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SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1

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April 27, 2001
PUD No. 20636

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Reference: Wildlife Habitat Management Plan
2000 Annual Report
Jackson Hydroelectric Project – FERC #2157 License Article 53

Gentlemen:

A copy of the 2000 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 for

Bruce Meaker
Senior Manager,
Regulatory Affairs

Enclosure
BT:nda

Cc: Ann Savery, Tulalip Tribes

# 2000 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**

# 2000 ANNUAL PROGRESS REPORT
# WILDLIFE HABITAT MANAGEMENT PLAN

## TABLE OF CONTENTS


**TABLE OF CONTENTS** I

**LIST OF FIGURES** IV

**LIST OF TABLES** IV

**1.0 SUMMARY** 1

**1.1 MAJOR TASKS ACCOMPLISHED DURING 2000** 1

**1.2 TASKS SCHEDULED FOR 2001** 2

**2.0 INTRODUCTION** 2

**3.0 WORK COMPLETED DURING 2000** 4

**3.1 FOREST VEGETATION MANAGEMENT (Lake Chaplain Tract)** 4
3.1.1 Timber Harvest and Reforestation 4
3.1.2 Reforestation 4
3.1.3 Harvest Unit Layout 4
3.1.4 Other Management Activities 6
3.1.5 Land Use 6

**3.2 FOREST VEGETATION MANAGEMENT (LOST LAKE & SPADA LAKE)** 6
3.2.1 Spada Lake Precommercial Thinning 6
3.2.2 Lost Lake Tract Forest Management 6
3.2.3 Timber Harvest Feasibility Study 7

**3.3 SNAG AND CWD MANAGEMENT** 9
3.3.1 Snag Inventory and Creation 9
3.3.2 Mapping of Snags and CWD 9
3.3.2 Coarse Woody Debris Management 9

**3.4 REVEGETATION** 13
3.4.1 Power Pipeline Right-of-Way 13
3.4.2 North end of Lake Chaplain 13

**3.5 NEST STRUCTURES** 13
3.5.1 Floating Nest Platforms 13
3.5.2 Nest Boxes 13

3.5.3 Osprey Nest Platforms 19
3.5.4 Bald Eagle Nesting 20

**3.6 OTHER WILDLIFE OBSERVATIONS 20**

**3.7 BIOSOLIDS APPLICATION 20**

**3.8 DEER FORAGE MONITORING 24**

**3.9 WILLIAMSON CREEK TRACT 24**

**4.0 CUMULATIVE SUMMARY 30**

**4.1 FOREST VEGETATION MANAGEMENT (LAKE CHAPLAIN TRACT) 30**
4.1.1 Road System Layout and Construction 30
4.1.2 Timber Harvest 30
4.1.3 Management of Roads and Post-harvest Units 32

**4.2 FOREST VEGETATION MANAGEMENT (LOST LAKE TRACT) 32**

**4.3 FOREST VEGETATION MANAGEMENT (SPADA LAKE TRACT) 33**

**4.4 SNAG MANAGEMENT 33**

**4.5 COARSE WOODY DEBRIS MANAGEMENT 34**

**4.6 REVEGETATION 34**
4.6.1 Spada Lake Drawdown Zone 34
4.6.2 Power Pipeline Right-of-Way 38
4.6.3 North End of Lake Chaplain and Chaplain Marsh 38
4.6.4 Powerhouse Site 38

**4.7 NEST STRUCTURES 38**
4.7.1 Floating Nest Platforms 39
4.7.2 Nest Boxes 39
4.7.3 Osprey Nest Platforms 39

**4.8 BIOSOLIDS APPLICATION 39**

**4.9 DEER FORAGE MONITORING 40**

**4.10 LAND ACQUISITION 40**

**4.11 WILLIAMSON CREEK TRACT 41**

**5.0 WORK PLANNED FOR 2001 43**

**5.1 FOREST VEGETATION MANAGEMENT 43**
5.1.1 Lake Chaplain Tract 43

5.1.2 Spada Lake Tract 44
5.1.3 Lost Lake Tract 44

**5.2 SNAG MANAGEMENT** 44

**5.3 COARSE WOODY DEBRIS MANAGEMENT** 45

**5.4 REVEGETATION** 45
5.4.1 Spada Lake Drawdown Zone 45
5.4.2 Power Pipeline Right-of-Way 45
5.4.3 Chaplain Marsh, North End of Lake Chaplain, and Powerhouse Site 45

**5.5 NEST STRUCTURES** 45

**5.6 BIOSOLIDS APPLICATION AT LAKE CHAPLAIN** 46

**5.7 DEER FORAGE MONITORING** 46

**5.8 WILLIAMSON CREEK TRACT** 46

**6.0 SCHEDULE OF ACTIVITIES FOR 2001** 47

**APPENDIX 1 – WHMP IMPLEMENTATION MILESTONES** 48

## LIST OF FIGURES


FIGURE 1. WHMP PROJECT AREA WITH MANAGEMENT TRACTS 3
FIGURE 2. HARVEST ACTIVITY – LAKE CHAPLAIN TRACT 5
FIGURE 3. FOREST VEGETATION MANAGEMENT – SPADA LAKE TRACT 8
FIGURE 4. SNAG MANAGEMENT, 2000—LOST LAKE & LAKE CHAPLAIN TRACTS 10
FIGURE 5. SNAG INVENTORY, 2000 – WILLIAMSON CREEK TRACT 12
FIGURE 6. PIPELINE RIGHT-OF-WAY 14
FIGURE 7. NEST STRUCTURES AT LOST LAKE 15
FIGURE 8. NEST STRUCTURES AT SPADA LAKE 16
FIGURE 9. NEST BOX LOCATIONS AT CHAPLAIN MARSH 17
FIGURE 10. NEST BOXES IN LAKE CHAPLAIN TRACT 18
FIGURE 11A. BIOSOLIDS APPLICATION MONITORING - NITRATES 21
FIGURE 11B. BIOSOLIDS APPLICATION MONITORING – FECAL COLIFORMS 22
FIGURE 11C. BIOSOLIDS APPLICATION MONITORING - AMMONIA 23
FIGURE 12. DEER FORAGE MONITORING 25
FIGURE 13. WILLIAMSON CREEK OLD GROWTH STANDS 10-6 AND 10-7 28
FIGURE 14. WILLIAMSON CREEK OLD GROWTH STAND 10-2 AND RIPARIAN STAND 10-3 29
FIGURE 15. WHMP SCHEDULE VS COMPLETED FOREST VEGETATION MANAGEMENT – LAKE CHAPLAIN/LOST LAKE TRACTS, 1989-2000 31
FIGURE 16. SNAG MANAGEMENT—LAKE CHAPLAIN AND LOST LAKE, 1989-2000 35


## LIST OF TABLES


TABLE 1. STANDS INCLUDED IN TIMBER HARVEST FEASIBILITY STUDY 7
TABLE 2. SUMMARY OF SNAG MANAGEMENT IN 2000 11
TABLE 3. USE OF NEST BOXES ON WHMP LANDS 19
TABLE 5. WILLIAMSON CREEK STANDS INVENTORIED IN 2000 24
TABLE 6. WILLIAMSON CREEK 2000 SNAG INVENTORY RESULTS. 26
TABLE 7. WILLIAMSON CREEK 2000 CWD INVENTORY RESULTS. 27
TABLE 8. MODIFICATIONS OF THE FINAL HARVEST (FH) SCHEDULE ON LAKE CHAPLAIN TRACT 30
TABLE 9. MODIFICATIONS OF THE COMMERCIAL THINNING (CT) SCHEDULE ON LAKE CHAPLAIN TRACT 32
TABLE 10. SUMMARY OF SNAG MANAGEMENT THROUGH 2000 (1) 36
TABLE 10. SUMMARY OF SNAG MANAGEMENT THROUGH 2000 (2) 37
TABLE 11. SUMMARY OF DEER FORAGE MONITORING SCHEDULE 40
TABLE 12. WILLIAMSON CREEK BASELINE INVENTORY SUMMARY. 41
TABLE 13. WILLIAMSON CREEK TRACT SNAG CUMULATIVE INVENTORY SUMMARY 42
TABLE 14. WILLIAMSON CREEK CWD CUMULATIVE INVENTORY SUMMARY 43

# 2000 ANNUAL PROGRESS REPORT
# WILDLIFE HABITAT MANAGEMENT PLAN

## 1.0 SUMMARY

Accomplishments of the year 2000 on the Wildlife Habitat Management Plan (WHMP) for the Henry M. Jackson Hydroelectric Project are presented in this report. A cumulative summary of tasks accomplished since the initiation of the WHMP in 1989 is also presented in this report. Problems or changes needed during implementation of the WHMP are discussed, and updated schedules are presented. A draft of this report was submitted for comments to the U.S. Fish and Wildlife Service (USFWS), the Washington Department of Fish and Wildlife (WDW), and the Tulalip Tribes. The Washington Department of Natural Resources (DNR) was also consulted.

The basic habitat enhancements, monitoring programs, and reports required by the WHMP to date have been implemented consistent with the Plan's objectives (Section 3, WHMP, by management tract) and implementation schedule (Section 5.0, WHMP). In some cases, procedures described in the WHMP have been modified or refined to improve the usefulness and reliability of results. Similarly, the details of timber stand boundaries and harvest schedules have been modified to improve operations and reduce impacts, but all such modifications have been within the allowances provided by the WHMP. All significant modifications in procedures have been evaluated relative to the WHMP's management objectives, in consultation with agency reviewers, and have been approved only if the modifications remain consistent with the WHMP's objectives.

As described in Sections 3 and 4 of this report and in previous years' reports, implementation of the WHMP over the past decade has already provided many of the intended wildlife habitat benefits. For example, snag and coarse woody debris creation has provided critical shelter and foraging substrate that was scarce in second growth forest stands, while small-scale timber harvest has created new foraging opportunities for several species. Revegetation of areas disturbed during project construction has provided cover and forage.

## 1.1 MAJOR TASKS ACCOMPLISHED DURING 2000

- Tiki Sale unit 2 replanted (Lake Chaplain Tract)
- Completed road construction for Linetree Sale (Lake Chaplain Tract)
- Harvested Linetree Sale units (Lake Chaplain Tract)
- Planted Linetree Sale Unit 2 and part of Unit 1 (Lake Chaplain Tract)
- Completed layout of Donkey Damper Sale (Lake Chaplain Tract)
- Preliminary layout work on next timber sale (Lake Chaplain Tract)
- Completed half of the Lake Chaplain Road drainage upgrade
- Plantation monitoring (Lake Chaplain Tract)
- Biosolids application (Lake Chaplain Tract)
- Snag inventory and creation (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 nest structures

- Monitoring of revegetation and wetland sites (Lost Lake Tract, Lake Chaplain Tract)
- Monitoring of Williamson Creek Tract
- Monitoring of biosolids application sites (Lake Chaplain Tract)
- Feasibility study of timber harvest options (Lost Lake Tract, Spada Lake Tract)

## 1.2 TASKS SCHEDULED FOR 2001

- Complete planting of Linetree Sale Unit 1
- Precommercial thinning of Chaplain Sale Unit 1 (Lake Chaplain Tract)
- Hardwood thinning in Diversion Sale Unit 2 (Lake Chaplain Tract)
- Complete Lake Chaplain Road drainage upgrade
- Sell Donkey Damper Sale (Lake Chaplain)
- Complete layout of next sale (Lake Chaplain)
- Plantation monitoring (Lake Chaplain)
- Biosolids monitoring (Lake Chaplain)
- Continue snag management program on Lake Chaplain and Lost Lake Tracts
- Snag inventory on Spada Lake Tract and Williamson Creek Tract
- Monitor Williamson Creek Tract; assess benefits of snag and CWD creation
- Monitor nest structures
- Monitor revegetation sites
- Deer forage monitoring (Lake Chaplain Tract)
- Snag monitoring (Lake Chaplain Tract, Lost Lake Tract)
- Coarse woody debris monitoring on Lake Chaplain harvest units
- Monitor buffer zones and green tree areas in harvested units (Lake Chaplain Tract)
- Monitor precommercial thinning units (Spada Lake Tract, Lost Lake Tract)
- Monitor vegetation coverage on pipeline ROW

# 2.0 INTRODUCTION

The 2000 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 2000 (see Section 3.0) and summarizes activities completed since the management program was initiated in 1989 (see Section 4.0). Activities anticipated for the calendar year 2001 are described (see Section 5.0). 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 compliance with Project License Article 53 and subsequent related orders from the Commission.

Williamson Creek Tract

Spada Lake Tract

Sultan River

Lake Chaplain Tract

T29N

T28N

Lost Lake Tract

Power Pipeline/Tunnel

R8E R9E

Project Facilities Tract (Powerhouse)

HENRY M. JACKSON PROJECT
WILDLIFE HABITAT MANAGEMENT PLAN

FIGURE 1. MANAGEMENT TRACTS

N

4000 0 4000 8000 Feet

Projects\snopud\jhptracts.apr

# 3.0 WORK COMPLETED DURING 2000

## 3.1 FOREST VEGETATION MANAGEMENT (Lake Chaplain Tract)

### 3.1.1 Timber Harvest and Reforestation

The Linetree timber sale was sold in May 1999 (Figure 2). Road construction began in August and was completed in October of that year. Timber harvest began on Line2-00[1] in March 2000 and all harvest activities were completed on both units in June.

### 3.1.2 Reforestation

Line2-00 and a portion of Line1-00 were planted to 250 Douglas fir per acre and 50 red cedar per acre immediately following harvest. The nine remaining acres in Line1-00 were not planted because logging was not complete in time to plant during cool weather. This area will be replanted in the spring of 2001. Bare soil in the harvest units and associated road ROW's were seeded with a grass forb mix, which has become well established.

During routine plantation monitoring it was found that the trees in Tiki1-98 (Figure 2), which was harvested in 1998 and replanted in 1999, had been severely damaged by mountain beaver and deer. Survival plots indicated that at least 40 percent of the planted trees had been either damaged or destroyed. This unit was interplanted in the spring of 2000, bringing stocking levels up to the original 250 Douglas fir per acre and 50 red cedar per acre.

### 3.1.3 Harvest Unit Layout

Sale layout for the Donkey Damper Sale was completed in 2000. In the process of the Donkey Damper sale layout, PMF-1 (9.8 acres) was located and flagged (Figure 2). The sale consists of three units totaling 44.5 acres (Figure 2). There will be 6688 feet of mainline road built for the harvest of these units and future sales. In addition, two short spurs will be built into Unit 1 and Unit 3. Trees were selected for snag and CWD retention and creation on each unit, and selected big-leaf maples were marked for retention, if possible. Stream buffer zones were bounded out of the harvest units. A 1.3 acre GTA was designated for unit 1 (23.5 acres) and a 1 acre GTA was designated for units 2 and 3 collectively, since they are relatively small units (14 and 7 acres, respectively). Trees and existing snags were inventoried in 2000 on both GTAs. The harvest units will be offered for sale in 2001.

Preliminary sale layout for two units of the next timber sale on the Lake Chaplain Tract started in 2000.

---

[1] A convention for naming harvest units was developed to abbreviate unit names on maps; e.g. Unit 1 of the Linetree Sale, harvested in 2000, is abbreviated Line1-00. The same abbreviated name will be used in the text of this report to avoid confusion.

