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April 23, 2003

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Reference:

Wildlife Habitat Management Plan  
2002 Annual Report  
Jackson Hydroelectric Project – FERC #2157 License Article 53

Dear Colleagues:

A copy of the 2002 Annual Report on the Jackson Project Wildlife Habitat Management Program is enclosed for your records.

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

Sincerely,

A handwritten signature of Bruce Meaker in dark ink.

Bruce Meaker  
Senior Manager,  
Regulatory Affairs

Enclosure

BT: nda

cc: Ann Savery, Tulalip Tribes  
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**2002 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 2003**

**2002 ANNUAL PROGRESS REPORT  
WILDLIFE HABITAT MANAGEMENT PLAN**

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# **2002 ANNUAL PROGRESS REPORT WILDLIFE HABITAT MANAGEMENT PLAN**

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## **1.0 SUMMARY**

Accomplishments of the year 2002 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 WHMP'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 2002**

- Complete construction of access road to Donkey Damper Sale units (Lake Chaplain Tract)
- Logging of Donkey Damper Sale units
- Reforestation of Donkey Damper Sale units
- Plantation monitoring (Lake Chaplain Tract)
- Reseeding/erosion control of new road ROWs (Lake Chaplain Tract)
- Precommercial thinning Chaplain Sale Unit 3 (Lake Chaplain Tract)
- Complete layout of Phone Line Sale units (Lake Chaplain Tract)
- Hemlock looper infestation monitoring (Lake Chaplain Tract)
- Precommercial thinning on Spada Lake Tract
- Set up commercial thinning units on Spada Lake Tract
- Complete Road Maintenance and Abandonment Plan (RMAP) and begin implementation at Lake Chaplain Tract
- Begin implementation of Lake Chaplain Tract RMAP

- Implement RMAP at Spada Lake Tract, including abandonment of three spur roads in the Sultan Basin
- Snag creation on Spada Lake Tract and Williamson Creek Tract
- Snag inventory and creation (Spada Lake, Lake Chaplain and Williamson Creek Tracts)
- Monitoring of revegetation and wetland sites (Lost Lake, Lake Chaplain Tract)
- Deer forage monitoring (Lake Chaplain Tract)
- Seeding of power pipeline ROW (Project Facilities Tract)
- Monitoring of vegetation coverage on power pipeline ROW (Project Facilities Tract)
- Monitoring of nest structures (Lake Chaplain, Lost Lake and Spada Lake Tracts)
- Long-term snag monitoring (Lost Lake Tract, Lake Chaplain Tract)
- Layout of timber harvest units (Spada Lake Tract)
- Complete feasibility study of timber harvest options (Lost Lake Tract)
- Continued monitoring and baseline data collection at Williamson Creek Tract

## **1.2 TASKS SCHEDULED FOR 2003**

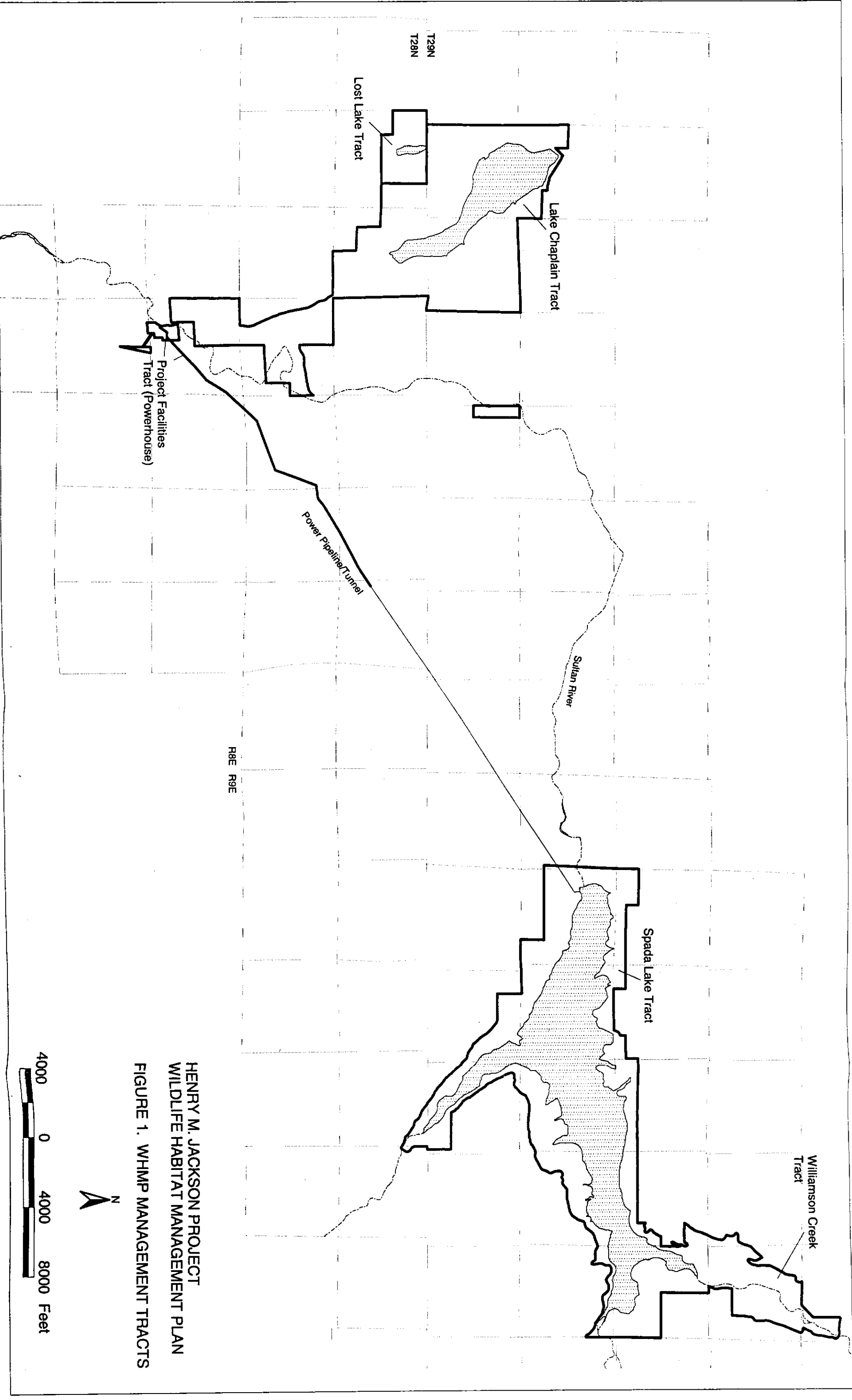
- Replant portions of Donkey Damper Unit 1 (Lake Chaplain Tract)
- Sale and final harvest (tentative) of Phone Line Sale (Lake Chaplain Tract)
- Precommercial thinning on Chaplain Unit 2 (tentative)
- Reconnaissance for 2004 timber sale (tentative) (Lake Chaplain Tract)
- Commercial thinning on Spada Lake Tract (tentative)
- Precommercial thinning on Spada Lake Tract (tentative)
- Plantation monitoring (Lake Chaplain Tract)
- Snag monitoring (Lake Chaplain and Lost Lake Tracts)
- Snag creation on Spada Lake Tract
- Snag inventory on Spada Lake Tract and Williamson Creek Tract
- Monitor Williamson Creek Tract and collect baseline data
- Monitor nest structures
- Monitor revegetation sites
- Deer forage monitoring (Lake Chaplain Tract)
- Monitor buffer zones and green tree areas in harvested units (Lake Chaplain Tract)
- Implement RMAPs (Lake Chaplain, Spada Lake Tracts)

## **2.0 INTRODUCTION**

The 2002 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 2002 (see Section 3.0) and summarizes activities completed since the management program was initiated in 1988 (see Section 4.0). Activities anticipated for the calendar year 2003 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.





HENRY M. JACKSON PROJECT  
WILDLIFE HABITAT MANAGEMENT PLAN  
FIGURE 1. WHMP MANAGEMENT TRACTS

### 3.0 WORK COMPLETED DURING 2002

#### 3.1 FOREST VEGETATION MANAGEMENT ON THE LAKE CHAPLAIN TRACT

##### 3.1.1 Timber Harvest

The Donkey Damper Sale, comprised of three units totaling 44.9 acres, was sold in 2001 (Figure 2). Road construction began in November 2001, and, final timber harvest was completed in the spring of 2002 (Figure 2).

##### 3.1.2 Reforestation

The three Donkey Damper Sale units were planted with 250/ac Douglas fir and 50/ac western red cedar in Spring 2002. Road rights-of-way were seeded with a grass-clover seed mix.

##### 3.1.3 Harvest Unit Layout

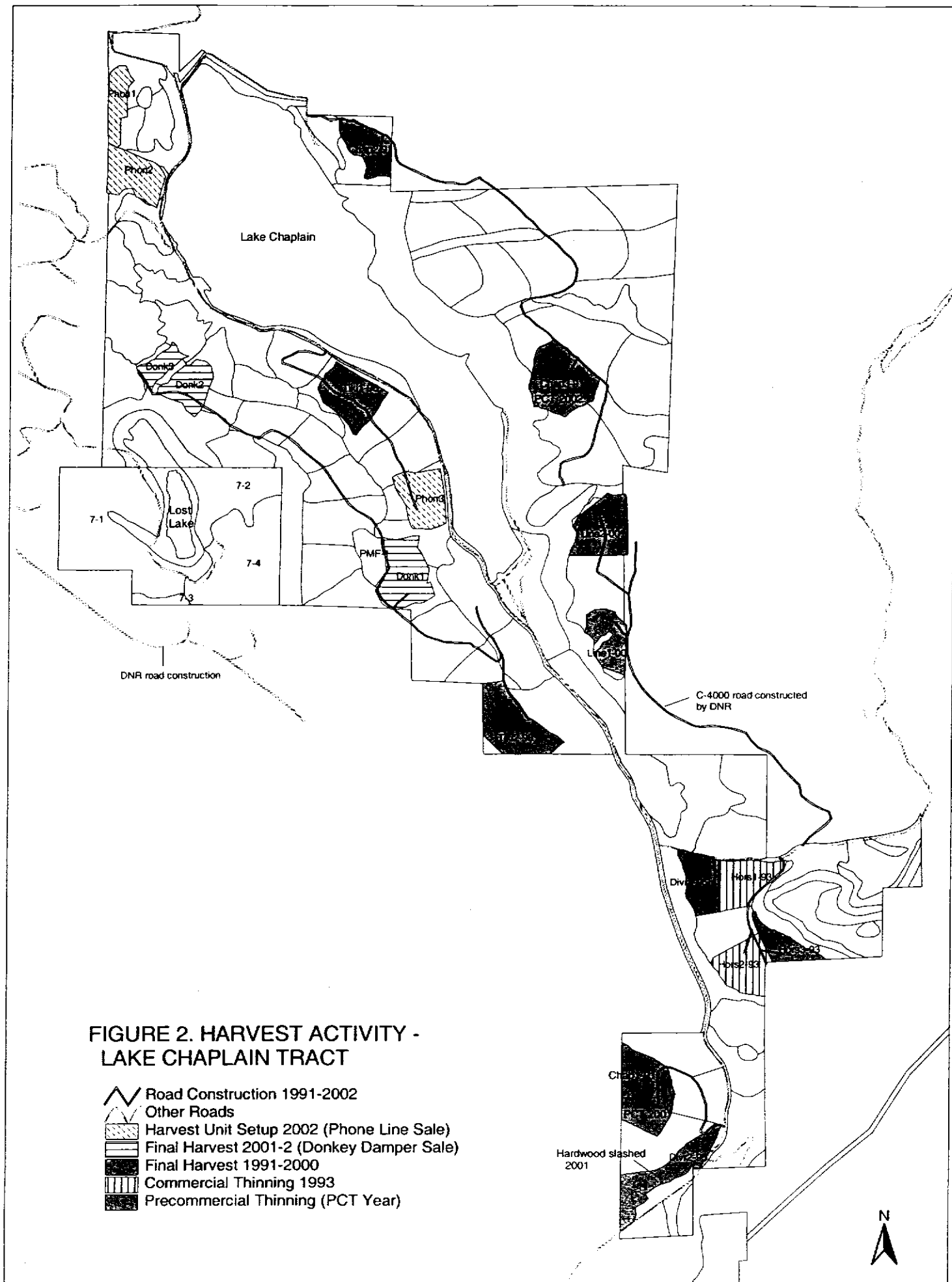
Layout work for the Phone Line Sale was completed in 2002 (Figures 2 and 3). The sale includes three units scheduled in the WHMP: Sale Unit 1 (10.5 ac.) includes the western portions of WHMP units 2000-3 and 2035-2, Sale Unit 2 (18.1 ac.) includes the northern portion of WHMP unit 2005-3 and a portion of 2035-2, and Sale Unit 3 (18.3 ac.) is slightly modified from WHMP unit 2000-5.

Sale units 1 and 2 were substantially reconfigured to facilitate logging operations and exclude required wetland buffer zones. Unit 1 (10.5 ac.) was reconfigured and reduced in size to allow a 200 foot wetland buffer zone along the east side of the unit, and because access to the north slope of the unit is difficult from the proposed spur road into the unit (Figure 3). No management decision has been made for the north slope of Unit 1 at this time. The southern boundary of Unit 1 was extended south along a 240-foot wide strip to the boundary of Unit 2. The trees standing between the proposed access road and the adjacent clear-cut are expected to blow down once the spur road corridor is cleared, and the extension of Unit 1 will allow the harvest of these trees. Units 1 and 2 have some existing snags and CWD logs located along the western boundary that are the result of blow down following past clearcutting on the adjacent stand. Logging equipment will be kept out of the western edge in order to preserve these snags and logs.

Unit 2 (18.1 ac.) was reconfigured to exclude the southernmost portion of the WHMP unit (Figure 3). This area includes approximately 5 acres and will serve as the green tree area (GTA) for units 1 and 2 of the Phone Line Sale. The GTA has a number of existing snags and CWDs, a well-developed shrubby understory, and is larger than required for the two harvest units; (the requirement for both units is about 1.5 ac). On this sale, we will forgo snag and CWD creation on the harvest units in exchange for the opportunity to preserve the enlarged GTA with its desirable wildlife habitat features.

A post-harvest inventory of snags and CWD logs on units 1 and 2 and the GTA will identify whether any additional trees are needed to produce the required numbers and sizes.

If additional snags and logs are needed, they will be produced in the wetland BZ and in



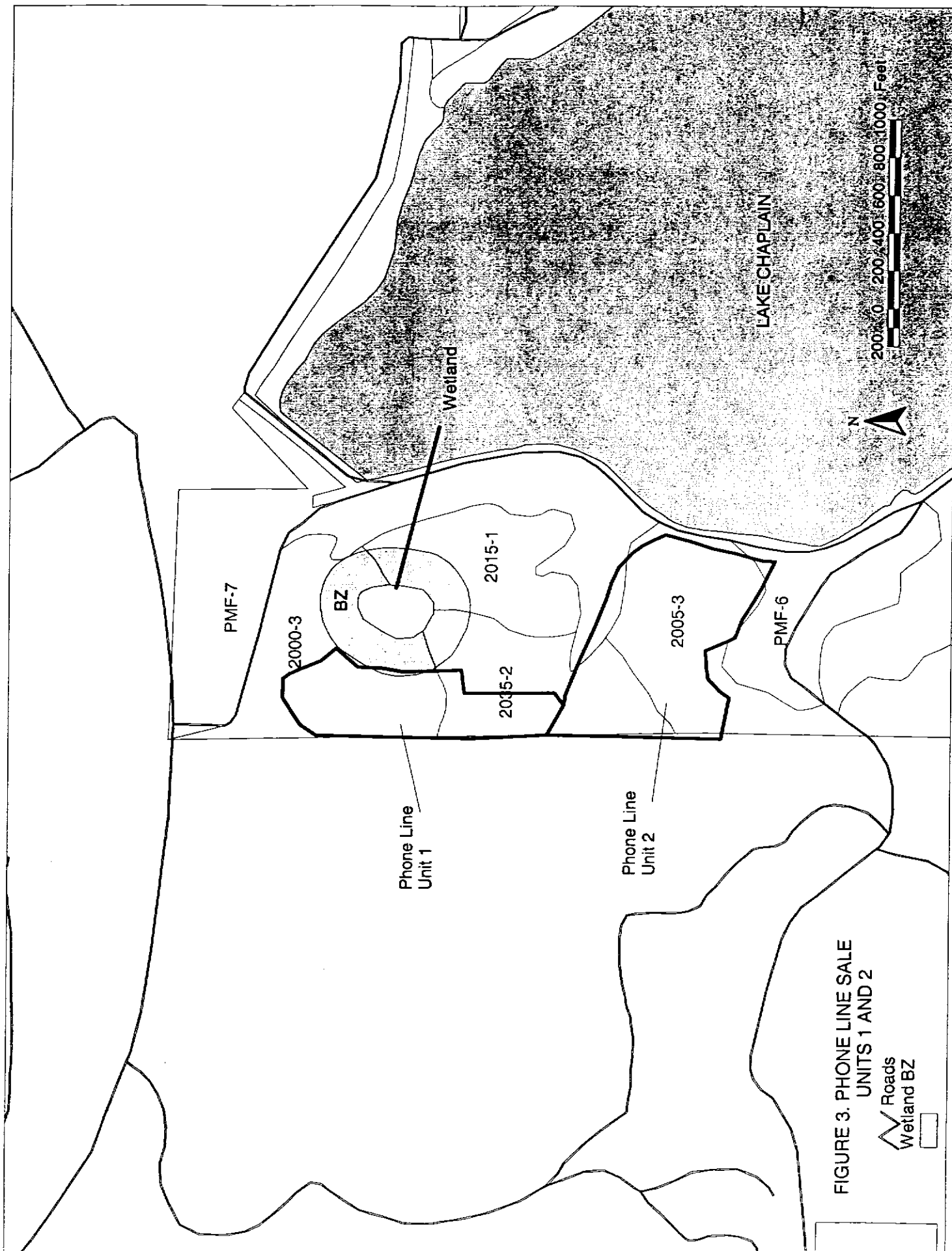


FIGURE 3. PHONE LINE SALE  
UNITS 1 AND 2

an area northeast of Unit 1 between the BZ and a drainage that flows northeast from the unit.

