Henry M. Jackson Hydroelectric Project
FERC No. 2157

2009 ANNUAL PROGRESS REPORT
WILDLIFE HABITAT MANAGEMENT PLAN

May 20, 2010

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TABLE OF CONTENTS

List of Tables

List of Figures

1.0 SUMMARY

Activities accomplished during 2009 on the Wildlife Habitat Management Plan (WHMP) lands 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 1988 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 (WDFW), and the Tulalip Tribes (Tribes). The Washington Department of Natural Resources (DNR) was also consulted. A meeting was offered by the District to discuss the results of the past year's work.

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 implemented only if the modifications remain consistent with the WHMP's objectives. Significant modifications are documented in the WHMP annual reports.

As described in Sections 3 and 4 of this report and in previous years' reports, implementation of the WHMP since 1988 has already provided many of the intended wildlife habitat benefits. For example, snag and coarse woody debris creation have provided important shelter and foraging substrates that were 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 2009

- Managed noxious and invasive weeds (all WHMP tracts)
- Created snags and gaps (Spada Lake)
- Monitored nest structures (Lake Chaplain, Lost Lake and Spada Lake Tracts)
- Monitored water quality in Chaplain Creek
- Monitored deer forage (Lake Chaplain Tract)
- Continued implementation of Lake Chaplain Tract RMAP
- Continued timber inventory update (Lake Chaplain Tract)
- Refined Cover Type Maps to reflect current management plans (Spada Lake Tract)
- Continued layout of future harvest units (Lake Chaplain Tract)
- Continued implementation of Spada Lake Tract RMAP and completed major road repairs damaged during early 2009.
- Monitored deer forage (Lake Chaplain Tract)

- Jackson Project Relicensing: completed studies, conducted stakeholder meetings, prepared protection, mitigation and enhancement measures, prepared and filed the Noxious Weed Management Plan, Marbled Murrelet Habitat Protection Plan, Terrestrial Resource Management Plan and Final License Application in May and filed a revised Recreation Resource Management Plan and final Relicensing Settlement Agreement in October. Also signed an off license agreement regarding management of the Lake Chaplain Tract.
- Continued implementation of Spada Lake Tract RMAP and associated road repairs

1.2 TASKS SCHEDULED FOR 2010

- Monitor snags to determine levels of use & preference (all tracts)
- Create snags and/or gaps (Spada & Lake Chaplain Tracts)
- Monitor nest structures (Spada, Lost Lake & Lake Chaplain Tracts)
- Monitor water quality (Chaplain Creek)
- Monitor deer forage (Lake Chaplain Tract)
- Finalize layout of Cougar Timber Sale harvest units (Lake Chaplain Tract)
- Continue timber inventory update (Lake Chaplain Tract)
- Monitor plantations (Lake Chaplain Tract)
- Monitor thinned stands (Spada Lake Tract)
- Monitor revegetation sites
- Monitor Old Growth & Wetlands (Williamson Creek Tract)
- Continue implementation of RMAP (Lake Chaplain Tract)
- Manage noxious and invasive weeds (all WHMP tracts)

2.0 INTRODUCTION

The 2009 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 currently co-licensees in the Project. The WHMP project area and management tracts are shown in Figure 1.

The WHMP guides management of the five tracts of land totaling approximately 7,070 acres of land and water. Refer to the WHMP, Wildlife Habitat Management Plan Supplement for the Spada Lake Tract (January 1997 & January 2008), and the Pre-Application Document (PAD) for the Jackson Hydroelectric Project, Section 5.4 (December 2005) for details on management goals and objectives, schedules and updated information. These documents are available on the District's web site at web site at **http://www.snopud.com/PowerSupply/hydro/jhprelicense.ashx?p=1197.**

This annual report describes activities conducted during the previous calendar year (Section 3.0) and summarizes activities completed since the management program was initiated in 1988 (Section 4.0). Activities anticipated for the calendar year 2010 are also described (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.

Activities completed prior to 2009 (from 1990 – 2008) are documented in a series of Annual Progress Reports prepared by the District and City, and may be found at the District's web site:
http://www.snopud.com/PowerSupply/hydro/jhprelicense/jhprdoch/jhprhisttr.ashx?p=1533.

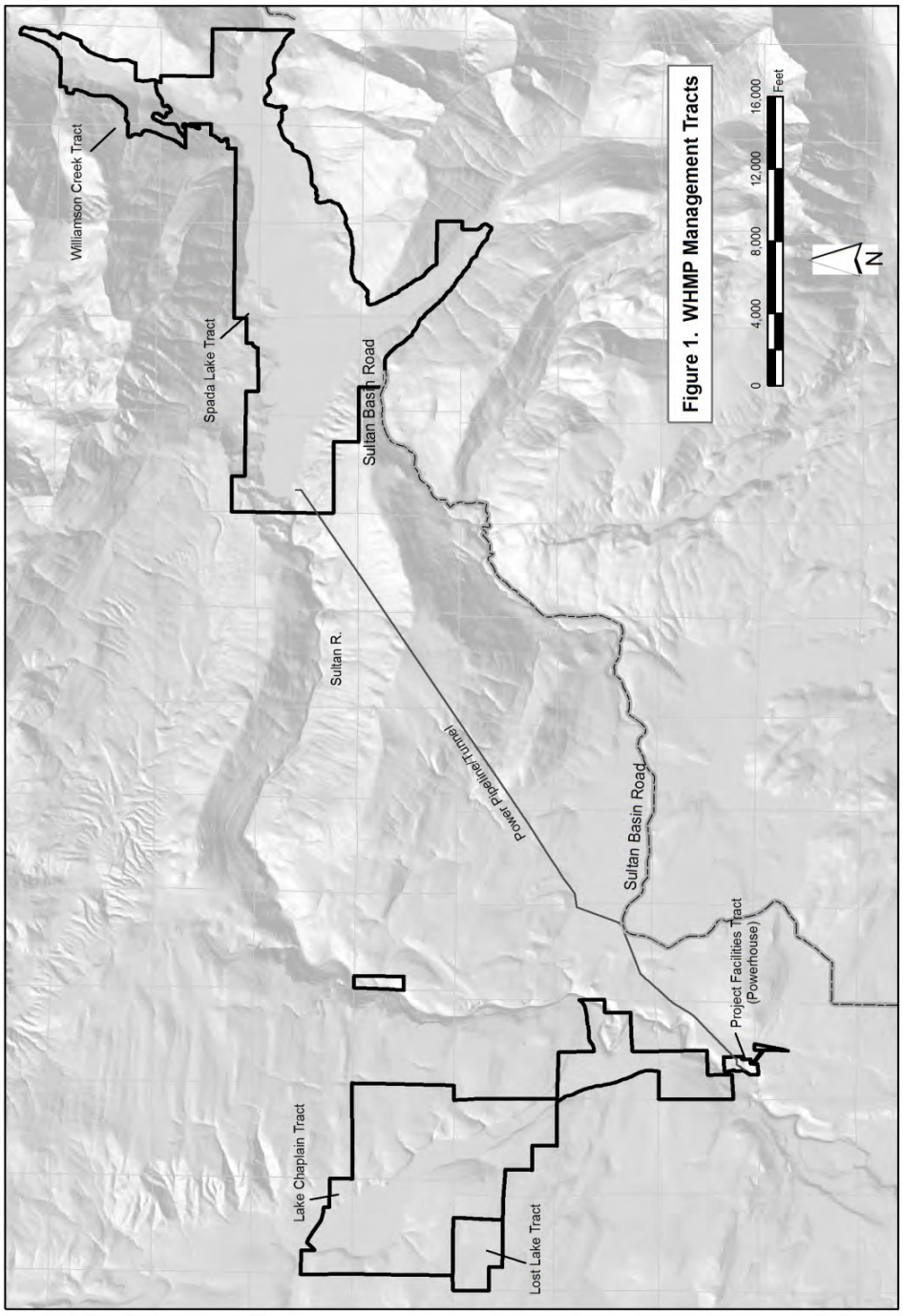

FIGURE 1. WHMP MANAGEMENT TRACTS

3.0 WORK COMPLETED DURING 2009

3.1 SNAG MANAGEMENT

3.1.1 Lake Chaplain Tract

Snag creation did not occur on the Lake Chaplain Tract in 2009, due to the high priority of completing snag creation along the Spada Lake South Shore Road system, a portion of which the DNR will abandon during the summer/fall of 2010.

3.1.2 Spada Lake Tract

In 2009, a total of 555 snags were created (Table 1) in groups of typically 20-25 trees, on nearly 113 acres, along the North Shore of Spada Lake (Figure 2). Of these, nearly 300 trees had cat-faces or cavities carved in the tree with a chain saw to expedite decay and nest cavity creation and about 260 were topped but left alive in an attempt to create live decadent trees for future nest cavity creation. Typical diameters for created snags range from 11-17 inches, with an average of about 15 inches. Approximately 2,000 additional small trees (< 11" dbh) were either topped or base girdled within these gaps to increase light input to the forest floor. WHMP requirements for a minimum of three snags/acre are met on these stands, but due to small average tree diameter, size class distribution requirements cannot be met at this time.

Photo-documentation stations were established at the center of each gap to allow changes over time to be noted. Qualitative assessments of each species of understory plant were also made within selected gaps. A subset of these gaps will be monitored over time to determine the effects of canopy removal on the forage plants, and whether decadent features are created by live-topping a portion of the snags. This information will allow for refinement in snag and gap creation procedures.

Table 1. Summary of Snag Management Activities in 2009

UNIT	ACRES	NUMBER CREATED	AVG DBH (in.)	AVG HT. (ft.)	# PER ACRE	NOTES [1]
9-48	113	555	14.6	59.5	4.91	√ Includes created snags only
√ Meets WHMP requirements for number per acre, but larger size classes not available in this stand. Numerous smaller trees (<11" dbh) were also topped or girdled to reduce over-crowding.						