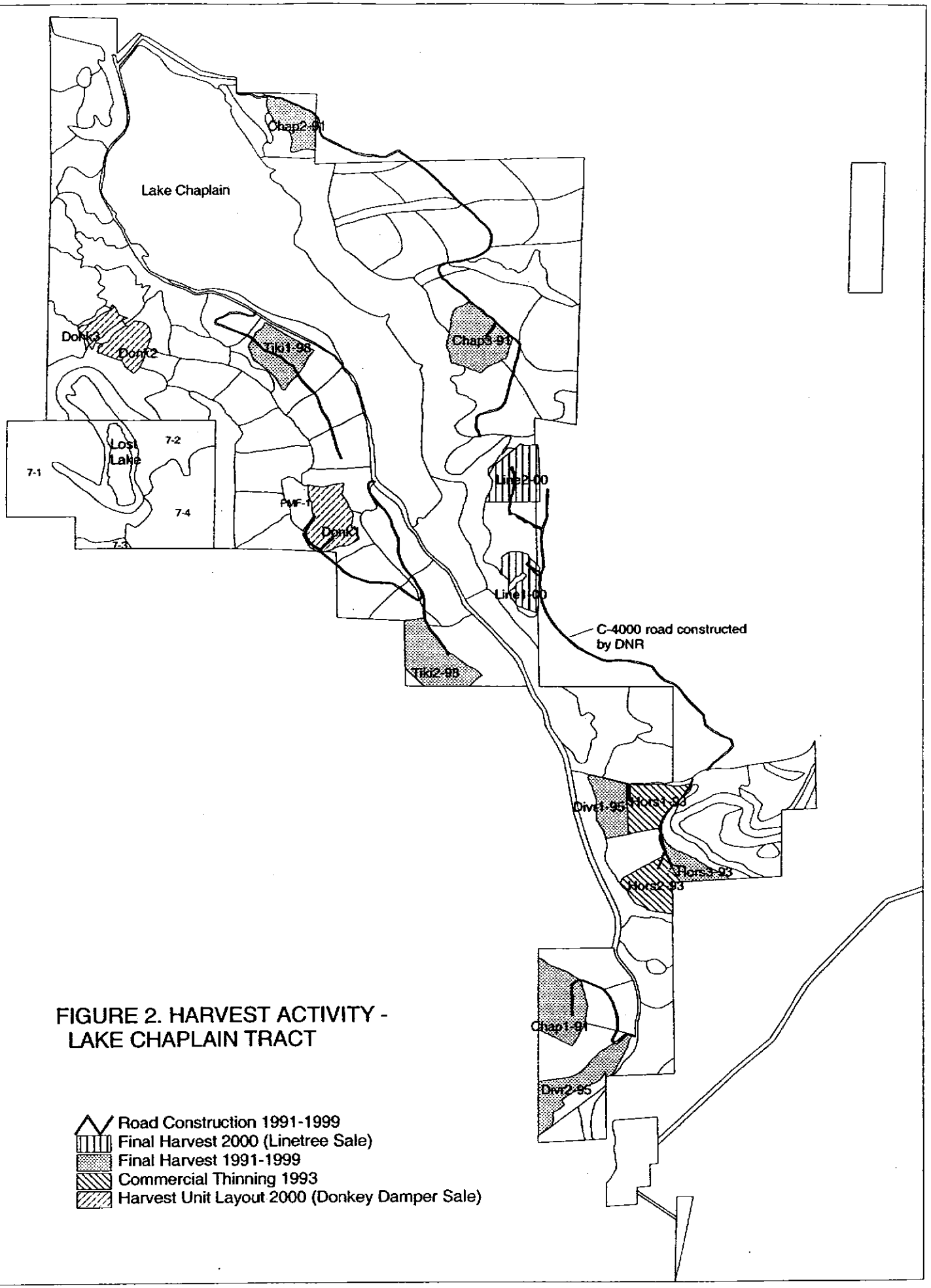


FIGURE 2. HARVEST ACTIVITY - LAKE CHAPLAIN TRACT

- Road Construction 1991-1999
- Final Harvest 2000 (Linetree Sale)
- Final Harvest 1991-1999
- Commercial Thinning 1993
- Harvest Unit Layout 2000 (Donkey Damper Sale)

### 3.1.4 Other Management Activities

A project to improve drainage from the Lake Chaplain Road was started in 2000 in order to bring the road up to the newest Forest Practices requirements. Culverts were examined and replaced as needed.

### 3.1.5 Land Use

The City entered into discussions with Trillium Corp. on purchase of Trillium's property north of Lake Chaplain (T 29N, R7E, portions of Section 25) and northwest of the Lost Lake Tract (T29N, R7E, portion of Section 35). The objectives of the purchase are to control access and preserve water quality within the hydrographic boundary of Lake Chaplain. If the City acquires the properties, they will not be subject to the guidelines or requirements of the WHMP.

## 3.2 FOREST VEGETATION MANAGEMENT (LOST LAKE & SPADA LAKE)

### 3.2.1 Spada Lake Precommercial Thinning

Contractors thinned approximately 38 acres in Stands 9-160, 163, 165 and 179 at Spada Lake in April 2000. The stands included an early successional stand (9-160) that was clearcut approximately in 1978 and older unmanaged second growth conifer stands.The prescription called for thinning conifers to an average spacing of 14 feet, and retaining all hardwoods except alder. All shrubs and some large alders, plus snags that were safe to work under, were also retained.

### 3.2.2 Lost Lake Tract Forest Management

The WHMP designated 96 acres of mixed forest outside the 500-ft. wetland buffer zone to be managed on a 60-year final harvest rotation. The 80-acre buffer zone was designated as permanent mixed forest, with 1-acre patch cuttings allowed in the outer 300 feet of the buffer zone. (For details, see WHMP, Section 2.1.4 and Section 3.2). Since the development of the WHMP, however, forest cover on adjacent property has been greatly reduced by timber harvest and additional harvests are planned. The District's biologists determined that the habitat needs of Lost Lake's target species, black-tailed deer, ruffed grouse and black-capped chickadee, would not be served by creating additional clearcuts. In addition, the WHMP schedule for final harvest entries into the tract also presented some access problems that would require an excessive amount of road construction and long-term maintenance. To solve these problems and retain the mixed forest objective for Lost Lake, a new activity schedule and new management prescriptions involving variable density selective harvest were developed for further study. The details of the new management prescriptions were still under discussion at the end of 2000, and will be developed more fully in 2001.

### 3.2.3 Timber Harvest Feasibility Study

A forestry consultant was hired in 2000 to prepare a feasibility study of timber harvest at the Lost Lake Tract and the Spada Lake Tract. Several stands in these tracts were identified for commercial harvest in the WHMP and the Spada Supplement, respectively, but there were concerns over access and operational constraints. The District determined that a feasibility study would assist in determining timing and detailed prescriptions for the stands. The consultant cruised the Lost Lake Tract (Table 1; Figure 2) and selected stands in the Spada Lake Tract (Table 1; Figure 3)). He projected costs and revenues of timber harvest at current (year 2000) conditions and at five year increments through 2020.

**Table 1. Stands Included in Timber Harvest Feasibility Study**

| Tract | Stand No. | Cover Type | Size of Stand(s) | Approximate Age of Stand |
|---|---|---|---|---|
| Lost Lake | 7-1, 7-2, 7-3 | Mixed forest/western hemlock | 85 ac. | 60+ |
| Lost Lake | 7-4 | Closed canopy sapling/pole conifer; patches of alder | 49 | 22+ |
| Spada Lake | 9-36, 9-37, 9-38 | Closed canopy sapling/pole conifer; never thinned | 45 | 35-40 |
| Spada Lake | 9-120 | Closed canopy sapling/pole conifer; previously lightly thinned | 16 | 35 |
| Spada Lake | 9-121, 9-183, | Closed canopy sapling/pole conifer | 79 | 40 |
| Spada Lake | 9-142, 9-150 | Closed canopy sapling/pole conifer | 23 | 40 |
| Spada Lake | 9-184 | Closed canopy sapling/pole conifer | 4 | 40 |

Depressed hemlock prices and road costs at the end of 2000 had a significant effect on the economic analysis of the small-wood stands ($\leq$ 40 yrs. old). The consultant calculated that prices must rise from the current $30 per ton to $43 per ton (or more depending on required road work) to break even. Revenues produced from the older timber stands at Lost Lake would be sufficient to subsidize road work at Spada Lake.

Management decisions for these stands depend on several considerations:

- Wildlife habitat values on the Spada Lake stands, if left unmanaged, will not improve for many years.
- Prompt thinning of the Spada Lake stands will not result in a large increase in the future value of residual timber within the next 20 years due to poor soil productivity, compared to taking no action now.
- Habitat values of portions of the Lost Lake stands, especially 7-1, are currently good.

An additional option for Spada Lake stands 9-36, 37 and 38 would be to thin them precommercially in the near future, with no road work required, and commercially harvest them in the future. Decisions on management options will be made in 2001.

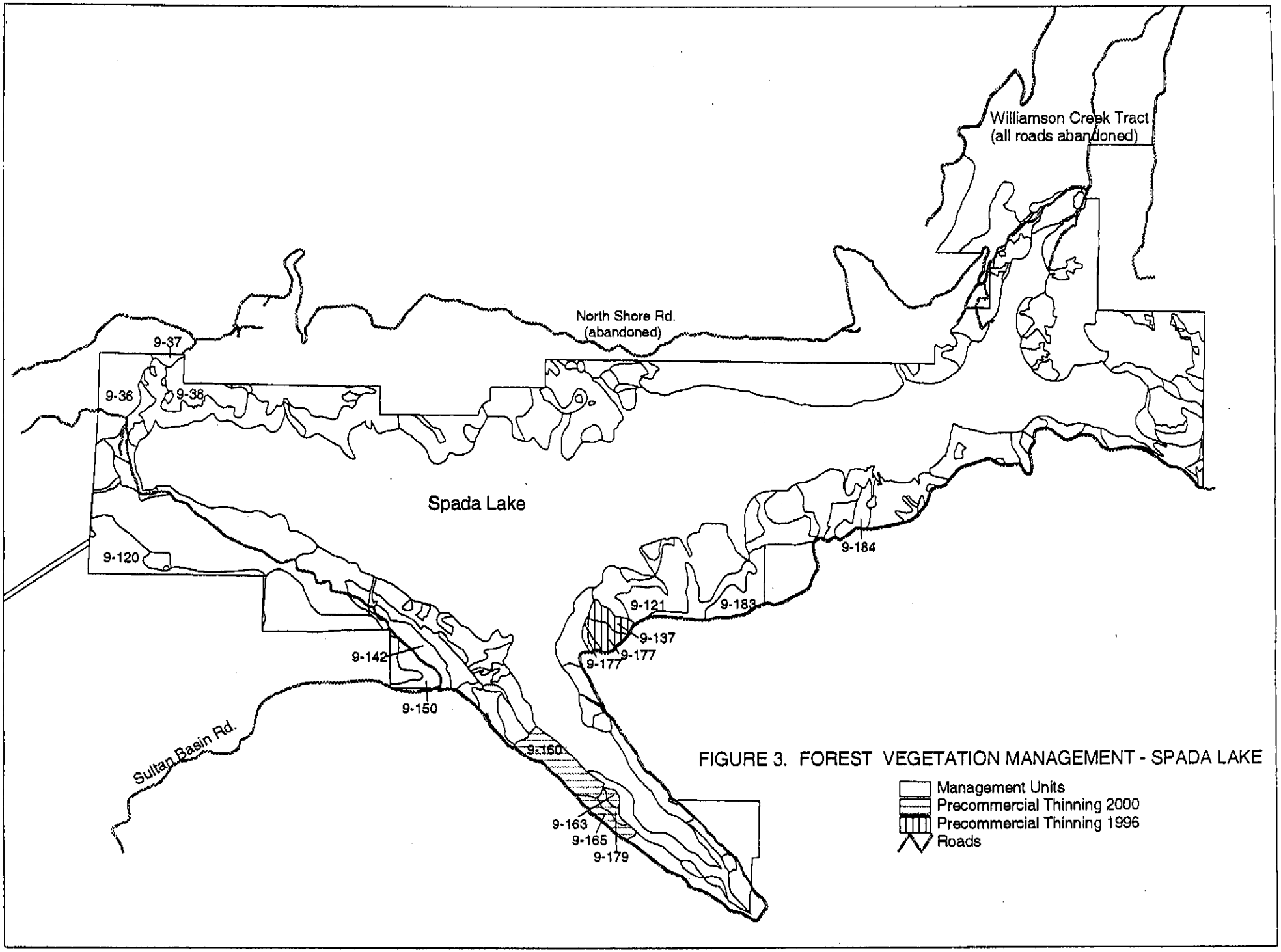


FIGURE 3. FOREST VEGETATION MANAGEMENT - SPADA LAKE

## 3.3 SNAG AND CWD MANAGEMENT

### 3.3.1 Snag Inventory and Creation

In 2000, 503 snags were created on 11 units totaling 330 acres on the Lake Chaplain and Lost Lake Tracts (Figure 4, Table 2). Six units at Lost Lake and Lake Chaplain, which had previous snag creation but were not complete, were among those finished this year. Five other stands or units were inventoried in 2000 but no snag creation was necessary to produce the required number and size distribution of snags. Additionally, snag inventories were completed on 5 riparian stands comprising 67 acres on the Williamson Creek Tract (Figure 5, Table 2), but no snag creation has taken place yet. Snags were also inventoried in Stands 10-6 and 10-7 at Williamson Creek. Additional inventories will be conducted on these large old growth stands to result in 5 percent coverage of the stands (see Section 3.5 for preliminary data).

As in past years, trees were topped with a chainsaw, typically between 50 and 60 feet high, and marked with paint and a numbered metal tag. Their locations were mapped for future monitoring.

### 3.3.2 Mapping of Snags and CWD

Snags and CWD created prior to 2000 on harvest units were mapped to facilitate long-term monitoring using the District's newly-acquired GPS equipment. The following units were mapped: Tiki1-98 and Tiki2-98, Linetree1-00 and Linetree2-00, Divr1-95 (CWD only), PMF-11 (some snags) (Figure 4). The objective is to map at least the subset of snags and CWD that are selected for long-term monitoring, but if time allows all tagged snags and CWD will be mapped on harvest units. GPS mapping was not very successful under the tree canopy, and we will continue to map snags and CWD in forested units with compass and tape.

### 3.3.2 Coarse Woody Debris Management

Existing CWD in decay classes 3 and 4 were marked, mapped and photographed during sale layout in 1999 on each unit of the Linetree Sale for post-harvest monitoring. The objective of this monitoring was to determine the effects of logging on existing CWD.

Marked logs were examined in late 2000, about 6 months after harvest. Six of the seven marked logs were readily located and had not been moved during the logging operation. The remaining log was probably mis-mapped. Most of the vegetation originally present on the marked logs, consisting of mosses, salal, huckleberry and ferns, was stripped off during logging. The limited amount of bark that was present on the logs prior to harvest was stripped off, and two of the logs were partially broken into lengthwise slabs. Two logs that were originally were partly suspended by logs below them or irregularities in the ground contours were broken at the suspended portions. The mechanical damage from logging may speed up decomposition processes. However, the logs remain mostly intact in their original locations and will continue to provide habitat benefits such as moisture retention, shelter for small animals, and substrate for invertebrates and decomposer organisms.