#### **3.1.4 Stand Management**

Chap3-91, harvested in 1991, was precommercially thinned in 2002 to the following specifications:

- 12 ft x 12 ft spacing for Douglas fir and western hemlock
- Ignore all western red cedar and hardwoods
- Cut big-leaf maple stump sprouts back to 3 to 5 stems

#### **3.1.5 Insect Outbreak**

Survey work by DNR in 2001 predicted that the hemlock looper population in 2002 would be high (i.e. similar to two previous years), and additional damage was expected. However, the population appears to have crashed in 2002, and no additional significant damage to forest stands was observed this year on District and City lands.

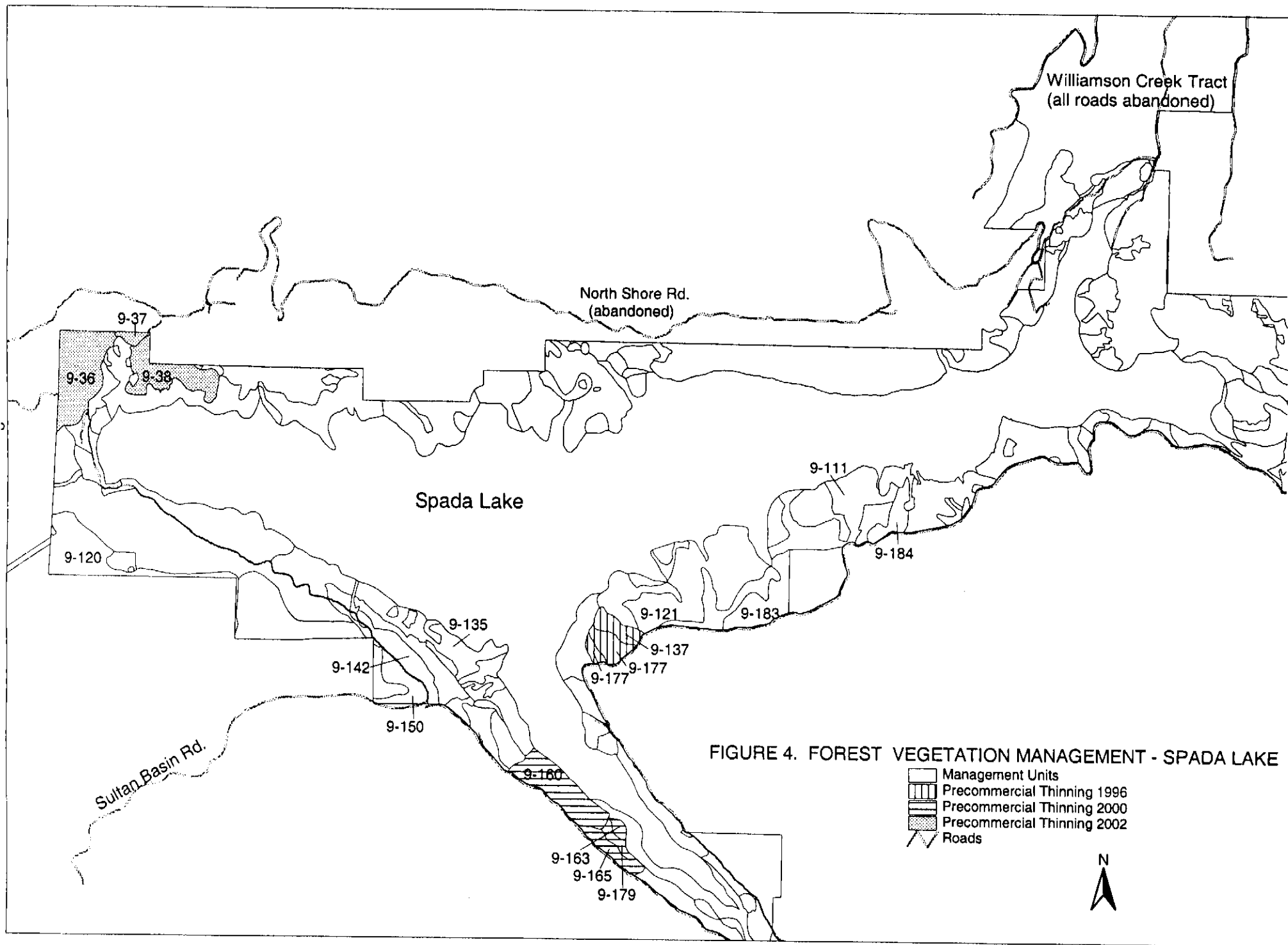
### **3.2 FOREST VEGETATION MANAGEMENT ON THE SPADA LAKE TRACT**

The District's forestry consultant initially reported on timber harvest feasibility on the Spada Lake Tract in late 2000, and continued to advise the District on management options on its small-wood stands ( $\leq 40$  yrs. old). Six stands were carried forward from the consultant's original 2000 report on commercial thinning options, (9-120, 9-121, 9-183, 9-142, 9-150 and 9-184), and two more stands (9-111 and 9-135) were evaluated in 2002 and proposed for commercial thinning (Figure 4). The consultant provided a preliminary break-even cost analysis of these stands, which will be refined in 2003 following timber cruise work. All of these stands were reconfigured for operational ease and marked for commercial thinning in 2001 and 2002, including boundary tags, road alignments, culvert locations and required buffer zones. The Department of Natural Resources approved the District's Forest practices applications for these stands in 2002.

Two stands (9-36 and 9-37) with a total of approximately 40 acres were precommercially thinned in 2002. This action reduced the stand density to about 220 trees per acre.

### **3.3 FOREST VEGETATION MANAGEMENT ON THE LOST LAKE TRACT**

The District's consultant reported on timber harvest feasibility on five Lost Lake Stands late in 2000 (Figure 5). He performed timber cruises in 2001 and estimated the net harvest value in late 2001, using the U.S. Forest Service FVS model to project timber volumes that would result from commercial thinning. Assumptions included post-harvest canopy goals of 50% throughout the harvest units, except for one-acre openings covering 10% of the harvest area. As in the Sultan Basin, depressed hemlock prices continued to influence decision-making on the Lost Lake Tract, with the additional concerns over the loss of forested habitat on adjacent properties. The co-licensees discussed the management options, described in detail in the 2001 Annual Report, with agency representatives on April 5, 2002 (see 2001 Annual Report, Agency Meeting Minutes, Appendix A). The decision was made in 2002 to delay any timber harvest on the Lost Lake Tract for several years. Commercial thinning options will be re-evaluated in the



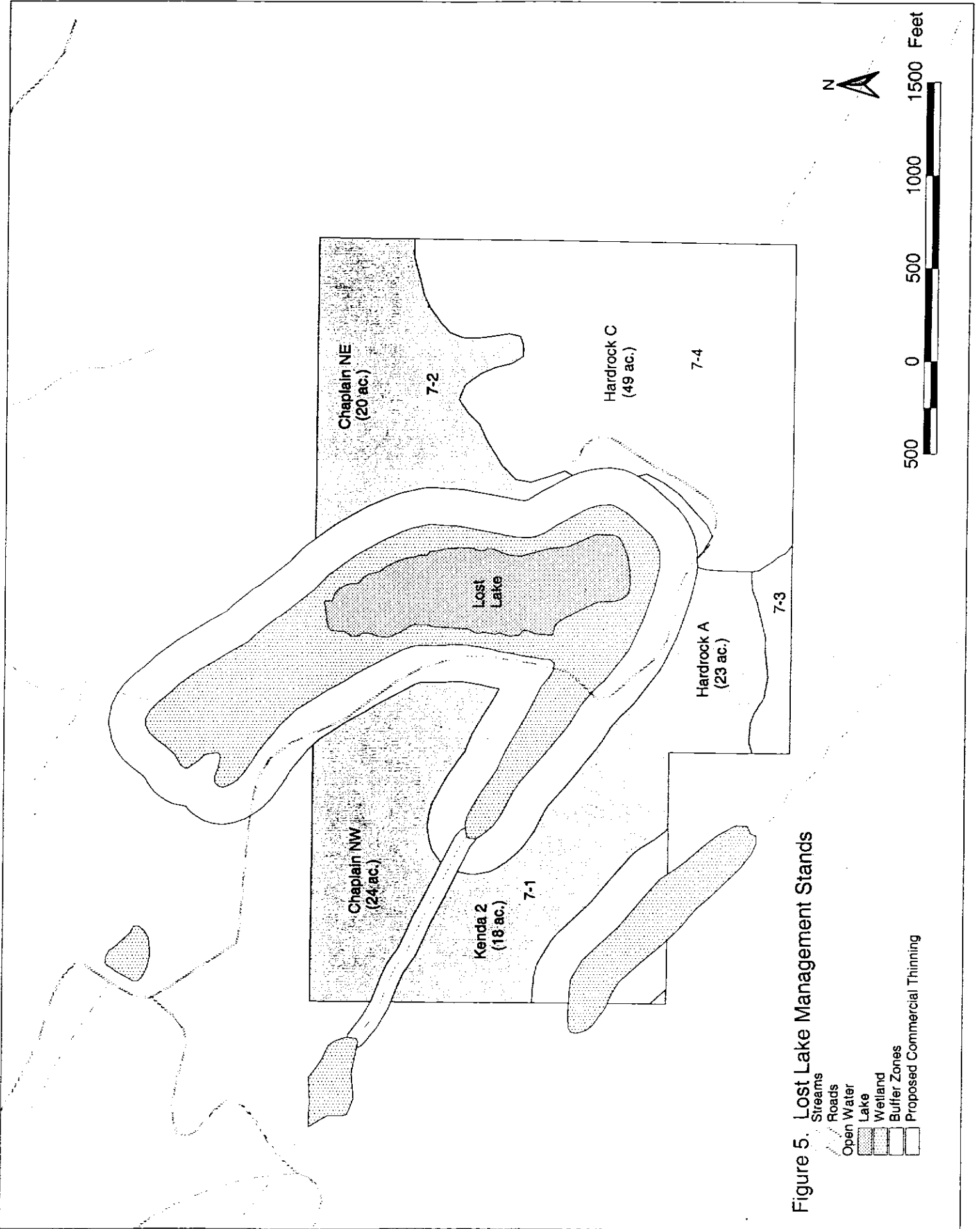


Figure 5. Lost Lake Management Stands

future, and may be implemented after adjacent clearcuts on neighboring properties have developed adequate hiding cover for wildlife.

### **3.4 SNAG AND CWD MANAGEMENT**

#### **3.4.1 Snag Inventory and Creation**

In 2002, snag management at Lake Chaplain included inventorying three units, totaling 70 acres (Figure 6) (Table 1). Trees were also selected for snag creation on unit 3 of the Phone Line timber sale. Existing snags and CWD on Phone Line Sale units were inventoried in 2002.

All required snag creation was completed on the Williamson Creek Tract. Snag creation on stand 10-1 had been started in 2001, and was finished on 2002 (Table 1). To date, 121 snags have been created on about 62 acres comprising 4 stands (10-1, 10-3, 10-4 & 10-5). As a result, all stands detailed in the WHMP as requiring pro-active management of snags within the Williamson Creek Tract are now complete (Figure 7).

On the Spada Lake Tract, snag management occurred on five stands (Figure 8). A total of 210 acres was inventoried, and about 180 snags created. Stand 9-180 was inventoried and had some snags created in 2001. Snag creation on that stand was completed in 2002. Stands 9-114 and 9-125 were evaluated on a walk-through basis but no snag creation potential was found, and they will be re-visited in 10 years. Stands 9-173 and 9-8 were inventoried in 2002. Stand 9-173 had an adequate number of natural snags; Stand 9-8 required 325 snags to be created (Figure 8). This stand is the largest on the east end of the lake and represents the best opportunity for snag supplementation in the area. Snags of the required size were created where possible, but in many areas, trees in the 11-15" size range were the largest available, and some were topped in lieu of trees in larger snag size classes. After discussion with the District's forestry consultant, it was determined that creating small openings by topping groups of trees greater than 11" might be beneficial to the understory layer. In conjunction with snag creation, smaller, suppressed trees were felled, girdled or topped to create openings of 0.10 to 0.25 acres in size.

#### **3.4.2 Mapping of Snags and CWD**

Snags and CWD on previously-harvested Lake Chaplain units were mapped using GPS equipment to facilitate long-term monitoring and to enter the locations into the Jackson Project's GIS data base. The following units were mapped in 2002: Donk1-02, Donk2-02, Donk3-02 (Figure 6). We attempted to map all tagged created snags and CWD that are located on the harvest units, plus any naturally-occurring snags that are marked for future monitoring. GPS mapping has not been very successful under the forest canopy in unharvested stands, and we will continue to map snags and CWD in forested units with compass and tape.



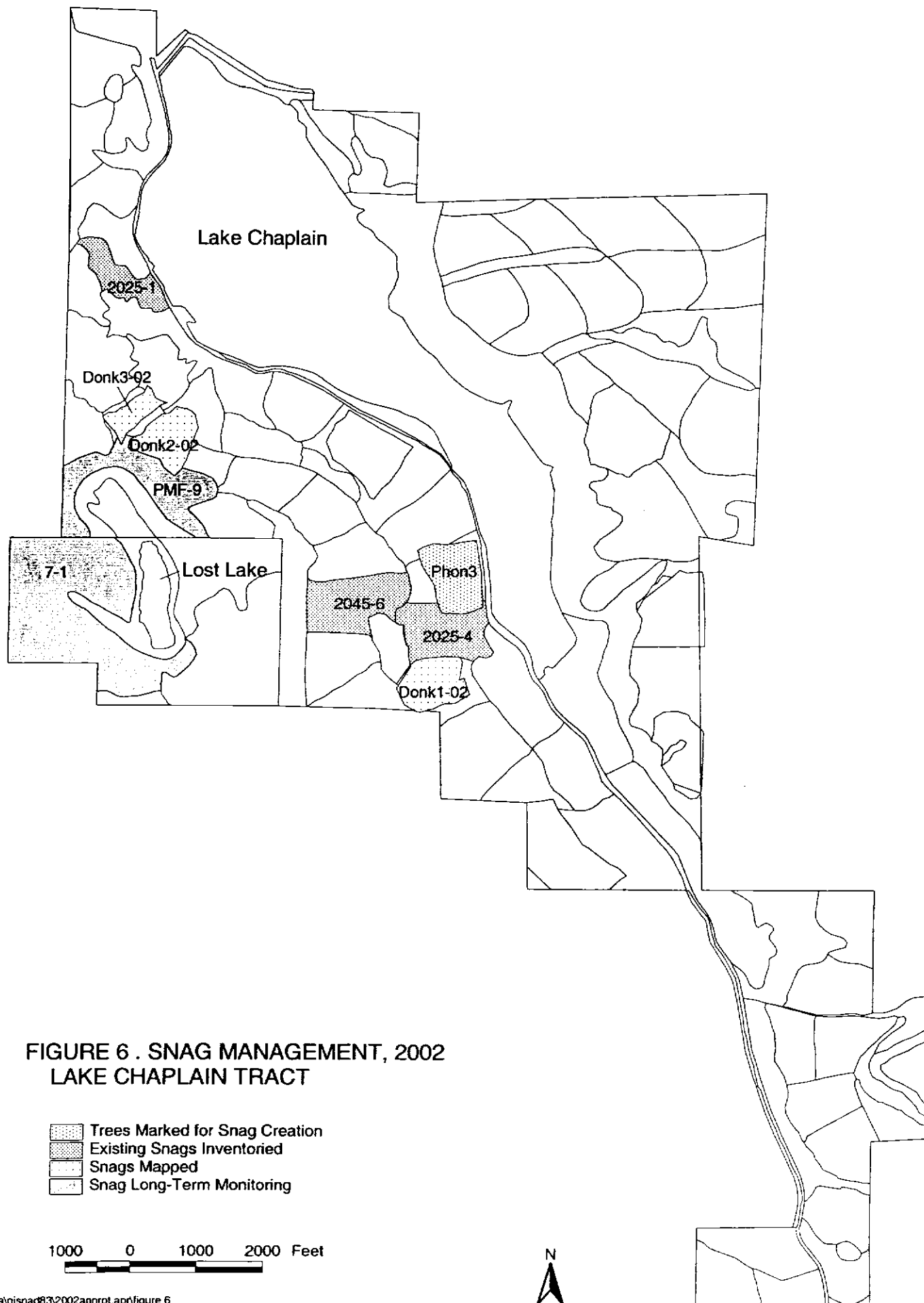


FIGURE 6 . SNAG MANAGEMENT, 2002  
LAKE CHAPLAIN TRACT

**TABLE 1. SUMMARY OF SNAG MANAGEMENT ACTIVITIES IN 2002**

UNIT	ACRES	NUMBER CREATED	AVG. DBH (in.)	AVG. HT. (ft.)	# PER ACRE	NOTES
<b>Lake Chaplain Tract</b>						
2025-1	14.0	0				Inventoried 2002; Creation 2003
2025-4	28.0	0				Inventoried 2002; Creation 2003
2045-6	28.0	0				Inventoried 2002; Creation 2003
Phone Line 3	19.0	0				Snags marked 2002; Creation 2003
<b>Spada Lake Tract</b>						
Stand 9-8 <sup>1</sup>	106.0	133	15.4	60.9	1.3	Includes natural and created snags
Stand 9-114 <sup>2</sup>	53.0	0	n/a	n/a	n/a	Re-visit in 10 years
Stand 9-125 <sup>2</sup>	33.0	0	n/a	n/a	n/a	Re-visit in 10 years
Stand 9-173	20.5	0	34.9	58.8	5.8	✓ Natural snags only
Stand 9-180	7.4	0	21.4	65.0	1.2	Natural snags only
<b>Williamson Creek Tract</b>						
Stand 10-1	21.2	68	16.4	57.1	3.2	Created snags only
<b>TOTALS</b>	<b>330</b>	<b>201</b>	Totals for those 12 units with snag management in 2002			
<b>Bold denotes units where snag management activity occurred in 2002.</b>						
✓ Meets WHMP requirements for size class distribution and number per acre						
<sup>1</sup> Snag creation incomplete, to be completed in 2003.						
<sup>2</sup> Trees not of adequate size for snag creation, re-evaluate in 10 years.						