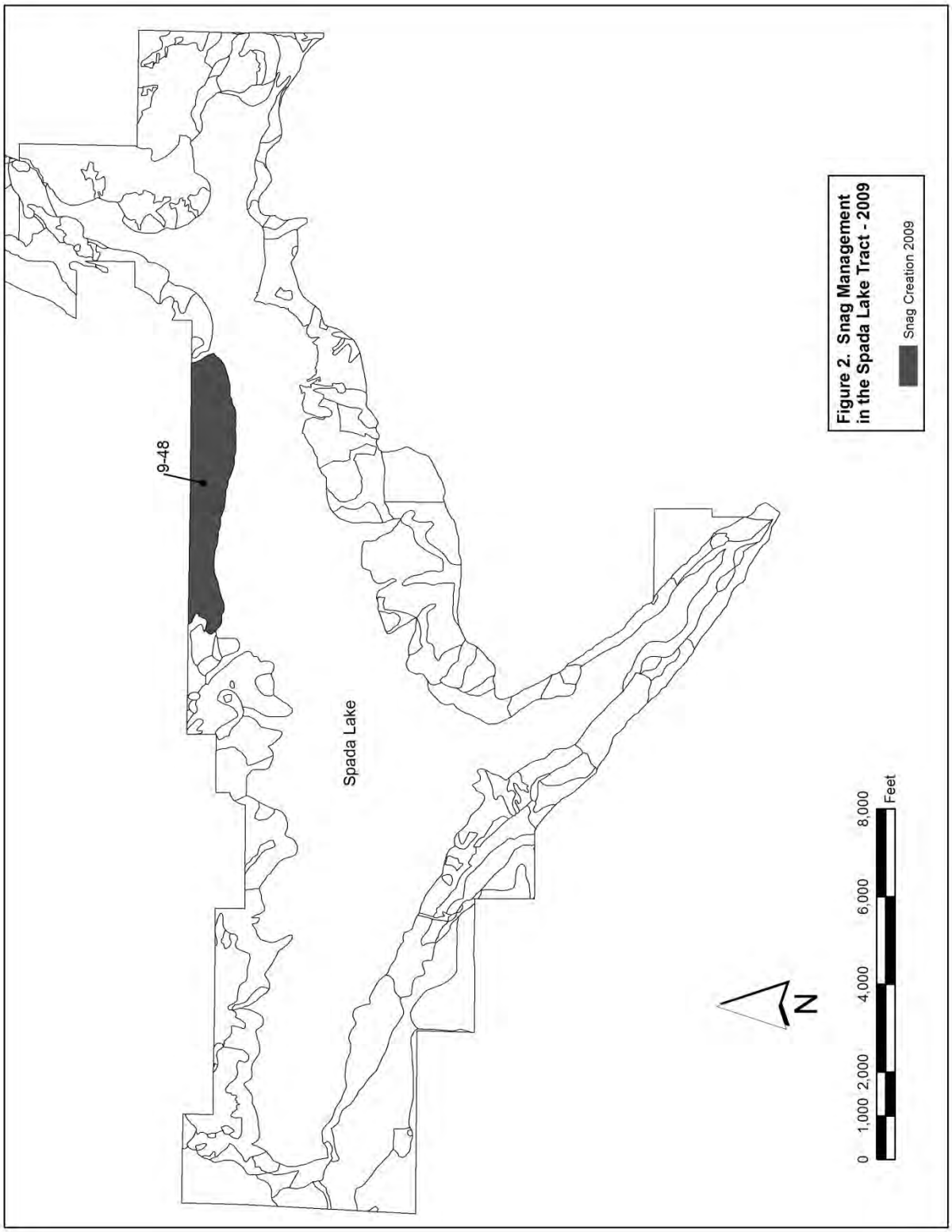

FIGURE 2. SNAG MANAGEMENT IN THE SPADA LAKE TRACT – 2009

3.2 REVEGETATION AND WEED MANAGEMENT

3.2.1 Lake Chaplain Tract

Over nine hundred individual noxious and/or invasive non-native weeds (thistles, butterfly bush, tansy ragwort, and scotch broom) were uprooted along roadsides on the Lake Chaplain Tract during 2009. Nearly 70% of uprooted weeds were situated within the hydrographic boundary of Lake Chaplain, where herbicide application is not permitted. Flower or seed-head cutting and hand pulling are the typical means used to control these plants.

Two patches of Japanese knotweed were identified outside of the hydrographic boundary of Lake Chaplain in 2006. The patches were slashed in early summer of 2008 and subsequent sprouts were treated with herbicide in early fall of 2008. One patch was again slashed in the early summer of 2008 and treated with herbicide in early fall of 2008. An additional, adjacent patch was slashed in the early summer of 2009 and treated with herbicide in early fall of 2009. Additional treatment may be necessary in 2010.

3.2.2 Pipeline ROW

The pipeline Right-of-Way (ROW) was searched for noxious weeds with a licensed contract sprayer applying herbicide to any found outside of riparian buffer areas and the City of Sultan's watershed area. Typical weeds found were Canada thistle, hawkweed, scotch broom, Himalayan blackberry, and tansy ragwort. Off-road vehicle use of portions of the ROW is still a persistent problem, creating areas of open soil which may allow weed seed germination. These areas are over-seeded with a grass/clover mix when discovered.

Treated biosolids from the City of Everett wastewater treatment plant were applied to approximately 1/4 mile of the ROW near Marsh Creek. The area was publicly posted as required under the SEPA permit. Biosolids were bladed out to approximately 6 inches deep then over seeded with grass/forb mixes typical for use on the ROW. Photodocumentation will allow comparison over time to untreated areas to determine if this is an appropriate and cost-effective means of amending the soil, while re-seeding with a lower growing grass/forb mix to reduce the need for vegetation maintenance, and still providing hiding cover for small mammals and forage for deer.

3.2.3 Transmission Line ROW

Noxious weeds were pulled or sprayed several times during the growing season, with the primary species found here being English Holly, and thistle and blackberry species.

3.2.4 Spada Lake Tract

Selected areas at Spada Lake were aggressively treated to prevent noxious weed seed production. These include Culmback Dam, which has an extensive Hawkweed infestation, and the Culmback Dam Road, which has Canada thistle infestations along significant portions of the road length. Experimental applications of vinegar as an herbicide were made to these infestations, with many of the treated plants showing top-

kill for several months after treatment. Other commercially available and State licensed biochemicals will be tested in 2010.

During other field work, locations of weeds were recorded to document occurrence and note any control measures taken. Individual plants or small infestations were typically controlled at the time of discovery. GPS coordinates were recorded for each infestation; the District has this information in their GIS database and can use it for management purposes.

3.2.5 Williamson Creek Tract

Areas identified by consultants during noxious weed inventories were visited once during the growing season to pull and grub-out weeds; these were found primarily along the abandoned road grade running north through the Tract. Weeds found and pulled include hawkweeds, thistles and reed canary grass. Additionally, vinegar was sprayed on the hawkweed infestations to top-kill the plant, thus preventing seed production for the year.

3.3 NEST STRUCTURES

3.3.1 Floating Nest Platforms

Two floating nest platforms are in place on Lost Lake and one in the Williamson Creek arm of Spada Lake. None of the 3 floating nest platforms were observed to have use in 2009 (Figures 3 and 4). Occasional use by feeding otters and possibly loafing by water birds is typical, evidence of which is commonly noted during end of breeding season visits.

3.3.2 Nest Boxes

On the Spada Lake Tract none of the eight boxes installed had been used by cavity nesting waterfowl, although some were being used by squirrels when checked in the fall (Figures 3 and 4, Table 2). Boxes on this tract have not been subjected to as much predation by bears as have boxes on the other tracts, possibly because the boxes receiver very little use by cavity nesting birds.

Nest boxes on the Lost Lake and Lake Chaplain Tracts receive more use than those at Spada Lake; however they are also more prone to bear predation attempts. Installation of aluminum flashing around the base of the mounting trees has reduced bear predation, although evidence of attempted bear predation is often seen on the aluminum banding. Overall use of boxes by nesting waterfowl remains quite low (Figures 5 and 6, Table 2). Three of the 6 boxes available in 2009 were used by cavity-nesting waterfowl. Repairs to the remaining boxes as well as adding bear predation deterrents will be installed as time permits.

Table 2. Nest Box Use on JHP Lands in 2009

Location	Boxes Available	Boxes Used	Box Success (# boxes that fledged >/= 1 egg)	Number fledged by species
Lost Lake Tract	5	2 (40%)	2 (40%)	6 hooded mergansers & 5 wood ducks fledged; 3 other boxes used by squirrels, 1 used by a skunk, in fall.
Lake Chaplain Tract	1	1	0	Nesting use, but destroyed by bear
Spada Lake Tract	8	0 (0%)	n/a	0
TOTAL	**14**	**3 (21%)**	**2 (14%)**	**11 total**

3.3.3 Osprey Nest Platforms

District staff monitored the osprey nest platform at Lost Lake (Figure 6) and the two platforms at Spada Lake (Figure 4) while conducting other work in the area. No use was noted on any of the three structures.

Osprey were occasionally seen in the area of the additional platform placed near the powerhouse, but no nesting attempts were made.

3.3.4 Bald Eagle Nest

The bald eagle nest established in 1997 on the Lake Chaplain Tract was monitored occasionally by District biologists, and more frequently by City watershed patrolmen with park naturalist experience. The nest was occupied again by nesting bald eagles, with 1 eaglet observed in mid-June which was seen to have successfully fledged.