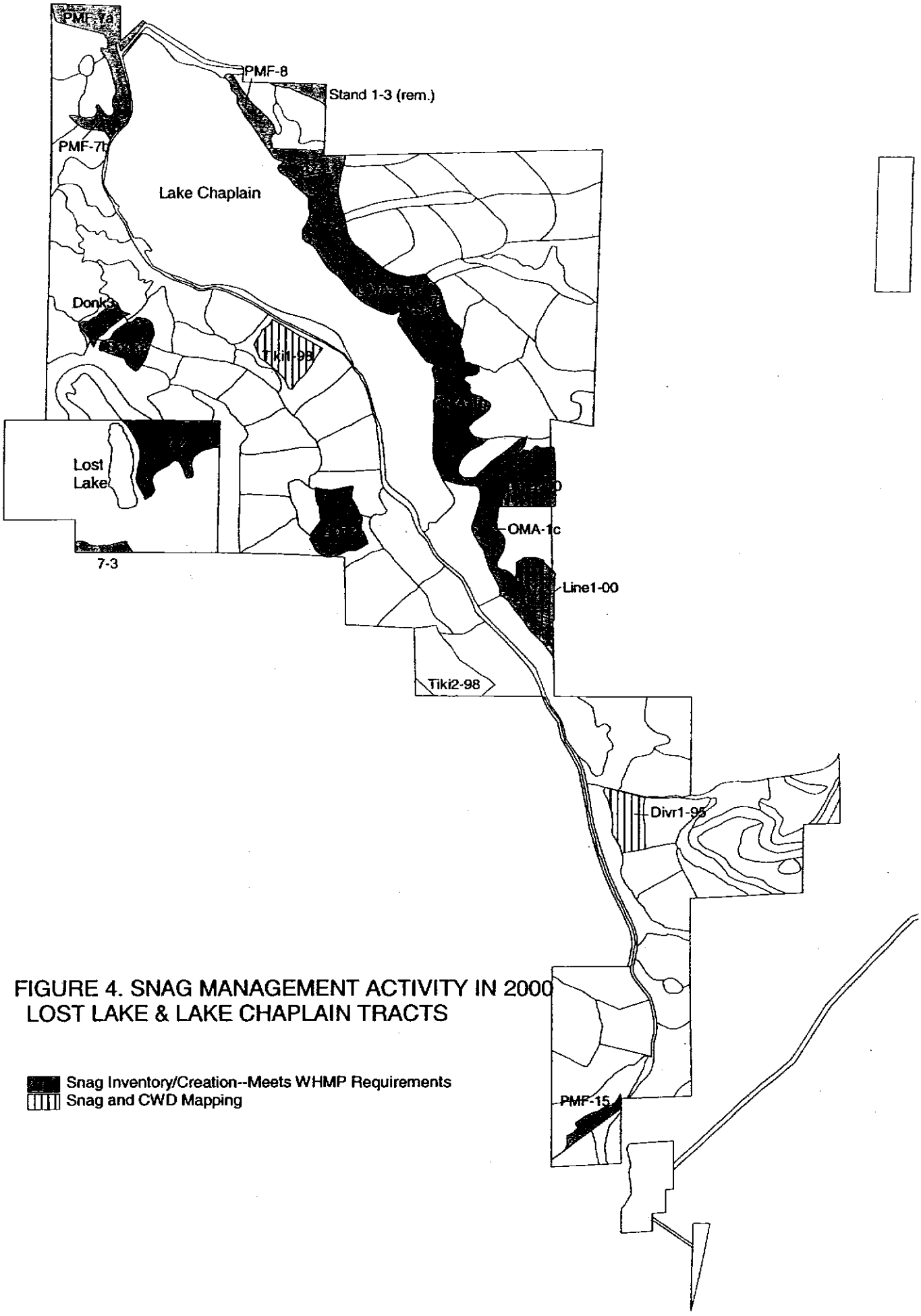


FIGURE 4. SNAG MANAGEMENT ACTIVITY IN 2000
LOST LAKE & LAKE CHAPLAIN TRACTS

**Table 2. Summary of Snag Management In 2000**

| UNIT | ACRES | NUMBER CREATED | AVG. DBH (in.) | AVG. HT. (ft.) | # PER ACRE | NOTES |
|---|---|---|---|---|---|---|
| **Lake Chaplain and Lost Lake Tracts** | | | | | | |
| Buffer Zone 1 | 2.3 | 0 | 16.4 | 63.8 | 9.8 | √ Includes natural and created snags |
| Buffer Zone 2 | 1.4 | 0 | 15.9 | 46.6 | 5.0 | √ Includes natural and created snags |
| Donkey Damper 1 | 23.5 | 67 | 17.1 | 65.3 | 3.1 | √ Includes natural and created snags |
| Donkey Damper 2 | 21.4 | 58 | 18.0 | 67.6 | 3.0 | √ Includes natural and created snags |
| Line Tree 1 | 14.8 | 42 | 18.0 | 65.4 | 3.0 | √ Includes natural and created snags |
| Line Tree 2 | 22.0 | 62 | 17.4 | 66.4 | 3.1 | √ Includes natural and created snags |
| Lost Lake 7-2\1 | 34.0 | 75 | 17.3 | 61.7 | 3.2 | √ Includes natural and created snags |
| Lost Lake 7-3 | 4.0 | 0 | n/a | n/a | 3.1+ | √ Natural snags only |
| OMA1a\2\1 | 74.8 | 1 | 17.9 | 68.3 | 4.3 | √ Includes natural and created snags |
| OMA1b\2 | 50.5 | 62 | 18.4 | 65.2 | 3.2 | √ Includes natural and created snags |
| OMA1c\2\1 | 30.7 | 58 | 18.1 | 64.4 | 4.0 | √ Includes natural and created snags |
| PMF 7a\1 | 15.5 | 16 | 17.8 | 58.5 | 2.5\4 | √ Includes natural and created snags |
| PMF 7b | 15.8 | 38 | 18.1 | 66.0 | 4.6 | √ Includes natural and created snags |
| PMF 8 | 8.5 | 24 | 17.5 | 65.2 | 3.2 | √ Includes natural and created snags |
| PMF 15 | 6.8 | 0 | 14.4 | 35.0 | 10.6 | √ Includes natural and created snags |
| Stand 1-3 \2\3 | 4.4 | 0 | n/a | n/a | 3.1+ | √ Natural snags only |
| **Williamson Creek Tract** | | | | | | |
| Stand 10-1 \3 | 21.2 | 0 | 0.0 | 0.0 | 0.0 | Natural snags only |
| Stand 10-2 \3 | 4.2 | 0 | 15.1 | 12.0 | 1.3 | Natural snags only |
| Stand 10-3 \3 | 18.7 | 0 | 21.8 | 14.0 | 0.4 | Natural snags only |
| Stand 10-4 \3 | 7.5 | 0 | 17.0 | 32.6 | 1.8 | Natural snags only |
| Stand 10-5 \3 | 15.1 | 0 | 24.3 | 31.3 | 2.7 | Natural snags only |
| **TOTALS** | **397** | **503** | Totals for those 21 units with snag management in 2000 | | | |

\1 Shows only the number of snags created in year 2000.

\2 Remainder of stand, exclusive of already delineated units.

\3 Inventories conducted, but no creation.

\4 Fewer than 3.07 snags/acre exist because fewer snags than required were created due to lack of overstory trees in this forested wetland area. Unit will be revisited in 10 years for further snag opportunities.

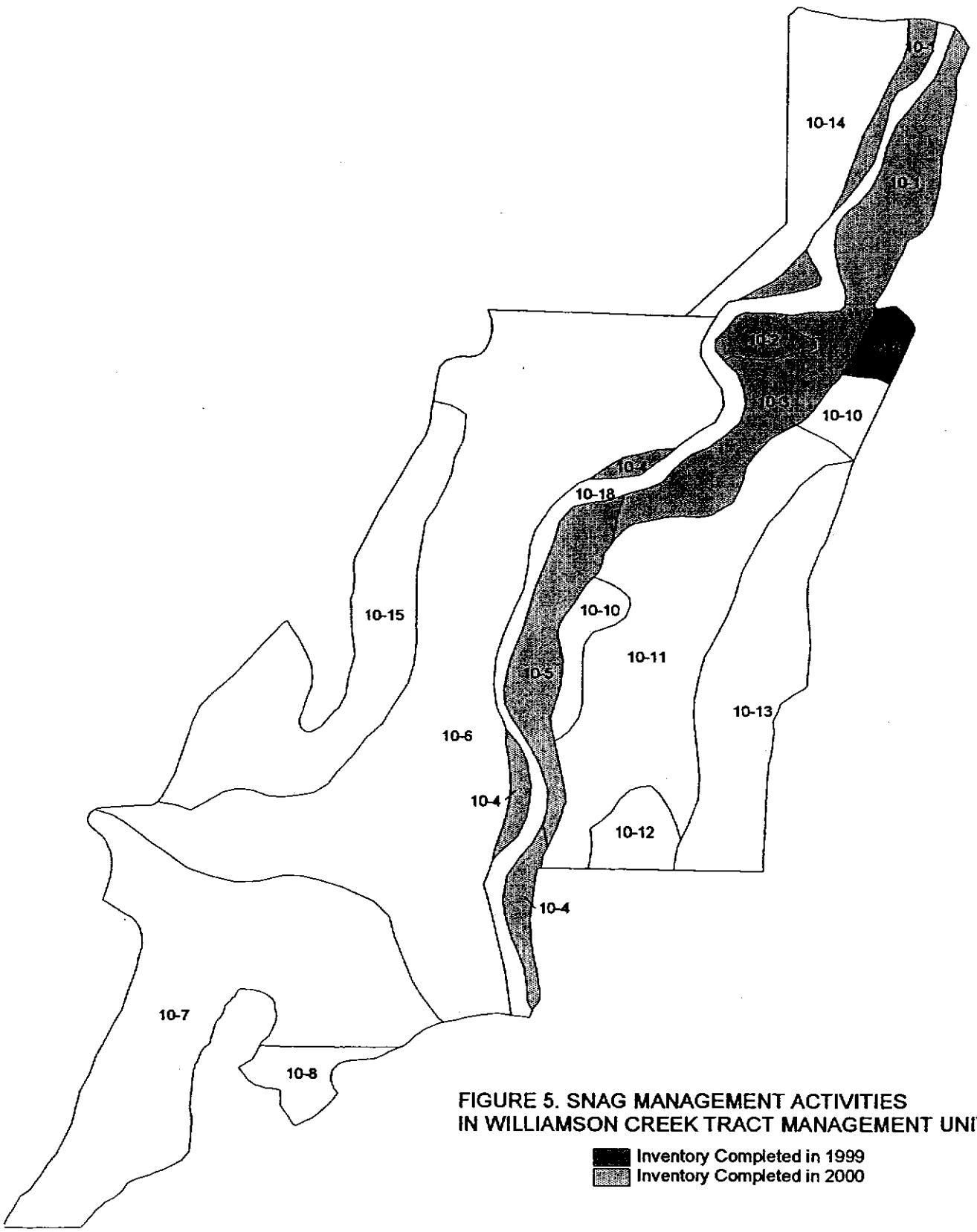


FIGURE 5. SNAG MANAGEMENT ACTIVITIES
IN WILLIAMSON CREEK TRACT MANAGEMENT UNITS

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## 3.4 REVEGETATION

### 3.4.1 Power Pipeline Right-of-Way

Areas of bare soil were seeded again this year with a mixture of rye grasses, clovers and fescues. The ½-acre area where new topsoil was graded out and reseeded in 1999 adjacent to manhole P10 has come in very well and now supports a good layer of grasses and forbs (Figure 6).

The pipeline was mowed in the fall of 2000. Vegetation monitoring was conducted before mowing for the third straight growing season to document the effects of current ROW management practices. This year, grass was the most widespread vegetative cover (32%) and bare soil accounted for 30.2% cover. The next most widespread groups were trefoils (13.8%) and miscellaneous asters (10.5%). All other groups or species sampled reported individual coverages of less than 10 %. The largest change from 1999 was an increase in overall coverage of 7.6% for trefoils and a decline of 4.7% overall coverage of miscellaneous asters. The balance of plants found was comprised of other composites, seedlings and small shrub species.

### 3.4.2 North end of Lake Chaplain

The north end of Lake Chaplain (Stand 1-17, about 10.7 acres) is intended to be maintained as a mixed shrub/brush and grass meadow. Alder saplings have gradually populated large portions of the stand, and it was determined in 1998 that the alders would be reduced to a few narrow corridors connecting the planted conifer row near the road to the shoreline. Alders were removed in the conifer row in 1998, and additional alders were removed elsewhere in the stand in 2000. Alder removal, as planned, will be completed in 2001.

## 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) when they were conducting other activities on the tracts. District biologists did not observe wildlife use of any of the floating platforms in 2000.

### 3.5.2 Nest Boxes

The nest boxes at Lost Lake (Figure 7), Spada Lake (Figure 8), Chaplain Marsh (Figure 9) and Wetland 2 (Figure 10) were maintained and monitored by District staff during the 2000 nesting season. Three nest boxes were installed in the winter of 1999/2000 along the north shore of Spada Lake. The surrounding area is a large stand of sapling/pole hemlocks with little potential for natural cavities. The nest boxes which had been placed along Wetland 2 in the NE corner of the Chaplain Tract were removed after the 2000 nesting season due to the City's concern over water quality impacts.

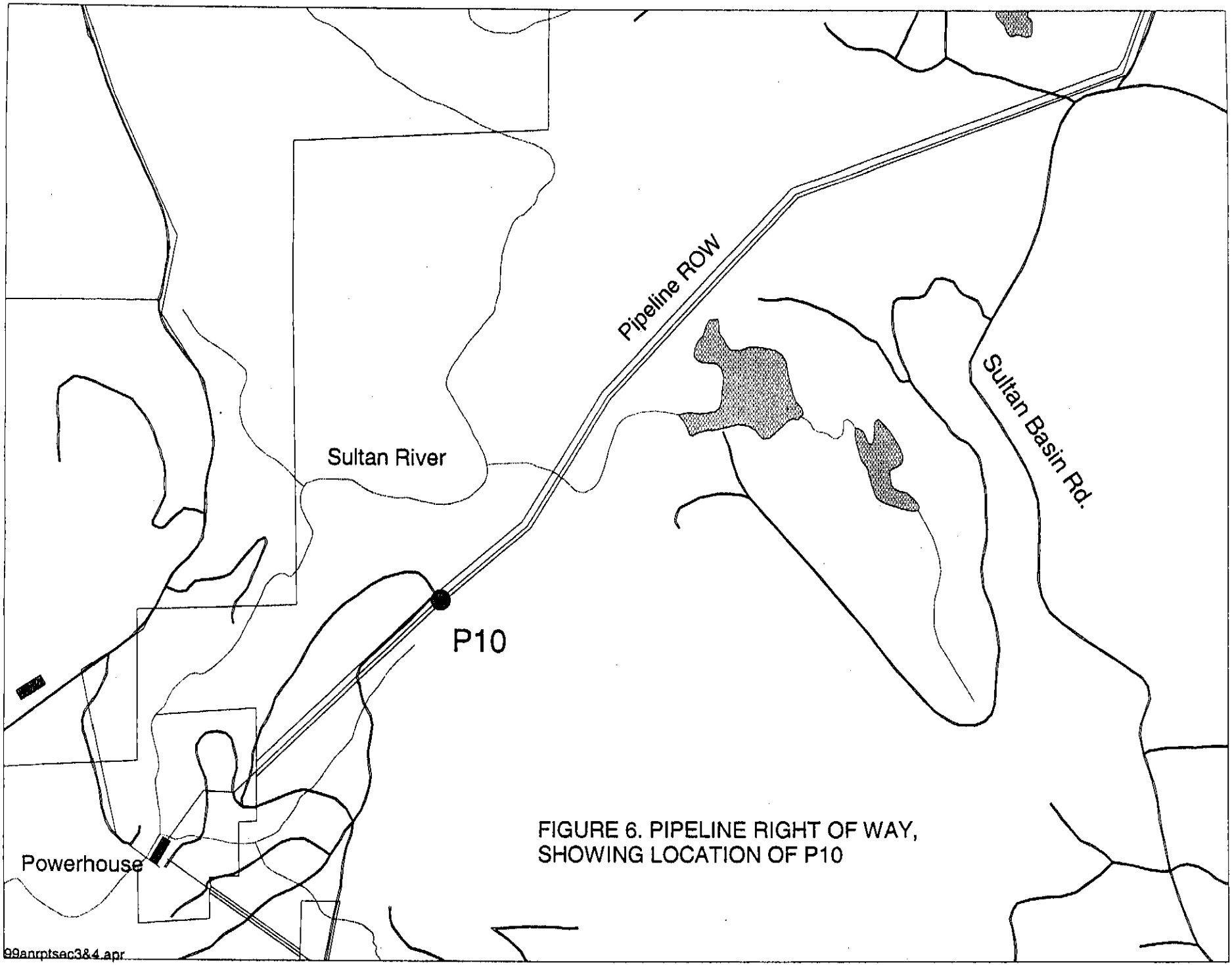


FIGURE 6. PIPELINE RIGHT OF WAY, SHOWING LOCATION OF P10

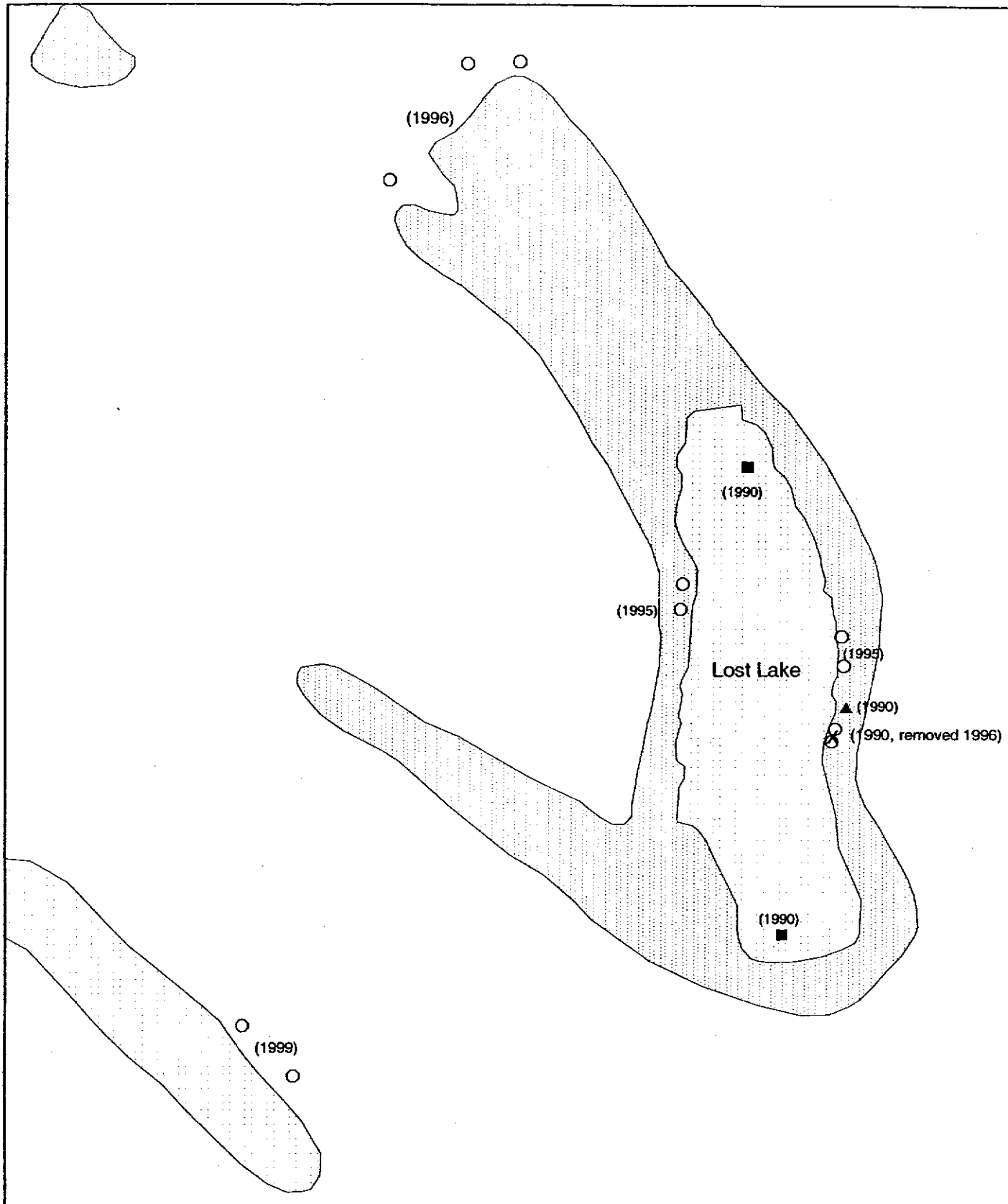


FIGURE 7. NEST STRUCTURES AT LOST LAKE, 2000
○ Duck Nest Box
■ Floating Nest Platform
▲ Osprey Platform

