	18	36
Downstream(CHAPCR38)		38	36	8	4	8	4	1	1	1	42	18	25
pH													
Upstream (CHAPCR08)	s.u.	6.6	6.6	6.4	6.6	6.3	6.6	6.6	6.7	6.8	7.0	6.7	6.5
Downstream(CHAPCR38)		6.4	6.6	6.8	7.1	6.5	6.7	6.5	6.8	7.0	6.9	6.7	6.8

Sample Date		8/4/1999	9/8/1999	10/6/1999	11/3/1999	12/15/1999
Analyte/Sample Site	**Units**	**Results**				
Ammonia (NH3)						
Upstream (CHAPCR08)	mg/L	0.009	0.010	0.007	<0.004	<0.004
Downstream(CHAPCR38)		<0.004	<0.004	<0.004	<0.004	0.005
Nitrate (NO3)						
Upstream (CHAPCR08)	mg/L	0.007	0.008	0.004	0.138	0.236
Downstream(CHAPCR38)		0.031	0.031	0.022	0.170	0.257
Total Phosphorus						
Upstream (CHAPCR08)	mg/L	0.011	0.009	0.006	0.003	0.004
Downstream(CHAPCR38)		0.009	0.008	0.006	0.005	0.005
Chloride						
Upstream (CHAPCR08)	mg/L	1.4	2.0	2.5	2.4	1.1
Downstream(CHAPCR38)		1.3	1.8	2.5	2.4	1.2
Fecal Coliforms						
Upstream (CHAPCR08)	CFU/100mL	30	70	10	6	4
Downstream(CHAPCR38)		42	36	10	8	1
pH						
Upstream (CHAPCR08)	s.u.	6.5	6.7	6.6	6.8	7.0
Downstream(CHAPCR38)		6.7	6.5	6.8	6.9	6.9

4.10 LAND ACQUISITION

In 1988 the District purchased the 205 acre Lost Lake Tract as part of the WHMP requirement. The District/USFS/DNR land exchange was completed in 1991. The District acquired 2,295 acres of upland and wetland habitat at Spada Lake and Williamson Creek. This included the entire Williamson Creek Tract identified in the WHMP. With the exception of existing recreation sites and areas used for hydroelectric operations, the land in the Spada Lake Tract has been incorporated into the wildlife habitat management program as prescribed by the WHMP and the Spada Lake Tract Supplemental Plan. The Supplemental Plan was approved by the FERC on April 18, 1997 and will guide future forest vegetation management for that tract.

The City/DNR land exchange was completed in late 1991. All of the land specified in the WHMP in the Lake Chaplain Tract was acquired by the City and dedicated to management under the WHMP.

5.0 WORK PLANNED FOR 2000

5.1 FOREST VEGETATION MANAGEMENT

5.1.1 Lake Chaplain Tract

The Linetree Sale harvest will be completed in the spring of 2000 and the units will be replanted if time and weather permit. The planting will be 250 Douglas fir and 50 western red cedar per acre. The units will be seeded with a grass/forb seed mix as soon as possible after logging is complete.

Sale layout work will be completed on the Donkey Damper Sale and the timber will be offered for sale during 2000. Sale layout work on the next timber sale will be started.

Tree seedlings on all harvest units will be monitored for survival and vigor. Conifer and hardwood densities on the three units of the 1991 Chaplain Sale will be evaluated and a schedule will be developed for future precommercial and commercial thinning activities.

We will complete work on GTA management procedures in 2000, and draft management plans for existing GTA's.

5.1.2 Spada Lake Tract

The second growth stands that were set up for precommercial thinning in 1999 will be thinned in 2000 (Figure 3). We will evaluate the need for additional precommercial thinning on South Fork and South Shore units that were identified for possible management in the Spada Supplement. If the canopy in a unit is close to closure, it will probably be thinned promptly; if not, action will be deferred. We will investigate the feasibility of helicopter logging for units that were identified in the Spada Supplement for commercial thinning.

5.1.3 Lost Lake Tract

Field reconnaissance will continue in the units that were scheduled for harvest in the WHMP in 2000 (Figure 22). The wildlife benefits of harvesting as scheduled in the WHMP will be examined in light of the timber harvesting adjacent to the Lost Lake Tract in recent years.