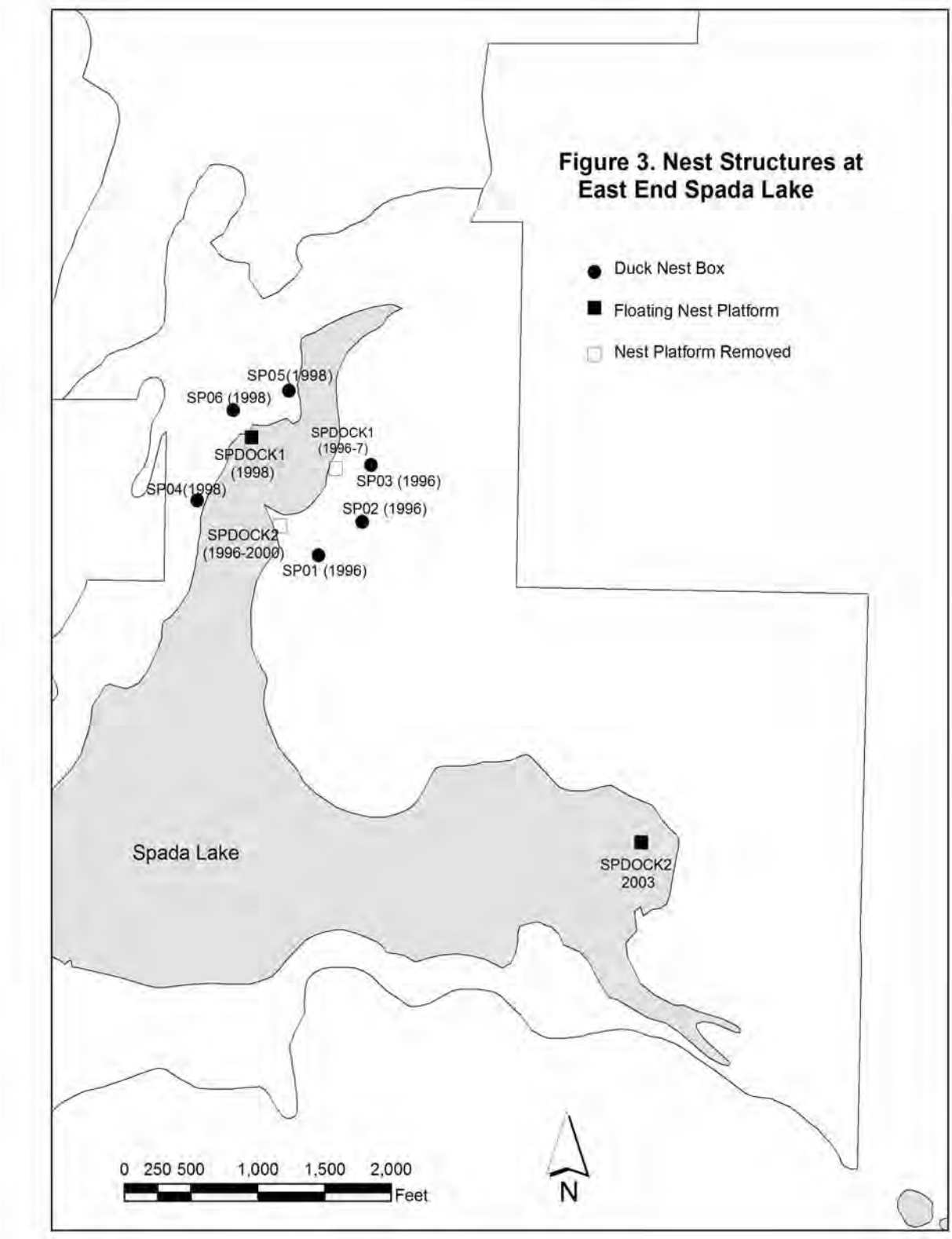

FIGURE 3. NEST STRUCTURES AT EAST END SPADA LAKE

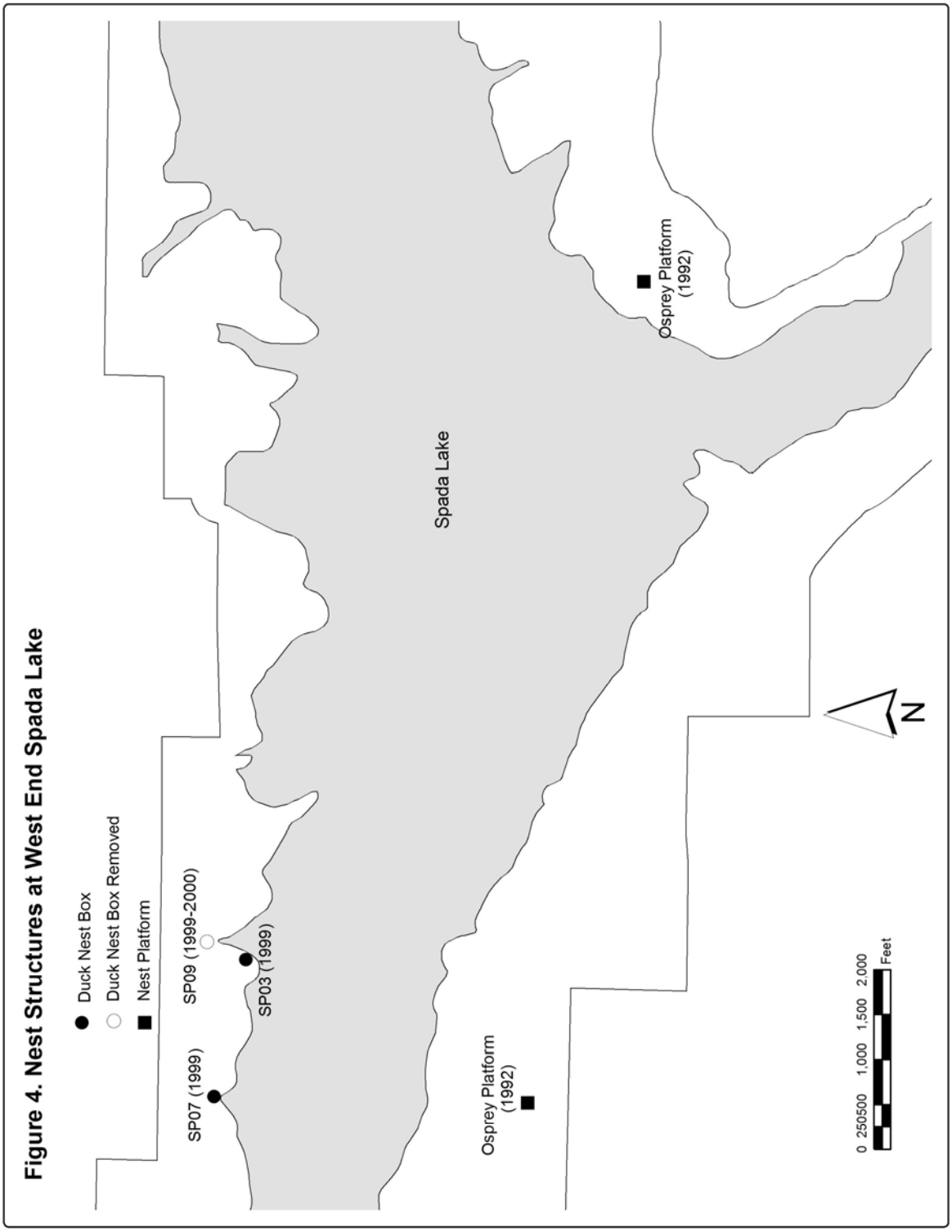

FIGURE 4. NEST STRUCTURES AT WEST END SPADA LAKE

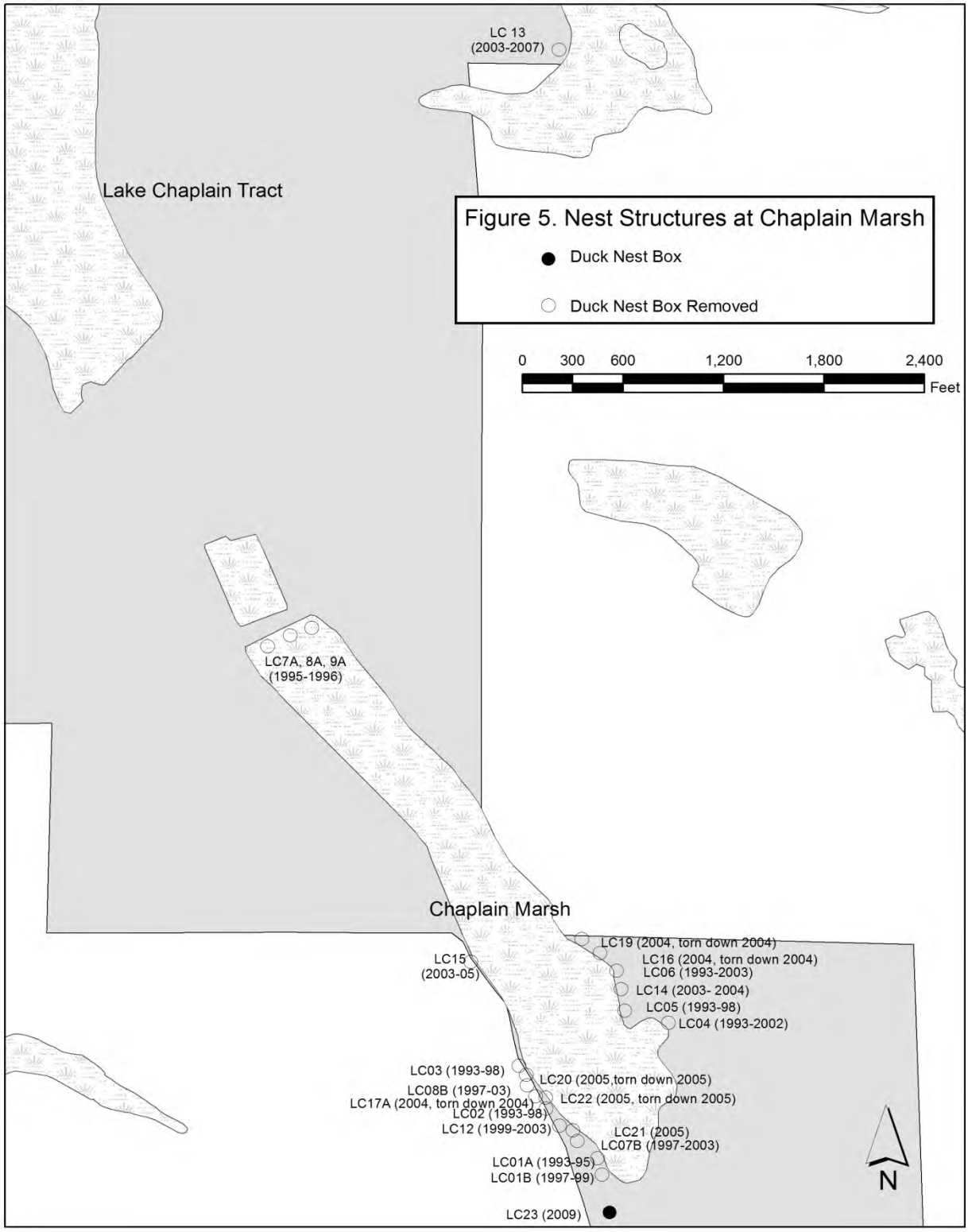

FIGURE 5. NEST STRUCTURES AT CHAPLAIN MARSH

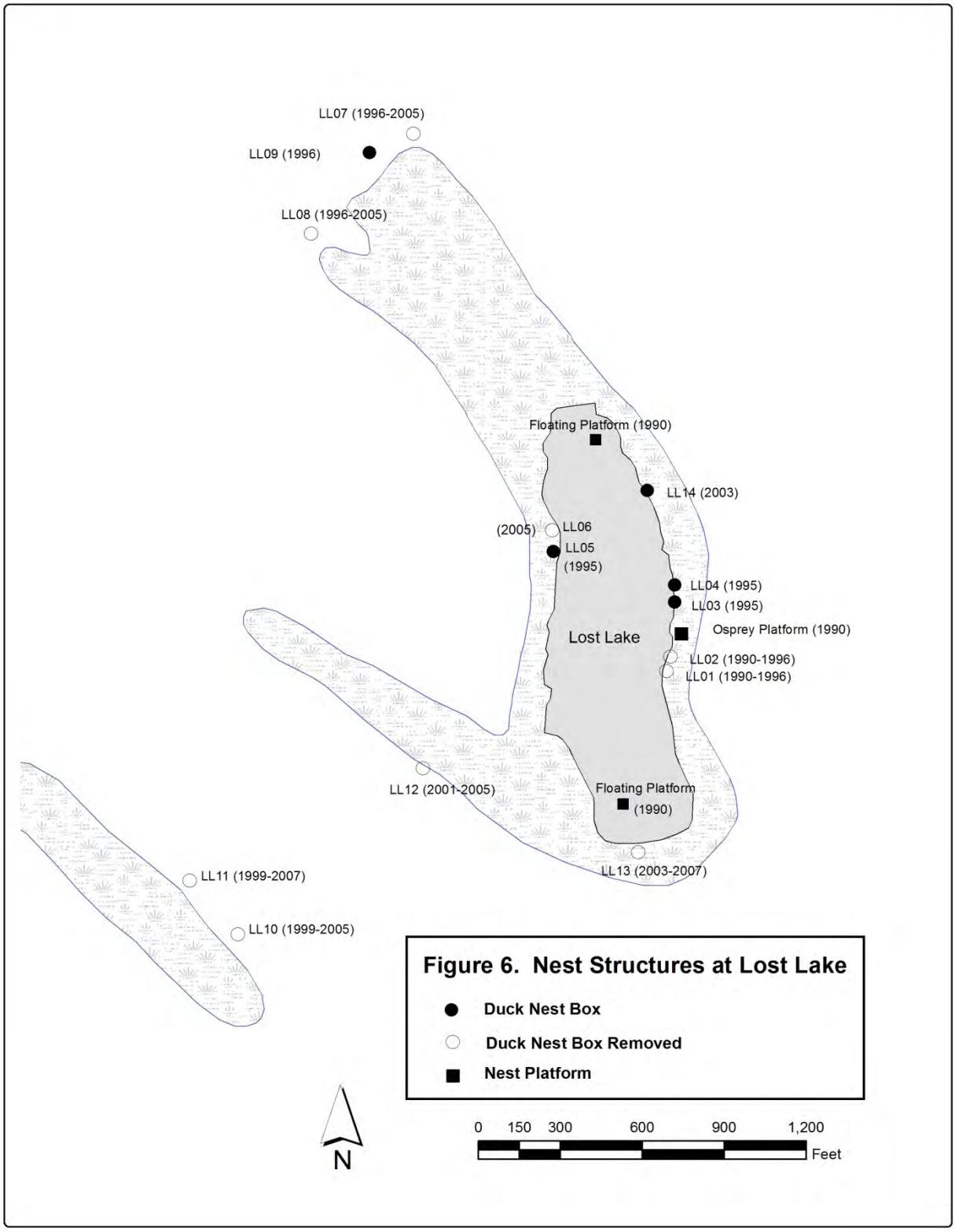

FIGURE 6. NEST STRUCTURES AT LOST LAKE

3.4 FOREST VEGETATION MANAGEMENT ON THE LAKE CHAPLAIN TRACT

3.4.1 Layout of Future Harvest Units

Field reconnaissance and inventory of three final harvest units (2000-1, 2005-1, and 2005-2) and two thinning units (2025-5 and 2035-1) was completed in 2008. The final harvest units were reconfigured to account for mapping inaccuracies and to minimize road construction. The three final harvest units will be combined as the Cougar Timber Sale Harvest with sale anticipated in the spring of 2011. Harvest unit design remains to be finalized and baseline forage data collection will occur in 2010.

3.4.2 Monitoring of Plantations

Older plantations were monitored for bear damage and hardwood competition was evaluated. Bear damage is evident in all of the plantations that were thinned (Chap1-91, Chap2-91, and Chap3-91). Bears strip bark from conifer trees during spring sap flow to feed on the cambium and prefer the vigorously growing trees retained in thinned plantations. Survival of planted and natural seedlings in the Crazy Bear Timber Sale harvest units has been excellent; early thinning of seedlings may be appropriate.