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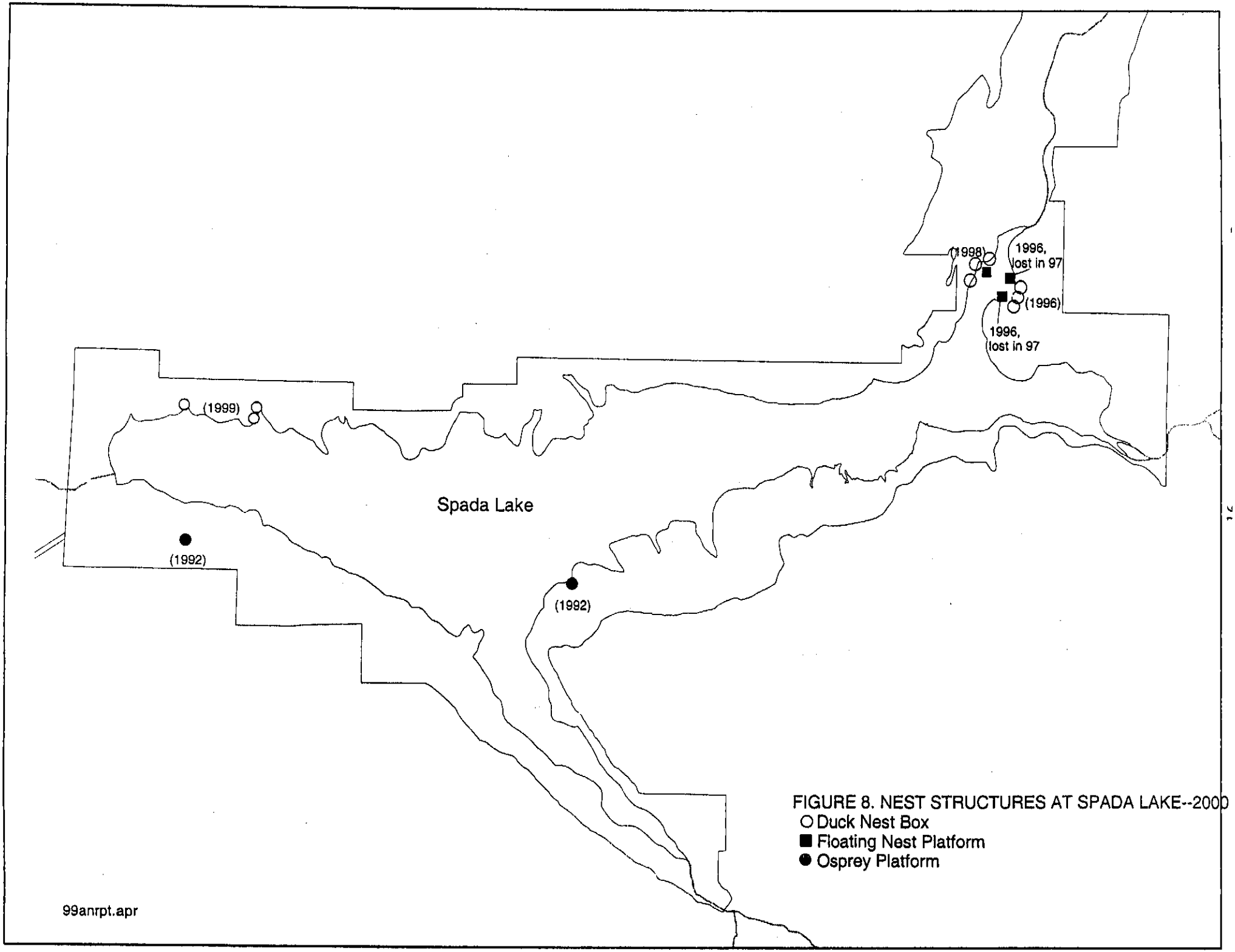



FIGURE 8. NEST STRUCTURES AT SPADA LAKE--2000

○ Duck Nest Box

■ Floating Nest Platform

● Osprey Platform

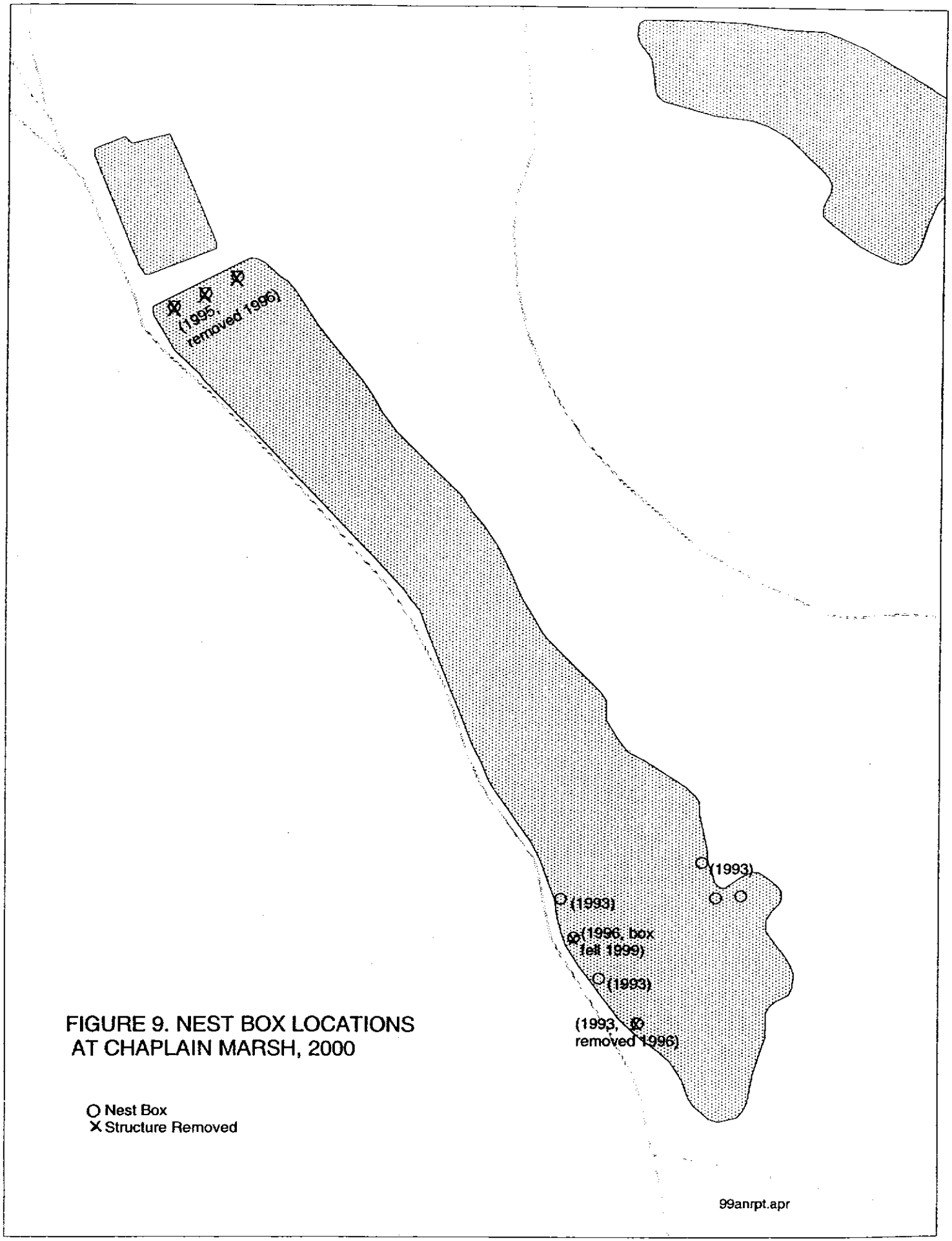



FIGURE 9. NEST BOX LOCATIONS AT CHAPLAIN MARSH, 2000

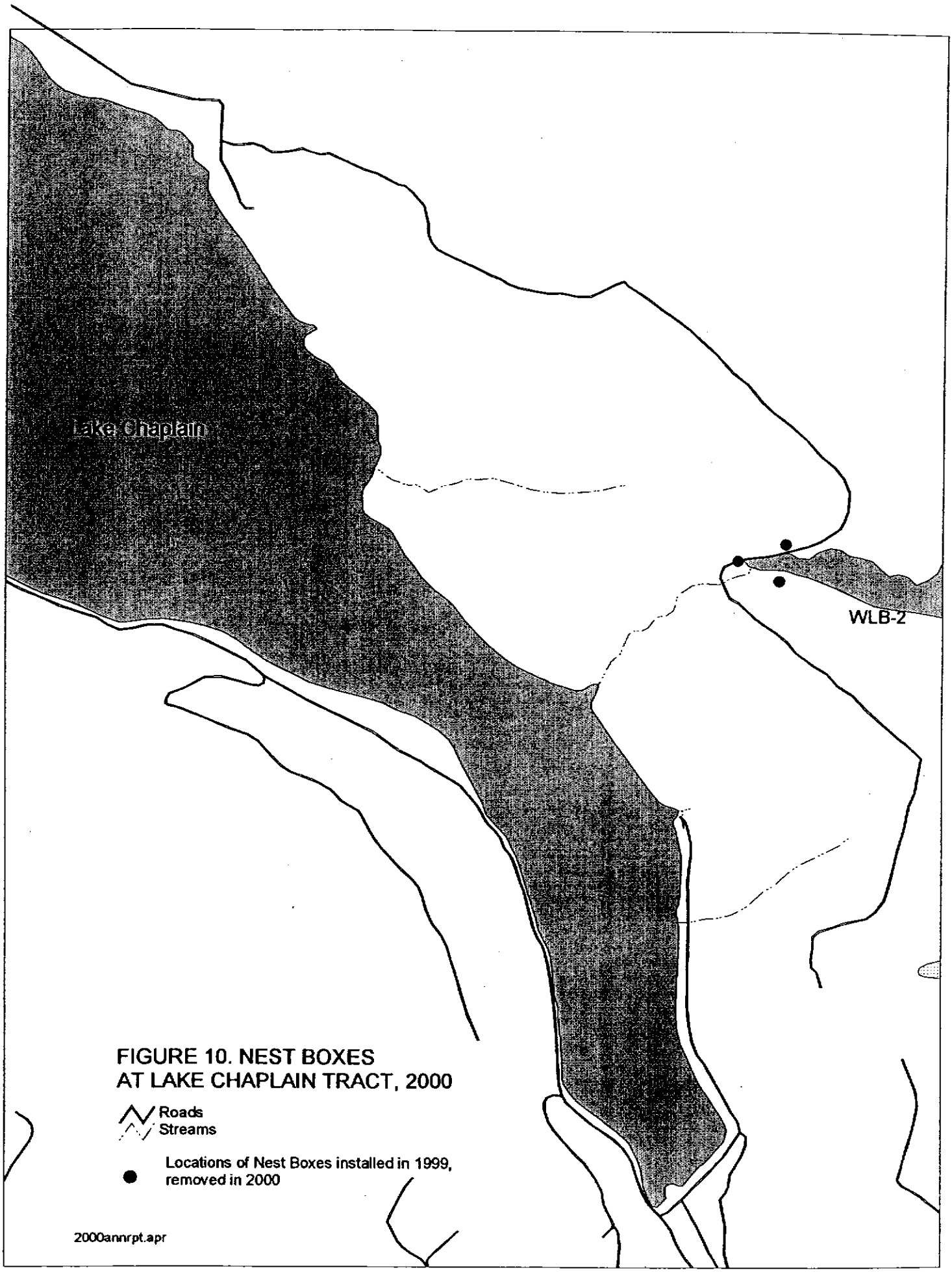



FIGURE 10. NEST BOXES AT LAKE CHAPLAIN TRACT, 2000

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 3. Wood ducks used three of the boxes at Lost Lake. Two of the other nest boxes at Lost Lake had nests dished out in them, but no further use. Wood ducks used one of the nest boxes and hooded mergansers used three of the nest boxes at Chaplain Marsh. A nest was dished out in the other box at Chaplain Marsh, with no further signs of nesting observed. One of the two nest boxes at Wetland 2 was used by wood ducks. No signs of successful nesting were observed at Spada Lake. In one of the Spada Lake boxes, a nest was dished out and bear claw and bite marks were observed on the box and tree. A screech owl egg with a hole in it was found in another Spada Lake box.

In the year 2000, eight of the 25 boxes were used successfully with 37 to 41 wood ducks and 19 to 20 hooded mergansers hatched. Overall, nest box success was about 32% in 2000. The Spada Lake boxes bring down the success rate possibly because other habitat conditions there, such as forage and hiding cover, are poorer. In the future, nest boxes may be placed in areas farther up in the Williamson Creek drainage, where the habitat may be more suitable.

**Table 3. Use of Nest Boxes on WHMP Lands**

| 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 | 9 | 3 | 3 (33%) | 17-19 wood ducks | 1 squirrel nest |
| Chaplain Marsh | 5 | 4 | 4 (80%) | 12-13 wood ducks<br>19-20 hooded mergansers | 0 |
| Spada Lake | 9 | 0 | 0 | 0 | 1 screech owl |
| Wetland 2 | 2 | 1 | 1 (50%) | 8-9 wood ducks | 0 |
| Totals | 25 | 8 | 8 (32%) | 37-41 wood ducks<br>19-20 hooded mergansers | 2 |

3.5.3 Osprey Nest Platforms

District staff monitored the osprey nest platforms at Lost Lake and Spada Lake when they were performing other duties on the tracts, during spring and summer 2000. No osprey activity was observed on the nesting platforms this year. It appears the osprey moved to a nesting site on DNR land in 1999. The District cleared branches around the platform at Lost Lake to try to improve it as a potential nesting site for osprey.

### 3.5.4 Bald Eagle Nesting

The bald eagle nest established in 1997 on the Lake Chaplain Tract was occupied by bald eagles in 2000. Two eaglets were observed in the nest from mid-June through mid-August, when they were seen perched on a branch on the nest tree. In late August an immature bald eagle was observed in the Line2-00, perched on a log with prey in its talons.

## 3.6 OTHER WILDLIFE OBSERVATIONS

Other wildlife observations on WHMP management tracts during 2000 included:

- Several bobcats on Lost Lake Tract and vicinity
- Otters at Lake Chaplain
- Tundra swan at Lake Chaplain; found dead two weeks later
- Virginia rails with 10 chicks at Lost Lake
- Otter on N shore of Spada Lake
- Pygmy owls at Lake Chaplain

## 3.7 BIOSOLIDS APPLICATION

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, 1996 (Figure 2). The units and the application procedure were described in the 1996 Annual Report. Half of the prescribed amount of biosolids was applied to these units. In the summer of 2000, the City applied a blended soil amendment consisting of 2 parts biosolids and 1 part wood ash to units Hors1-93, Hors2-93, Hors3-93, and Divr1-95. Hors1-93 and Hors2-93 received 37.5 dry tons per acre of soil amendment and stands Hors3-93 and Divr1-95 received 45 dry tons per acre of soil amendment.

Two water quality monitoring sites were established on Chaplain Creek in 1996. Creek waters were sampled monthly from August 1996 to December 2000. Parameters examined were nitrates, phosphorous, fecal coliform, ammonia, and chloride. Some of the results of the water quality monitoring are shown in Figures 11a, b and c. Nitrates, fecal coliforms, and ammonia in both upstream and downstream sampling points show predictable seasonal variations, but no biosolids effect on the water quality parameters is indicated.