5.2 SNAG MANAGEMENT

The six units shown in Table 8 as having incomplete snag management will be the first priority for snag creation in 2000. Additionally, several units that were inventoried in 1998 but were not included in the 1999 snag creation contract will be completed. Permanent mixed forest and old-growth management units at Lake Chaplain will also be inventoried and snag creation completed where appropriate.

The first snag management activities on the Spada Lake and Williamson Creek Tracts will begin in 2000. A variety of management units around Spada Lake including old growth, mixed forest and closed canopy/sapling will be inventoried. Riparian mixed and coniferous forest units adjacent to Williamson Creek will also be inventoried for possible snag creation.

5.3 COARSE WOODY DEBRIS MANAGEMENT

CWD trees will be selected and marked on the Donkey Damper Sale, and existing CWD will be inventoried prior to harvest.

5.4 REVEGETATION

5.4.1 Spada Lake Drawdown Zone

Survival of wetland plantings and natural recruitment of vegetation will be monitored on the two shoreline revegetation sites in 2000.

5.4.2 Power Pipeline Right-of-Way

The potential for planting additional shrub/mast tree groupings will be investigated this year and bare areas will again be seeded. Quantitative measurements of the grass/forb layer will be made and compared to previous years' results to chart the results of the seeding effort. Thinning of the trees in the buffer strip between the pipeline and service road may continue in 2000 to promote the growth of perch trees and release existing shrubs within this buffer. Monitoring of planted shrubs will begin in 2000 to determine whether planting additional shrubs is warranted, and which species survive best under current conditions.

5.4.3 Chaplain Marsh, North End of Lake Chaplain, and Powerhouse Site

Monitoring will be conducted as in previous years.

5.5 NEST STRUCTURES

The two floating nest platforms and the osprey platform at Lost Lake and will be not be monitored on a regular basis during the breeding season (April-late June) due to lack of use in past years. Instead, they will be monitored when the biologists are on site to perform other activities. Monitoring will be reinstated on a regular basis if any platform is used for nesting. At the end of the nesting season the platforms will be visited to look for signs of use by wildlife. The floating nest platforms at the east end of Spada Lake can no longer be monitored from a vantage point because the North Shore Road has been abandoned. However, these platforms will be visited by boat and inspected at the time when duck nest boxes in the vicinity are checked in June.

Nest boxes will be cleaned and repaired in February and checked for nesting success in June. Data from the three nest box designs that used in this program will be evaluated to identify whether details such as roof or door design may be contributing to low usage by cavity nesting ducks. The osprey platforms will be monitored during the breeding season according to the same procedures used in previous years.

5.6 DEER FORAGE MONITORING

The following harvest units will be sampled in 2000: Divr1-95, Tiki1-98 and Tiki2-98.

5.7 BIOSOLIDS APPLICATION AT LAKE CHAPLAIN

Water quality monitoring for units Hors1-93 and Hors2-93 will continue at the established stations in Chaplain Creek in 1999. Understory monitoring will also be conducted on the treated stands and control plots as described in the 1997 Annual Report. Application of the remainder of the prescribed amount of biosolids is planned for 2000. Other possible biosolids fertilization projects in 2000 could include stand 1993-3.