The WHMP standard calling for hardwoods to comprise 5 to 10 percent of total stem count has been exceeded in Divr2-95. Monitoring of conifer growth suppression will continue; a decision to slash excessive hardwood trees will consider the potential for subsequent bear damage on conifer trees.

3.5 FOREST VEGETATION MANAGEMENT ON THE SPADA LAKE TRACT

All forest units where commercial harvest or pre-commercial thinning could occur without new road construction or slope de-stabilizing re-construction have been completed. No harvest is planned for the Tract, and units will be revisited in approximately 2015 to re-evaluate the potential and need for timber management activities.

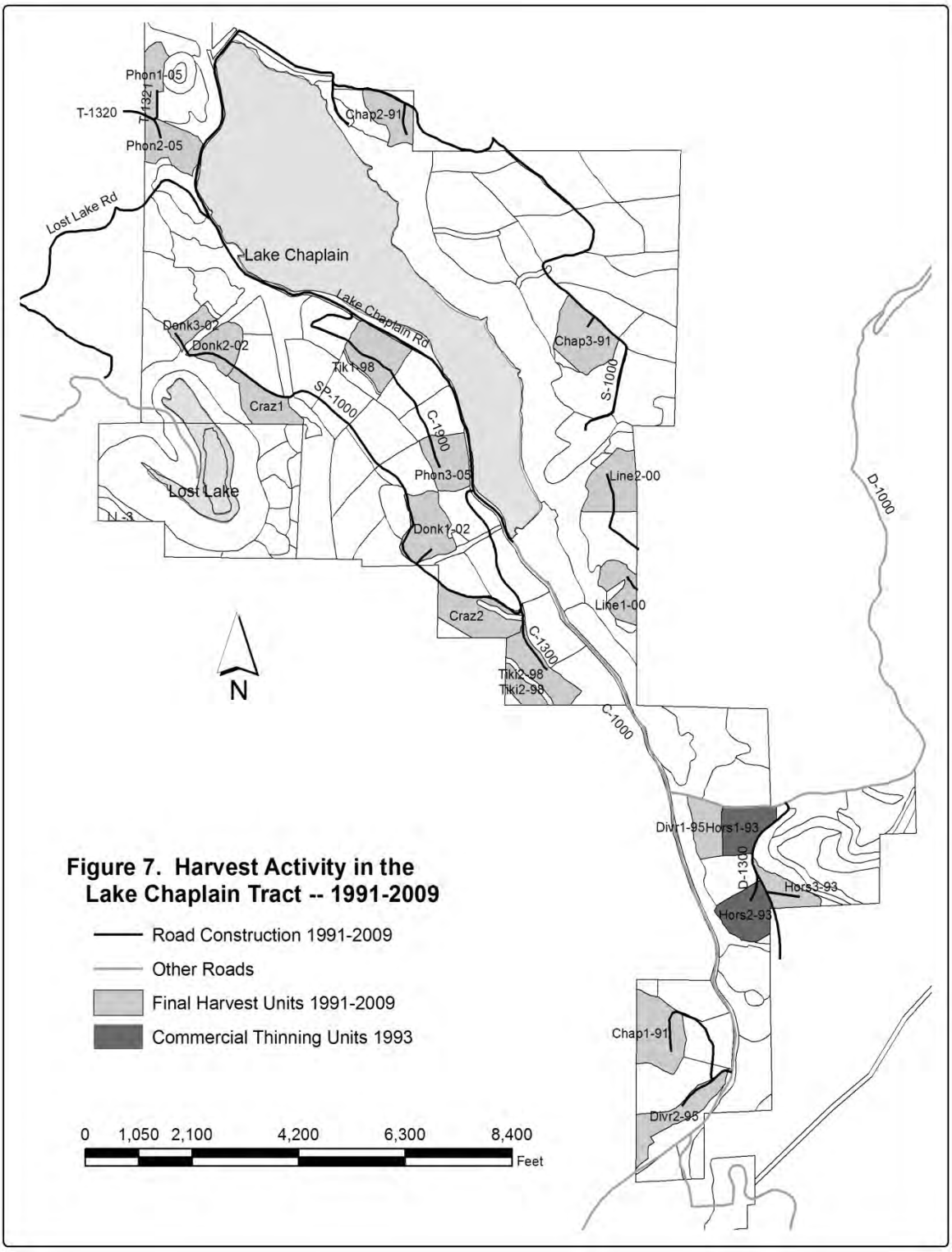

FIGURE 7. HARVEST ACTIVITY IN THE LAKE CHAPLAIN TRACT – 1991-2009

3.6 INCIDENTAL WILDLIFE OBSERVATIONS

Some incidental observations of wildlife species by District wildlife biologists and knowledgeable City personnel on WHMP lands are listed below in Table 3. This partial list of observations is not the result of systematic surveys for wildlife, but is included in this report to document the presence of these species on management lands.