Vegetation in sample and control plots, described in the 1996 Annual Report, was not monitored in 2000 because biosolids application during the summer months disturbed the vegetation. Percent cover data and vegetation height growth data collected during application and shortly after application would not have been comparable to data previously gathered. Vegetation monitoring will resume in units Hors1-93 and Hors2-93 in the summer of 2001.

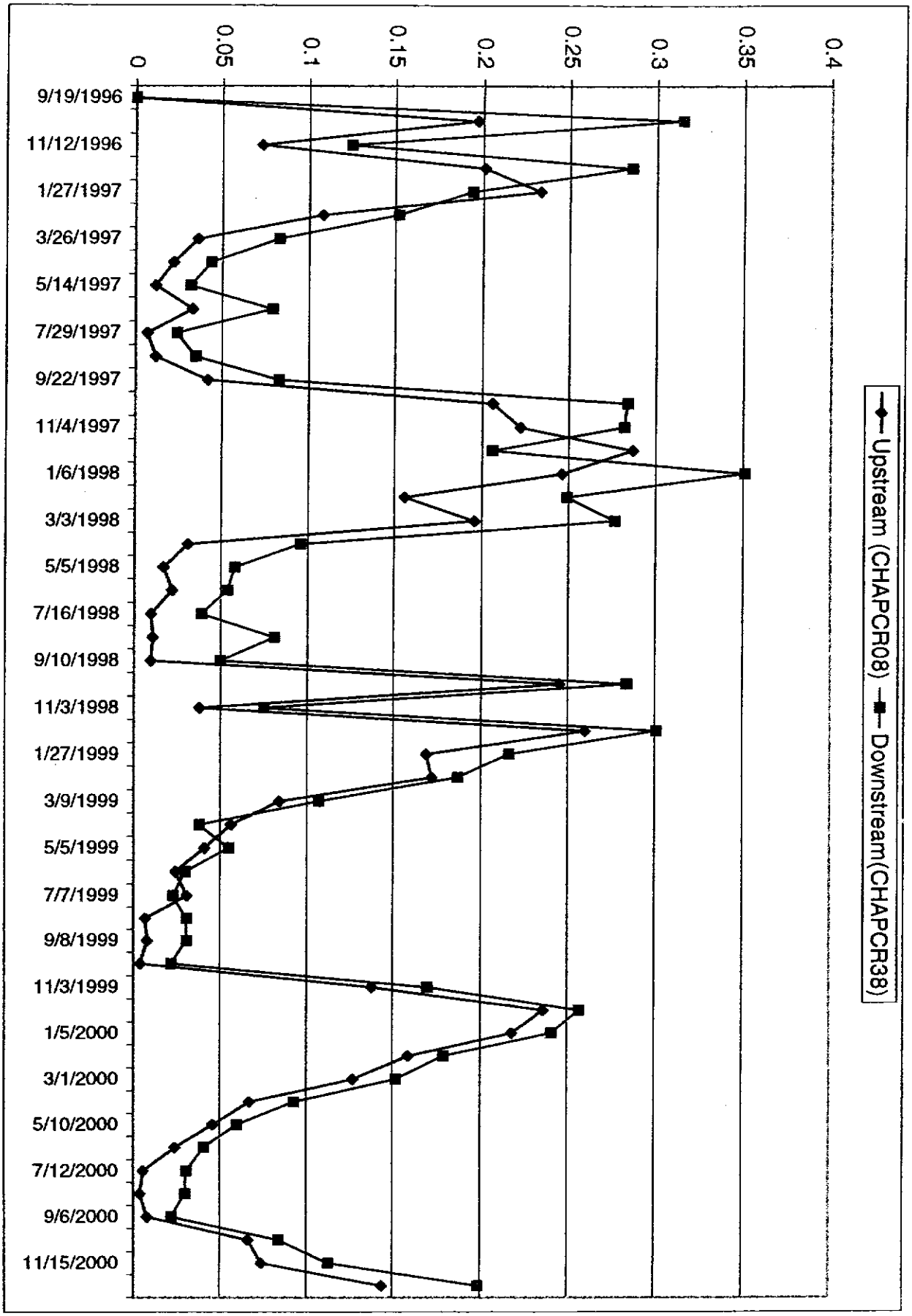
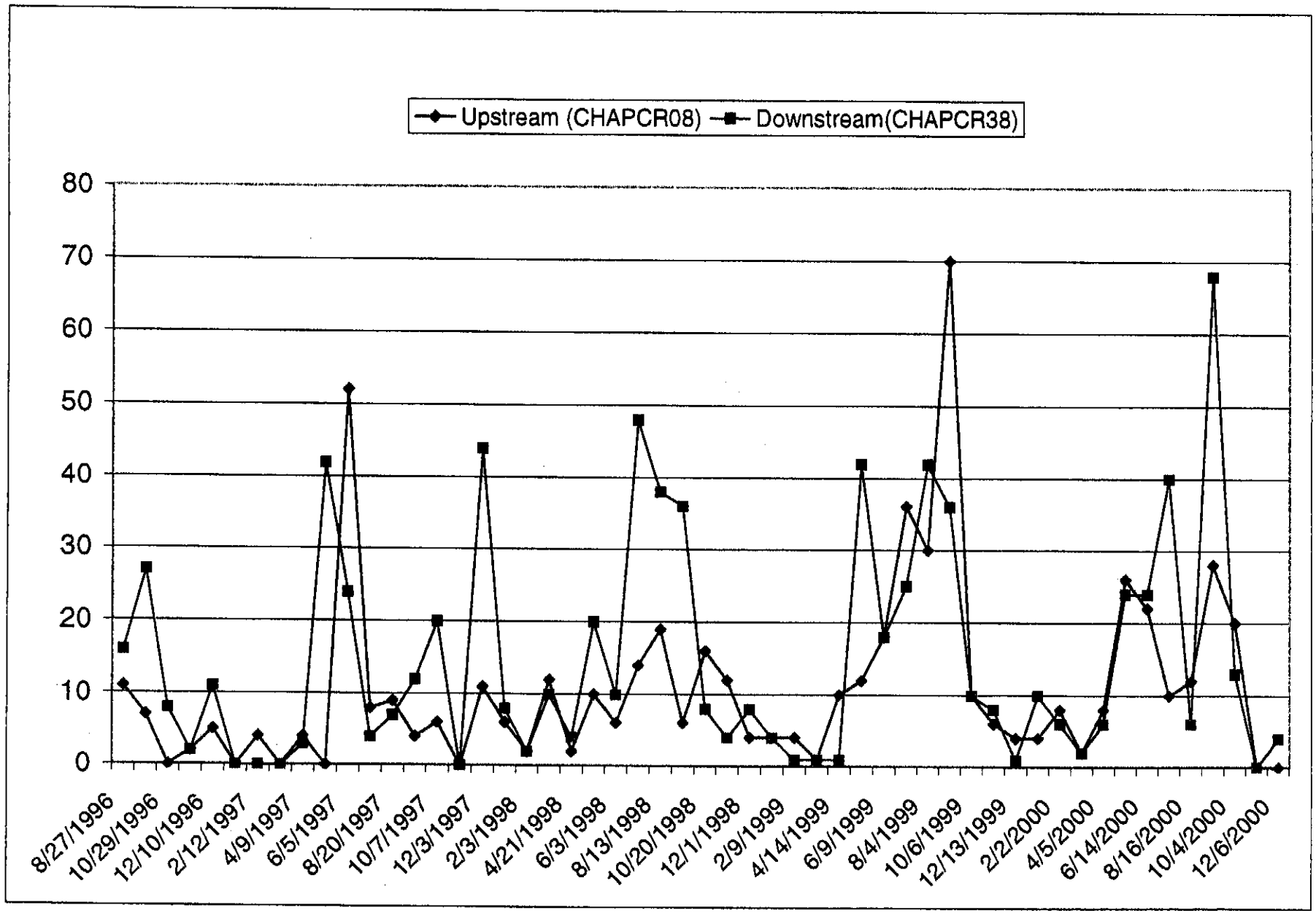



FIGURE 11A. BIOSOLIDS APPLICATION MONITORING - NITRATES (mg/L)

FIGURE 11B. BIOSOLIDS APPLICATION MONITORING - FECAL COLIFORMS (CFU/100mL)



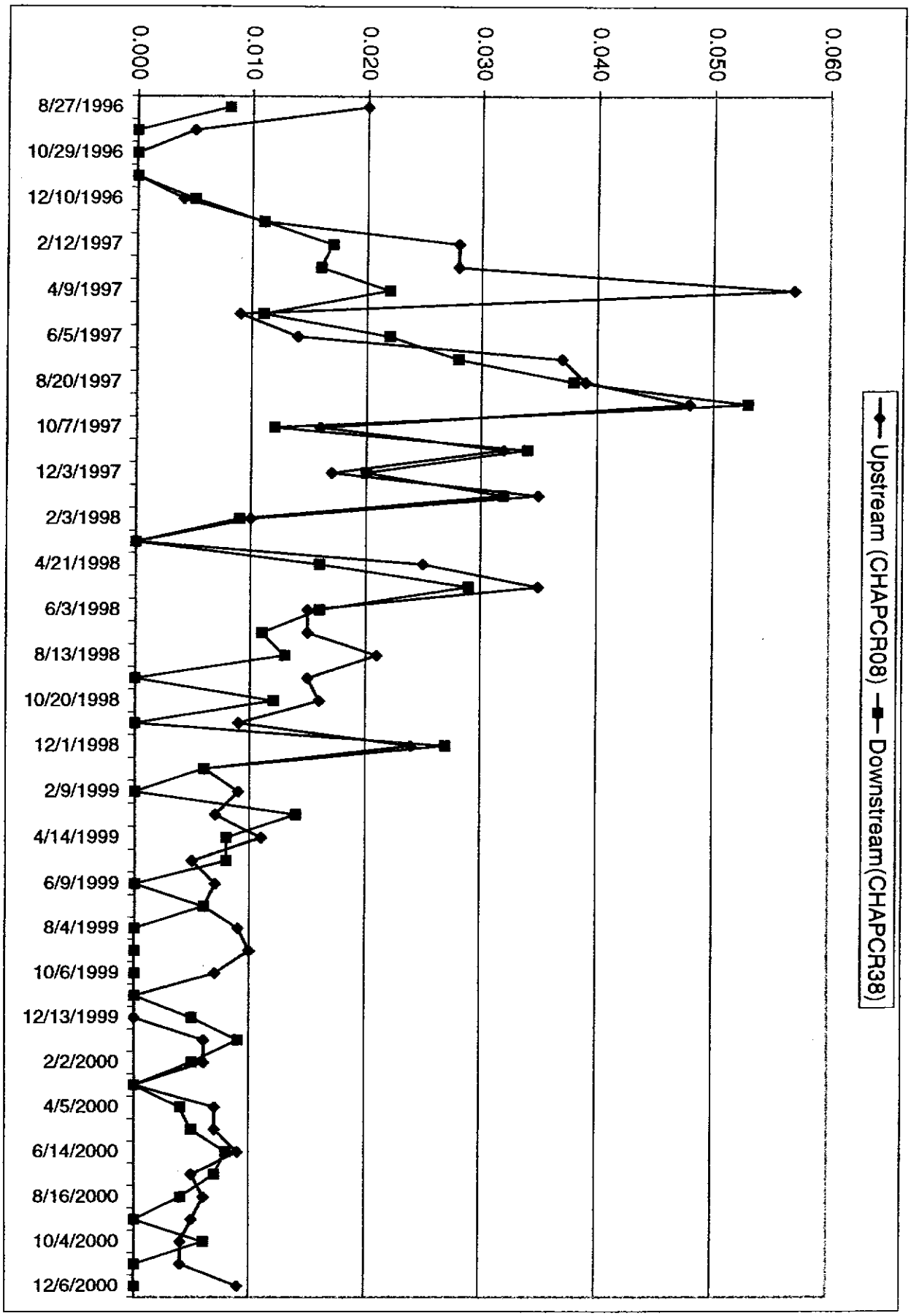



FIGURE 11C. BIOSOLIDS APPLICATION MONITORING - AMMONIA (mg/L)

## 3.8 DEER FORAGE MONITORING

Deer forage availability was sampled in late June 2000 on Tiki1-98 and Tiki2-98, which were harvested in 1998. Comparison of understory vegetation in Tiki1 before harvest and 2 years after harvest shows an increase in the occurrence of species that are palatable to deer including *Rubus* species, fireweed, grasses and other herbaceous plants. Sword fern coverage decreased (Figure 12). Moss was an abundant component of the ground layer both before and after harvest. As expected, the amount of woody debris increased significantly post-harvest. Similar results were obtained in Tiki2 (Figure 12). We had planned on sampling deer forage on Divr1-95 in 2000, but biosolids were applied to this unit just before the sampling period.

## 3.9 WILLIAMSON CREEK TRACT

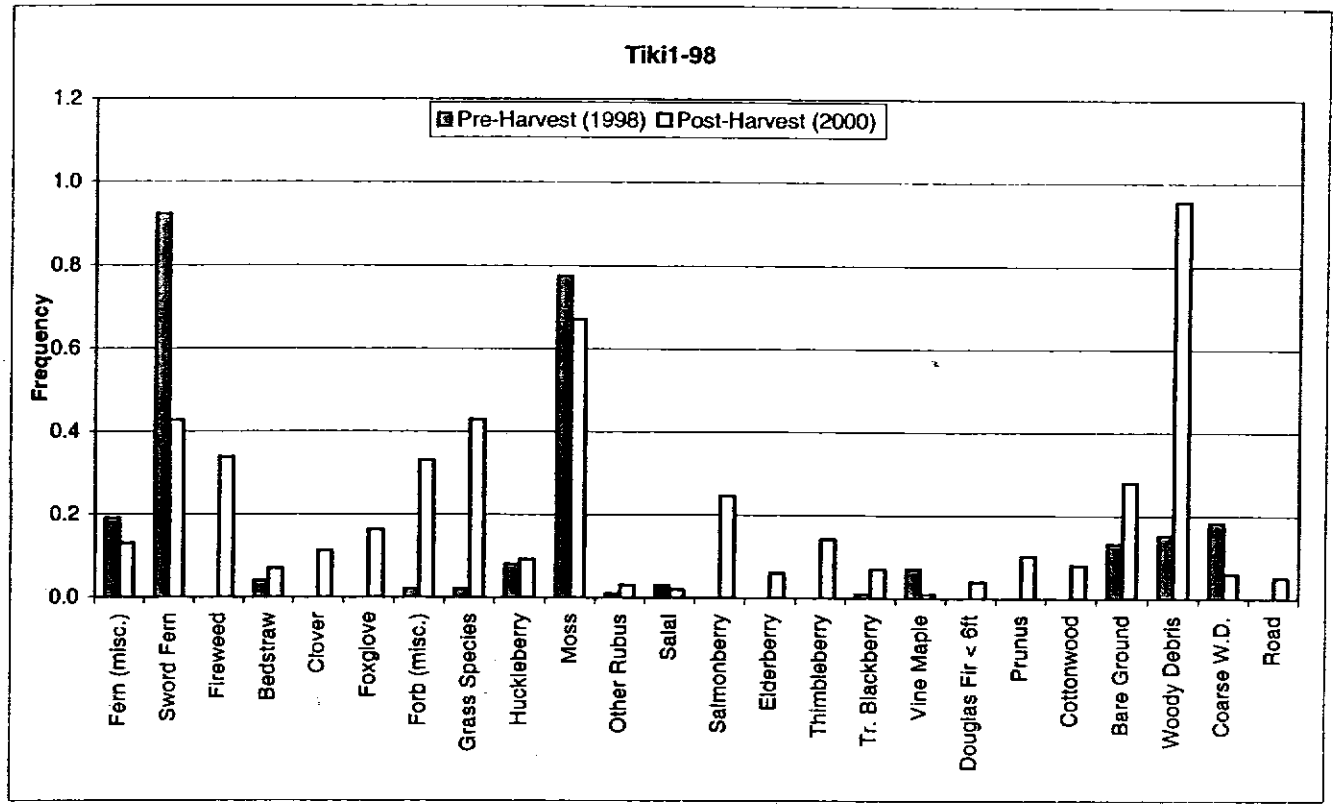
In 2000 District biologists collected baseline data (Table 5) for the Williamson Creek Tract, on three old growth stands (10-2, 10-6, 10-7) and in other forested stands adjacent to Williamson Creek (10-1, 10-3, 10-4, 10-5). Access to the Williamson Creek Tract is now available only by boat since the DNR abandoned the Northshore Road (P-5000 Road) in 1999, just east of Recreation Site 8 (Figure 3).