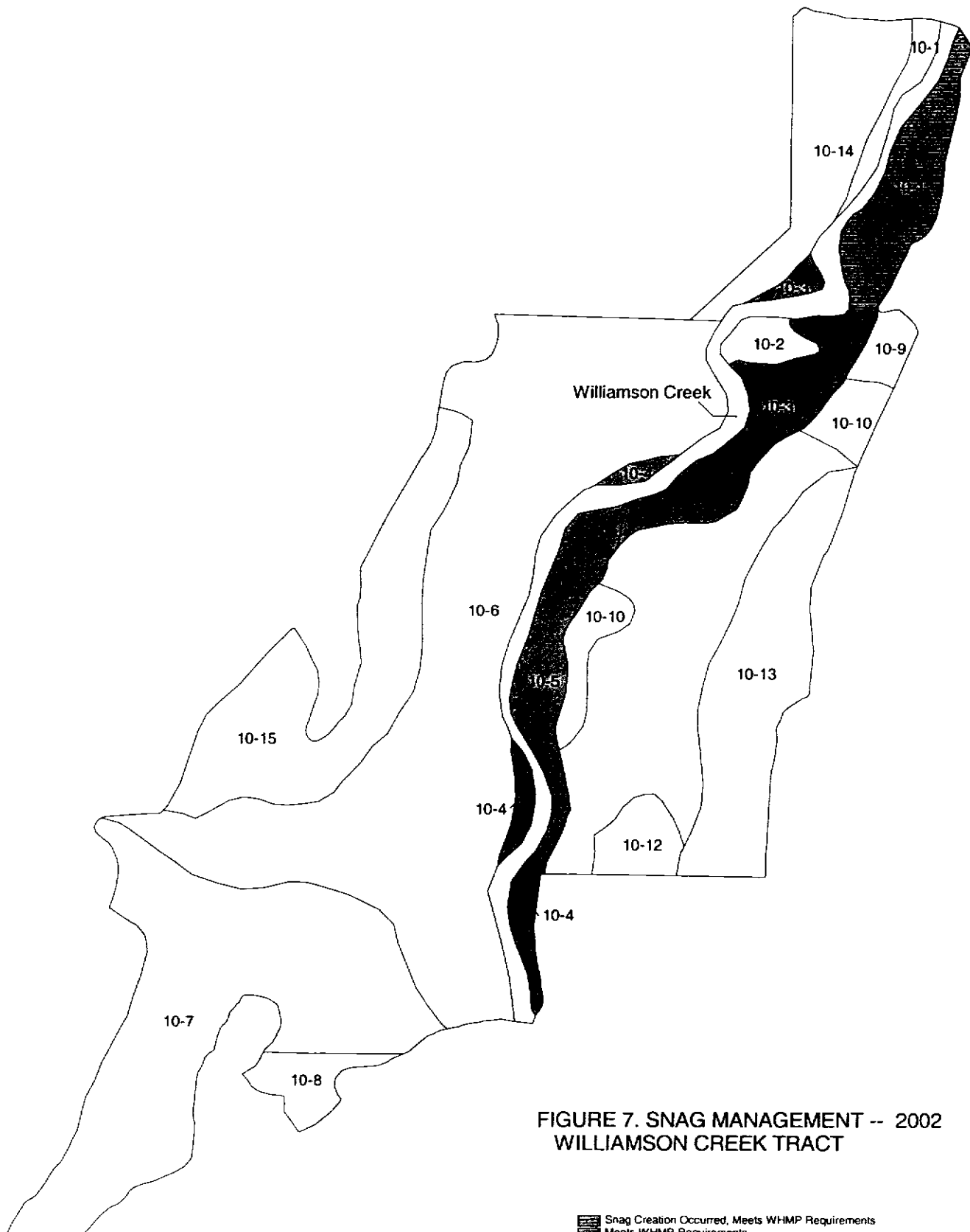


FIGURE 7. SNAG MANAGEMENT -- 2002  
WILLIAMSON CREEK TRACT

 Snag Creation Occurred, Meets WHMP Requirements  
 Meets WHMP Requirements



800 0 800 1600 Feet

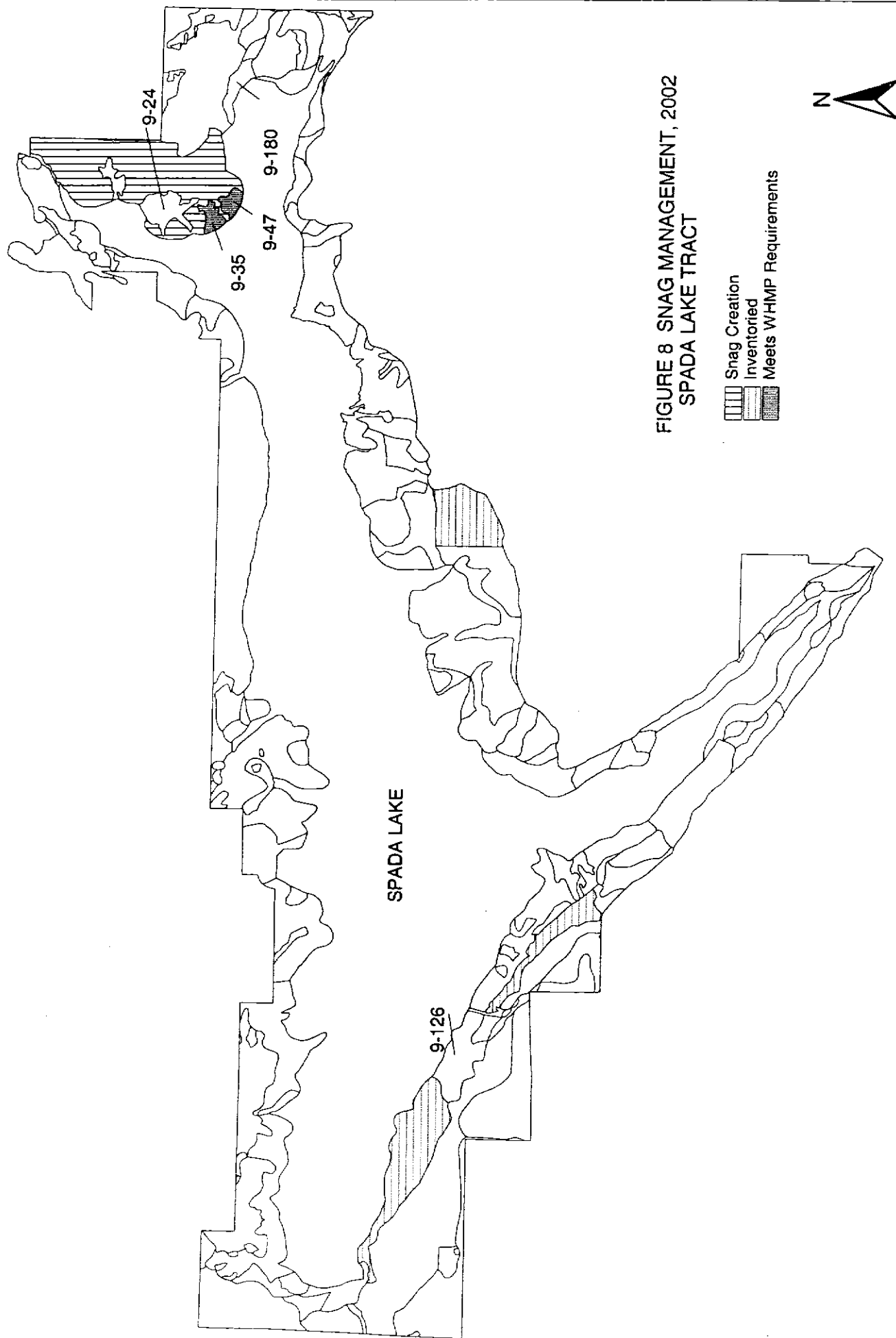


FIGURE 8 SNAG MANAGEMENT, 2002  
SPADA LAKE TRACT

SPADA LAKE

9-126

9-24

9-35

9-47

9-180

### 3.4.3 Long-Term Snag Monitoring

Created snags and a few naturally occurring snags were monitored to track decay processes and use by wildlife on harvest units and forested stands at Lake Chaplain and Lost Lake. Snags in the following units were revisited in 2002: Stand 7-1 (part) and PMF-9 (Figure 6). Results were tabulated and added to records obtained in previous years.

## 3.5 REVEGETATION

### 3.5.1 Spada Lake Drawdown Zone

Wetland emergent species were planted in mudflats at two sites in the Spada Lake drawdown zone from 1430 ft. to 1445 ft. elevation in 1994, as reported in the Annual Report for that year. The sites were monitored annually through 1999 and again in 2002. Results in 2002 were similar to those of 1999. Vegetation cover at the North Fork site was greatest in the middle section ("Spada Group") adjacent to the abandoned road grade. Volunteer small-fruited bulrush, small creeping buttercup, and some reed canarygrass at the upper edge of the site, were the dominant plants present. *Carex* clumps present at the lower spots of this section represent the remnants of the planted rows, plus some vegetative offshoots. Another set of planted rows of *Carex* ("North Fork Group") also survived and naturalized in small patches.

Surviving plantings at Williamson Creek consisted of the rows of *Carex*, including some in flower, above approximately 1438 ft. elevation. Outside of the planted rows, small-fruited bulrush, small creeping buttercup, and horsetail made up the dominant vegetation of the site. Reed canarygrass was present above approximately 1441 ft. elevation

### 3.5.2 Power Pipeline Right-of-Way

A large revegetation project was undertaken in 2002, with approximately 200 native shrubs planted in about 70 groupings along the entire 4-mile pipeline ROW. Species planted include Nootka rose, red osier dogwood, ocean spray, mock orange, red flowering currant, pacific ninebark, and beaked filbert. Planting holes were dug by backhoe about 18" deep and 18" square, then backfilled with a mixture of about 30% composted manure mixed with the native soil. Shrub clumps were positioned so that they will help to break up the line of sight in long, straight areas, and also protect existing desirable shrubs from being mowed. All planted shrubs were flagged and marked with a wooden stake, and each clump of shrubs was then marked with a 5' metal garden stake, which was also flagged. In an effort to reduce competition and the need for chemical fertilizers by providing a natural source of nitrogen fixation, clover was seeded around each plant. In some areas the clover has done well, and in others, it has not. Clover overseeding may be attempted again in 2003, in the hope that high amounts of nitrogen from the manure has largely been cycled through, thus providing a more suitable environment for the clover. Poorly vegetated areas of the ROW were seeded in 2002 with the same mixture of clovers, ryegrass and fescues as has been used for the past 3 years.

This was also the fifth and final year of vegetation monitoring to document the effects of this seeding program. Most areas along the ROW have shown an increase in herbaceous plants. The data in table 2 show that the most common plants or cover types found in 2002 were grasses, bare soil and miscellaneous trefoils (41%, 30% & 16% relative abundance, respectively). Trefoils, miscellaneous forbs and clovers make up a small but significant portion of the vegetation coverage as well.

<b>TABLE 2. 2002 ROW VEGETATION MONITORING RESULTS</b>			
<b>PLANT GROUP or SPECIES</b>	<b>FREQUENCY (%)</b>	<b>AVERAGE % COVER (within plot frame)</b>	<b>RELATIVE ABUNDANCE (Freq. x % Cover)</b>
Grass	84.7	48.0	40.7
Bare Soil	47.5	62.0	29.5
Misc. Trefoil	33.9	48.0	16.3
Moss	15.3	36.0	5.5
Misc. Forb	47.5	7.0	3.3
Misc. Asteraceae	39.0	7.0	2.7
Cottonwood	8.5	27.0	2.3
Rubus spp.	6.8	18.0	1.2
Alder	6.8	18.0	1.2
Strawberry	10.2	9.0	0.9
Clover	10.2	8.0	0.8
Salal	1.7	3.0	0.1
Conifer	1.7	3.0	0.1

Monitoring of the revegetation process on the ROW was conducted for the fifth and final year in 2002. Table 3 shows the relative abundance of the vegetation cover types found on the ROW during each year's inventory. For the most part, the list has remained relatively consistent from year to year, with grasses, bare soil and miscellaneous asters residing at the top of the list each year. Although bare soil is the cover type with the second highest relative abundance, it should be noted that there are not many bare patches larger than a few square feet. Only those portions of the ROW that have very sandy soil and exposure to full sun have not yet become revegetated. Damage caused by ORV's was less significant than in past years. No changes appear to be necessary with regard to the seed mixture or application process based on the results of the quantitative data collected.

**TABLE 3. VEGETATIVE COVER ON THE PIPELINE ROW, 1998-2002**

<b>Relative Abundance</b>						
<b>SPECIES or GROUP</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>average '98-'02</b>
GRASS	31.30	23.60	20.20	35.70	40.70	<b>30.30</b>
BARE SOIL	27.30	20.70	30.20	31.50	29.50	<b>27.84</b>
MISC. ASTERACEAE	15.80	29.80	13.90	13.10	2.70	<b>15.06</b>
MOSS	18.20	18.40	4.40	4.30	5.50	<b>10.16</b>
MISC. TREFOIL	6.80	1.90	0.70	2.80	16.30	<b>5.70</b>
MISC. FORB	3.00	5.30	12.10	2.80	3.30	<b>5.30</b>
CLOVER	3.90	3.90	11.20	5.10	0.80	<b>4.98</b>
COTTONWOOD	3.10	2.50	0.80	1.40	2.30	<b>2.02</b>
ALDER	1.10	1.80	1.50	0.20	1.20	<b>1.16</b>
RUBUS SPP.	0.30	0.50	0.40	2.20	1.20	<b>0.92</b>
STRAWBERRY	0.04	0.50	0.80	1.80	0.90	<b>0.81</b>
CONIFER	0.04	0.00	2.50	0.70	0.10	<b>0.67</b>
SALIX SPP.	0.30	0.00	0.30	0.90	0.00	<b>0.30</b>
RUSH	0.30	0.60	0.00	0.00	0.00	<b>0.18</b>
SPIREA	0.30	0.60	0.00	0.00	0.00	<b>0.18</b>
SALAL	0.00	0.00	0.30	0.00	0.10	<b>0.08</b>
CRATAGEUS	0.30	0.00	0.00	0.00	0.00	<b>0.06</b>
FIREWEED	0.00	0.00	0.30	0.00	0.00	<b>0.06</b>

\* In 2001, approximately 1/3 of the ROW was mowed in early summer, likely reducing the relative abundance of all vegetation cover types except bare soil and moss.

## 3.6 NEST STRUCTURES

### 3.6.1 Floating Nest Platforms

District biologists monitored the two platforms at Lost Lake (Figure 9) and the one platform on the Williamson Creek Arm of Spada Lake (Figure 10) when they were conducting other activities on the tracts. District biologists did not observe wildlife use of the floating platforms in 2002. The platforms on Lost Lake became overgrown with grasses and tall forbs. The platforms were inspected by boat on 5 September. There was one slightly trampled spot on the edge of the north platform and a path worn down to the center of the south platform, but no signs of other use.

The Spada Lake platform showed no sign of use, and vegetation is not overgrown on this platform. The second platform that had been lost sometime in late 1996 or early 1997 was found where it was anchored. It appears that a log floating down from Williamson Creek became entangled in the anchor chain and caused the platform to sink. It will be retrofitted with additional PVC float tubes and moved further south out of the direct thalweg of Williamson Creek.

### 3.6.2 Nest Boxes

The nest boxes at Lost Lake (Figure 9), Spada Lake (Figure 10), and Lake Chaplain (Figure 11) tracts were maintained and monitored by District staff during the 2002 nesting 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. In 2003, wood ducks used three of the nest boxes at Lost Lake, bufflehead shared use of one of those boxes, and hooded mergansers used one of the boxes. Wood ducks used two of the boxes on the Lake Chaplain Tract, bufflehead used one box, and hooded mergansers used one of the boxes on the Lake Chaplain Tract. Two of the boxes showed signs of predation and one of the nest box trees fell over during the nesting season. Several boxes (5 out of 10) at Lost Lake had squirrel nests of moss in them when checked in spring. These nests were not disturbed because the Western Gray Squirrel is listed as threatened by the state and as a species of concern by the federal government. (Additionally, no sightings of Eastern Gray Squirrels have been made on project lands to date.) No signs of successful nesting were observed at Spada Lake.

In 2002, seven of the 24 boxes were used successfully with 22 wood ducks, seven bufflehead and eight hooded mergansers hatched. Last year 40 to 41 wood ducks, two bufflehead and no hooded mergansers were hatched out. Overall, nest box success was about 29% in 2002, up from 21% in 2001. The Spada Lake boxes bring down the success rate possibly because other habitat conditions there are poorer, such as forage and hiding cover. In the future, nest boxes may be placed in areas farther up in the Williamson Creek drainage, where the habitat may be more suitable.