Table 3. Incidental Wildlife Observations

DESCRIPTION	LOCATION	DATE
Pileated woodpecker – heard calling & drumming	NE corner Lost Lake tract	1/21/09
Black bear – cinnamon in color	NE corner L. Chaplain tract	6/2/09
Gray jay	NE corner L. Chaplain tract	6/2/09
Canada goose – 16 late stage juveniles w/4-5 adults	Williamson Cr mouth area of Spada Lake	6/24/09
Hummingbird - likely rufous	N Shore Spada Lake	6/24/09
Ruffed grouse	East side of Lost Lake	7/1/09
Elk	Scat noted at Lost Lake kiosk, and animals seen south of Chaplain Tract	7/6/09
Swainson's thrush	Diversion 1, 1995 Unit, Lake Chaplain Tract	7/16/09
Black-capped chickadees	Diversion 1, 1995 Unit, Lake Chaplain Tract	7/16/09
Swainson's thrush	Tiki 1, 1998 Unit, Lake Chaplain Tract	7/20/09
Black-capped chickadees	Tiki 1, 1998 Unit, Lake Chaplain Tract	7/20/09
Flycatcher	Tiki 1, 1998 Unit, Lake Chaplain Tract	7/20/09
Common loon - calling	Spada Lake near Culmback Dam	8/12/09
American wigeon, Blue-winged teal, Caspian tern, Pine siskin, Ring-necked duck, Short-eared grebe, Spotted sandpiper, Surf scoter, Turkey vulture, Western Grebe, White-crowned sparrow, Yellow throat	Various project locations as noted by City Watershed Patrolmen	various

3.7 BIOSOLIDS APPLICATION AND MONITORING ON LAKE CHAPLAIN TRACT

Biosolids were not applied in the Lake Chaplain Tract during 2009, and there are no plans to apply biosolids in 2010.

Water quality in Chaplain Creek, both upstream and downstream from previous biosolids application sites, was monitored quarterly. Results obtained in 2009 indicate the same patterns of seasonal variations for several contaminants, all within the acceptable range, that have been found in previous years.

3.8 DEER FORAGE MONITORING

Deer forage availability was sampled in July 2009 on Tiki1-98, Tiki2-98, and Divr1-95, on the Lake Chaplain Tract (Figure 7). Eleven years after harvest, Tiki1-98 (Figure 8) tree layer was dominated by Douglas fir trees greater than six feet tall (>85 % of quadrats), followed by hemlock over six feet tall (> 36% of quadrats). Cherry (Prunus) and alder occurred in more than 20 percent of the quadrats. The stand also contained cedar, cottonwood, cascara and willow (Figure 9). Sword fern, salmonberry, thimbleberry, moss, trailing blackberry, deer fern, bracken fern and huckleberry were each present in over 50% of the quadrats (Figure 10). The understory also contained salal, fireweed, various grass and forb species, elderberry and evergreen blackberry. Coarse woody debris persists and was observed on almost 40% of the quadrats. Game trails and browsing on huckleberry, salmonberry, thimbleberry, salal and fireweed were noted. In general, the composition of the stand was variable, having open areas of shrubs containing huckleberry and salmonberry, while other areas were dominated by trees greater than six feet tall. Swanson's thrush, black capped chickadee, goldfinch and a flycatcher were observed.

Tiki2-98 (Figure 11) was also sampled 11 years after harvest. It was dominated by alder over six feet tall and Douglas fir over six feet tall (each with an adjusted frequency of over 50%). Alder usually occurred in pockets, separate from where Doug fir was encountered. Hemlock, big leaf maple, cottonwood, cedar and cascara were also present (Figure 12). The understory was dominated by trailing blackberry, bracken fern, sword fern, huckleberry, salal, salmonberry, and moss (Figure 13). Browsing was noted on salmonberry and huckleberry, and game trails and bedding areas were observed. Mountain beaver burrows were frequently encountered. One garter snake was observed. Bear damage and pileated woodpecker holes were observed on trees and snags.

Fourteen years after harvest, Divr1-95 (Figures 14-16) had a tree layer dominated by Douglas fir greater than 6 feet tall (frequency of occurrence over 60%). Cascara was present throughout the unit (over 40%). Cherry (Prunus), hemlock, cottonwood, alder, big leaf maple and hazel were also present. Grass, salmonberry, bracken fern, trailing blackberry, forb species, moss, sword fern, vine maple, salal and elderberry were present in the understory. In general this stand is characterized by variable density with open areas of grass, forbs and shrubs. There is mountain beaver sign throughout the unit. Two bird nests, Swanson's thrush, and black-capped chickadee were observed. Browsing on salmonberry, numerous game trails, and bedding areas were noted.