6.0 SCHEDULE OF ACTIVITIES FOR 2000

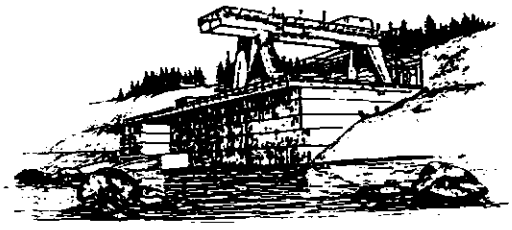
MAJOR ACTIVITIES	LOCATION	QUANTITY
Final Harvest		
Complete layout and sale	Donkey Damper Sale, see Fig. 2	2 units (approx. 37 ac.)
Timber harvest	Linetree Sale; see Fig.2	2 units (approx. 45 ac.)
Layout	L. Chaplain Tract, Unnamed Sale, see Fig. 2	2 units (acreage TBD)
Field Reconnaissance	Lost Lake Tract	2 scheduled FH units (acreage TBD)
Reforestation/seeding	Linetree Sale, depending on weather	45 acres
Harvest Unit Stocking Monitoring	L. Chaplain Tract, all previously harvest units	8 units
Precommercial Thinning	Spada Lake Tract	2 units (approx. 38 ac.)
Snag Creation	Lake Chaplain Tract	6+ units, as needed
Snag Inventory	Lake Chaplain Tract, Spada Lake Tract, Williamson Creek	6+ units on L. Chaplain Tract; other tracts TBD
CWD Creation	Lake Chaplain Tract	2 units (Linetree Sale)
CWD Inventory	Lake Chaplain Tract	2 units (Donkey Damper Sale)
Revegetation		
Grass seeding/fertilizer	Pipeline ROW	As needed to improve bare spots
Monitoring		
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.
Deer Forage	Lake Chaplain Tract	3 FH units
Snags	L. Chaplain, Lost Lake Tracts	100 created snag trees
Nesting Structures	Lost Lake, Spada Lake, and Chaplain Marsh	Monitor all structures .
Wetland Monitoring	Lost Lake	All wetlands designated in SOPs
Biosolids Application	L. Chaplain Tract	Hors1-93, Hors2-93, Hors3-93
Understory monitoring	Hors1-93, Hors2-93	2 units plus controls
Water quality monitoring	Chaplain Creek	2 stations
GTA and BZ Management	All established units	Monitor and develop long-term management plans

APPENDIX 1 – WHMP IMPLEMENTATION MILESTONES

General Activity Category	Management Tract	Milestone	Annual Report Reference – (Section/page #)
Timber Harvest	Lake Chaplain	Chaplain Sale	1991 (3.3.1, p.6), 1992 (3.2.1, p.4)
	Lake Chaplain	Horseshoe Sale	1992 (3.2.2, p.6), 1993 (3.1.1, p.6)
	Lake Chaplain	Diversion Sale	1995 (3.1.1, p.6)
	Lake Chaplain	Tiki Sale	1997 (3.1.1, p.2), 1998 (3.1.1, p.2)
	Lake Chaplain	Line Tree Sale	1997 (3.1.1, p.2), 1998 (3.1.2, p.5), 1999 (3.1.2, p.2)
	Lake Chaplain	Donkey Damper Sale	1999 (3.1.4, p.5)
	Lake Chaplain	Salvage Sales	1993 (3.1.2, p.6), 1998 (3.1.1, p.2), 1999 (3.1.1, p.2)
Reforestation	Lake Chaplain	Chaplain Sale	1992 (3.2.1, p.4)
	Lake Chaplain	Horseshoe Sale	1993 (3.1.1, p.6), 1994 (3.1.3, p.5)
	Lake Chaplain	Diversion Sale	1996 (3.1.1, p.4)
	Lake Chaplain	Tiki Sale	1999 (3.1.1, p.2)
Roads	Lake Chaplain	S1000 (Chaplain Sale)	1991 (3.3.1, p.6)
	Lake Chaplain	C1300 (Chaplain Sale)	1991 (3.3.1, p.6)
	Lake Chaplain	C1900 (Tiki Sale)	1997 (3.1.2, p.5)
	Lake Chaplain	SP1500 (Tiki Sale)	1997 (3.1.2, p.5)
	Lake Chaplain	SP1000 (Tiki Sale)	1997 (3.1.2, p.5)
	Lake Chaplain	SP1300 (Tiki Sale)	1997 (3.1.2, p.5)
	Lake Chaplain	(Linetree Sale)	1999 (3.1.3, p.5)
	Spada Lake	North Shore Road	1997 (4.3, p.28), 1999 (3.8, p.26)
Forest Vegetation Management	Lake Chaplain	Chaplain Sale	1999 (3.1.5, p.5)
	Lost Lake	Precommercial Thinning	1991 (3.3.2, p.9)
	Spada Lake	Precommercial Thinning	1996 (3.1.5, p.6)
Stream and Wetland Buffer Zone Management	Lake Chaplain	Snag creation and monitoring	
GTA Management	Lake Chaplain	Chaplain Sale Unit 1	1994 (3.1.3, p.5)
Snag Management	Lake Chaplain	Implementation Decisions	1990 (3.3, p.6), 1993 (3.2, p.8), 1996 (3.2, p.6)
	Lake Chaplain	Snag Inventory Results	1991 (3.4, p.9), 1992 (3.3, p.6), 1995 (3.2, p.7), 1997 (3.2.2, p.7), 1998 (3.2.1, p.5), 1999 (3.2.1, p.5)
	Lake Chaplain	Snag Creation	1990 (3.3, p.6), 1991 (3.4, p.12), 1992 (3.3, p.6), 1993 (3.2, p.8), 1994 (3.2, p.6), 1995 (3.2, p.7), 1996 (3.2, p.6), 1997 (3.2.2, p.7), 1998 (3.2.1, p.7), 1999 (3.2.1, p.5)
	Lake Chaplain	Snag Monitoring	1998 (3.2.2., p.7), 1999 (3.2.2, p.9)