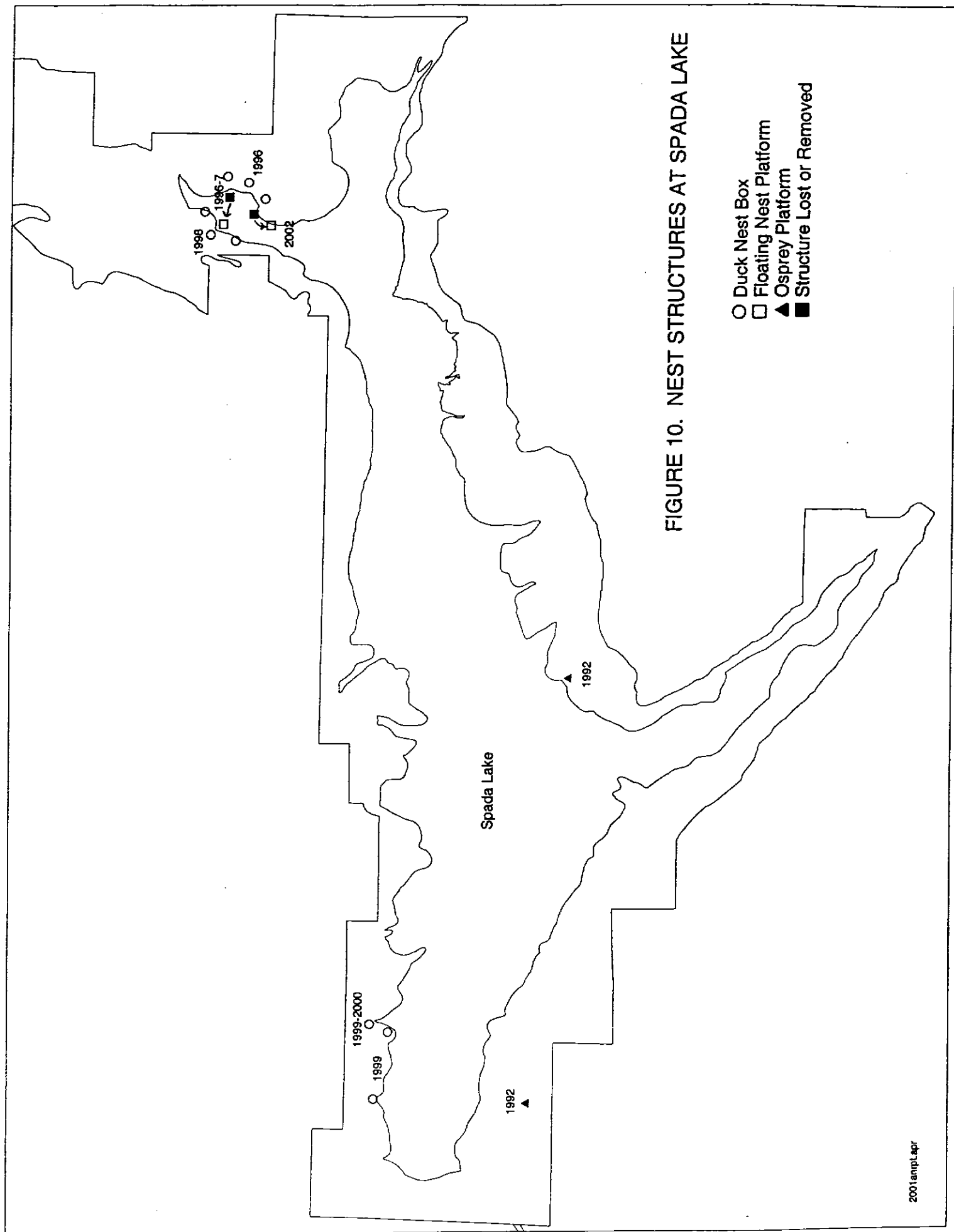
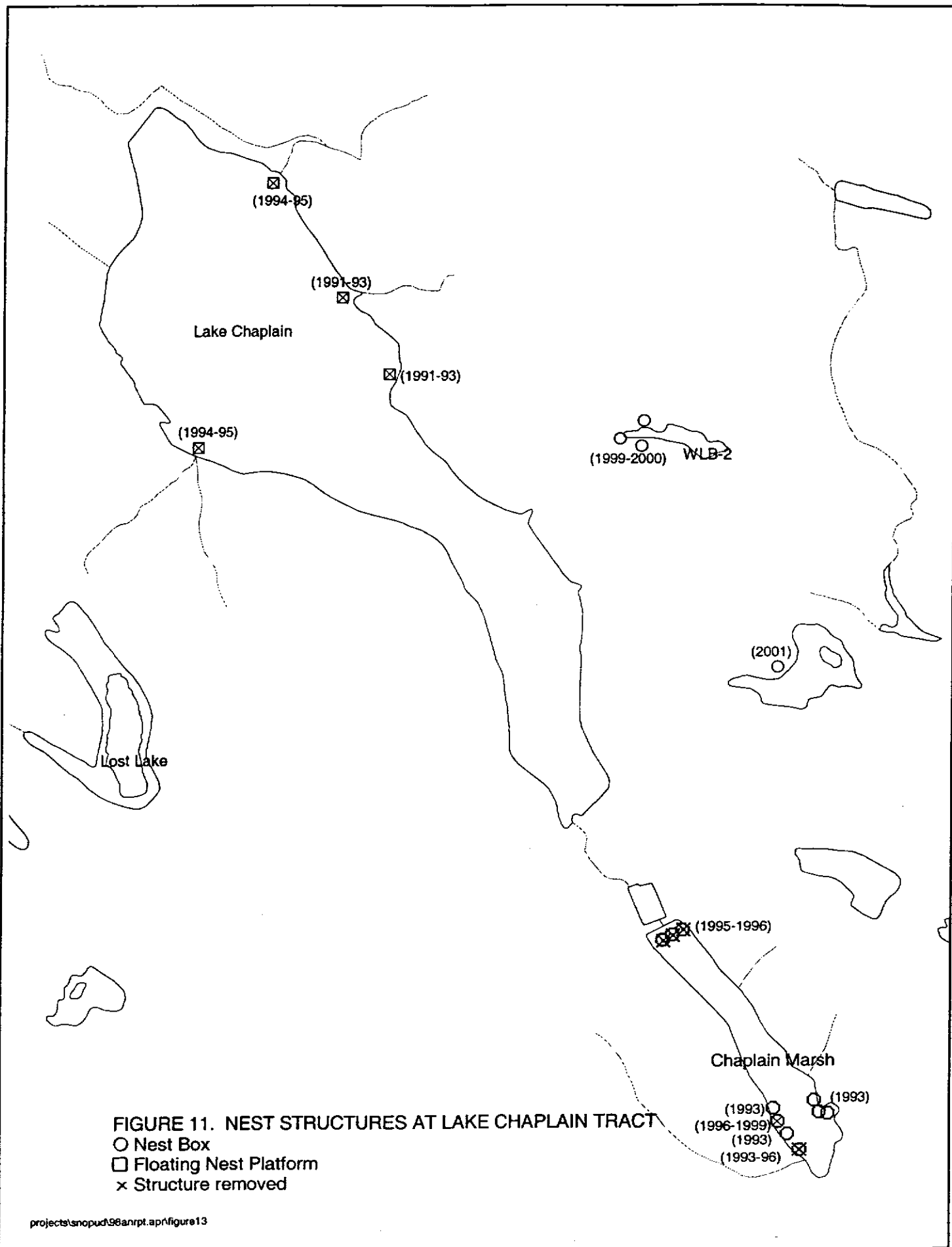


FIGURE 10. NEST STRUCTURES AT SPADA LAKE



<b>TABLE 4. USE OF NEST BOXES ON WHMP LANDS</b>					
<b>Site</b>	<b>Number of Boxes</b>	<b>Number of Boxes with Duck Eggs</b>	<b>Number of Successful Boxes</b>	<b>Number of Eggs Hatched by Species</b>	<b>Number of Boxes Used by Other Species</b>
Lost Lake Tract	10	5	4 (40%)	16 wood ducks 2 bufflehead 5 hooded mergansers	5 (Douglas squirrels & other Sciurids)
Lake Chaplain Tract	6	4	3 (50%)	6 wood ducks 5 bufflehead 3 hooded mergansers	0
Spada Lake Tract	8	0	0	0	2 abandoned yellow-jacket nests 2 squirrel nests
Totals	24	9	7 (29%)	22 wood ducks 7 bufflehead 8 hooded mergansers	9

### 3.6.3 Osprey Nest Platforms

District staff monitored the osprey nest platforms at Lost Lake (Fig. 9) when they were performing other duties there during spring and summer 2002. One adult osprey was observed on the nest on 22 April and two adult ospreys were observed sitting on the platform on 23 April. An adult osprey was observed setting on the nest on 30 April. Only the bird's head was visible. A few new green branches were noted on the nest platform. An osprey was observed on the nest during frequent visits throughout May, with the second osprey nearby on all but one visit. The nest was empty on the 31 May visit and all monitoring visits thereafter.

### 3.6.4 Bald Eagle Nesting

The bald eagle nest established in 1997 on the Lake Chaplain Tract was occupied by nesting bald eagles in 2002; however, it appears that nesting was not successful. Two Adult bald eagles were observed in mid-April sitting on branches of the nest tree. They were observed on 23 April in the nest tree, with one setting in the nest. On 30 April one of the biologists noted that a lot of long grasses and fresh fir branches had been added to the nest, but no bald eagles were noted. The nest was empty and no eagles were seen on 16 May. On 24 May the nest was empty; however, two adult bald eagles were perched in a snag close to the top of the ridge about 200 feet southeast of the nest tree.

### **3.7 OTHER WILDLIFE OBSERVATIONS**

Some incidental observations of wildlife species on WHMP lands are listed in this section. These observations are not the result of systematic surveys for wildlife, but are included in the report to document the presence of these species on management lands.

- Swainson's thrush nest on Williamson Creek Tract
- coyote on north shore of Spada Lake
- 3 loons in molt at Spada Lake
- 3 bufflehead at Spada Lake
- bobcat on 5000 Road west of Spada Lake
- frequent sightings of hairy woodpecker at Lake Chaplain and Lost Lake Tracts
- great gray owl heard at Lake Chaplain
- several sightings of female black bear with yearling in Lost Lake area, and bears near the north end of Lake Chaplain and east end of Spada Lake
- bobcat, skunk, Douglas squirrel at Lake Chaplain Tract
- several deer at Lake Chaplain, especially in recent clearcuts, also at Lost Lake and Spada Lake Tracts, some in velvet, some with fawns
- barred owl heard at Lost Lake, 2nd answered from across Lake Chaplain
- pied-billed grebe, loon, mallards, bufflehead, hooded merganser, blue winged teal, ruffed grouse, kingfisher, pileated woodpecker, hairy woodpecker, rufous hummingbird, purple finch, osprey at Lost Lake
- frequent sighting of ruffed grouse near Lost Lake
- 7 wood ducks (4 males, 3 females) in perch tree near duck box LL04 at Lost Lake

### **3.8 BIOSOLIDS APPLICATION**

The City of Everett monitored water quality in Chaplain Creek in relation to biosolids applications on units Hors1-93, Hors2-93 and Divr1-95 in 1996 and 2000. The units and the application procedures were described in the 1996 Annual Report and the 2000 Annual Report, and monitoring procedures were described in the 1996 Annual Report. Water quality data has been collected from August 1996 through December 2002 (Figures 12, 13 and 14). Relative to ambient levels (measured upstream from the application sites), downstream measurements of fecal coliforms (Figure 12), ammonia (Figure 13) and nitrates (Figure 14) showed no appreciable effects of the biosolids applications.

There was no monitoring of vegetation response on biosolids application units and control units in 2002.

### **3.9 DEER FORAGE MONITORING**

Deer forage availability was sampled in late June-July 2002 on Chap1-91, Line1-00, which were harvested in 1991 and 2000, respectively, and Phon3, prior to harvest (Fig.2). The frequency of trees less than 6 ft tall on Chap1-91 peaked in 1997, after

which most of these trees entered the next size category (Figure 15 ). The frequency of trees greater than 6 ft tall and less than 40 ft was lower in the 2002 survey because the unit was precommercially thinned in 2001. Many of the understory species that are palatable to wildlife, including blackberry, thimbleberry, salmonberry, grass species, forbs and fireweed were in decline by 1999 following post-harvest dominance due to the increasing tree layer (Figure 16). In addition, ferns other than bracken fern, which peaked in 1999, declined during the same period. Probably due to the precommercial thinning, some understory species increased in 2002, including deer fern, sword fern, some forb species, thimbleberry and trailing blackberry. Precommercial thinning appears to have improved the incidence of palatable species on this unit relative to the 1999 survey. Oregon grape, salal and huckleberry remained relatively constant throughout the monitoring period. Unvegetated ground and small woody debris declined between harvest and 1999, but increased in frequency following precommercial thinning.

Line1-00 showed a decrease in ferns other than bracken fern, vine maple and certain Rubus species two years after harvest (Figure 17). Many new shrub and forb species increased or first appeared after the unit was harvested, including huckleberry, salal, trailing blackberry, wild rose, and forbs like twin flower and foam flower.

Phon3, the pre-harvest unit surveyed in 2002, showed the understory flora typical of second-growth stands on the Lake Chaplain Tract. Species diversity was low relative to post-harvest units, and the dominant species were mosses, salal, sword fern and huckleberry (Figure 18).

### **3.10 WILLIAMSON CREEK TRACT**

In 2002 District biologists collected baseline data (Table 5) for the Williamson Creek Tract on two old growth stands, 10-6 and 10-11 (Figure 19). Procedures for data collection are described in the Cumulative Summary, Williamson Creek Tract section of this report. Baseline inventory was completed in stand 10-11. Photodocumentation was conducted at Wetlands 1 and 2 and field observations were recorded. Snag creation was completed in stand 10-1 (see Section 3.4, Table 1, and Figure 19).

FIGURE 12. BIOSOLIDS APPLICATION MONITORING - FECAL COLIFORMS (CFU/100mL)

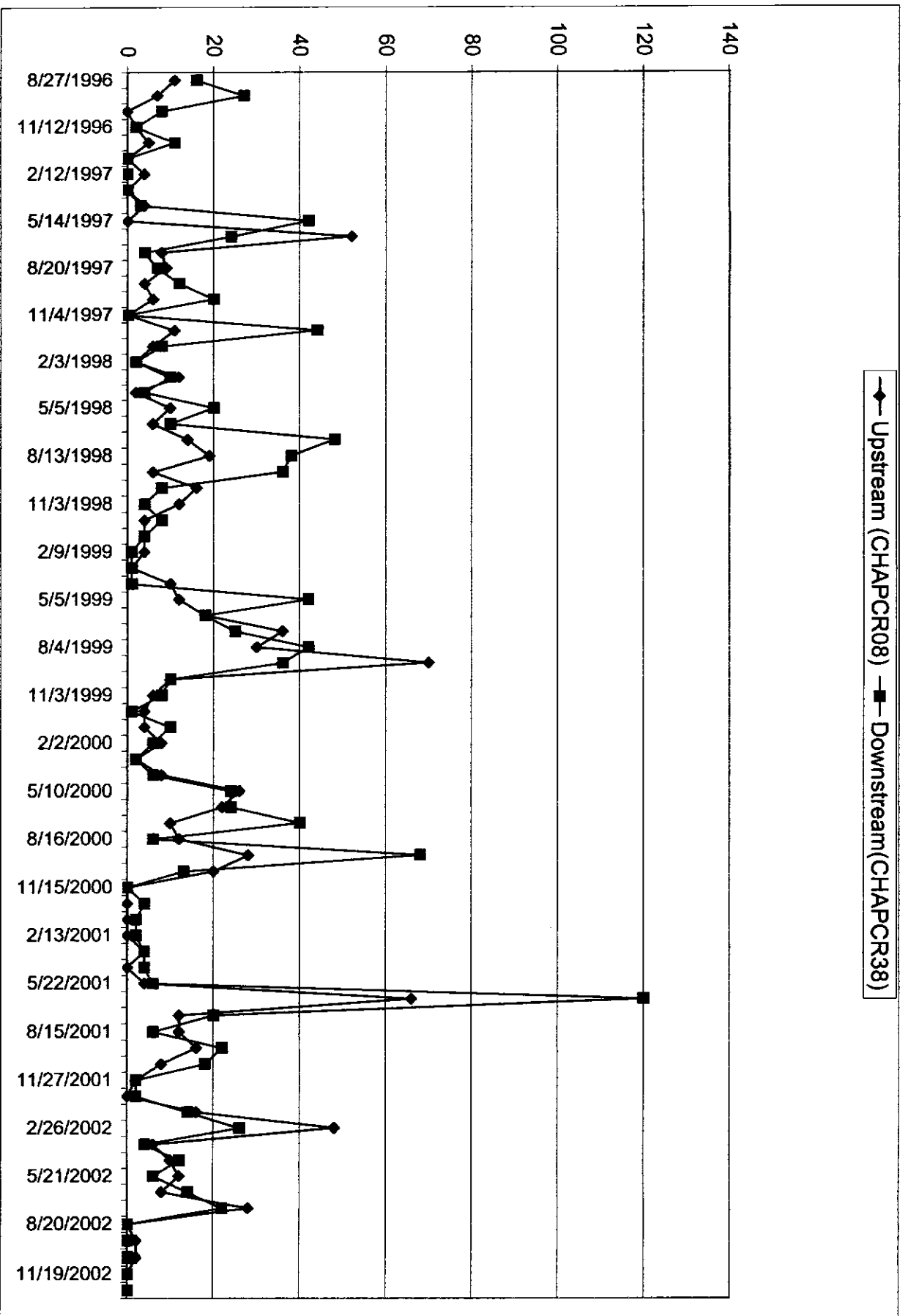
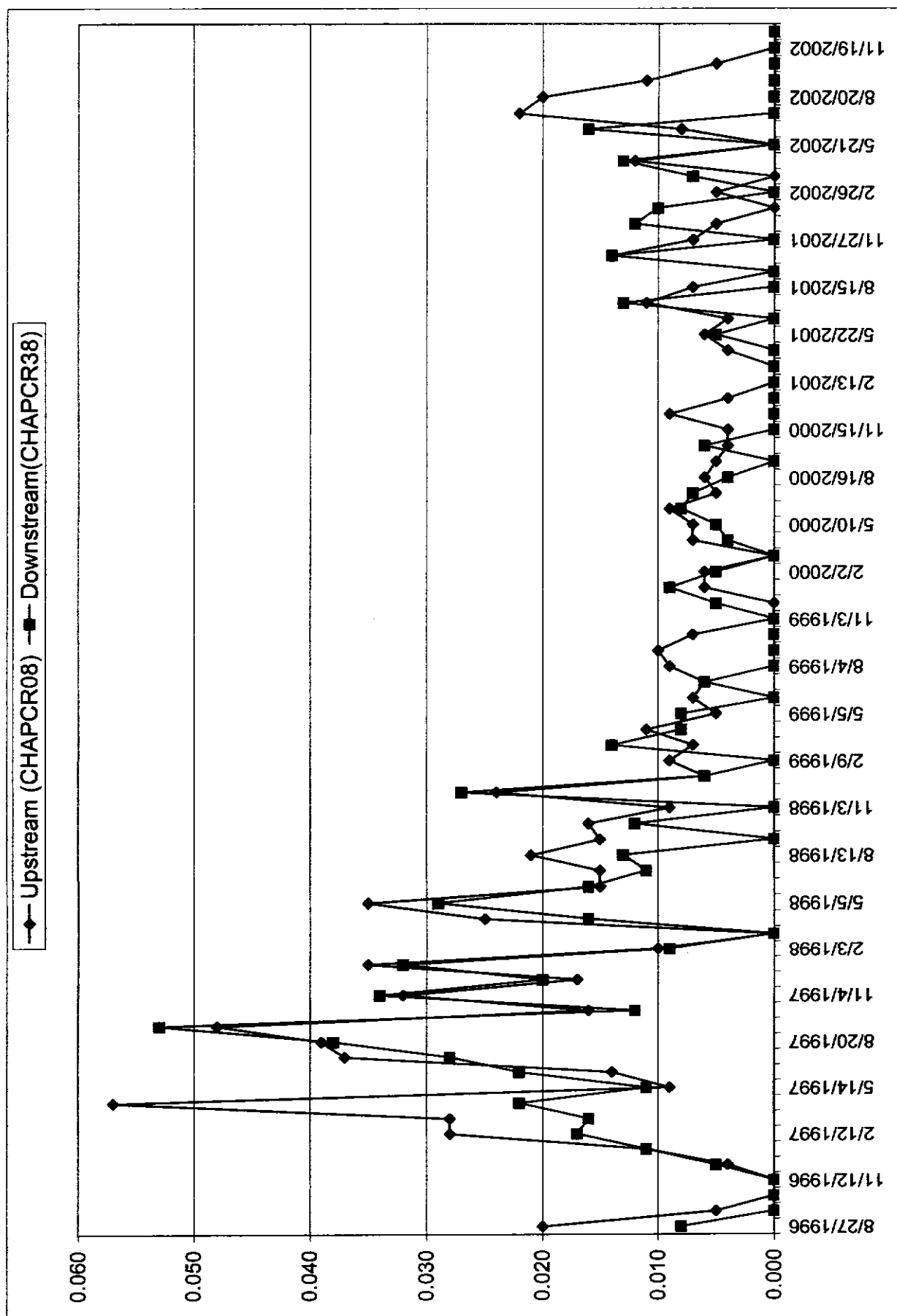