FIGURE 8. TIKI1-98 HARVEST UNIT

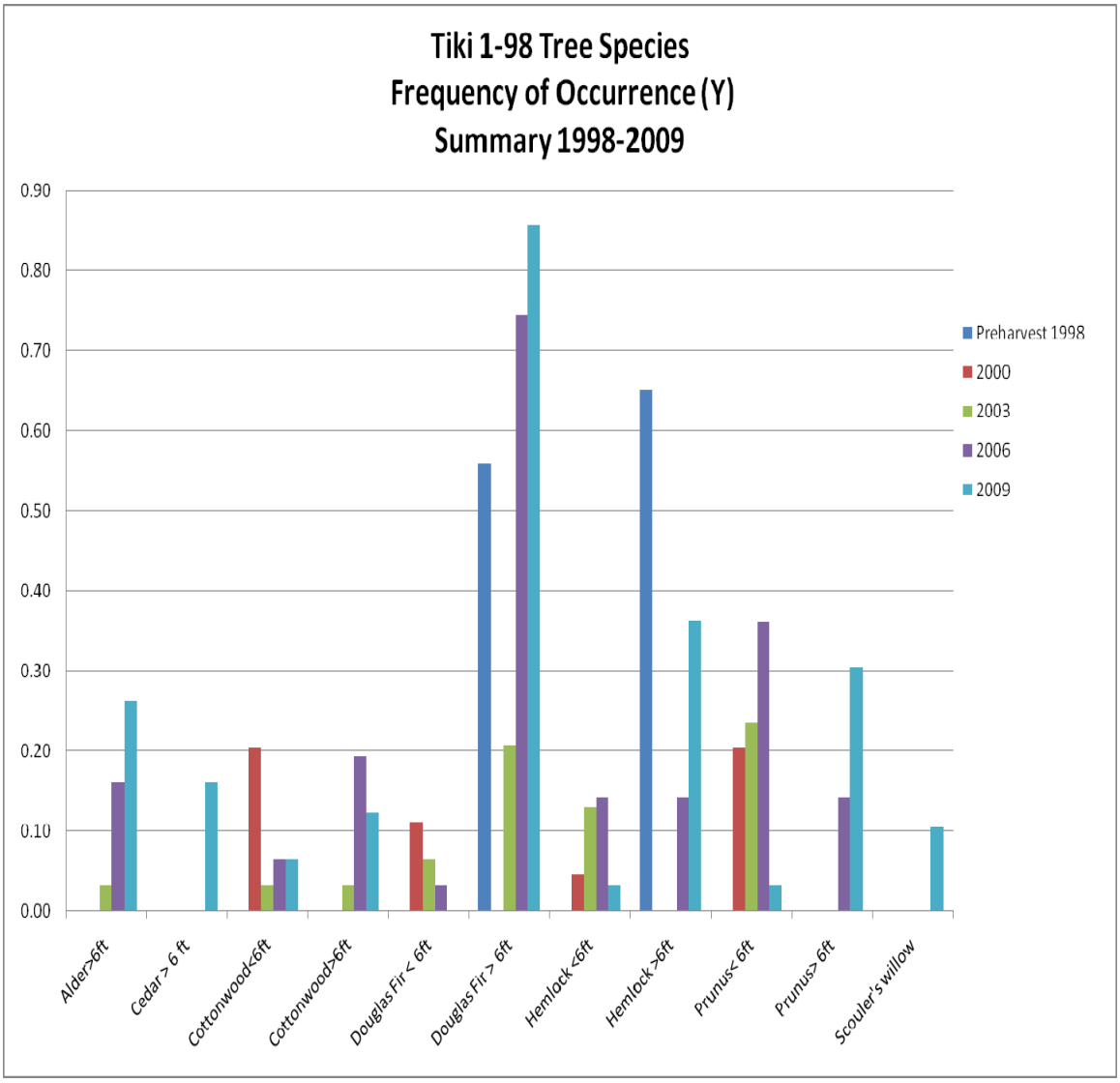

FIGURE 9. TIKI1-98 TREE SPECIES FREQUENCY OF OCCURRENCE

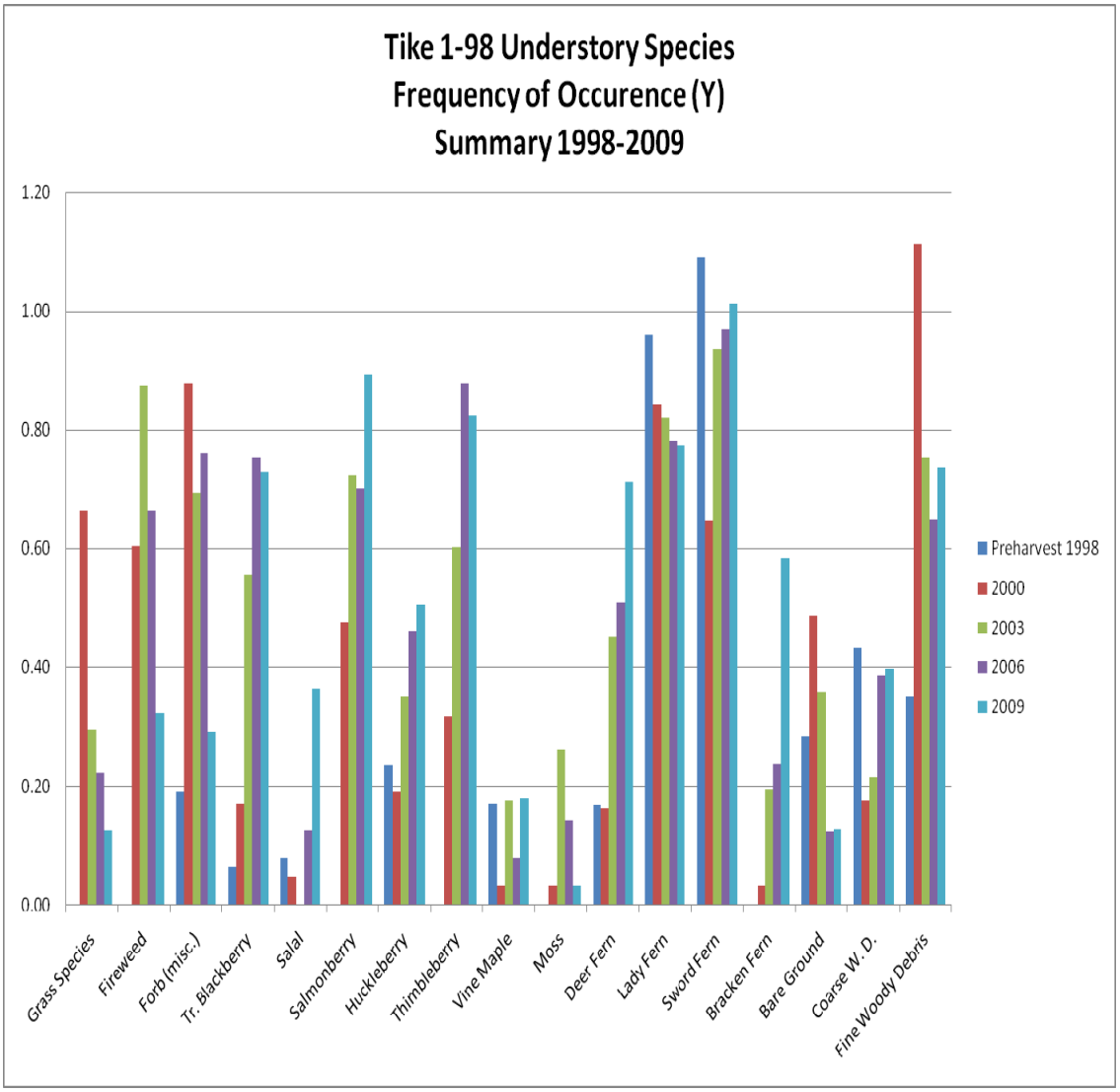

FIGURE 10. TIKI1-98 UNDERSTORY SPECIES FREQUENCY OF OCCURRENCE

FIGURE 11. TIKI2-98 HARVEST UNIT

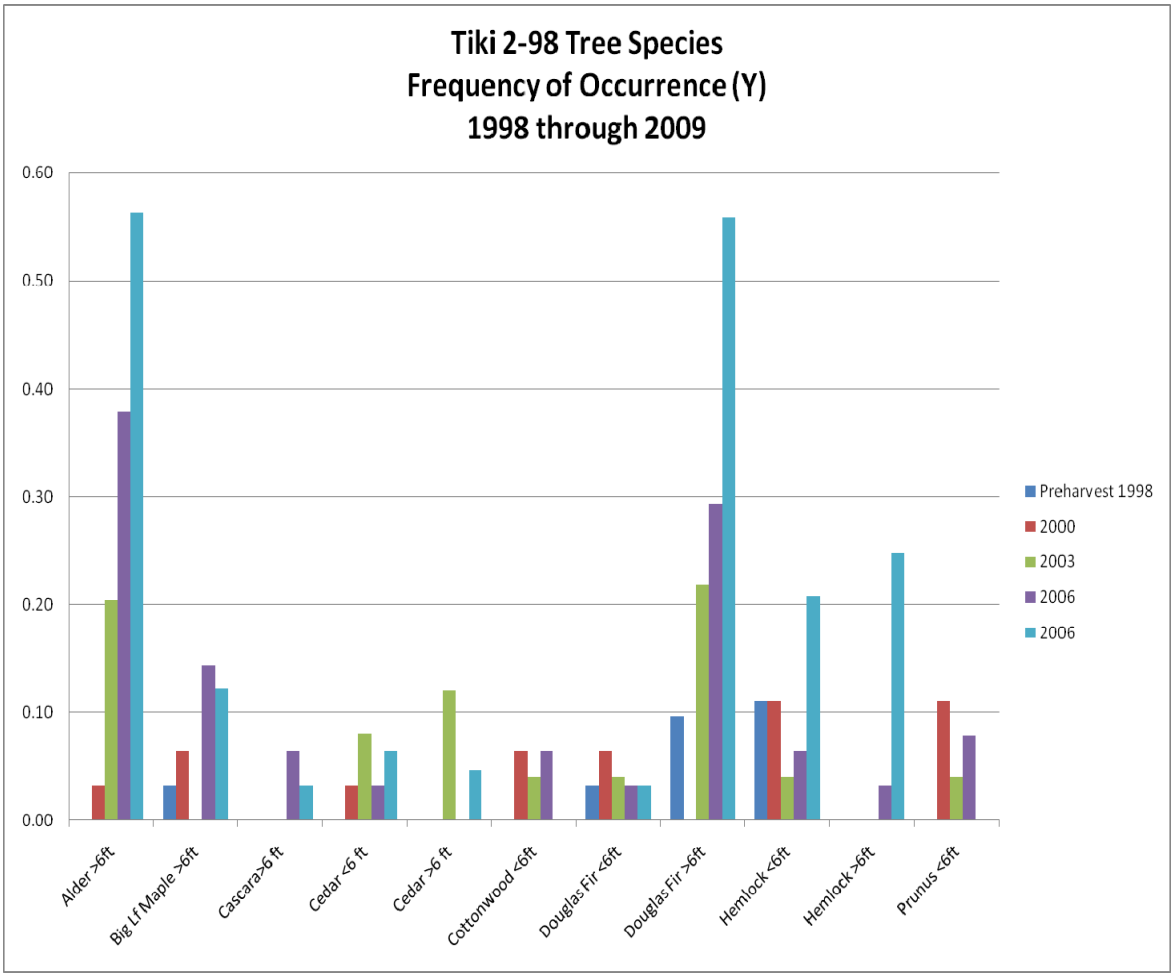

FIGURE 12. TIKI2-98 TREE SPECIES FREQUENCY OF OCCURRENCE

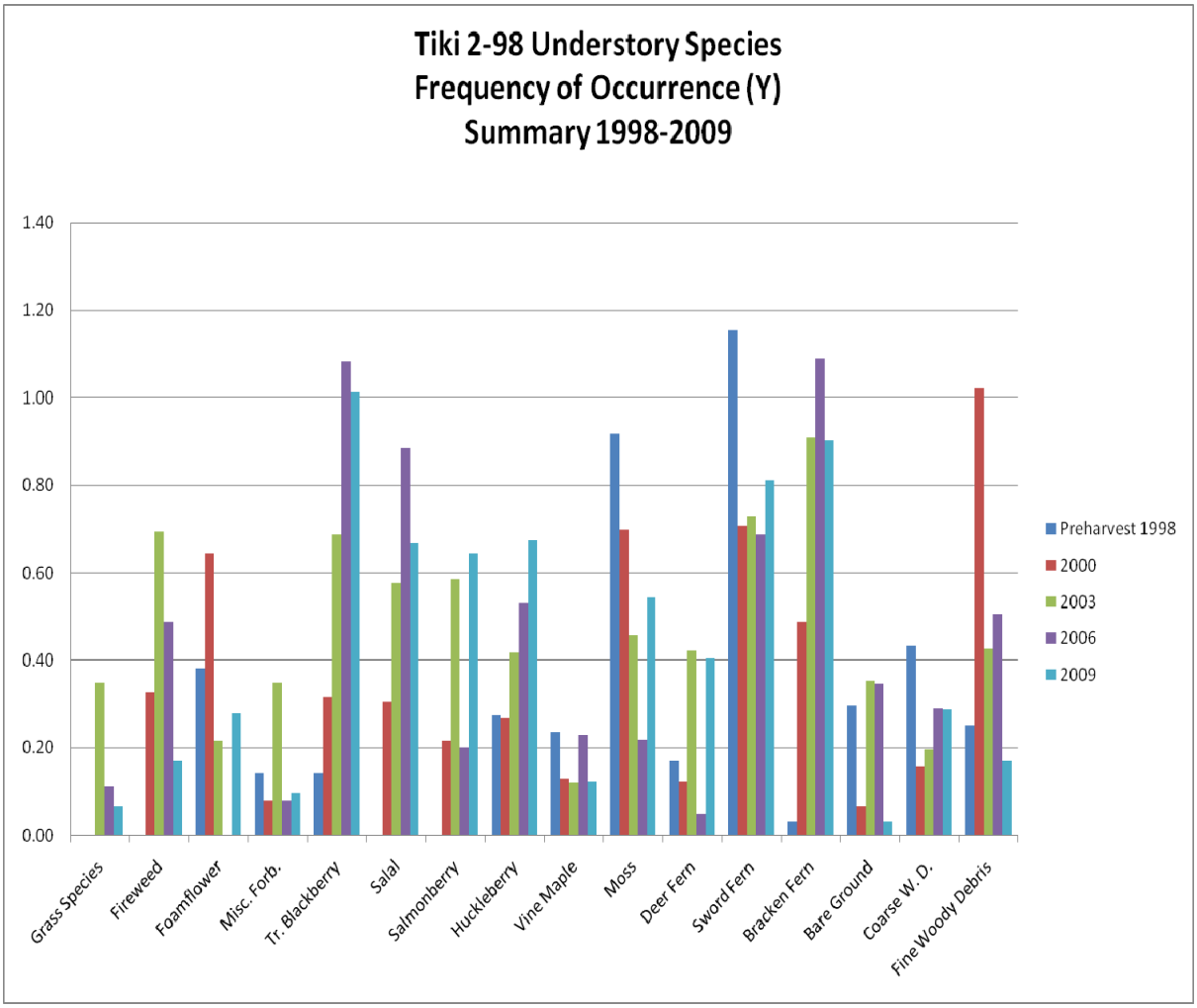

FIGURE 13. TIKI2-98 UNDERSTORY SPECIES FREQUENCY OF OCCURRENCE

FIGURE 14. DIVERSION 1-95 HARVEST UNIT

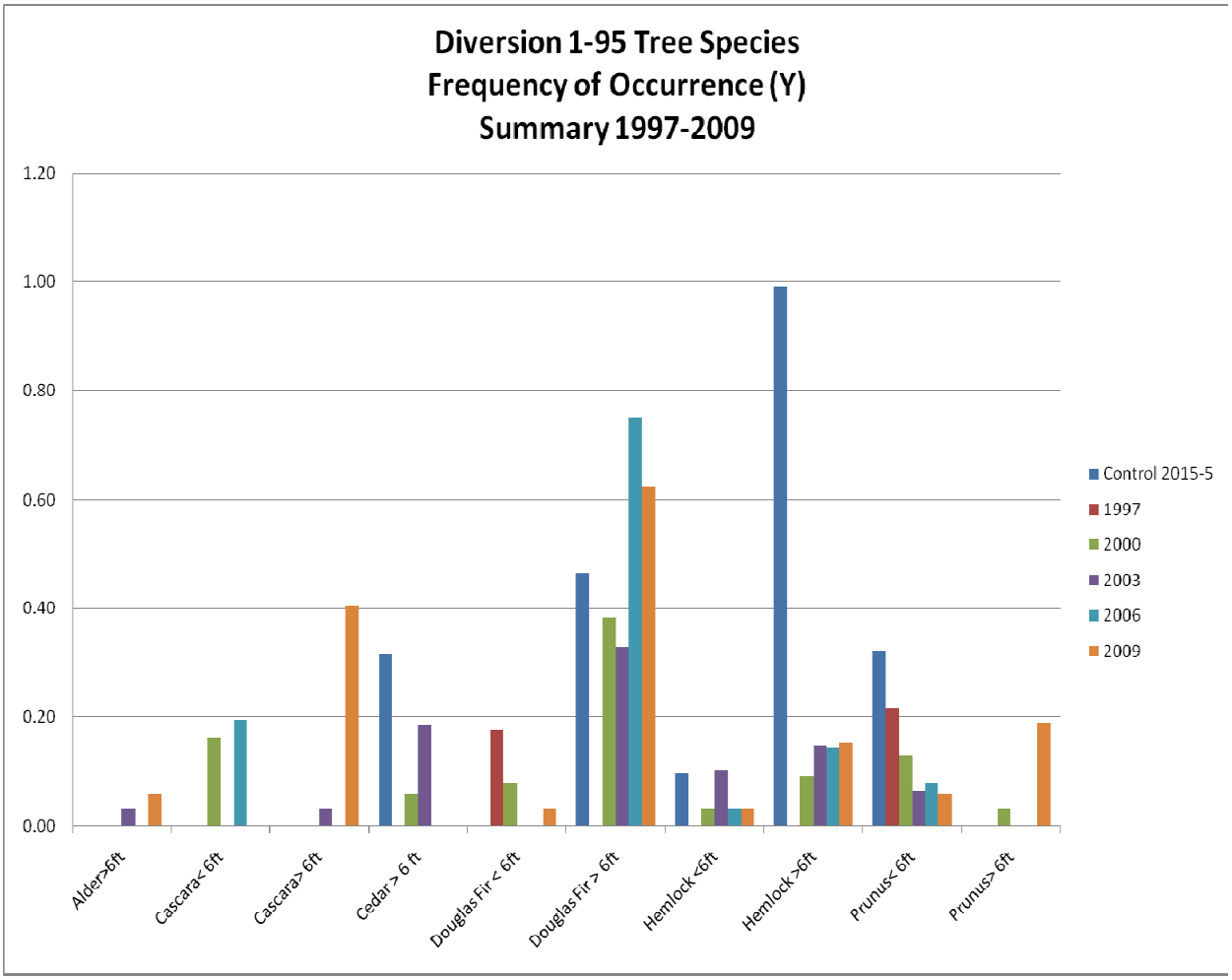

FIGURE 15. DIVERSION1-95 TREE SPECIES FREQUENCY OF OCCURRENCE

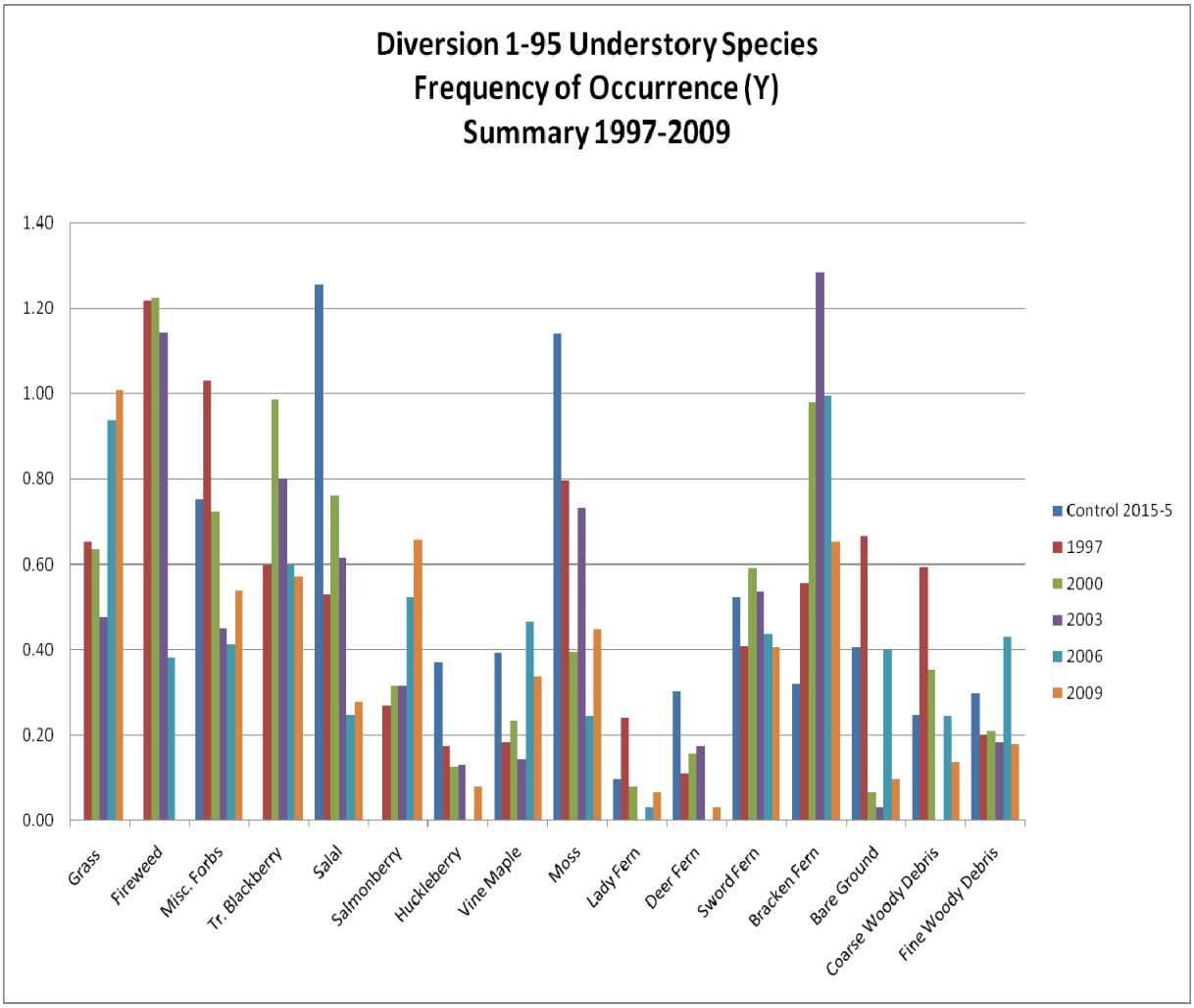

FIGURE 16. DIVERSION1-95 UNDERSTORY SPECIES FREQUENCY OF OCCURRENCE

3.9 LAND MANAGEMENT AT LAKE CHAPLAIN

The City of Everett continued implementation of its Road Maintenance and Abandonment Plan (RMAP) in the Lake Chaplain Tract. RMAP activities included brush cutting along roadsides and cleaning of culverts and ditches, as needed.

3.10 LAND MANAGEMENT ON DISTRICT PROPERTY

The District continued implementation of its RMAP. Routine road maintenance was conducted as needed on all District roads in 2009. Culverts and ditches were inspected and cleaned or brushed as needed. The District submitted the annual Road Maintenance and Abandonment Plan (RMAP) report to DNR as required, for roads on WHMP mitigation lands.

Consultations with Jackson Project stakeholders as part of the Project relicensing effort, included discussion of potential road abandonment of DNR's (SL-ML South Shore Road), and Forest Service 6122 Road (District CD14 Road) in the Sultan Basin adjacent to Spada Lake. Options for use of those roads were considered. As part of relicensing and the new Recreation Resource Management Plan (RRMP) it was decided that the 6122 Road (CD14 Road) will be formally abandoned and converted to a trail for hiking that will accommodate off-road vehicle use for non-Project miners and administration/maintenance up to the point where it will converge with a hiking trail that will lead down to the Sultan River.