General Activity Category	Management Tract	Milestone	Annual Report Reference – (Section/page #)
CWD Management	Lake Chaplain	Implementation Decisions	1991 (3.10.2, p. 27), 1992 (3.9.2, p.12), 1993 (4.5, p.22), 1994 (3.6.6, p.10), 1995 (3.3.2, p.11), 1995 (Appendix A-Exhibits 1-3), 1996 (3.3, p.10)
	Lake Chaplain	CWD Inventory Results	1991 (3.10.2, p.27), 1993 (3.7.2, p.14), 1995 (Appendix A-Exhibit 4)
	Lake Chaplain	CWD Creation	1994 (4.7.6, p.18), 1995 (3.3.1, p.7), 1995 (Appendix A-Exhibit 4), 1998 (3.3, p.9)
	Lake Chaplain	CWD Monitoring	1998 (3.3, p.9), 1999 (3.3, p.5)
Revegetation	Spada Lake	Drawdown Zone Test Plantings	1994 (3.3.1, p.6), 1995 (3.4.1, p.12), 1996 (3.4.1, p.10), 1997 (Fig.4), 1998 (3.4.1, p. 10), 1999 (3.4.1, p.11)
	Pipeline ROW	Revegetation Design	1991 (3.5, p.19)
	Pipeline ROW	Seeding	1992 (3.4, p.10), 1993 (3.3, p.11), 1994 (3.3.2, p.7), 1996 (3.4.2, p.11), 1997 (3.4.2, p.11), 1998 (3.4.2, p. 10), 1999 (3.4.2, p.11)
	Pipeline ROW	Plant shrubs and trees	1997 (3.4.2, p.11), 1998 (3.4.2, p.10), 1999 (3.4.2, p.12)
	Pipeline ROW	Place tree root wads	1989 (3.3, p.3), 1995 (3.4.2, p.13)
	Lake Chaplain	Revegetation Design	1991 (3.5, p.19)
	Lake Chaplain	Plantings at north end of lake	1992 (3.4, p.10), 1998 (3.4.5, p.12), 1999 (3.4.5, p.12)
	Lake Chaplain	Plantings along Chaplain Marsh	1993 (3.3, p.11), 1998 (3.4.3, p.12), 1999 (3.4.3, p.12)
	Powerhouse	Revegetation Design	1991 (3.5, p.19)
	Powerhouse	Plant shrubs and trees	1993 (3.3, p.11). 1999 (3.4.3, p.12)
Nest Structures	Lost Lake	Floating platforms	1991 (3.6, p.20), 1992 (3.5, p.10), 1993 (3.4, p.11), 1998 (3.5.1, p.13), 1999 (3.5.1, p.14)
	Lost Lake	Duck nest boxes	1990 (3.7, p.8), 1995 (3.5.2, p.16), 1996 (3.5.2, p.13), 1999 (3.5.2, p.14)
	Lost Lake	Osprey Platform	1990 (3.8, p.8), 1999 (3.5.3, p.19)
	Lake Chaplain	Floating platforms	1991 (3.6, p.20), 1992 (3.5, p.10), 1993 (3.4, p.11), 1994 (3.4, p.7), 1999 (3.5.1, p.140
	Lake Chaplain	Duck Nest Boxes	1993 (3.5, p.11), 1995 (3.5.2, p.16), 1996 (3.5.2, p.13), 1997 (3.5.1, p.16), 1999 (3.5.2, p.14)
	Spada Lake	Floating Platforms	1996 (3.5.1, p.13), 1997 (3.5.1, p.16), 1999 (3.5.1, p.14)
	Spada Lake	Duck Nest Boxes	1996 (3.5.2, p.13), 1998 (3.7, p.18, 1999 (3.5.2, p.14)
	Spada Lake	Osprey Platforms	1992 (3.7, p.11), 1999 (3.5.3, p.19)