FIGURE 13. BIOSOLIDS APPLICATION MONITORING - AMMONIA (mg/L)



excel\biosolids\whmpcharts2002



FIGURE 14. BIOSOLIDS APPLICATION MONITORING - NITRATES (mg/L)

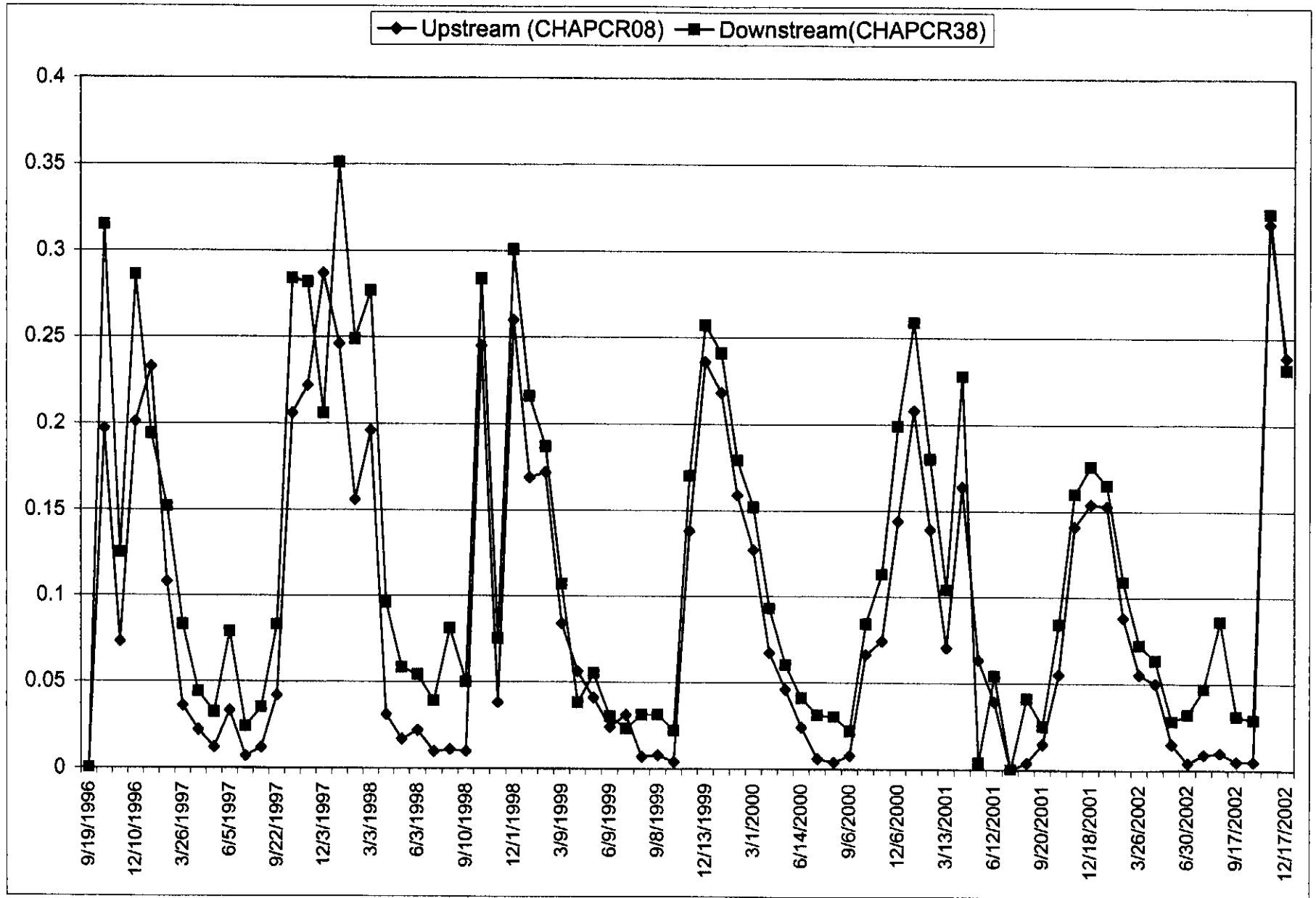
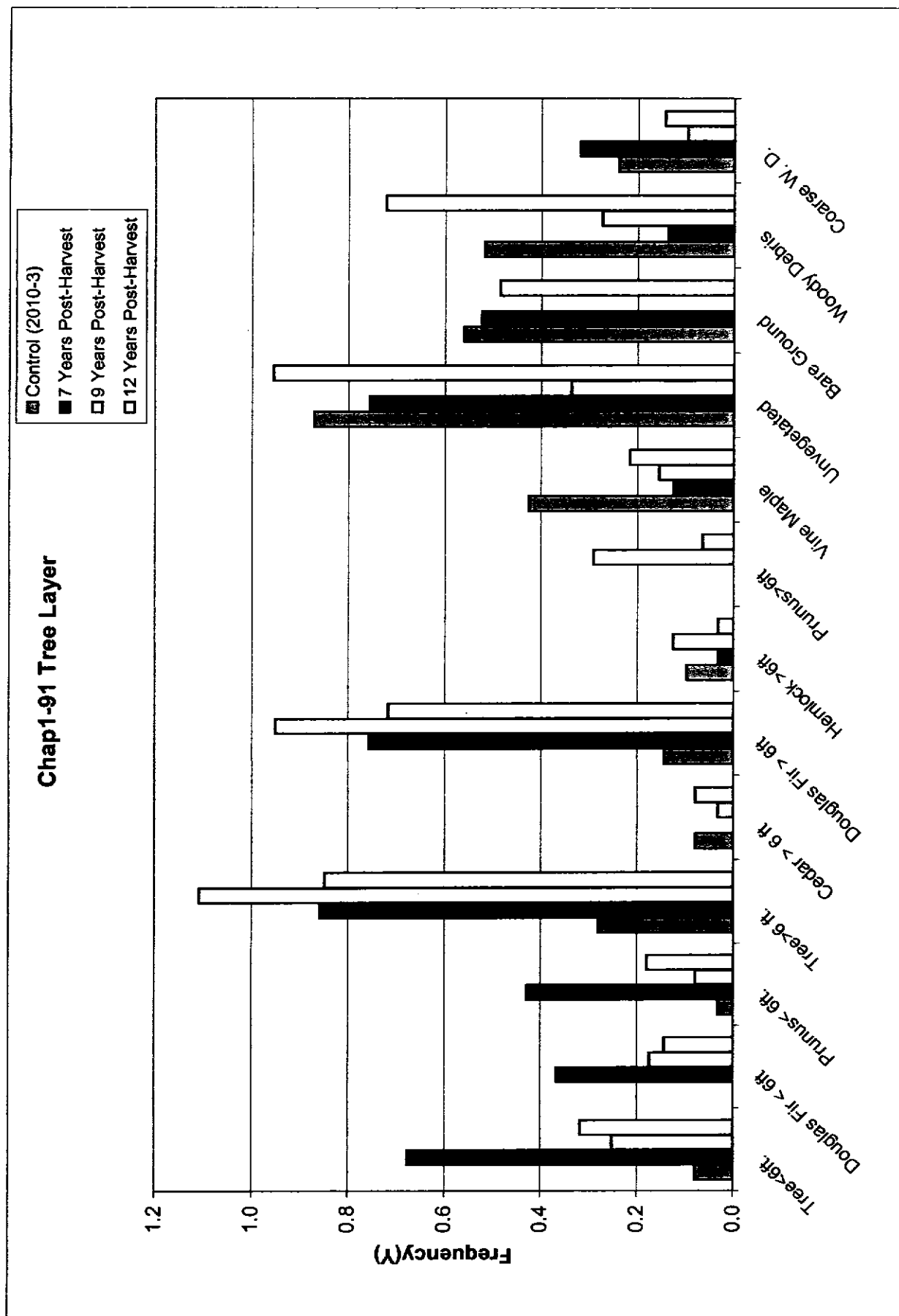
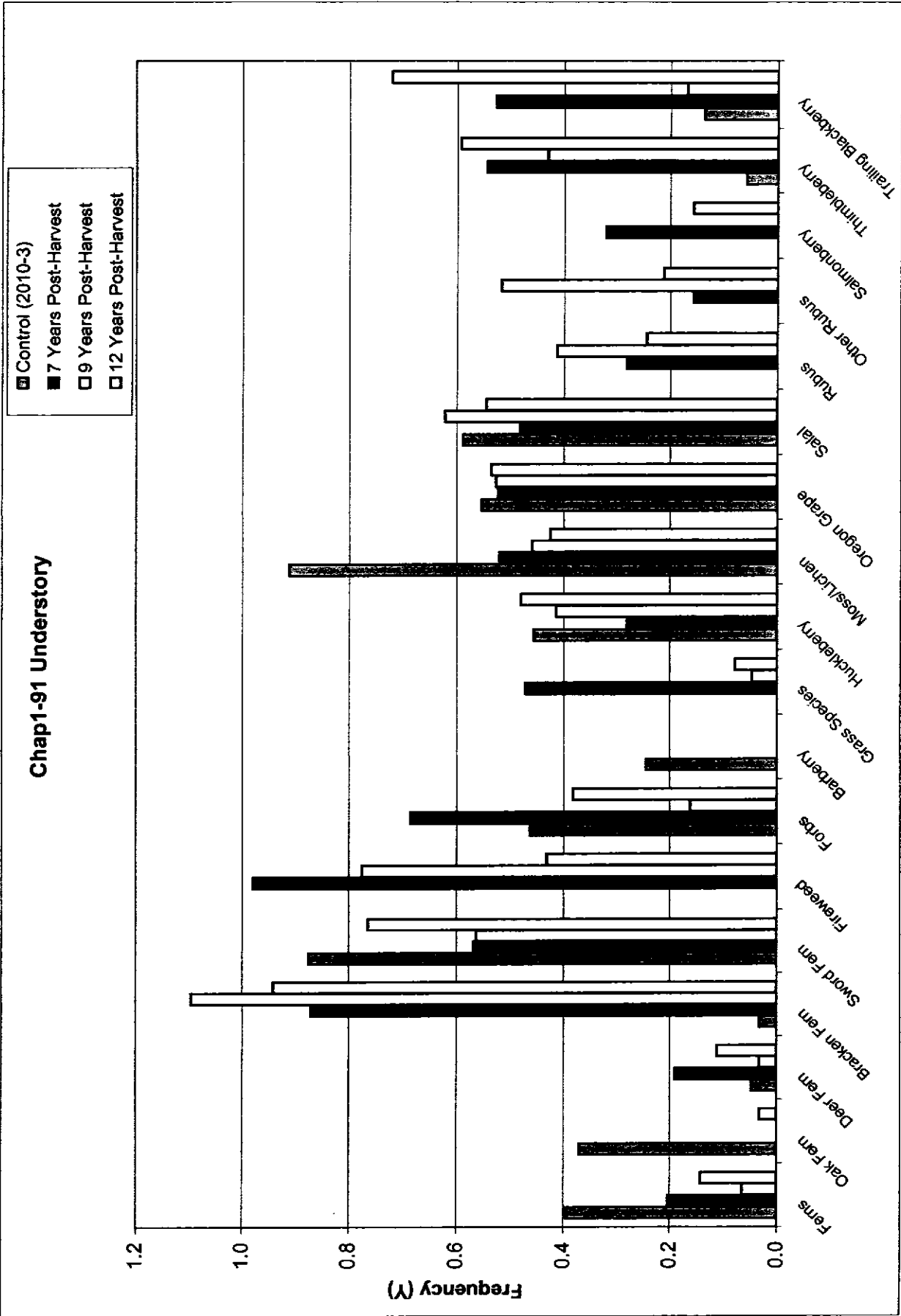