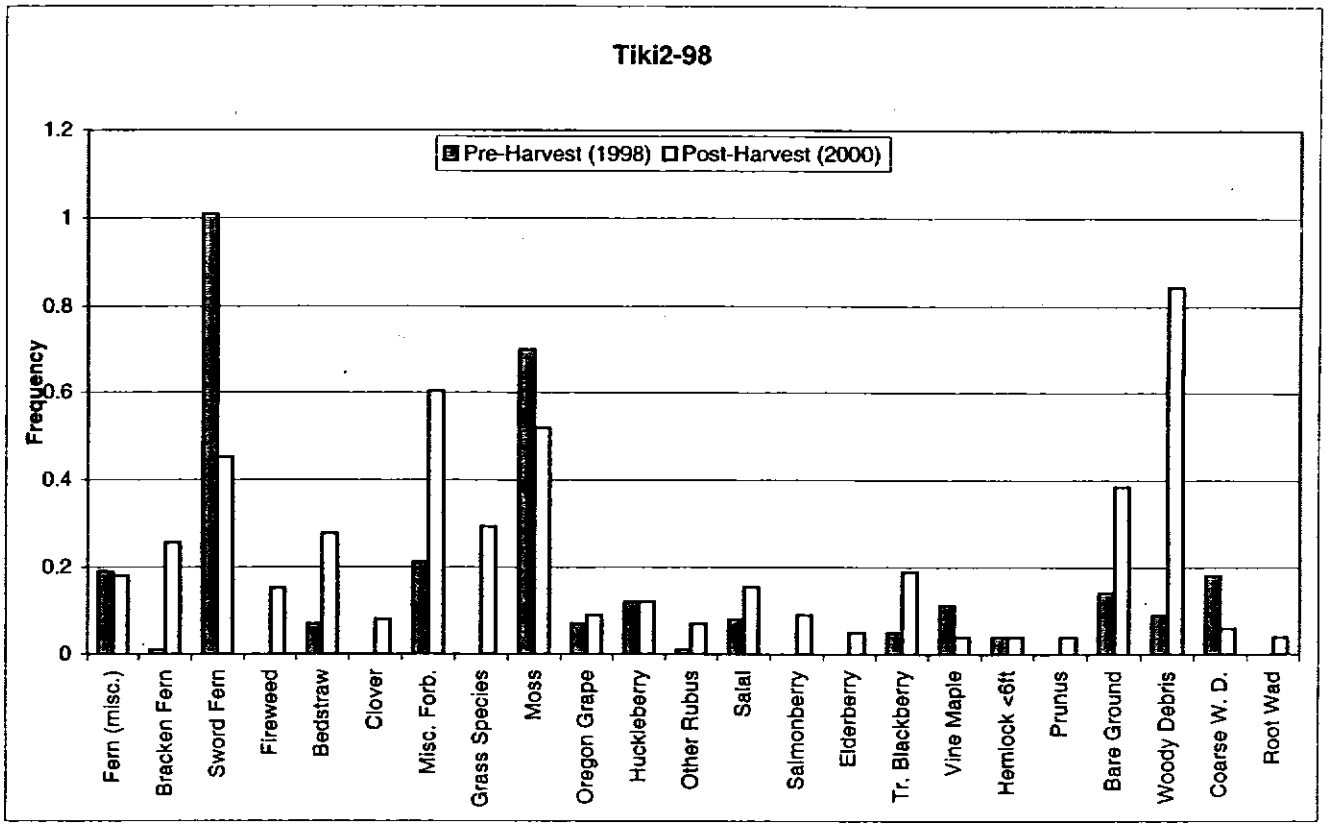
**Table 5. WILLIAMSON CREEK STANDS INVENTORIED IN 2000**

| Stand # | Date | Snags | CWD | Understory Vegetation | Photo Doc. |
|---|---|---|---|---|---|
| 10-1 | 10/5/00 | 9 transects + | 9 transects + | N/A | completed |
| 10-2 | 10/5/00 | 1 transect + | 1 transect + | 1 transect + | 1 transect + |
| 10-3 | 10/5/00 | 4 transects + | 4 transects + | N/A | completed |
| 10-4 | 10/3/00 | 6 transects + | 6 transects | N/A | completed |
| 10-5 | 10/3/00 | 5 transects + | 5 transects + | N/A | completed |
| 10-6 | 10/5/00 | 4 transects | 4 transects | 4 transects | 4 transects + |
| 10-7 | 10/3/00 | 2 transects | 2 transects | 2 transects | 2 transects + |

Field procedures beyond those described in the WHMP have been specifically developed for the Williamson Creek Tract, as described more fully in the Williamson Creek Standard Operating Procedures (PUD 1999). Baseline surveys are being conducted in old growth stands to descriptively characterize snags, CWD and understory vegetation. Baseline surveys began in 1998. Snags and CWD are inventoried following the standards for sampling these elements on the Lake Chaplain and Lost Lake Tracts. The minimum size for snags is 10' tall and 11" dbh, for CWD it is 10' long and 11" diameter at the large end. On the Williamson Creek Tract, transects are located along reasonably accessible walking routes determined in the field. The goal is to sample enough transects within each stand over the next several years to provide at least 5 percent coverage. Each transect is 330'x66' (0.5 ac.). Understory vegetation is inventoried by sampling 1/100th-acre circular plots at each end of the snag and CWD transects. Species occurrence is noted and notes are taken describing the biologist's overall characterization of the stand. During the surveys, photos are taken to illustrate stand characteristics that the biologists consider representative of these stands and descriptive notes are taken.

FIGURE 12. DEER FORAGE MONITORING RESULTS, TIKI1-98 AND TIKI2-98



Data from year 2000 show an average of 13 snags and 18 snags/ac. (Table 6) on the old growth stands 10-6 and 10-7 respectively (not yet 5% coverage on these two stands). Stands 10-6 and 10-7 have an average of 38 and 35 CWD/ac. respectively (Table 7). 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 13).

Baseline sampling was completed for the small old growth stand 10-2 located adjacent to Williamson Creek (Table 6, Figure 5, and Figure 14). The average number of snags/ac. was only 1.3, and the average number of CWD was 13/ac (Table 7). The average size of snags found in this unit was 15.1" dbh and 12' tall. Snag creation potential will be looked at in the Spring/summer of 2001.

**Table 6. WILLIAMSON CREEK 2000 SNAG INVENTORY RESULTS.**

| Stand # | Cover Type | Decay Class | Snags/ac. | Avg. Diameter (in.) | Avg. Height (ft.) |
|---|---|---|---|---|---|
| 10-1 | Riparian/Mixed | 1 & 2 | 0.0 | 0.0 | 0.0 |
| | | 3, 4 & 5 | 0.0 | 0.0 | 0.0 |
| | | All decay classes | 0.0 | | |
| 10-2 | Old Growth | 1 & 2 | 0.0 | 0.0 | 0.0 |
| | | 3, 4 & 5 | 1.3 | 15.1 | 12.0 |
| | | All decay classes | 1.3 | | |
| 10-3 | Riparian/Mixed | 1 & 2 | 0.0 | 0.0 | 0.0 |
| | | 3, 4 & 5 | 0.4 | 21.8 | 14.0 |
| | | All decay classes | 0.4 | | |
| 10-4 | Riparian/Mixed | 1 & 2 | 0.6 | 22.8 | 63.0 |
| | | 3, 4 & 5 | 1.2 | 18.4 | 25.5 |
| | | All decay classes | 1.8 | | |
| 10-5 | Riparian/Mixed | 1 & 2 | 1.0 | 15.5 | 42.7 |
| | | 3, 4 & 5 | 1.7 | 29.5 | 24.4 |
| | | All decay classes | 2.7 | | |
| 10-6 | Old Growth | 1 & 2 | 3.0 | 40.7 | 60.0 |
| | | 3, 4 & 5 | 10.0 | 32.7 | 28.9 |
| | | All decay classes | 13.0 | | |
| 10-7 | Old Growth | 1 & 2 | 2.0 | 29.5 | 80.0 |
| | | 3, 4 & 5 | 16.0 | 30.6 | 32.3 |
| | | All decay classes | 18.0 | | |

**Table 7. WILLIAMSON CREEK 2000 CWD INVENTORY RESULTS.**

| Stand # | Cover Type | Decay Class | CWD/ac. | Avg. Diameter (in.) | Avg. Length (ft.) |
|---|---|---|---|---|---|
| 10-1 | Riparian/Mixed | 1 & 2 | 2.0 | 26.5 | 29.7 |
| | | 3, 4 & 5 | 1.0 | 19.8 | 17.8 |
| | | All decay classes | 3.0 | | |
| 10-2 | Old Growth | 1 & 2 | 10.3 | 21.0 | 74.9 |
| | | 3, 4 & 5 | 2.6 | 15.0 | 18.5 |
| | | All decay classes | 12.9 | | |
| 10-3 | Riparian/Mixed | 1 & 2 | 1.3 | 23.7 | 36.3 |
| | | 3, 4 & 5 | 2.6 | 16.3 | 18.8 |
| | | All decay classes | 3.9 | | |
| 10-4 | Riparian/Mixed | 1 & 2 | 0.3 | 32.0 | 41.0 |
| | | 3, 4 & 5 | 1.2 | 26.2 | 53.3 |
| | | All decay classes | 1.5 | | |
| 10-5 | Riparian/Mixed | 1 & 2 | 1.4 | 19.0 | 71.5 |
| | | 3, 4 & 5 | 0.7 | 21.1 | 26.5 |
| | | All decay classes | 2.1 | | |
| 10-6 | Old Growth | 1 & 2 | 9.0 | 21.6 | 63.7 |
| | | 3, 4 & 5 | 29.0 | 23.9 | 34.0 |
| | | All decay classes | 38.0 | | |
| 10-7 | Old Growth | 1 & 2 | 8.0 | 27.1 | 75.6 |
| | | 3, 4 & 5 | 27.0 | 26.9 | 43.9 |
| | | All decay classes | 35.0 | | |

The other forested stands (10-1,10-3, 10-4, 10-5) adjacent to Williamson Creek were included in the original WHMP (Figure 5). The WHMP calls for retaining stands 10-1 and 10-4 as riparian forest without harvesting through the life of the plan. These stands were cover-typed as riparian, mixed, and small saw timber coniferous forest in the WHMP which requires snag management, maintenance and monitoring in these stands. The baseline snag inventory was completed in these two stands. No snags were found within the transects in stand 10-1 and an average of 1.8 snags were found within the transects in stand 10-4 (Table 6). Potential snag creation opportunities will be explored during the coming field season.

The WHMP calls for retaining stands 10-3 and 10-5 for late successional stage species. These stands were cover-typed as mixed, deciduous, riparian, and large saw timber coniferous forests in the WHMP, which requires ensuring adequate snags and CWD on these two stands. Snag management and monitoring is required for the life of the plan. The baseline snag and CWD inventories were completed in these two stands. The average number of snags/ac. was 0.4 and 2.7 on stands 10-3 and 10-5 respectively (Table 6). The average number of CWD/ac. was 3.9 and 2.1 on stands 10-3 and 10-5 respectively (Table 7).

**Figure 13. Williamson Creek Old Growth Stands 10-6 (top) and 10-7 (bottom)**

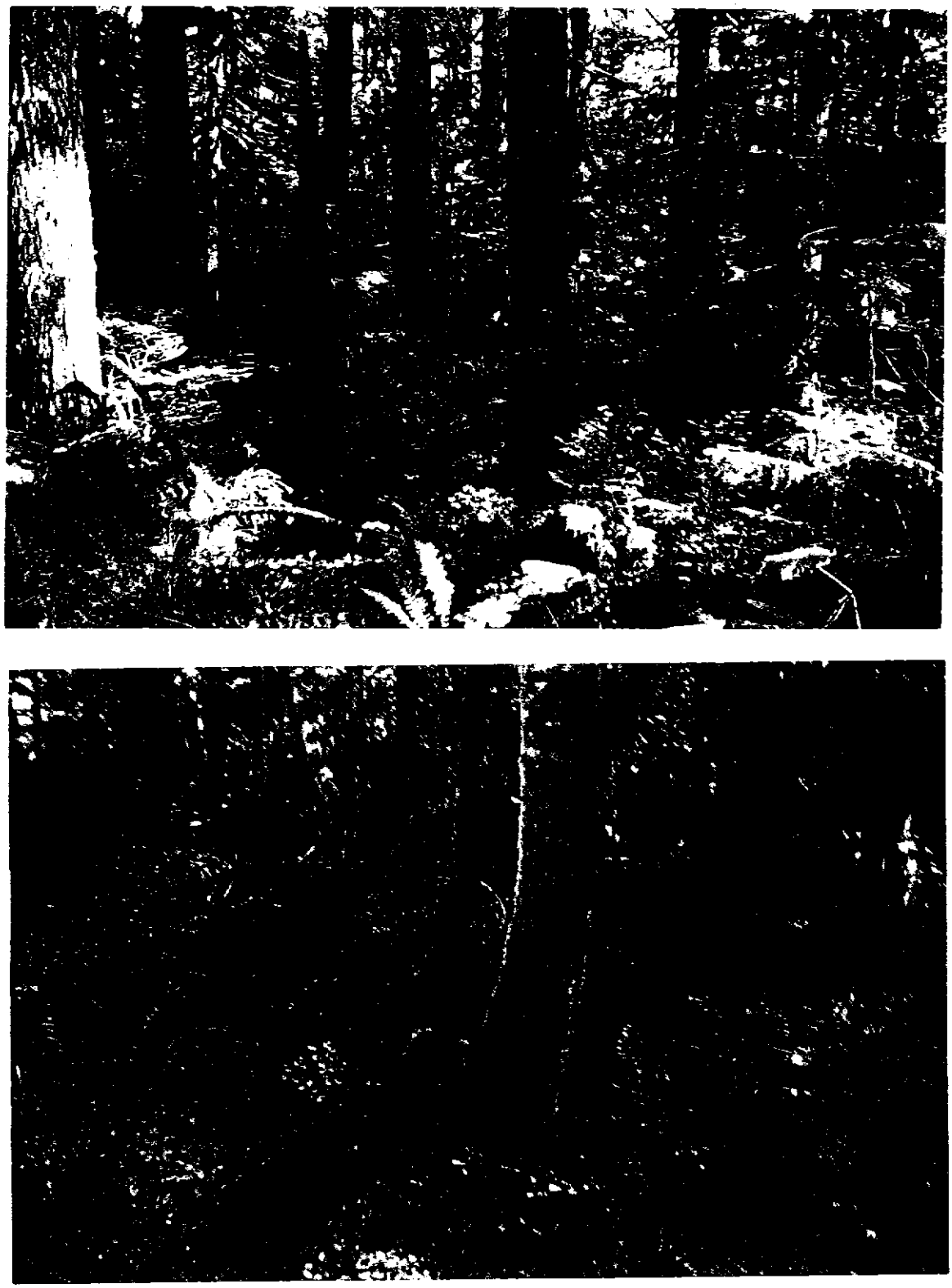


**Figure 14 Williamson Creek Old Growth Stand 10-2 (top and Riparian Stand 10-3 (bottom)**

These four riparian/mixed forest stands are primarily dense alder stands with heavy salmonberry understory and relatively wet soils (Figure 14). Due to the small average size of trees in these stands (12-15" alders), there is limited potential for snag creation. District biologists will assess the benefits of specific snag creation and initiate appropriate action during the field season of 2001.

# 4.0 CUMULATIVE SUMMARY

A summary of all activities completed under the WHMP, from the earliest implementation in 1988 through the end of December 2000, 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 (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 was completed in 2000 for additional portions of the road system on the west side of the tract (Figure 2).

### 4.1.2 Timber Harvest

Harvest activity to date is depicted in Figure 15. All of the unit 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 8. However, the final harvest program complies with the WHMP's schedule and requirements including the restriction on harvest unit size and the required green-up period for adjacent harvest units.