General Activity Category	Management Tract	Milestone	Annual Report Reference – (Section/page #)
Bald Eagle Nest	Lake Chaplain	Monitoring	1997 (3.5.4, p.19), 1998 (3.5.4, p.18), 1999 (3.5.4, p.20)
Biosolids Application	Lake Chaplain	Biosolids Application	1996 (3.8, p.18), 1998 (3.7, p.18)
	Lake Chaplain	Monitoring	1996 (3.8, p.18), 1997 (3.7, p.19)
Deer Forage Monitoring	Lake Chaplain	Implementation Decisions & Methods	1991 (3.10.1, p.21), 1996 (3.9, p.18) 1997 (3.8.1, p.19)
		Forage Availability Results	1991 (3.10.1, p.22), 1996 (3.9, p.18) 1997 (3.8.2, p.22), 1998 (3.8, p.18), 1999 (3.7, p.20)
		Utilization Results	1991 (3.10.1, p.22)
Land Acquisition	Lost Lake		1989 (3.1, p.2)
	Lake Chaplain		1991 (3.1, p.3)
	Spada Lake		1990 (3.1, p.2)
	Williamson Creek		1991 (3.1, p.3)
Management Plans & Land Use Decisions	Lake Chaplain	Chaplain Property Comprehensive Plan	1995 (3.7, p.17)
	Lake Chaplain	Shoreline Zone development permit	1995 (3.7, p.17)
	Lake Chaplain	Zoning Code change	1996 (3.7, p.15)
	Lake Chaplain	Bald Eagle Nest Site Management Plan	1997 (Attachment 1)
	Lost Lake	Concrete Ford Installation	1991 (3.2, p.3)
	Spada Lake	Supplemental Plan	1997 (Attachment 2)
ROW Management	Power Pipeline	Gate to restrict public access	1994 (3.3.2, p.7)
	Power Pipeline	Access Road	1996 (3.4.2, p.11), 1997 (3.4.2, p.11)
Special Agency Consultation	All management tracts	Agency tour of WHMP Sites	1997 (3.9, p.22)
		FERC Environmental Inspection	1999 (3.9, p.31)
Other Monitoring	Williamson Creek	Monitoring	1999 (3.8, p.26)



Jackson Hydroelectric Project

MEMORANDUM

July 28, 1999

TO: File

FROM: Bruce Meaker

RE: FERC Environmental and Public Use Inspection – July 20, 1999

Attendees: PUD - Bruce Meaker, Barry Chrisman, Bernice Tannenbaum, Mike Schutt, Karen Bedrossian
City of Everett - Roy Metzgar, Don Farwell, Dan Lowell, Dan Thompson, Dan Mathias, Rob Scott
FERC - Charles Klinkenberg

Tour group met at Dutch Cup Restaurant and proceeded according to the attached schedule.

Tour highlights were:

- The signage at Recreation Site 1 (Olney Pass) showing Part 8 compliance. The restroom facility and information signage were viewed.
- Recreation sites 2, 3, 4, 5, 6, and 8 were all toured to show off various recreation and public use development. New shelters for several recreation site tables have been added since the last inspection.
- The Culmback Dam toe area was observed and the PUD response to the 1996 Part 12 suggestion to consider fencing the bypass facilities was discussed. Mr. Klinkenberg concurred that the apparent expense of fencing out the public did not seem warrented.
- Forest cutting history and future plans for pre-commercial thinning were discussed.
- The pipeline right-of-way was observed from the tunnel portal to the Marsh Creek access. The culvert crossing on No Name Creek facilitated efficient access to the right of way.
- Powerhouse was toured and the intertwining of operations with fishery management was discussed.
- Sultan River access areas or roads were visited or viewed to Horseshoe Bend, Trout Farm Road, Powerhouse, Chaplain Creek, and the Diversion Dam.
- Several forest management areas were viewed with differing ages of clear cuts to show rate of regrowth, snag trees, coarse woody debris and biosolids application results.