The District continued to work with stakeholders and DNR representatives regarding DNR's proposal to abandon the South Shore Road, which leads to four of the District's Jackson Project Recreation Sites and wildlife mitigation lands. Relicensing studies including the Recreation Needs Analysis and consultations with stakeholders during the relicensing process resulted in a decision that the District will upgrade the South Shore road to Recreation Site 3 and DNR will convert the road to a pedestrian trail from Site 3 to the Greider trailhead. The District filed with FERC a license amendment application to the existing license to modify Recreation Sites 4 and 5 prior to DNR's proposed abandonment of the road beyond Site 3 in the summer of 2010; the FERC approved the amendment on March 11, 2010.

3.11 SECURITY MEASURES AT LAKE CHAPLAIN/JACKSON PROJECT FACILITIES

Restrictions on access to and across Culmback Dam continued as approved by FERC "Order Modifying and Amending Recreation Plan (Issued June 28, 2006)."

The District continues to use the installed security systems on the Culmback Dam Road in the vicinity of Culmback Dam. These systems include motion-activated alarms, lights and cameras.

3.12 JACKSON PROJECT RELICENSING

Activities important to the formal relicensing process in 2009 included:

- Completion of Terrestrial and Recreation Plans for the new license:
  - Noxious Weed Management Plan,
  - Marbled Murrelet Habitat Protection Plan,
  - Terrestrial Resource Management Plan
  - Recreation Resource Management Plan
- Preparation and filing of the Final License Application in May
- Filing of the Settlement Agreement in October
- Developed and signed the Off-license Agreement for Management of the Lake Chaplain Tract with WDFW, City of Everett, and District

All of these documents are posted to the District's relicensing web site, which is continually updated. It provides the agencies and public with information about relicensing of the Jackson Project and displays many of the documents compiled over the past 20+ years of Project history. The web site is at: **http://www.snopud.com/PowerSupply/hydro/jhprelicense.ashx?p=1197** .