**Table 8. Modifications of the Final Harvest (FH) Schedule on Lake Chaplain Tract**

| New Unit Name (see Fig. 15) | 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 |

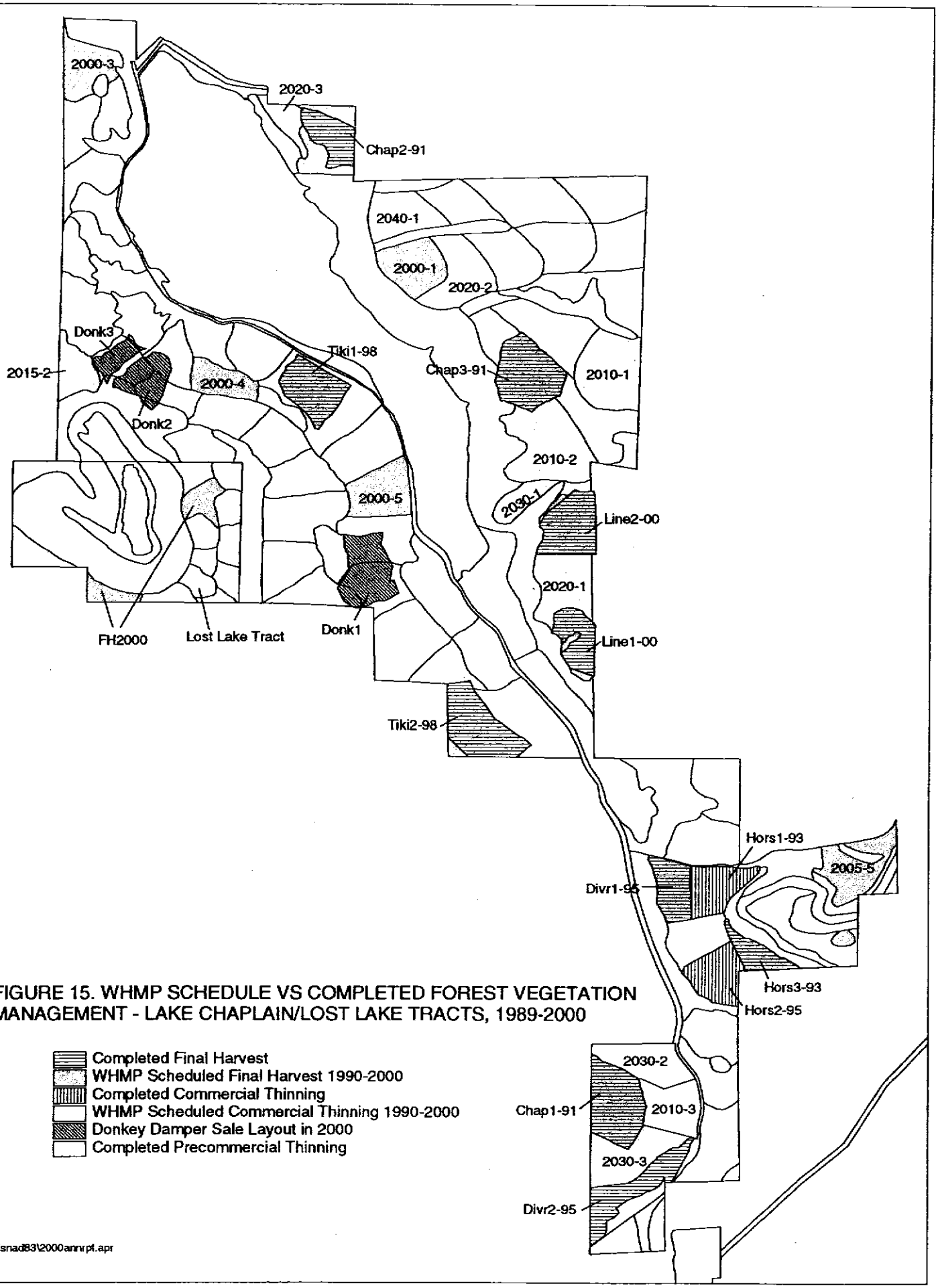



FIGURE 15. WHMP SCHEDULE VS COMPLETED FOREST VEGETATION MANAGEMENT - LAKE CHAPLAIN/LOST LAKE TRACTS, 1989-2000

Commercial thinning scheduled in the WHMP (Figure 15) 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 9.

Two units that were not scheduled in the WHMP were thinned in 1993 (Table 9). Additional opportunities for commercial thinning will be evaluated in the northeast and northwest corners of the Lake Chaplain Tract.

**Table 9. 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 that year 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.

## 4.2 FOREST VEGETATION MANAGEMENT (LOST LAKE TRACT)

As described in the 1996 Annual Report, stand 7-4, which 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.

A feasibility study of timber harvest on the Lost Lake Tract was performed by a consultant in 2000; results were summarized in Section 3.1. The older stands in this tract (7-1, 7-2, 7-3) could be commercially thinned to generate revenue and improve understory development as soon as access roads on adjacent properties (DNR and City of Everett) are constructed.

## 4.3 FOREST VEGETATION MANAGEMENT (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 on the south fork were precommercially thinned 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 (Figure 3). 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.

A forestry contractor performed a feasibility study of timber harvest on second growth stands at the Spada Lake Tract that can be accessed by road. The results of this study, summarized in Section 3.1.5, advised against commercial harvest in 2000 due to depressed hemlock prices. In discussions with the contractor, precommercial thinning in the near future was recommended for several stands (9-36, 37 and 38), with commercial thinning 15 to 20 years later. Management recommendations were drafted for consideration by the District in 2001.

## 4.4 SNAG MANAGEMENT

Snag management activity from the beginning of implementation in 1989 through 2000 is shown in Figure 16 and summarized in Table 10. 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 were created to meet the requirements. Snag inventory/creation has been completed on all units that have been harvested or thinned, and all units scheduled for harvest by 2020, except one scheduled for commercial thinning within 20 years.

To date, snag inventory and creation has been conducted on 59 units on the Lake Chaplain and Lost Lake Tracts, totaling 1215 acres. A total of 2034 snags have been created on those 59 units, with 53 units (1140 acres) now meeting the WHMP requirements of at least 3.07 snags per acres in the appropriate size classes. The entire Lost Lake Tract now meets the WHMP requirements for snags. Natural snags have been completely inventoried on the Williamson Creek Tract in Stands 10-1 through 10-5, and 10-9. Inventory has been started in Stands 10-6 and 10-7. There has been no snag creation on Williamson Creek Tract stands to date.

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 at the Lake Chaplain and Lost Lake Tracts was conducted in 1998 and 1999. Snag management procedures specific to the Williamson Creek Tract were developed in 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. CWD management procedures specific to the Williamson Creek Tract were developed in 1999. 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 Sultan River 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 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.

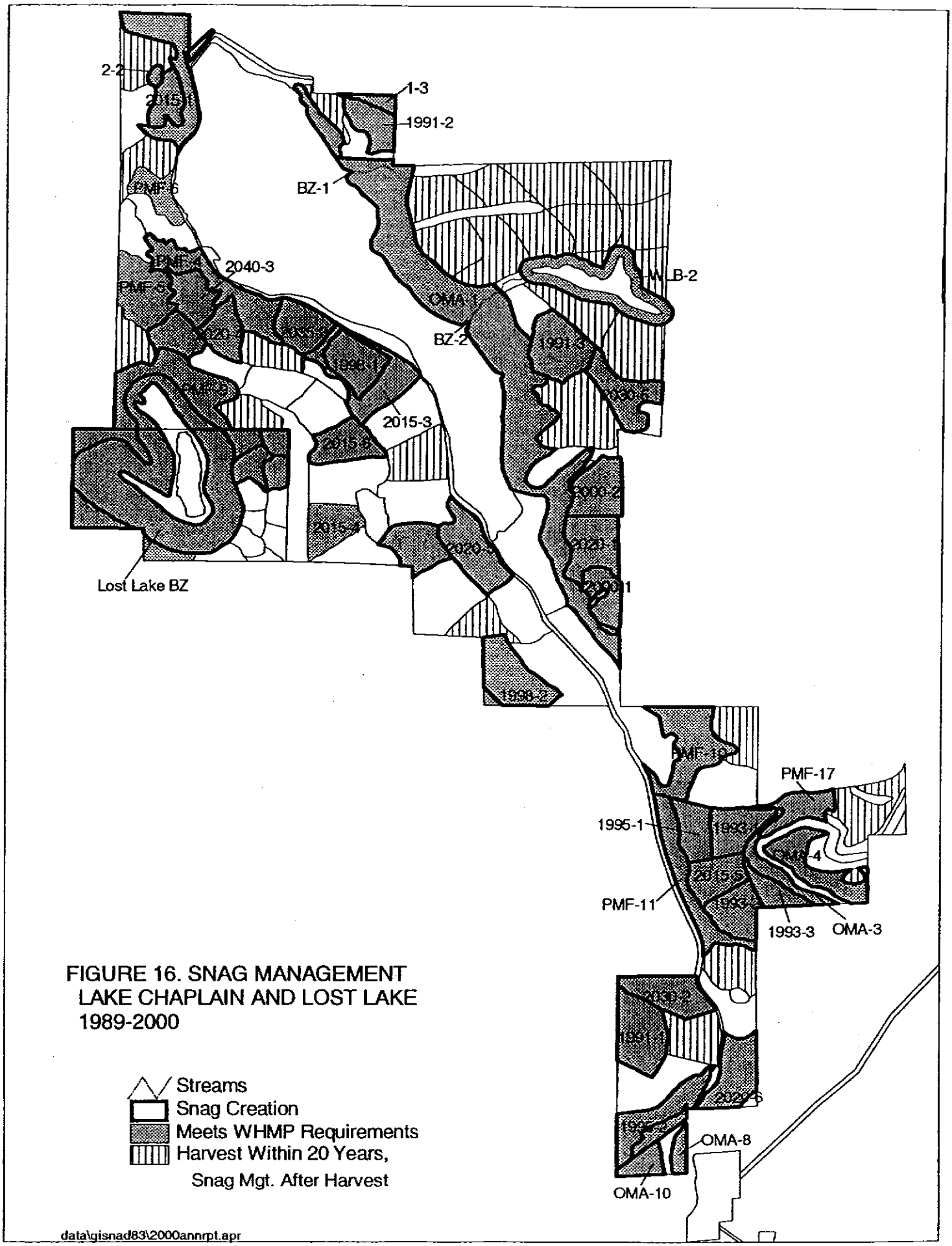



FIGURE 16. SNAG MANAGEMENT
LAKE CHAPLAIN AND LOST LAKE
1989-2000

| Table 10. Summary of Snag Management Through 2000 | | | | | | |
|---|---|---|---|---|---|---|
| UNIT | ACRES | NUMBER CREATED | AVG. DBH (in.) | AVG. HT. (ft.) | # PER ACRE | NOTES |
| *Buffer Zone 1* [17] | 2.3 | 15 | 16.4 | 63.8 | 9.8 | √ Includes natural and created snags |
| *Buffer Zone 2* [17] | 1.4 | 7 | 15.9 | 46.6 | 5.0 | √ Includes natural and created snags |
| *Donkey Damper 1* | 23.5 | 67 | 17.1 | 65.3 | 3.1 | √ Includes natural and created snags |
| *Donkey Damper 2* | 21.4 | 58 | 18.0 | 67.6 | 3.0 | √ Includes natural and created snags |
| *Line Tree 1* | 14.8 | 42 | 18.0 | 65.4 | 3.0 | √ Includes natural and created snags |
| *Line Tree 2* | 22.0 | 62 | 17.4 | 66.4 | 3.1 | √ Includes natural and created snags |
| *Lost Lake 7-2* [17] | 34.0 | 80 | 17.3 | 61.7 | 3.2 | √ Includes natural and created snags |
| *Lost Lake 7-3* | 4.0 | 0 | n/a | n/a | 3.1+ | √ Natural snags only |
| *OMA1a* [12][17] | 74.8 | 14 | 17.9 | 68.3 | 4.3 | √ Includes natural and created snags |
| *OMA1b* [12] | 50.5 | 62 | 18.4 | 65.2 | 3.2 | √ Includes natural and created snags |
| *OMA1c* [12][17] | 30.7 | 68 | 18.1 | 64.4 | 4.0 | √ Includes natural and created snags |
| *PMF 7a* [17] | 15.5 | 20 | 17.8 | 58.5 | 2.5 [15] | √ Includes natural and created snags |
| *PMF 7b* | 15.8 | 38 | 18.1 | 66.0 | 4.6 | √ Includes natural and created snags |
| *PMF 8* | 8.5 | 24 | 17.5 | 65.2 | 3.2 | √ Includes natural and created snags |
| *PMF 15* | 6.8 | 0 | 14.4 | 35.0 | 10.6 | √ Includes natural and created snags |
| *Stand 1-3* [13] | 4.4 | 0 | n/a | n/a | 3.1+ | √ Natural snags only |
| *Stand 10-1* [14] | 21.2 | 0 | 0.0 | 0.0 | 0.0 | Natural snags only |
| *Stand 10-2* [14] | 4.2 | 0 | 15.1 | 12.0 | 1.3 | Natural snags only |
| *Stand 10-3* [14] | 18.7 | 0 | 21.8 | 14.0 | 0.4 | Natural snags only |
| *Stand 10-4* [14] | 7.5 | 0 | 17.0 | 32.6 | 1.8 | Natural snags only |
| *Stand 10-5* [14] | 15.1 | 0 | 24.3 | 31.3 | 2.7 | Natural snags only |
| *Stand 10-6* [14] | 133.4 | 0 | 34.5 | 33.2 | 13.0 | Natural snags; incomplete inventory |
| *Stand 10-7* [14] | 68.8 | 0 | 28.5 | 40.2 | 14.0 | Natural snags; incomplete inventory |
| Stand 10-9 [14] | 3.7 | 0 | 24.2 | 45.0 | 9.5 | Natural snags only |
| 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 |
| 2020-1 | 24.0 | 50 | 16.9 | 61.9 | 4.9 | √ Includes natural and created snags |
| 2020-4 | 15.3 | 36 | 17.0 | 49.3 | 4.4 | √ Includes created snags only |
| 2020-5 | 19.1 | 15 | 19.1 | 61.4 | 9.8 | √ Includes natural and created snags |
| 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 3 | 8.7 | 23 | 16.6 | 46.6 | 4.5 | √ Includes natural and created snags |
| CHAP1-91 | 26.0 | 75 | 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 | 55 | 18.0 | 31.0 | 3.6 | √ Includes natural and created snags |
| DIVR1-95 | 15.6 | 42 | 16.8 | 50.3 | 3.1 | √ Includes natural and created snags |
| DIVR2-95 | 19.7 | 59 | 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 | 37 | 16.0 | 33.8 | 3.1 | √ Includes natural and created snags |

| UNIT | ACRES | NUMBER CREATED | AVG. DBH (in.) | AVG. HT. (ft.) | # PER ACRE | NOTES |
|---|---|---|---|---|---|---|
| Lost Lake 7-1 | 93.7 | 234 | 18.1 | 62.2 | 3.3 | √ 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 |
| OMA 10 | 8.6 | 4 | 20.0 | 56.3 | 18.4 | √ 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 9 | 52.2 | 71 | 17.3 | 54.9 | 3.1 | √ 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 |
| 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 |
| Wetland Buffer 1 | 8.7 | 12 | 19.0 | 47.9 | 1.4 | Includes created snags only |
| Wetland Buffer 2 | 35.5 | 65 | 17.2 | 56.4 | 3.1 | √ Includes natural and created snags |
| **TOTALS** | **1140** | **2022** | Totals for those 53 units which meets WHMP requirements. | | | |
| | **1421** | **2034** | Totals for all 59 units having snag management activity to date. | | | |

***BOLD ITALICS*** denotes those units where snag management activity occurred in 2000

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

\1 Snag creation occurred in year 2000 as well as prior year(s)

\2 OMA 1 was divided into three separate management units for ease of management.

\3 Remainder of stand, exclusive of already delineated units.

\4 Inventories conducted, but no creation.

\5 Fewer than 3.07 snags/acre exist because fewer snags than required were created due to lack of overstory trees in this forested wetland area. Unit will be revisited in 10 years for further snag opportunities. Unit is counted as meeting WHMP requirements.

### 4.6.2 Power Pipeline Right-of-Way

The pipeline ROW has been seeded annually, all or in part, since 1990, and considerable effort has been expended over the years to minimize ORV damage. A good layer of herbaceous material now occupies the entire ROW. Small bare areas still exist, primarily in areas of sandy or rocky soil, or where ORV damage has disturbed the vegetation.

Quantitative sampling of vegetative cover on the ROW has been performed annually since 1998 to document the effects of management procedures and identify any changes that may be necessary. To date, results have not indicated that any changes are necessary. Seeding annually and allowing the plants to go to seed prior to mowing in the fall are producing the desired effect on most 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.

Restoration of a portion of the access road and replacement of a washed out culvert were completed in 1999.

### 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 annually 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. Figures 7 through 10 of this report and Figure 13 of the 1998 Annual Report summarize 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.

### 4.7.1 Floating Nest Platforms

In addition to the required nest structures, we placed two additional 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.

The floating platforms have been used for resting and feeding by waterfowl and otters, but no breeding attempts have been noted.

### 4.7.2 Nest Boxes

In 2000 there was a total of 25 functional waterfowl nest boxes on mitigation lands. Figure 7 through 10 show nest box locations throughout implementation since the original two required nest boxes were installed in 1990 at Lost Lake.

The nest boxes have been monitored every year since installation. Ducks used over half of the boxes each year (61% in 1997) through 1998, when nest box success was 16%. Nest box success was only 10% in 1999. In 2000 overall nest box success was 32%. Success in 2000 at Lost Lake, Chaplain Marsh, Spada Lake and Wetland 2 was 33%, 80%, 0% and 50% respectively.

### 4.7.3 Osprey Nest Platforms

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. It appears the osprey moved to nest site on DNR land in 1999. No osprey use of the platform at Lost Lake was observed in 2000.