FIGURE 15. DEER FORAGE MONITORING -- CHAP1-91 TREE LAYER



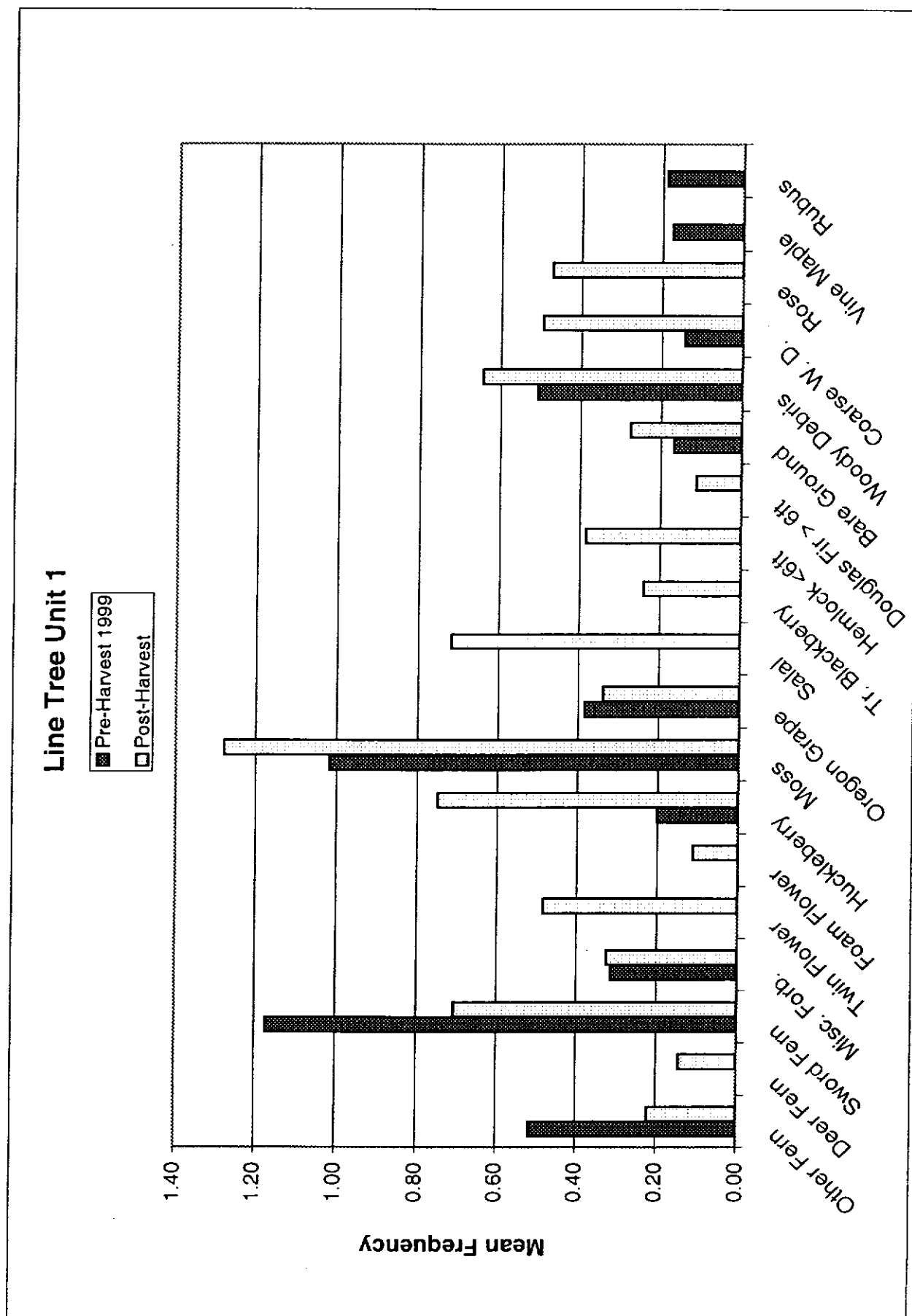
Chap1-91\Comparisons

FIGURE 16. DEER FORAGE MONITORING -- CHAP1-91 UNDERSTORY



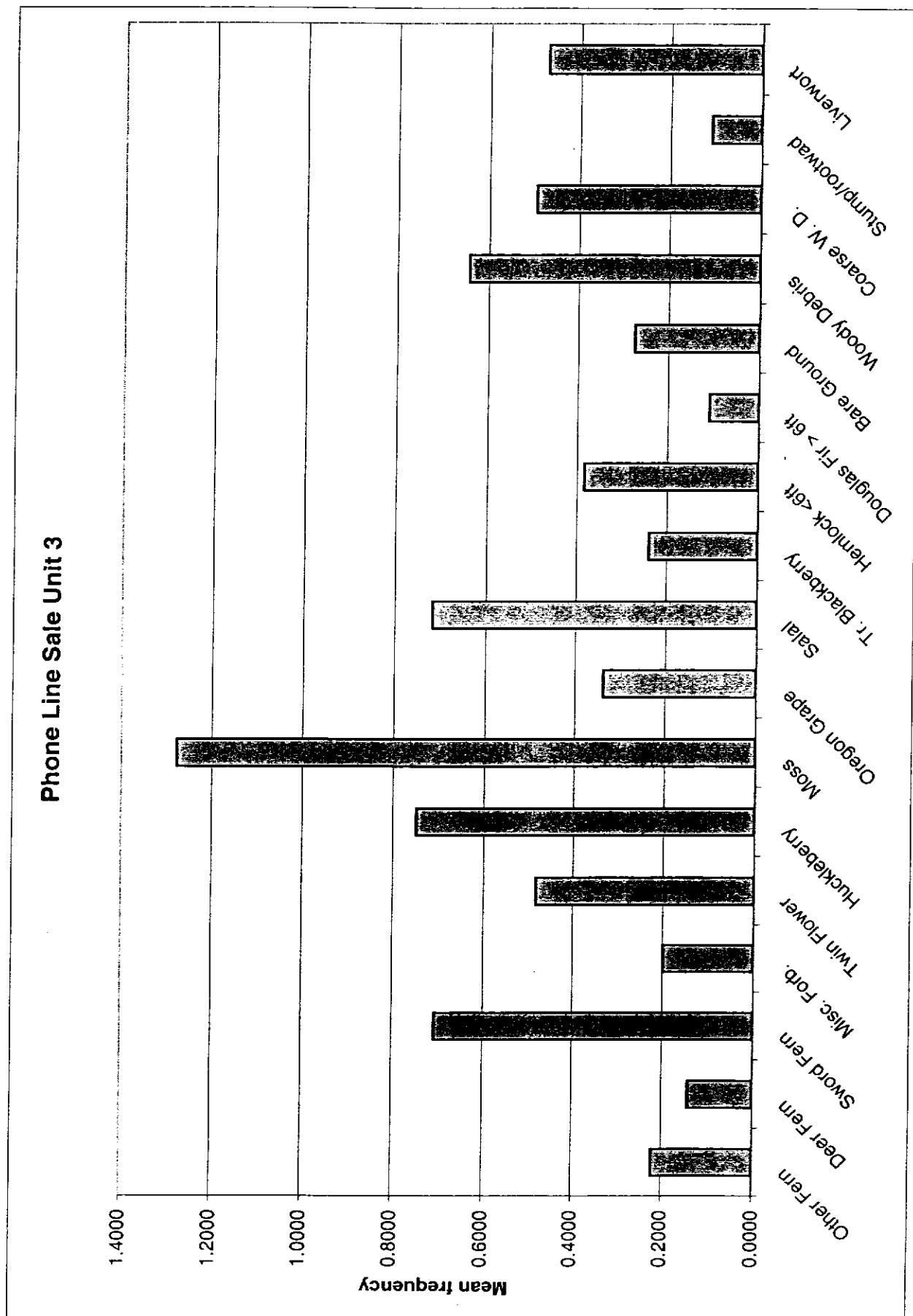
chChap1-91\comparisons

FIGURE 17. DEER FORAGE MONITORING -- LINE1-00



Line1-00\Comparisons

FIGURE 18. DEER FORAGE MONITORING -- PHON3



deer forage\phon3\2002Data

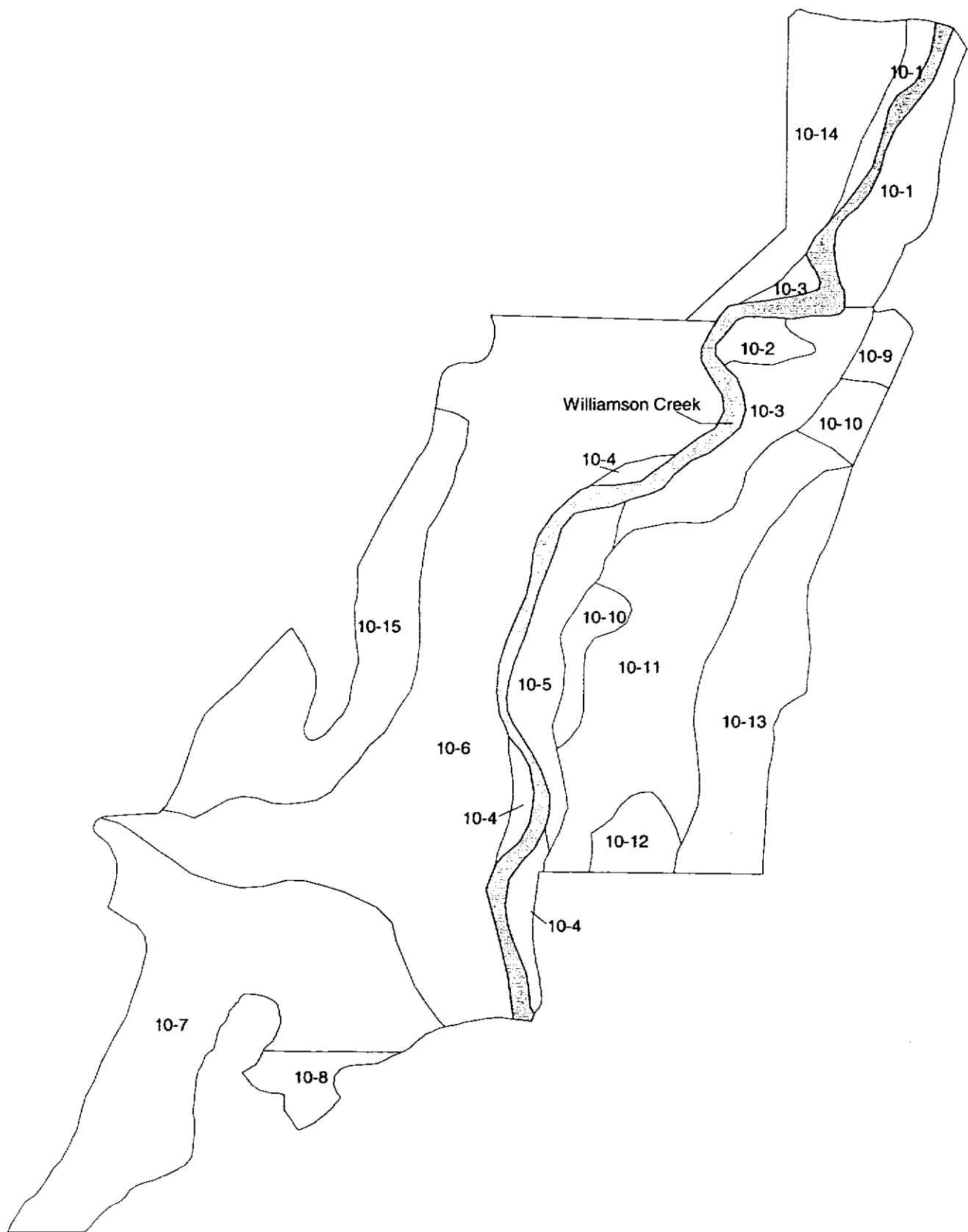


FIGURE 19. WILLIAMSON CREEK STANDS



1000 0 1000 Feet

A scale bar with three segments. The first segment is labeled "1000", the second segment is labeled "0", and the third segment is labeled "1000 Feet". The bar is black with white segments.

**TABLE 5. WILLIAMSON CREEK STANDS INVENTORIED AND SNAGS CREATED IN 2002**

Stand #	Date	Snags	CWD	Understory Vegetation	Photo Doc.
10-1	various	55 created			
10-6	7/25/02	4 transect	4 transect	4 transect	4 transect
10-10	10/23/02				Wetlands 1 & 2
10-11	7/15/02	3 transects	3 transects	3 transects	3 transects

Results from the 2002 snag surveys on old growth stands 10-6 and 10-11 varied (Table 5). Stand 10-6, transects 5 and 6 averaged 20 snags /acre and transects 7 and 8 averaged 7 snags/acre. Transects 3, 4 and 5 on stand 10-11 averaged 5.3 snags/acre. These results were added to the cumulative totals from previous years' data on stands 10-11 and 10-6 and are shown in Section 4.11, Table 12 of this document.

**TABLE 6. WILLIAMSON CREEK 2002 SNAG INVENTORY RESULTS**

Stand #	Transect #	Cover Type	Decay Class	Snags/ac	Avg. Diameter (in.) <sup>1</sup>	Avg. Height (ft.) <sup>2</sup>
10-6	5 & 6	Old Growth	1 & 2	07.0	32.9	56.4
			3, 4 & 5	13.0	29.3	29.2
			All decay classes	20.0	30.6	38.7
10-6	7 & 8	Old Growth	1 & 2	03.0	26.7	50.0
			3, 4 & 5	04.0	35.5	22.5
			All decay classes	07.0	31.7	34.3
10-11	3, 4 & 5	Old Growth	1 & 2	02.0	37.0	63.3
			3, 4 & 5	03.3	22.6	29.0
			All decay classes	05.3	28.0	41.9

Snag creation was completed in Stand 10-1 with the creation of 55 snags in 2002. In 2001, 13 snags were created in Stand 10-1. The 68 snags in the unit have an average DBH of 16.4 inches and average height of 57.1 ft. See section 3.4.1 for additional information.

Results of the CWD inventories on stand 10-6, transects 5 through 8 varied from an average of 28 CDW /acre to 46 CWD/acre (Table 6). Transects 3, 4 and 5 on stand 10-11 averaged 26, 38 and 26 CWD/acre, respectively. These results were added to the

<sup>1</sup> Minimum snag diameter recorded in these surveys is 11 inches DBH

<sup>2</sup> Minimum snag height recorded in these surveys is 10 feet.

TABLE 7. WILLIAMSON CREEK 2002 CWD INVENTORY RESULTS						
Stand #	Transect #	Cover Type	Decay Class	CWD/ac.	Avg. Diameter (in.)	Avg. Length (ft.)
10-6	5	Old Growth	1 & 2	10.0	16.2	70.0
			3, 4 & 5	26.0	25.1	42.3
			All decay classes	36.0	22.6	50.0
10-6	6	Old Growth	1 & 2	06.0	28.7	81.7
			3, 4 & 5	24.0	22.7	49.3
			All decay classes	30.0	23.9	55.8
10-6	7	Old Growth	1 & 2	14.0	27.3	65.7
			3, 4 & 5	14.0	27.4	24.3
			All decay classes	28.0	27.4	45.0
10-6	8	Old Growth	1 & 2	16.0	23.0	61.9
			3, 4 & 5	30.0	22.6	24.5
			All decay classes	46.0	22.7	37.5
10-11	3	Old Growth	1 & 2	02.0	45.0	70.0
			3, 4 & 5	24.0	31.9	35.3
			All decay classes	26.0	32.9	38.0
10-11	4	Old Growth	1 & 2	12.0	18.3	44.2
			3, 4 & 5	26.0	24.0	37.7
			All decay classes	38.0	22.2	39.7
10-11	5	Old Growth	1 & 2	04.0	28.0	67.5
			3, 4 & 5	22.0	28.8	28.6
			All decay classes	26.0	28.7	34.6

cumulative totals from previous years' data on stands 10-11 and 10-6 and are shown in Section 4.11, Table 13 of this document. Pacific silver fir and hemlock dominate the overstory with huckleberry, hemlock under 6 feet tall, moss and deer fern seen most often in the understory plots (Figure 20).

Wetlands 1 and 2 were visited in early October 2002. The dominant vegetation in Wetland 1 was willow with scattered small-fruited bulrush. The one-acre opening in Wetland 1 has been filled in with salmonberry. Beavers have chewed up the willows extensively, but the few small dams on the drainage are in disrepair. Skunk cabbage is the dominant ground cover in Wetland 2. The size of wetlands 1 and 2 appear unchanged since the 1998 monitoring visit.



FIGURE 20. WILLIAMSON CREEK TRACT OLD GROWTH STANDS 10-6 AND 10-11



### **3.11 LAND MANAGEMENT AT LAKE CHAPLAIN**

A Road Maintenance and Abandonment Plan (RMAP), required under the Washington State Forest Practices Act, was completed and approved by DNR on the Lake Chaplain Tract road network. The RMAP must include a complete inventory of all forestland owners' road systems and a detailed plan to bring all of the forest roads used for forest practices after 1974 up to current standards within 15 years. All roads and railroad grades on forest land that have not been used since 1974 must also be inventoried for potential damage to a public resource, but no plan for improvements on these orphaned roads and railroad grades is required.

### **3.12 LAND MANAGEMENT ON DISTRICT PROPERTY**

In 2002 the District began implementation of its Road Maintenance and Abandonment Plan (RMAP) which includes the roads on the Spada Lake, Williamson Creek, Lost and Project Facility Lands Tracts. Necessary work and permits were completed to officially abandon three spur roads in the Sultan Basin (SL-22, SL61, and SL-67) under Forest Practice abandonment standard, WAC 222-24-052(3). Abandonment of SL48 as described in the RMAP is on hold until pending harvest plans have been finalized. Work on OR17 was conducted as described in the RMAP, page 11. Water bars were dug by hand at the culvert site and at the site of stream piracy. In addition, other sites on OR17 were cleared of debris and three additional water bars were created. The required annual report and plan for next year were prepared and submitted to DNR.

The District prepared and submitted comments to DNR on their working draft of the Sultan Basin Natural Resource Conservation Area Plan.

### **3.13 SECURITY MEASURES AT LAKE CHAPLAIN/JACKSON PROJECT FACILITIES**

Heightened security measures at the City's water treatment facilities and the Jackson Project facilities have been implemented since the events of September 11, 2001. The electric gate south of the filter plant at Lake Chaplain is kept closed at all times, and the south gate is closed on weekends. The gates at Olney Pass are closed during the winter, restricting public vehicle access to the Spada Lake Tract. The gate at Olney Pass leading to Recreation Sites 2, 3, 4 and 5 and the DNR trailheads was opened on June 1, 2002, to allow access to the east end of the reservoir during spring, summer and fall. Restrictions on access to the Culmbach Dam area continue at this time. Several additional gates on the road to Culmbach Dam are planned for construction in 2003. Members of the public that can demonstrate a legitimate right and need to have access to lands on the west-end of the reservoir may obtain limited controlled access by inquiring at the powerhouse.

## 4.0 CUMULATIVE SUMMARY

A summary of all activities completed under the WHMP, from the earliest implementation in 1988 through the end of December 2002, 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)

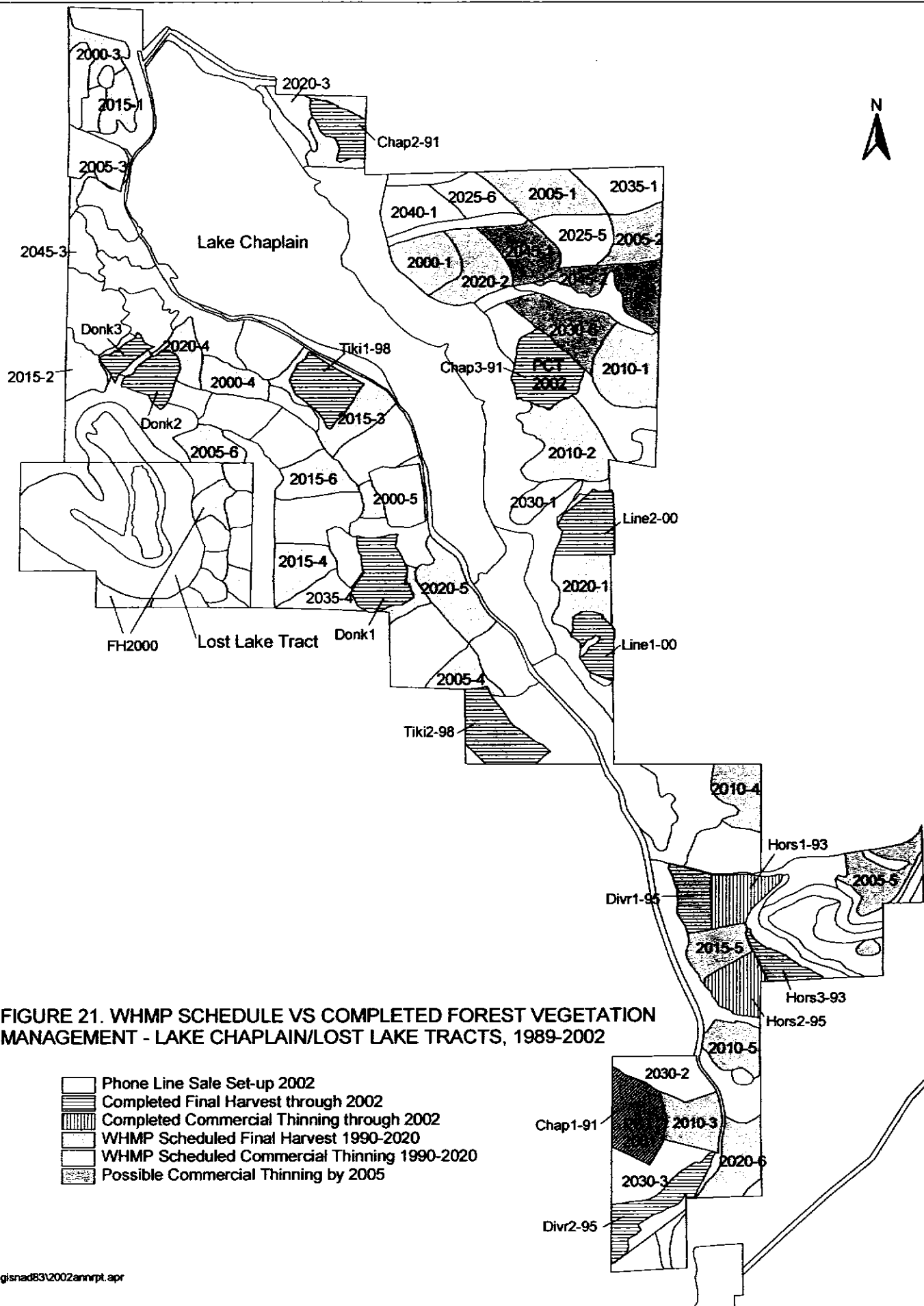
#### 4.1.1 Road System Layout and Construction

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. Construction on additional portions of the road system on the west side of the tract continued in 2001 and 2002 (Figure 2). The RMAP for the Lake Chaplain Tract was completed in 2002, and implementation is underway.

#### 4.1.2 Timber Harvest

Harvest activity to date is depicted in Figure 21. All of the unit boundaries have been reconfigured somewhat from the diagram in the WHMP 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.