- Diversion Dam was toured. The USGS gauging station at and below the structure were discussed.
- Lost Lake was toured. The group experienced the fishing platform provided by the PUD and the Sultan Sportsman's Council.
- A summary at the City Filter plant conference room completed the tour by 4:20 p.m.

A document was provided by the PUD to all party members listing activities since the submittal of the Wildlife Habitat Management Plan to the FERC in 1988. (See attached).

Mr. Klinkenberg stated that there were no apparent safety issues for public access.

The environmental and public use inspection (done every 3 years) will have a report and the licensees will be able to access it from the FERC internet web site.

Attachments

Tour Schedule
Description of Wildlife Habitat Management Plan Activities 1989-1999

BFM:

CC:

Craig Thompson - E2
Barry Chrisman - SU
Karen Bedrossian – E2
Mike Schutt - E2
Bernice Tannenbaum - E2
Murray Schuh – E2

Clair Olivers - City
Roy Metzgar - City
Don Farwell - City
Dan Lowell – City
Dan Mathias - City
Dan Thompson - City

Henry M. Jackson Hydroelectric Project
1999 FERC Environmental and Public Use Inspection

Tour Schedule
July 20, 1999

7:30 a.m.	Meet at Dutch Cup Restaurant, Sultan
7:45 - 8:20	Travel to and inspect Rec Site 1 (Olney Pass) (Public Use Facilities and project information)
8:20 - 8:45	Travel to and inspect Rec Site 2 (South Fork) (Public Use Facilties and project information)
8:45: - 9:10	Travel to and inspect Rec Site 3 and 4 (South Shore & Nighthawk) (Public Use Facilities and project information)
9:10 - 9:30	Travel to and inspect Rec Site 5 (Bear Creek) (Public Use Facilities and project information)
9:30 - 10:20	Travel to and inspect Rec Site 6 (Culmback Dam) (Public use facilities, project information, log boom area, minimum flows below Culmback)
10:20 - 11:05	Travel to and inspect Rec Site 8 (Overlook) (Overview of areas of precomercial thinning, location of osprey platforms, drawdown zone plantings)
11:05 - 12:15	Travel and inspect Pipeline Right of Way (Grass seeding, vegetation management, habitat creation)
12:15 – 1:05	Tour of Powerhouse (Including Lunch) (Operations impacts on stream conditions)
1:05 - 1:30	Travel to and inspect public access road to Horseshoe Bend and lower pipeline ROW
1:30 - 1:50	Travel to and inspect Sultan River access off Trout Farm Road (Boating access to lower river)
1:50 - 2:25	Travel to and inspect Sultan River access gates across from Powerhouse and at Chaplain Creek Gage
2:25 – 2:50	Travel to and inspect Diversion Dam Area (Chaplain Area Wildlife Management, cutting units, diversion dam flow control point, assess to upper Sultan River)
2:50 – 3:40	Travel to and inspect Lost Lake Area (Lost Lake Area Wildlife Management, Public Use Facilities, Wildlife Management on Lake Chaplain)
3:40 – 4:00	Travel to City Filter Plant
4:00 – 4:20	Summarize Tour Findings and Requirements
4:20 – 4:40	Return to Dutch Cup

SNOHOMISH COUNTY PUBLIC UTILITY DISTRICT NO. 1 and
CITY OF EVERETT

HENRY M. JACKSON HYDROELECTRIC PROJECT
WILDLIFE HABITAT MANAGEMENT PLAN - 1989-1999

The Wildlife Habitation Management Plan (WHMP), approved in the FERC's order dated May 19, 1989, was required under License Article No. 53. Implementation of the WHMP, which is described fully in the co-licensees' annual reports, has proceeded since the plan was approved. The last environmental inspection of the Jackson Project was in 1995. The following summary lists accomplishments that have occurred since the WHMP was submitted to the FERC in 1988.

A. ACQUISITION OF LAND FOR RECREATION AND WILDLIFE MITIGATION

The 205-acre Lost Lake Tract was acquired by the District in 1988. Lands adjacent to Spada Lake were acquired by the District from the U.S. Forest Service and the Washington Dept. of Natural Resources for wildlife habitat improvements and recreation (Figure 1). In addition to the reservoir, approximately 1745 acres of land now comprise the Spada Lake Tract, and 480 acres comprise the Williamson Creek Tract. The City exchanged certain lands adjacent to Lake Chaplain with the Dept. of Natural Resources, in order to acquire all of the lands in this area that the WHMP dedicates for wildlife habitat management (Figure 2).