A nest was partially constructed at the osprey platform near the South Fork Sultan River at Spada Lake during 1994, and in 1995 osprey completed a nest and were observed setting prior to abandoning the nest in June. Nesting has not been observed on the osprey platforms at Spada Lake since then. A nest was 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. Results for this nest site are uncertain for 2000, as it was not monitored on a regular basis.

## 4.8 BIOSOLIDS APPLICATION

The City of Everett applied 12.5 dry tons of biosolids per acre 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). This application was one half of the prescribed amount of biosolids (based on measured nitrogen requirements). In the year 2000, the City applied a blended soil amendment consisting of 2 parts biosolids and 1 part wood ash to units Hors1-93, Hors2-93, Hors3-93, and Divr1-95.

Units Hors1-93 and Hors2-93 received 37.5 dry tons per acre of soil amendment, and units Hors3-93 and Divr1-95 received 45 dry tons per acre.

Two water quality monitoring sites were established on Chaplain Creek. Creek waters were sampled monthly beginning in August 1996 through the end of 2000 (Table 4). 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.

Vegetation monitoring was conducted from 1996 to 1999 in accordance with the vegetation monitoring plan described in the 1996 Annual Report. No vegetation monitoring was conducted in 2000 because biosolids application at the sample sites disturbed the vegetation.

## 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 11. 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 | 2000 | |
| Tiki2-98 | 1998 | 1998 | 2000 | |
| Line1-00 | 2000 | 1999 | | |

## 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.

## 4.11 WILLIAMSON CREEK TRACT

Monitoring of the Williamson Creek tract has focused on baseline inventories of the stands for snags, CWD, understory vegetation, wetlands and photo documentation. The status of inventorying on each stand is summarized in Table 12. Note that old growth inventory includes snags, CWD, understory vegetation inventory and photo documentation. Wetland inventories will be done every five years. The table indicates that the initial wetland survey was completed in Stand 10-10. Baseline inventory will be complete once 18.5 old growth transects have been completed.

**Table 12. WILLIAMSON CREEK BASELINE INVENTORY SUMMARY.**

| Stand # | % Complete | Type of Inventory | Year of Inventory |
|---|---|---|---|
| 10-1 | 100 | Snags, CWD, photodoc. | 2000 |
| 10-2 | 100 | Old growth | 2000 |
| 10-3 | 100 | Snags, CWD, photodoc | 2000 |
| 10-4 | 100 | Snags, CWD, photodoc | 2000 |
| 10-5 | 100 | Snags, CWD, photodoc | 2000 |
| 10-6 | 30 | Old growth | 2000 |
| 10-7 | 58 | Old growth | 1999,2000 |
| 10-8 | 0 | Old growth | |
| 10-9 | 100 | Old growth | 1999 |
| 10-10 | 100 | Wetlands | 1998 |
| 10-11 | 0 | Old growth | |
| 10-12 | 0 | Old growth | |
| 10-13 | 100 | Photodoc | 1998 |
| 10-14 | 100 | Photodoc | 1998,1999 |
| 10-15 | 100 | Photodoc | 1999 |

Field procedures beyond those described in the WHMP have been specifically developed for the Williamson Creek Tract. Baseline surveys are being conducted in old growth stands to descriptively characterize snags, CWD and understory vegetation. Snags and CWD are inventoried following the standards for sampling these elements on the Lake Chaplain and Lost Lake Tracts. The minimum size for snags is 10' tall and 11" dbh, for CWD it is 10' long and 11" diameter at the large end. On the Williamson Creek Tract, transects are located along reasonably accessible walking routes determined in the field. The goal is to sample enough transects within each stand over the next several years to provide at least 5 percent coverage. Understory vegetation old growth stands is inventoried by sampling 1/100th-acre circular plots at each end of the snag and CWD transects. Species occurrence is noted and notes are taken describing the biologist's overall characterization of the stand. During the surveys, photos are taken to illustrate stand characteristics that the biologists consider representative of these stands and descriptive notes are taken.

Tables 13 and 14 summarize data for snags and CWD collected to date. The old growth stands 10-6, 10-7 and 10-9 have the highest number of snags and CWD on them, as

would be expected. Stand 10-2 which is a small old growth stand adjacent to Williamson Creek had a low number of snags, but a high number of CWD.

**Table 13. WILLIAMSON CREEK TRACT SNAG CUMULATIVE INVENTORY SUMMARY**

| Stand # | Cover Type | Decay Class | Snags/ac. | Avg. Diameter (in.) | Avg. Height (ft.) |
|---|---|---|---|---|---|
| 10-1 | Riparian/Mixed | 1 & 2 | 0.0 | 0.0 | 0.0 |
| | | 3, 4 & 5 | 0.0 | 0.0 | 0.0 |
| | | All decay classes | 0.0 | | |
| 10-2 | Old Growth | 1 & 2 | 0.0 | 0.0 | 0.0 |
| | | 3, 4 & 5 | 1.3 | 15.1 | 12.0 |
| | | All decay classes | 1.3 | | |
| 10-3 | Riparian/Mixed | 1 & 2 | 0.0 | 0.0 | 0.0 |
| | | 3, 4 & 5 | 0.4 | 21.8 | 14.0 |
| | | All decay classes | 0.4 | | |
| 10-4 | Riparian/Mixed | 1 & 2 | 0.6 | 22.8 | 63.0 |
| | | 3, 4 & 5 | 1.2 | 18.4 | 25.5 |
| | | All decay classes | 1.8 | | |
| 10-5 | Riparian/Mixed | 1 & 2 | 1.0 | 15.5 | 42.7 |
| | | 3, 4 & 5 | 1.7 | 29.5 | 24.4 |
| | | All decay classes | 2.7 | | |
| 10-6 (<5%) | Old Growth | 1 & 2 | 3.0 | 40.7 | 60.0 |
| | | 3, 4 & 5 | 10.0 | 32.7 | 28.9 |
| | | All decay classes | 13.0 | | |
| 10-7 (<5%) | Old Growth | 1 & 2 | 3.5 | 23.1 | 72.9 |
| | | 3, 4 & 5 | 10.5 | 30.3 | 27.8 |
| | | All decay classes | 148.0 | | |
| 10-9 | Old Growth | 1&2 | 0.0 | 0.0 | 0.0 |
| | | 3, 4 & 5 | 9.5 | 24.2 | 45.0 |
| | | All decay classes | 9.5 | | |

**Table 14. WILLIAMSON CREEK CWD CUMULATIVE INVENTORY SUMMARY**

| Stand # | Cover Type | Decay Class | CWD/ac. | Avg. Diameter (in.) | Avg. Length (ft.) |
|---|---|---|---|---|---|
| 10-1 | Riparian/Mixed | 1 & 2 | 2.0 | 26.5 | 29.7 |
| | | 3, 4 & 5 | 1.0 | 19.8 | 17.8 |
| | | All decay classes | 3.0 | | |
| 10-2 | Old Growth | 1 & 2 | 10.3 | 21.0 | 74.9 |
| | | 3, 4 & 5 | 2.6 | 15.0 | 18.5 |
| | | All decay classes | 12.9 | | |
| 10-3 | Riparian/Mixed | 1 & 2 | 1.3 | 23.7 | 36.3 |
| | | 3, 4 & 5 | 2.6 | 16.3 | 18.8 |
| | | All decay classes | 3.9 | | |
| 10-4 | Riparian/Mixed | 1 & 2 | 0.3 | 32.0 | 41.0 |
| | | 3, 4 & 5 | 1.2 | 26.2 | 53.3 |
| | | All decay classes | 1.5 | | |
| 10-5 | Riparian/Mixed | 1 & 2 | 1.4 | 19.0 | 71.5 |
| | | 3, 4 & 5 | 0.7 | 21.1 | 26.5 |
| | | All decay classes | 2.1 | | |
| 10-6 (<5%) | Old Growth | 1 & 2 | 9.0 | 21.6 | 63.7 |
| | | 3, 4 & 5 | 29.0 | 23.9 | 34.0 |
| | | All decay classes | 38.0 | | |
| 10-7 (<5%) | Old Growth | 1 & 2 | 10.0 | 27.7 | 70.3 |
| | | 3, 4 & 5 | 20.0 | 29.7 | 44.8 |
| | | All decay classes | 30.0 | | |
| 10-9 | Old Growth | 1 & 2 | 38.1 | 25.0 | 50.1 |
| | | 3, 4 & 5 | 14.3 | 21.3 | 27.3 |
| | | All decay classes | 52.4 | | |

# 5.0 WORK PLANNED FOR 2001

## 5.1 FOREST VEGETATION MANAGEMENT

### 5.1.1 Lake Chaplain Tract

Approximately 9 acres of Linetree Sale Unit 1 that were not replanted in 2000 will be planted with 300 Douglas fir per acre in the spring of 2001. Western red cedar seedlings were not available for planting in 2001, therefore none will be planted. Red cedar may be planted in this portion of the unit in the future.

Chaplain Sale Unit 1, which was planted in the spring of 1992, will be precommercially thinned in the spring of 2001. This unit will be thinned using the following prescription:

- Thin conifers, favoring Douglas fir over western hemlock, to a 12'x12' spacing
- Leave all western red cedar
- Thin maple clumps back to three to five stems per clump
- Thin hardwoods to a 30'x30' spacing
- When there are no conifers available, thin hardwoods to a 12'x12' spacing

Diversion Sale Unit 2, which was planted in the spring of 1996, will be hand slashed to reduce the hardwood competition. Currently, there is an excess of alder that is widely distributed throughout the unit and pockets of dense cottonwood. Thinning will be to 30' x 30' spacing. No conifers will be thinned at this time. An adequate number of hardwood trees will be retained to insure that the required hardwood overstory component (5 to 10 percent) will be present in the future.

The Donkey Damper Sale will be offered for sale during 2001 if the market is acceptable. If it is sold in the spring it is anticipated that road construction would begin the summer of 2001. Sale layout work on the next timber sale (unnamed at this time) will be completed and sold if market conditions are favorable.

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 2001, and draft management plans for existing GTA's.

The Lake Chaplain Road drainage improvement project will be completed.

5.1.2 Spada Lake Tract

Management recommendations from the timber harvest feasibility study will be evaluated. It is not anticipated that harvest would proceed until market conditions improve for the Spada Lake stands. Harvest units identified in Section 3.1.5 will be set up for future commercial thinning, at such time when the market improves. Spada Lake stands 9-36, 37, and 38 will be marked for precommercial thinning.

5.1.3 Lost Lake Tract

Harvest units identified in Section 3.1.5 may be set up for future commercial thinning, pending the District's evaluation of management recommendations.

## 5.2 SNAG MANAGEMENT

Snag management in 2001 will focus on creating snags in the 5 units inventoried at Williamson Creek in 2000. These units were primarily riparian and mixed forest stands. Several units at Spada Lake will also be inventoried, with creation to follow as time allows. These include old growth, mixed forest and closed canopy/sapling pole stands.

On the Lake Chaplain Tract, inventory and creation will include the remaining unmanaged units, i.e. PMF's and OMA's.

## 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 2001.

### 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. Fertilizer (where allowed) will be applied to the existing shrub plantings. Quantitative measurements of the grass/forb layer will be made again in the spring of 2001. Areas of ORV damage and creek crossings will be remedied as soon as possible, should they occur. As time allows, the buffer area between the pipeline and the access road may be thinned to promote shrub growth and perch potential for raptors. The ROW will be mowed during the summer of 2000 to help suppress alder growth.

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

Monitoring will be conducted as in previous years. Excess alders will be removed at the north end of Lake Chaplain.

## 5.5 NEST STRUCTURES

The floating nest platforms and the osprey platform at Lost Lake, and the osprey platforms at Spada Lake, 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 floating 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 are used in this program will be evaluated to identify whether details such as roof or door design may be influencing nest box success.

## 5.6 BIOSOLIDS APPLICATION AT LAKE CHAPLAIN

Vegetation monitoring and water quality monitoring for units Hors1-93 and Hors2-93 will continue at the established stations in Chaplain Creek in 2001.

## 5.7 DEER FORAGE MONITORING

The following harvest units will be sampled in 2001: Divr1-95, Hors3-93, and Donkey Damper2.

## 5.8 WILLIAMSON CREEK TRACT

Baseline inventorying will continue on the Williamson Creek Tract in 2001. Also, District biologists will assess the benefits of specific snag and CWD creation in the stands along Williamson Creek in which baseline inventory was completed in 2000 (Stands 10-1 through 10-5).

## 6.0 SCHEDULE OF ACTIVITIES FOR 2001

| Major Activities | Location | Quantity |
|---|---|---|
| Final Harvest | | |
| Timber Sale (Lake Chaplain) | Donkey Damper Sale, see Fig. 2 | 2 units (approx. 37 ac.) |
| Sale Layout (Lake Chaplain) | Unnamed Sale, see Fig. 2 | 2 units (acreage TBD) |
| Commercial Thinning | | |
| Sale Layout | Lost Lake Tract | Stands 7-1, 7-2, 7-3 (acreage TBD), pending internal review |
| Sale Layout | Spada Lake Tract | Acreage TBD, pending internal review |
| Reforestation/seeding | Linetree Sale, unit 1 | 9 acres |
| Harvest Unit Stocking Monitoring | L. Chaplain Tract, all previously harvest units | 10 units |
| Precommercial Thinning | Spada Lake Tract | 2 units (approx. 38 ac.), pending internal review |
| 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 | Pending harvest of Donkey Damper Sale |
| CWD Inventory | Lake Chaplain Tract | 2 units (Donkey Damper Sale) |
| Revegetation | | |
| Grass seeding/fertilizer/shrub plantings | Pipeline ROW | As needed to improve bare spots |
| Monitoring | | |
| Revegetation Site Monitoring/Maintenance | West side, Chaplain Marsh<br>North end, L.Chaplain<br>Powerhouse site<br>Spada L. drawdown zone<br>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 |
| Williamson Creek | Stands 10-6, 10-7, 10-8, 10-11, 10-12 | Continue old growth baseline inventory |
| Biosolids Application | L. Chaplain Tract | None planned |
| 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), 2000 (3.1.1, p.4) |
| | Lake Chaplain | Donkey Damper Sale | 1999 (3.1.4, p.5), 2000 (3.1.1, p.4) |
| | 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), 2000 (3.1.2, p.4) |
| | Lake Chaplain | Line Tree Sale | 2000 (3.1.2, p.4) |
| 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), 2000 (3.2.1, p.6) |
| | Lost Lake | Harvest Planning | 2000 (3.2.2, p.6) |
| | Spada Lake | Harvest Planning | 2000 (3.2.3, p.7) |
| 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 and Lost Lake | 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), 2000 (3.3.1, p.9) |

| General Activity Category | Management Tract | Milestone | Annual Report Reference – (Section/page #) |
|---|---|---|---|
| | 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), 2000 (3.3.1, p.9) |
| | Lake Chaplain | Snag Monitoring | 1998 (3.2.2., p.7), 1999 (3.2.2, p.9) |
| 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), 2000 (3.3.2, p.9) |
| 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), 2000 (3.4.1, p.13) |
| | 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), 2000 (3.4.2, p.13) |
| | 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), 2000 (3.5.1, p.13) |
| | 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), 2000 (3.5.2, p.13) |
| | Lost Lake | Osprey Platform | 1990 (3.8, p.8), 1999 (3.5.3, p.19), 2000 (3.5.3, p.19) |

| General Activity Category | Management Tract | Milestone | Annual Report Reference – (Section/page #) |
|---|---|---|---|
| | 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), 2000 (3.5.2, p.13) |
| | Spada Lake | Floating Platforms | 1996 (3.5.1, p.13), 1997 (3.5.1, p.16), 1999 (3.5.1, p.14), 2000 (3.5.1, p.13) |
| | Spada Lake | Duck Nest Boxes | 1996 (3.5.2, p.13), 1998 (3.7, p.18, 1999 (3.5.2, p.14), 2000 (3.5.2, p.13) |
| | Spada Lake | Osprey Platforms | 1992 (3.7, p.11), 1999 (3.5.3, p.19), 2000 (3.5.3, p.19) |
| Bald Eagle Nest | Lake Chaplain | Monitoring | 1997 (3.5.4, p.19), 1998 (3.5.4, p.18), 1999 (3.5.4, p.20), 2000 (3.5.4, p.20) |
| Biosolids Application | Lake Chaplain | Biosolids Application | 1996 (3.8, p.18), 1998 (3.7, p.18), 2000 (3.7, p.20) |
| | Lake Chaplain | Monitoring | 1996 (3.8, p.18), 1997 (3.7, p.19), 2000 (3.7, p.20) |
| 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), 2000 (3.8, p.24) |
| | | 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) |

| General Activity Category | Management Tract | Milestone | Annual Report Reference – (Section/page #) |
|---|---|---|---|
| ROW Management | Power Pipeline | Gate to restrict public access | 1994 (3.3.2, p.7) |
| 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), 2000 (3.9, p.24) |