<b>TABLE 8. MODIFICATIONS OF THE FINAL HARVEST (FH) SCHEDULE ON LAKE CHAPLAIN TRACT</b>		
<b>New Unit Name (see Fig. 21)</b>	<b>Scheduled FH</b>	<b>Reasons for Modification</b>
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
Phon1	2000-3 (part) and 2035-2 (part)	Portions of units originally scheduled for FH in 2000 and 2035 reconfigured into Phon1
Phon2	2005-3 (part) and 2035-2 (part)	Portions of units originally scheduled for FH in 2005 and 2035 reconfigured into Phon2 (see Section 3.1.3 of this annual report for details.



Commercial thinning scheduled in the WHMP (Figure 21) from 1990 to 2005 was modified 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 was determined that several units would 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).

<b>TABLE 9. MODIFICATIONS OF THE COMMERCIAL THINNING (CT) SCHEDULE ON LAKE CHAPLAIN TRACT</b>		
<b>Unit</b>	<b>Scheduled CT</b>	<b>Reasons for Modification</b>
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

Additional opportunities for commercial thinning in the northeast and northwest corners of the Lake Chaplain Tract are under evaluation, following the hemlock looper outbreak observed in 2001. Possibly some harvest units will be rescheduled, or the type of harvest may change. The mix of final harvest units and commercial thinning units in these corners has not yet been determined, but the required "green-up" period between adjacent harvest units will be observed.

#### 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. In 2001 some hardwood removal was done in Divr2-95, and Chap1-91 was precommercially thinned. Chap3-91 was precommercially thinned in 2002.

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

Stand 7-4 was precommercially thinned in 1991 and monitored annually through 2000.(Figure 5). 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 of the 2000 Annual Report. A detailed timber cruise of the older stands (7-1, 7-1, 7-3) was performed in 2001, and several management options were prepared. The decision was made in 2002 not to harvest these stands, as described in Section 3.3 of this report.

## **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 and two stands totaling about 38 acres in the northeast corner of the property were precommercially thinned in 2002 (Figure 4).

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 5). 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 only 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 (see Section 3.1.5 of the 2000 Annual Report). Eight stands were set up for future harvest, and Forest Practices applications were approved by the DNR in 2002.

#### 4.4 SNAG MANAGEMENT

Snag management activity from the beginning of implementation in 1989 through 2002 is shown in Figures 22 and 23 and summarized in Tables 10 and 11. 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 (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 Lake Chaplain and Lost Lake units that have been harvested or thinned, and all units scheduled for harvest by 2020, except one scheduled for commercial thinning within 20 years.

All units on the Lake Chaplain and Lost Lake Tracts where snag management has occurred since 1989 are shown on Figure 22 with data for these units shown on Table 9a. In sum, 60 units totaling 1,237 acres have been inventoried, with 2,034 snags being created on those units. Fifty-four of those units (1,148 acres) now meet WHMP requirements.

Additionally, on the Spada Lake and Williamson Creek Tracts, 19 units totaling 594 acres have been inventoried, with 310 snags created on these units (Figure 23 & Table 9b). Of these, 9 units (103 acres) now meet the WHMP requirements for snags.

On these four tracts, a total of 1,251 acres over 63 units now meet the WHMP requirements, with 2,182 snags having been created since the program began in 1989. An additional 16 units totaling 580 acres have had some snag management, but as yet, do not meet the WHMP requirements. The entire Lost Lake Tract now meets the WHMP requirements for snags, except for Stand 7-4, which was harvested in the 1970's and does not have trees large enough for snag creation.

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, 1999 and 2001. Snag management procedures specific to the Williamson Creek Tract were developed in 1999.

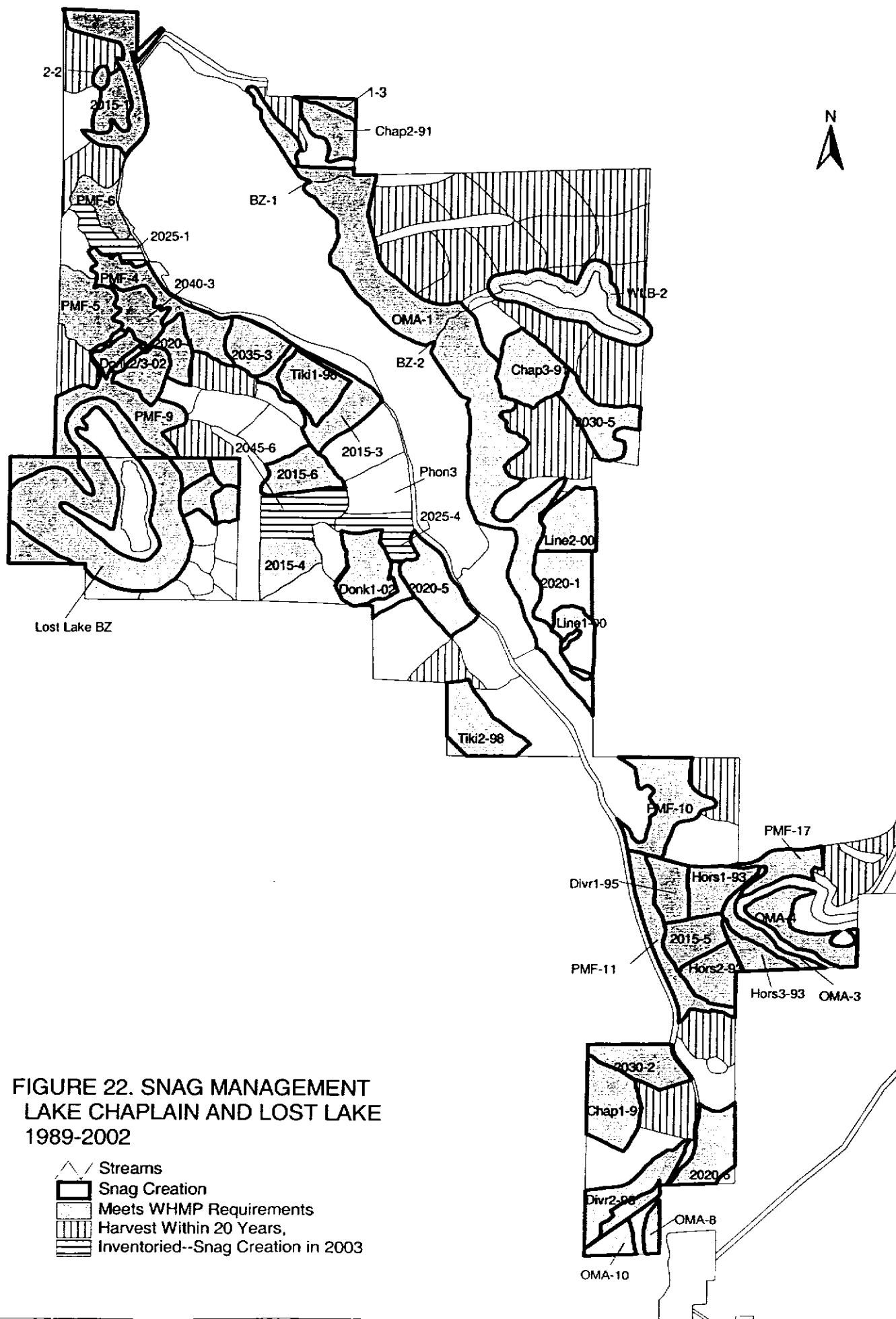
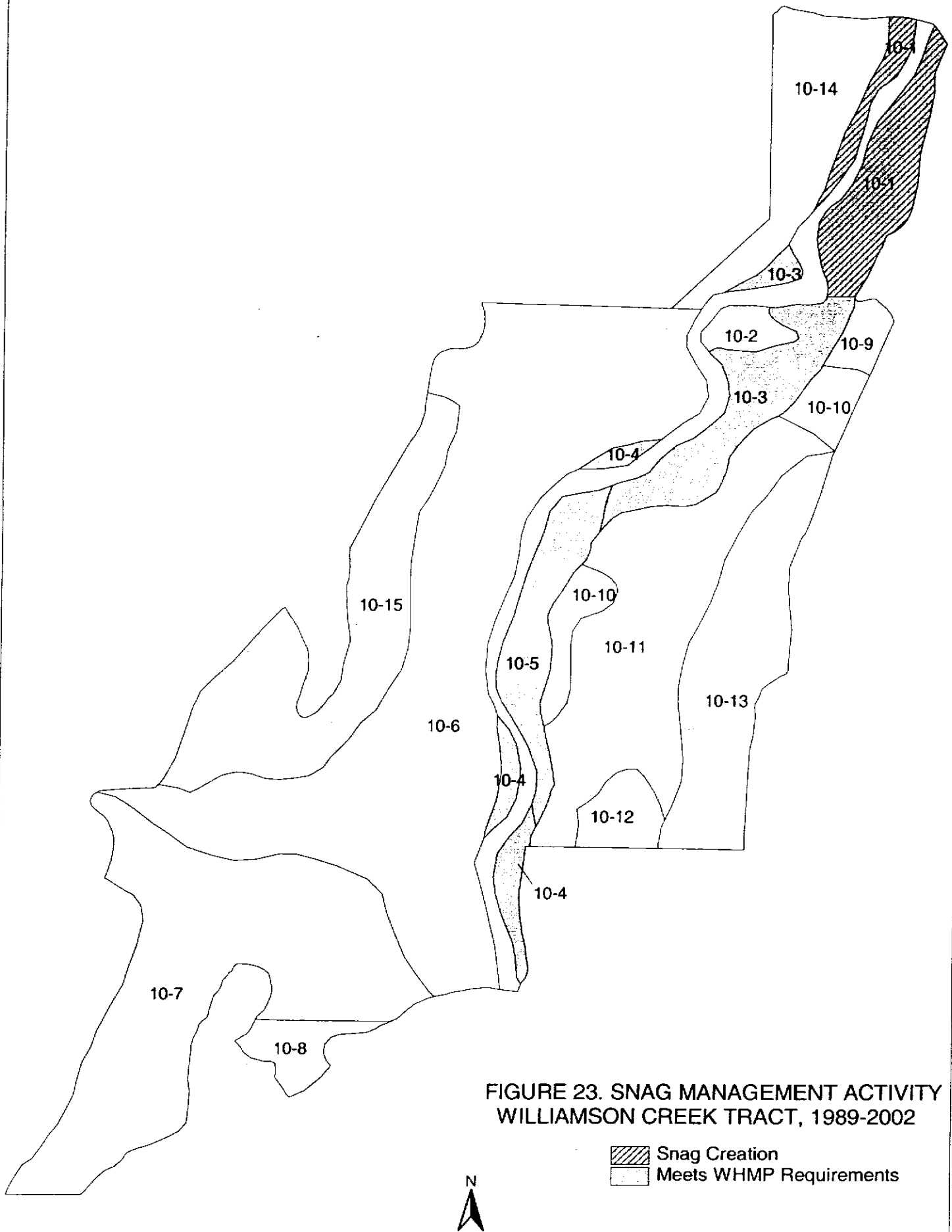


FIGURE 22. SNAG MANAGEMENT  
LAKE CHAPLAIN AND LOST LAKE  
1989-2002





**TABLE 10. SUMMARY OF SNAG MANAGEMENT THROUGH 2002 - LAKE CHAPLAIN & LOST LAKE TRACTS**

UNIT	ACRES	NUMBER CREATED	AVG. DBH (in.)	AVG. HT. (ft.)	# PER ACRE	NOTES
2045-6	28.0	0				Inventoried 2002; creation 2003
2025-4	28.0	0				Inventoried 2002; creation 2003
2025-1	14.0	0				Inventoried 2002; creation 2003
Phone Line 3	19.0	0	x	x	x	Snags marked 2002; creation 2003
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
Lost Lake 7-1	93.7	234	18.1	62.2	3.3	✓ Includes natural and created snags
Lost Lake 7-2	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
OMA 1a	74.8	14	17.9	68.3	4.3	✓ Includes natural and created snags
OMA 1b	50.5	62	18.4	65.2	3.2	✓ Includes natural and created snags
OMA 1c	30.7	68	18.1	64.4	4.0	✓ 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

UNIT	ACRES	NUMBER CREATED	AVG. DBH (in.)	AVG. HT. (ft.)	# PER ACRE	NOTES
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 created snags only
PMF 6	13.3	0	23.9	64.3	6.0	✓ Includes created snags only
PMF 7a <sup>11</sup>	15.5	20	17.8	58.5	2.5	✓ 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 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 15	6.8	0	14.4	35.0	10.6	✓ Includes natural and created snags
PMF 17	14.7	35	17.0	58.1	4.4	✓ Includes natural and created snags
Stand 1-3 <sup>12</sup>	4.4	0	n/a	n/a	3.1+	✓ Natural snags only
Buffer Zone 1	2.3	15	16.4	63.8	9.8	✓ Includes natural and created snags
Buffer Zone 2	1.4	7	15.9	46.6	5.0	✓ Includes natural and created snags
Buffer Zone 3	8.7	23	16.6	46.6	4.5	✓ 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
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
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
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
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
LINE 1-00	14.8	42	18.0	65.4	3.0	✓ Includes natural and created snags

UNIT	ACRES	NUMBER CREATED	AVG. DBH (in.)	AVG. HT. (ft.)	# PER ACRE	NOTES
LINE 2-00	22.0	62	17.4	66.4	3.1	✓ Includes natural and created snags
DONK 1-01	23.5	67	17.1	65.3	3.1	✓ Includes natural and created snags
DONK 2-01	21.4	58	18.0	67.6	3.0	✓ Includes natural and created snags
<b>TOTALS</b>	<b>1237</b>	<b>2034</b>	Totals for all 60 units having snag management activity to date.			
	1148	2034	Totals for the 54 units that meet snag requirements of 3.07/acre			
<b>BOLD denotes those units where snag management activity occurred in 2002</b>						
✓ Meets WHMP requirements for size class distribution and number per acre.						
1 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.						
2 Remainder of stand, exclusive of already delineated units.						

**TABLE 11. SUMMARY OF SNAG MANAGEMENT THROUGH 2002 - WILLIAMSON CREEK & SPADA LAKE TRACTS**

UNIT	ACRES	NUMBER CREATED	AVG. DBH (in.)	AVG. HT. (ft.)	# PER ACRE	NOTES
Stand 9-8 <sup>1</sup>	106.0	133	15.4	60.9	1.3	Includes natural and created snags
Stand 9-114 <sup>2</sup>	53.0	0	n/a	n/a	n/a	Re-visit in 10 years
Stand 9-125 <sup>2</sup>	33.0	0	n/a	n/a	n/a	Re-visit in 10 years
Stand 9-173	20.5	0	34.9	58.8	5.8	✓ Natural snags only
Stand 9-180 <sup>3</sup>	7.4	14	21.4	65.0	4.2	✓ Includes natural and created snags
Stand 10-1 <sup>3,4</sup>	21.2	68	16.4	57.1	3.2	✓ Created snags only
Stand 9-24 <sup>2</sup>	12.1	19	15.7	62.0	2.1	Includes natural and created snags
Stand 9-35	4.5	13	15.9	54.9	3.9	✓ Includes natural and created snags
Stand 9-47	4.3	10	15.7	64.0	3.0	✓ Includes natural and created snags
Stand 9-126 <sup>2</sup>	23.7	0	16.3	44.5	0.4	Natural snags only
Stand 10-2 <sup>5</sup>	4.2	0	15.1	12.0	1.3	Natural snags only
Stand 10-3	18.7	28	19.3	32.9	3.0	✓ Includes natural and created snags
Stand 10-4	7.5	13	16.8	40.1	3.5	✓ Includes natural and created snags
Stand 10-5	15.1	12	22.7	37.0	3.5	✓ Includes natural and created snags
Stand 10-6 <sup>5,6</sup>	133.4	0	34.5	33.2	13.0	Natural snags only
Stand 10-7 <sup>5,6</sup>	68.8	0	28.5	40.2	14.0	Natural snags only
Stand 10-9 <sup>5</sup>	3.7	0	24.2	45.0	9.5	✓ Natural snags only
Stand 10-11 <sup>5</sup>	50.5	0	32.3	46.0	6.0	Natural snags only
Stand 10-12 <sup>5</sup>	6.3	0	30.7	38.3	6.0	Natural snags only
<b>TOTALS</b>	<b>103</b>	<b>158</b>	Totals for those 9 units which meet WHMP requirements.			
	<b>594</b>	<b>310</b>	Totals for all 19 units having snag management activity to date.			
<b>BOLD denotes those units where snag management activity occurred in 2002</b>						
✓ Meets WHMP requirements for size class distribution and number per acre.						
<sup>1</sup> Snag creation began in 2002 and will be completed in 2003.						
<sup>2</sup> Trees not of adequate size for snag creation, re-evaluate in 10 years.						
<sup>3</sup> Snag creation occurred in 2001 & 2002.						
<sup>4</sup> No natural snags found during inventory.						
<sup>5</sup> Old-growth stand; will not have pro-active snag management.						
<sup>6</sup> 5% sampling not yet completed						

## 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 annually through 2000. 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. Subsequent monitoring visits (1999 and 2002) document the condition of the planting sites.

### 4.6.2 Power Pipeline Right-of-Way

Seeding of the pipeline ROW has been conducted annually, and is currently only needed in a few scattered areas where growing conditions are very inhospitable. Most of the ROW now has a good layer of herbaceous material. ORV damage has been reduced to almost insignificant amounts, due largely to gates and stream-crossing barriers.

Large revegetation efforts have occurred on two separate occasions on the ROW. The initial plantings of shrubs (1997 & 1999) around stump and brush piles helped to determine those species best suited for the conditions present on the ROW. Additional plantings were conducted in 2002.

### 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. Douglas fir saplings have had excellent growth, with overall survival over 90 percent. Excess alders were removed in 1998 and 2001 to release planted conifers and delay conversion of grass/shrub habitat to hardwood thickets.

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 the desired species composition was retained.

#### 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 9 through 11 of this report summarize past nest structure locations. In 1990, two floating nest platforms were placed in Lost Lake (Figure 9). The required two duck nest boxes were installed at Lost Lake in 1990. One osprey platform was installed at Lost Lake in 1990 (Figure 9) and two at Spada Lake in 1992 (Figure 10).