B. IMPLEMENTATION OF WILDLIFE HABITAT MANAGEMENT PLAN

The implementation phase of the WHMP has been completed, consisting of installation of required improvements and initiation of long-term management programs. Some stands depicted in the WHMP have been reconfigured and some units have been substituted for others, however, the implementation is consistent with the objectives, procedures, and activity schedule of the WHMP. Modifications have been reported in annual reports on the progress of WHMP implementation. The following summary of activities follows the organization of the WHMP's management tract prescriptions and monitoring program to facilitate comparison of accomplishments with scheduled activities.

Lake Chaplain Tract

Management of Harvest Units

- Road system construction into five major blocks of Lake Chaplain property
- Final harvest (FH) of eight units (159 ac.)
- Commercial thinning (CT) of two units (36 ac.)
- Reforestation of all FH units
- Snag tree inventory and creation (448 snags) on all FH and CT units. These units average 3 snags/ac. greater than 11 inches in diameter
- Coarse woody debris (CWD) inventoried on FH units. CWD management procedure approved by Joint Agencies; trees left on 4 FH units per this procedure.
- Seeding of roadsides, FH and CT units.
- Deer forage monitoring on selected FH units.

Other Management Activities

- Snag tree inventory and creation on other units - 780 ac. inventoried; 681 snags created
- Planting and maintenance of "vegetative screens" (shrub/tree plantings) at north end of Lake Chaplain and along Chaplain Marsh
- Installation of 9 wood duck nest boxes at Chaplain Marsh (not required by WHMP)
- Installation of 2 floating waterfowl platforms in Lake Chaplain (not required by WHMP), and subsequent relocation to Spada Lake.
- *Biosolids applications on 2 CT units. Understory vegetation and water quality monitoring of these units.*

Lost Lake Tract

- Precommercial thinning of 46-ac. unit
- Installation of one osprey nest platform
- Installation of seven wood duck nest boxes (only two required by WHMP)
- Installation of two floating waterfowl platforms (required third platform was placed in Lake Chaplain and later at Spada Lake).
- Installation of fishing platform (not required by WHMP)
- Snag tree inventory (130 ac.) and creation (43 snags).

Project Facility Lands Tract

- Shrub and tree plantings near powerhouse
- Reseeding of power pipeline, installation of gate on pipeline access road, placement of boulders and ecology blocks to protect Marsh Creek and other streams
- Shrub planting on pipeline right of way. Quantitative vegetation cover monitoring on pipeline right of way.

Spada Lake Tract

- Planting and monitoring of shoreline vegetation test plots for five wetland species
- Consultant evaluation of forest stand management opportunities
- FERC approval of Supplemental Plan for the Spada Lake Tract (1997).
- Evaluation of need for shoreline debris removal
- Precommercial thinning of 3 forest stands (30 ac.)
- Installation of 6 wood duck nest boxes, 2 osprey platforms, and 2 floating platforms.

Williamson Creek Tract

- Monitor status of old growth stand
- Development of detailed management procedures.

Monitoring Program

- Development of procedures for long-term monitoring of CWD and snags
- Long-term monitoring of CWD and snags initiated on selected units.
- Tests of procedures for monitoring deer forage availability and utilization
- Monitoring of all revegetation sites, including powerhouse, Lake Chaplain, Chaplain Marsh and Spada Lake shoreline plantings
- Annual maintenance and monitoring of all nest structures
- Monitoring of buffer zones and green tree areas associated with Lake Chaplain harvest units

C. Annual Reports

Annual reports were prepared and submitted to the FERC from 1989-1997, as required by the Jackson Project license. Prior to submitting the reports to the FERC, the co-licensees submitted a draft version to the Joint Agencies and held a meeting to describe in detail the previous year's accomplishments and respond to agency comments and questions. Several of the agency meetings included field trips to final harvest units and other sites where management activities have been implemented. Following the agency review, a revised final annual report, including agency comments, was sent to the FERC. Annual reports are produced for the Joint Agencies and submitted hereafter at 5 year intervals to the FERC, as specified by the Jackson Project license.