#### 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 (Figure 11). In February 1996 the floating platforms at Lake Chaplain were moved to Spada Lake (Figure 10). One sank in late 1996 or early 1997 after a log became entangled in its anchor chain, 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. In 2002 the missing Spada Lake platform was found during low water levels, buried where it was anchored. It appeared that a log became entangled in the anchor chain and caused the platform to sink. It will be repaired and moved out of the direct thalweg of Williamson Creek.

The floating platforms have been used for resting and feeding by waterfowl and otters, with the only breeding attempt noted to date being the north platform at Lost Lake in 2001. Pied-billed grebe used the north platform at Lost Lake in 2001. The nest was composed of a small amount of down and had two broken creamy white eggs.

#### 4.7.2 Nest Boxes

In 2002 there was a total of 24 functional waterfowl nest boxes on mitigation lands. Figures 9 through 11 of this report 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. Waterfowl used over half of the boxes each year (61% in 1997) until 1998, when nest box success was 16%. Nest box success was only 10% in 1999. In 2000 overall nest box success was 32%. In 2001 overall nest box success was 21%. Success was 29% in 2002. Success in 2002 at Lost Lake, Lake Chaplain Tract and Spada Lake was 40%, 50% and 0% 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 a nest site on DNR land in 1999. No osprey use of the platform at Lost Lake was observed in 2000 or 2001. Osprey used the platform in 2002, but nesting attempts did not appear to be successful.

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 since 2000, as it is 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 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. 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 2001. 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 and again in 2001 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, and no monitoring was conducted in 2002.

#### 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:

<b>TABLE 12. SUMMARY OF DEER FORAGE MONITORING SCHEDULE</b>					
<b>Unit Name</b>	<b>Harvest Year</b>	<b>Pre-Harvest Monitoring</b>	<b>Post-Harvest Monitoring</b>		
Chap1-91	1991	1997 (2010-3)	1997	1999	2002
Hors3-93	1993		1998	2001	
Divr1-95	1995	1997 (2015-5)	1997	2001	
Tiki1-98	1998	1998	2000		
Tiki2-98	1998	1998	2000		
Line1-00	2000	1999	2002		
Donk2-02	2002	2002			
Phon3	2002				

#### 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 13. Note that old growth inventory includes snags, CWD, understory vegetation inventory and photo documentation. Wetland inventories will be done at least every five years. The table indicates that the initial wetland survey was completed in Stand 10-10. Baseline inventory will be complete once 8.5 old growth transects have been completed.

Field procedures beyond those described in the WHMP have been developed specifically 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' x 66' (0.5 acres). Understory vegetation on 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.

**TABLE 13. WILLIAMSON CREEK BASELINE INVENTORY  
SUMMARY THROUGH 2002**

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	60	Old growth	2000,2002
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	100	Old growth	2001,2002
10-12	100	Old growth	2001
10-13	100	Photodoc	1998
10-14	100	Photodoc	1998,1999
10-15	100	Photodoc	1999

Tables 14 and 15 summarize inventory data for natural snags and CWD collected to date. Additional snag have been created in stands 10-1, 10-3, 10-4 and 10-5 (Table 11). The number of snags on the old growth stands ranges from 1.3 to 14 per acre. The amount of CWD on old growth stands ranges from 12.9 to 52.4 per acre.

**TABLE 14. WILLIAMSON CREEK TRACT NATURAL SNAG CUMULATIVE INVENTORY SUMMARY THROUGH 2002**

Stand #	Cover Type	SNAGS/AC. (all decay classes)	Avg. Diameter (in.)	Avg. Height (ft.)
10-1	Riparian/Mixed	0.0	0.0	0.0
10-2	Old Growth	1.3	15.1	12.0
10-3	Riparian/Mixed	0.4	21.8	14.0
10-4	Riparian/Mixed	1.8	17.0	32.6
10-5	Riparian/Mixed	2.8	24.3	31.3
10-6 (<5%)	Old Growth	13.3	32.7	35.4
10-7 (<5%)	Old Growth	14.0	28.5	40.2
10-9	Old Growth	9.5	24.2	45.0
10-11	Old Growth	5.6	29.9	43.6
10-12	Old Growth	6.0	30.7	38.3

**TABLE 15. WILLIAMSON CREEK NATURAL CWD CUMULATIVE INVENTORY SUMMARY THROUGH 2002**

Stand #	Cover Type	CWD/ac. (all decay classes)	Avg. Diameter (in.)	Avg. Length (ft.)
10-1	Riparian/Mixed	3.0	24.3	25.7
10-2	Old Growth	12.9	19.8	63.6
10-3	Riparian/Mixed	4.0	18.8	24.7
10-4	Riparian/Mixed	1.5	27.3	50.8
10-5	Riparian/Mixed	2.1	19.7	56.5
10-6 (<5%)	Old Growth	36.5	23.3	42.2
10-7 (<5%)	Old Growth	30.0	29.0	53.3
10-9	Old Growth	52.4	24.0	43.9
10-11	Old Growth	37.6	25.7	41.8
10-12	Old Growth	36.0	24.9	54.7

The early successional forested stands (10-1, 10-3, 10-4, and 10-5) adjacent to Williamson Creek (Figure 7) were inventoried in 2000. 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. No snags were found within the transects in stand 10-1 and an average of 1.8 snags/acre were found within the transects in stand 10-4 (Table 14). Snag creation was initiated in stand 10-1 with 13 snags created in 2001 and was completed with an additional 55 snags created in 2002 (Table 11). This stand is primarily composed of

small (10-15") conifers and alders. As a result, snag creation potential is limited at this time. Snag creation in stand 10-4 was completed in winter 2001, with 13 snags created (Table 11).

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 in 2000. The average number of snags/acre was 0.4 and 2.8 on stands 10-3 and 10-5 respectively (Table 14). The average number of CWD/acre was 3.9 and 2.1 on stands 10-3 and 10-5 respectively (Table 13). Snag creation was completed for both stands during the fall/winter of 2001. Twenty-eight snags were created in stand 10-3 and 12 snags were created in stand 10-5 (Table 11). Stand 10-3 had several irregularly distributed pockets of natural snags which were found, and thereby reduced the number of created snags required.

#### **4.12 LAND MANAGEMENT**

The co-licensees have worked with landowners in the Sultan Basin since the WHMP was initiated in an effort to coordinate land use activities so that they are consistent with, or at least do not interfere with management of the WHMP. Activities on adjacent property have included recreational pursuits, timber harvest, surveying, and road maintenance and abandonment.

The DNR is in the process of preparing a Natural Resource Conservation Area (NRCA) plan for the Upper Sultan Basin and the co-licensees have been following that process and providing input since 1999. The co-licensees have provided comments to DNR during the planning process and on working drafts of the plan.

In compliance with Washington Forest Practice Rules (WAC 222-24-050 through 052), the District prepared and submitted in 2001, a Road Maintenance and Abandonment Plan (RMAP) Inventory Scheduling Proposal and an RMAP covering all of the District owned wildlife mitigation lands. Implementation of the RMAP began in 2002. Spur roads SL-22, SL-61 and SL67 were officially abandoned in the Sultan Basin under WAC 222-24-052(3). The City completed its RMAP for the Lake Chaplain Tract in 2002 and obtained DNR approval.

The District and the DNR negotiated a Routine Road Maintenance Agreement in 2001 for roads associated with project mitigation lands in the Sultan Basin. Also in 2001, a supplemental easement was obtained on a portion of road CD-147 (see District RMAP) owned by DNR that will be used to access Spada Lake Tract lands for wildlife management purposes on land south of Culmbach Dam.

## **5.0 WORK PLANNED FOR 2003**

### **5.1 FOREST VEGETATION MANAGEMENT**

#### **5.1.1 Lake Chaplain Tract**

The three units of the Phone Line Sale may be sold and harvested in 2002, depending on timber prices. If the sale goes forward, road construction will take place; otherwise the units will be harvested when the timber market becomes more favorable.

Reconnaissance work on the 2004 timber sale, currently unnamed, may begin in 2003. Chap2-91 may be precommercially thinned with the following specifications:

- Leave Douglas fir at 12'x12' spacing
- Leave all Western red cedar
- Leave all hardwoods, except
- Prune maple stump sprouts to 2 to 3 stems

Hors3-93 will be evaluated for possible precommercial thinning.

Tree seedlings on all harvested units will be monitored for survival and vigor.

We will complete work on GTA management procedures in 2003, and draft management plans for existing GTAs.

#### **5.1.2 Spada Lake Tract**

Eight Spada Lake stands described in Section 3.2 may be commercially thinned in 2003, depending on the results of the forestry contractor's timber cruise. Some additional stands will be evaluated for precommercial thinning in 2003 or 2004.

### **5.2 SNAG MANAGEMENT**

In 2003, stands on the Lake Chaplain Tract that were inventoried or marked in 2002 will be completed. Additional stands to be inventoried will include those requiring management by 2005, to avoid creation within the 20-year window prior to scheduled harvest activities. Also, 2 additional units that will be included in the Phone Line Sale will have snag creation occurring.

On the Spada Lake Tract, stands shown in the 1997 Spada Lake Supplement as needing snag management by 2005 will receive first priority for inventory and creation. It is expected that many of these stands will not have trees of adequate size to meet all WHMP requirements, but if possible, additional patch openings may be created by topping, girdling or felling trees in areas less than 1/4 acre in size.

Stands where snag creation was completed 10 years ago will be re-visited to determine the need for replacing any snags that have fallen since being created. Each created snag will be visited to verify its status, with notes regarding use and current decay class being taken. Snag inventories within those units will be conducted according to the snag SOP.

to capture information relating to naturally occurring snag. Deficiencies in the numbers of natural plus created snags will be remedied during the next snag creation contract.

Long-term monitoring will continue on selected stands on the Lake Chaplain and Lost Lake Tracts where snags were created three or more years ago. The objective on harvested units is to determine whether the snags designated for each unit are still standing and whether any replacements are now needed. Created snags will be visited to verify their condition, noting wildlife use and current decay class. Snag inventories within those units will be conducted according to the snag SOP, to capture information relating to naturally occurring snags. Deficiencies in the numbers of natural plus created snags will be remedied during the next snag creation contract.

### **5.3 COARSE WOODY DEBRIS MANAGEMENT**

Created CWD will be monitored on selected Lake Chaplain harvest units.

### **5.4 REVEGETATION**

#### **5.4.1 Spada Lake Drawdown Zone**

Annual monitoring of wetland plantings and natural recruitment of vegetation was completed in 2002, but the sites may be informally monitored when District staff are in the vicinity.

#### **5.4.2 Power Pipeline Right-of-Way**

In 2003, planted shrubs will be visited to note growth and survival, to help determine appropriate species for any future planting efforts. Invading seedlings will be cut by hand from the shrub clumps, and the remainder of the ROW will be mowed in the late summer, after the existing herbaceous plants have gone to seed.

#### **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 excessive vegetation growing on the floating nest platforms will be removed in February. The South Lost Lake nest platform was listing and will be repaired by adding a pair of floatation tubes. At Spada Lake, the recovered platform will be retrofitted with additional PVC float tubes and moved to an area with less direct force from Williamson Creek.

The floating nesting platforms and osprey platforms at Lost Lake and Spada Lake, will be monitored when the biologists are on site to perform other activities during the breeding season (April-late June). 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 platform at the east end of Spada Lake will be visited by boat and inspected 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 MONITORING**

Water quality in Chaplain Creek and vegetation response in biosolids application sites and nearby control sites was completed in 2002 and 2001, respectively, and monitoring will be discontinued.

## **5.7 DEER FORAGE MONITORING**

The following harvest units will be monitored in 2003: Divr1-95, Tiki1-98, and Tiki2-98.

## **5.8 WILLIAMSON CREEK TRACT**

Baseline old growth inventorying will continue on the Williamson Creek Tract in 2003.

## **5.9 LAND MANAGEMENT**

The District will continue implementation of the RMAP and will prepare and submit an annual report to DNR. The City will implement its RMAP on the Lake Chaplain Tract.

The Co-licensees will continue to work with DNR on their NRCA plan for the Upper Sultan Basin, providing comments and suggestions on plans (habitat objectives, fire management, etc.) and coordinating land management in the basin.

## **5.10 SECURITY MEASURES AT LAKE CHAPLAIN/JACKSON PROJECT FACILITIES**

A security assessment of these sites is in progress, and additional changes may occur in 2003, which will include additional gates, reconfigured gates or changes in locations. Impacts on public access to the Lake Chaplain Tract and other Jackson Project lands will be considered in this assessment.

## 6.0 SCHEDULE OF ACTIVITIES FOR 2003

Major Activities	Location	Quantity
Road Construction	Lake Chaplain Tract	Construct road to Phone Line Sale units (tentative)
Final Harvest		
Timber Sale (Phone Line Sale)	Lake Chaplain Tract	3 units (approx. 46.9 ac.) (tentative)
Timber Harvest (Phone Line)	Lake Chaplain Tract	(tentative)
Sale Layout (2004 sale)	Lake Chaplain Tract	TBD
Commercial Thinning		
Timber Sale	Spada Lake Tract	Up to 8 units (9-111, 9-120, 9-121, 9-135, 9-142, 9-150, 9-183, 9-184)
Timber Harvest	Spada Lake Tract	TBD, depending on sale
Harvest Unit Stocking	Lake Chaplain Tract, all previously harvest units	16 units
Monitoring		
Precommercial Thinning	Spada Lake Tract	TBD
Snag Creation	Lake Chaplain Tract	Phone Line Sale, Unit 3, other units TBD
Snag Inventory	Lake Chaplain Tract, Spada Lake Tract, Williamson Creek	TBD
CWD Creation	Lake Chaplain Tract	Phone Line Sale, Unit 3 (tentative)
CWD Inventory	Lake Chaplain Tract	Phone Line Sale GTA
Revegetation		
Grass seeding/fertilizer	Pipeline ROW	As needed to improve bare spots
Shrub plantings		
Monitoring		
Revegetation Site Monitoring/Maintenance	West side, Chaplain Marsh North end, Lake Chaplain Powerhouse site Spada Lake drawdown zone Pipeline ROW	Monitoring of all planted/seeded areas. Maintenance as needed: Weeding, brush thinning, etc.
Deer Forage	Lake Chaplain Tract	Divr1-95, Tiki2-98, Tiki2-98
Snags	Lake Chaplain, Lost Lake Tracts	100+ created snag trees
CWD	Lake Chaplain Tract	2 Line Tree units
Nesting Structures	Lost Lake, Spada Lake, and Chaplain Tract	Monitor all structures .



<b>Major Activities</b>	<b>Location</b>	<b>Quantity</b>
Wetland Monitoring	Lost Lake, Williamson Creek	All wetlands designated in SOPs
Williamson Creek baseline inventory	Stands 10-6, 10-7, 10-8	3 old growth stands
Biosolids Application	Lake Chaplain Tract	None planned
Understory monitoring		None planted
Water quality monitoring	Chaplain Creek	2 stations
GTA and BZ Management	All established units	Monitor and develop long-term management plans
Land Management	Spada Lake Tract	RMAP implementation.
	Lake Chaplain Tract	RMAP implementation

## 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), 2002 (3.1.3, p.4)
	Lake Chaplain	Donkey Damper Sale	1999 (3.1.4, p.5), 2000 (3.1.1, p.4), 2002 (3.1.3, p.4)
	Lake Chaplain	Phone Line Sale	2002 (3.1.3, 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	Donkey Damper Sale	2002 (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), 2002 (3.1.4, p.7)
	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), 2002 (3.2.2, p.7)
	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), 2002 (3.3, p.7)
	Spada Lake	Harvest Planning	2000 (3.2.3, p.7), 2002 (3.2.2, p.7)
Stream and Wetland Buffer Zone Management	Lake Chaplain	Snag creation and monitoring	

<b>General Activity Category</b>	<b>Management Tract</b>	<b>Milestone</b>	<b>Annual Report Reference – (Section/page #)</b>
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)
	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 and Lost Lake	Snag Monitoring and Mapping	1998 (3.2.2, p.7), 1999 (3.2.2, p.9), 2002 (3.4.3, p.15)
	Williamson Creek	Snag Creation	2002 (3.4.1, p.10))
	Spada Lake	Snag Creation	2002 (3.4.1, p.10)
	Williamson Creek	Snag Inventory	2002 (3.10, p.33)
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)
	Williamson Creek	CWD Inventory Results	2002 (3.10, p.33)
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), 2002 (3.5.1, p.15)
	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)

<b>General Activity Category</b>	<b>Management Tract</b>	<b>Milestone</b>	<b>Annual Report Reference – (Section/page #)</b>
	Pipeline ROW	Plant shrubs and trees	1997 (3.4.2, p.11), 1998 (3.4.2, p.10), 1999 (3.4.2, p.12), 2002 (3.5.2, p.15)
	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), 2002 (3.6.2, p.18)
	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), 2002 (3.6.2, P.18)
	Lost Lake	Osprey Platform	1990 (3.8, p.8), 1999 (3.5.3, p.19), 2000 (3.5.3, p.19), 2002 (3.6.3, P.22)
	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), 2002 (3.6.2, p.18)
	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), 2002 (3.6.1, p. 18)
	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), 2002 (3.6.2, p.18)
	Spada Lake	Osprey Platforms	1992 (3.7, p.11), 1999 (3.5.3, p.19), 2000 (3.5.3, p.19), 2002 (3.6.3, p.22)
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), 2002 (3.6.4, p.22)
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), 2002 (3.8, p.23)
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)

<b>General Activity Category</b>	<b>Management Tract</b>	<b>Milestone</b>	<b>Annual Report Reference – (Section/page #)</b>
		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), 2002 (3.9, p.23)
		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)
	PUD Properties	Road Maintenance and Abandonment Plan	2002 (3.12, p.36)
	Lake Chaplain	Road Maintenance and Abandonment Plan	2002 (3.11, p.36)
ROW Management Special Agency Consultation	Power Pipeline	Gate to restrict public access	1994 (3.3.2, p.7)
	All management tracts	Agency tour of WHMP Sites	1997 (3.9, p.22)
		FERC Environmental Inspection	1999 (3.9, p.31)
Security Measures	Lake Chaplain and JHP Facilities	Heightened security measures	2002 (3.13, p.36)
Other Monitoring	Williamson Creek	Monitoring	1999 (3.8, p.26), 2000 (3.9, p.24), 2002 (3.10, p.24)