3.13 SPADA LAKE TRACT SUPPLEMENTAL PLAN

The management techniques and prescriptions of the second Supplemental Plan, approved August 21, 2008, continue to be implemented as required, including evaluation of timber management options, snag tree creation, wetland assessment and nest structure maintenance. Under the proposed new license, the Spada Lake Tract Supplemental Plan has been incorporated into the new Terrestrial Resources Management Plan and would no longer be used.

3.14 AGENCY AND TULALIP TRIBES CONSULTATION

The agencies, Tribes and stakeholders have been kept apprised of relicensing progress and WHMP activities throughout 2009. They were given the opportunity to comment on all of the relicensing documents mentioned in Section 3.5 and the Annual WHMP Report. WDFW was the only agency to accept the invitation to the Annual WHMP meeting held in April. In addition to that, the District and City met with WDFW periodically to work out the off-licensee agreement that is proposed to guide management of the Lake Chaplain Tract during the new license. Consult the relicensing web site for additional information: **http://www.snopud.com/PowerSupply/hydro/jhprelicense.ashx?p=1197.**

4.0 CUMULATIVE SUMMARY

Section 4.0 provides a cumulative summary of WHMP related activities conducted since the beginning of implementation in 1990 through 2009.

4.1 SNAG MANAGEMENT

Since implementation of the Wildlife Habitat Management Plan began in 1990, a total of 2,768 snags have been created on 74 units (1,558 acres) across the Lake Chaplain and Lost Lake Tracts (Figure 17 & Tables 4 & 5). Of these, 72 units (1,534 acres) currently meet the WHMP guidelines for snag size distribution and density.

On the Spada Lake and Williamson Creek Tracts, 3,468 snags have been created on 56 stands or stand complexes (1,388 acres), as shown in Figures 13 and 14, and Tables 6 and 7, respectively. Thirty-one of these stands/complexes (1,117 acres) have at least three snags/acre, but of a smaller average diameter than called for in the WHMP, due to the younger age of the stands. Snag creation now occurs almost exclusively in clumps to create gaps in the forest canopy, thereby increasing light input to the forest floor with the goal of improving forage shrub growth. As a result, groups of typically 20-25 trees greater than 11" dbh are topped, with most trees less than 11" dbh either topped or base girdled as well. Approximately two thirds of the trees greater than 11" dbh were live topped, with the intention of allowing them to continue growing, but also creating favorable conditions (such as a cathedral top or hollow top) for wildlife use in the future. Small cavities were also created in approximately half of the trees, but only in live-topped trees.

Across all Project lands, a total of 6,236 snags have been created, with 103 units or stands (2,750 acres) now meeting WHMP requirements for a minimum of three snags/acre. As noted in section 3.1.2, size class distribution on most stands at Spada Lake is impossible to attain at this time, due to extremely overstocked stands and associated small average diameters.

Table 4. Summary of Snag Management Through 2009 - Lake Chaplain

UNIT	ACRES	NUMBER CREATED	AVG. DBH (in.)	AVG. HT. (ft.)	# PER ACRE	NOTES
2025-2	17.3	42	18.2	75.5	4.5	√ Natural and created snags
2025-5	22.3	52	17.4	64.0	3.4	√ Natural and created snags
2025-6	15.9	30	18.5	68.3	3.6	√ Natural and created snags
2035-1	23.4	64	17.6	64.7	3.1	√ Natural and created snags
2035-2	5.0	11	18.0	77.3	4.1	√ Natural and created snags
2035-4	12.7	9	17.8	78.9	4.7	√ Natural and created snags
2035-5	20.0	42	17.9	75.9	4.7	√ Natural and created snags
2045-1	22.3	41	17.1	65.1	3.2	√ Natural and created snags

Table 4. Summary of Snag Management Through 2009 - Lake Chaplain

UNIT	ACRES	NUMBER CREATED	AVG. DBH (in.)	AVG. HT. (ft.)	# PER ACRE	NOTES
2045-2	27.3	0	30.9	62.2	7.7	√ Includes natural snags only
2045-3	11.0	6	17.7	83.3	3.6	√ Natural and created snags
2045-4	20.0	7	17.4	69.3	4.9	√ Natural and created snags
2045-5	17.8	68	18.3	68.1	3.8	√ Natural and created snags
2045-6	27.6	19	18.0	71.2	4.0	√ Natural and created snags
2015-1	12.2	15	16.1	66.5	4.5	√ Natural and created snags
2015-3	18.0	13	16.9	48.4	7.4	√ 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	√ Natural and created snags
2015-6	19.0	45	17.5	55.4	4.0	√ Natural and created snags
2020-1	24.0	50	16.9	61.9	4.9	√ 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	√ Natural and created snags
2020-6	12.0	26	17.7	50.5	6.3	√Includes created snags only
2025-1	28.0	24	16.5	65.4	4.1	√ Natural and created snags
2025-3	31.7	86	17.4	65.0	3.9	√ Natural and created snags
2025-4	26.0	49	17.0	66.9	4.2	√ Natural and created snags
2030-2	22.1	60	17.0	50.3	3.1	√ Natural and created snags
2030-3	21.0	0	17.2	70.8	6.8	√ Includes natural snags only
2030-5	24.0	48	18.0	50.0	3.2	√ Natural and created snags
2035-3	18.5	30	18.0	55.0	4.9	√ Natural and created snags
2040-3	16.3	14	21.4	50.0	6.9	√ Natural and created snags
Buffer Zone 1	2.3	15	16.4	63.8	9.8	√ Natural and created snags
Buffer Zone 2	1.4	7	15.9	46.6	5.0	√ Natural and created snags
Buffer Zone 3	8.7	23	16.6	46.6	4.5	√ Natural and created snags
CRAZ 1	17.8	57	17.5	66.3	3.2	√ Natural and created snags
CRAZ 2	23.2	69	17.4	75.7	3.0	√ Natural and created snags
OMA1a	74.8	14	17.9	68.3	4.3	√ Natural and created snags

Table 4. Summary of Snag Management Through 2009 - Lake Chaplain

UNIT	ACRES	NUMBER CREATED	AVG. DBH (in.)	AVG. HT. (ft.)	# PER ACRE	NOTES
OMA1b	50.5	62	18.4	65.2	3.2	√ Natural and created snags
OMA1c	30.7	68	18.1	64.4	4.0	√ Natural and created snags
OMA 3	11.8	27	16.2	63.6	6.3	√ Natural and created snags
OMA 4	26.5	22	16.1	54.5	6.7	√ Natural and created snags
OMA 8	5.3	7	18.1	54.3	18.4	√ Natural and created snags
OMA 10	8.6	4	20.0	56.3	18.4	√ Natural and created snags
PMF 4	31.8	54	16.5	46.2	4.9	√ Includes created snags only
PMF 5	27.4	0	23.5	47.3	5.3	√ Includes natural snags only
PMF 6	13.3	0	23.9	64.3	6.0	√ Includes natural snags only
PMF 7a \1	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	√ Natural and created snags
PMF 8	8.5	24	17.5	65.2	3.2	√ Natural and created snags
PMF 9	52.2	71	17.3	54.9	3.1	√ Natural and created snags
PMF 10	34.1	56	18.3	45.1	4.5	√ Natural and created snags
PMF 11	12.0	25	16.8	43.7	4.3	√ Natural and created snags
PMF 15	6.8	14	14.4	35.0	10.6	√ Natural and created snags, from danger tree removal along transmission lines
PMF 17	14.7	35	17.0	58.1	4.4	√ Natural and created snags
Stand 1-3 \2	4.4	0	n/a	n/a	3.1+	√ Natural snags only
TIKI 1-98	21.0	54	17.5	55.6	3.1	√ Natural and created snags
TIKI 2-98	23.8	73	18.0	56.1	3.1	√ 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	√ Natural and created snags
CHAP 1-91	26.0	75	16.6	33.5	3.1	√ Natural and created snags
CHAP 2-91	15.0	46	16.1	27.4	3.1	√ Includes created snags only

Table 4. Summary of Snag Management Through 2009 - Lake Chaplain

UNIT	ACRES	NUMBER CREATED	AVG. DBH (in.)	AVG. HT. (ft.)	# PER ACRE	NOTES
CHAP 3-91	24.0	55	18.0	31.0	3.6	√ Natural and created snags
DIVR1-95	15.6	42	16.8	50.3	3.1	√ Natural and created snags
DIVR2-95	19.7	59	18.3	47.9	3.1	√ Natural and created snags
DONK 1-01	23.5	67	17.1	65.3	3.1	√ Natural and created snags
DONK 2-01	21.4	58	18.0	67.6	3.0	√ 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	√ Natural and created snags
HORS3-93	13.7	37	16.0	33.8	3.1	√ Natural and created snags
LINE 1-00	14.8	42	18.0	65.4	3.0	√ Natural and created snags
LINE 2-00	22.0	62	17.4	66.4	3.1	√ Natural and created snags
Phone Line - 3	19.0	58	16.5	66.6	3.1	√ Natural and created snags
TOTAL	**1,402**	**2,422**	Totals for the 69 Lake Chaplain units which meet WHMP requirements.			
TOTAL	**1,426**	**2,454**	Totals for all 71 Lake Chaplain units having snag mgmt activity to date.			

√ Meets WHMP requirements for size class distribution and number per acre.
\1 Fewer than 3.07 snags/acre exist due to lack of overstory trees in this forested wetland area. Unit will be revisited in 10 years for further snag opportunities.
\2 Remainder of stand, exclusive of already delineated units.

Table 5. Summary of Snag Management Through 2009 – Lost Lake

UNIT	ACRES	NUMBER CREATED	AVG. DBH (in.)	AVG. HT. (ft.)	# PER ACRE	NOTES
Lost Lake 7-1	93.7	234	18.1	62.2	3.3	√ Natural and created snags
Lost Lake 7-2	34.0	80	17.3	61.7	3.2	√ Natural and created snags
Lost Lake 7-3	4.0	0	n/a	n/a	3.1	√ Natural snags only
TOTAL	**132**	**314**	Totals for all 3 Lost Lake units having snag mgmt activity to date, all of which meet WHMP requirements for snags.			

√ Meets WHMP requirements for size class distribution and number per acre.
\1 Fewer than 3.07 snags/acre exist due to lack of overstory trees in this forested wetland area. Unit will be revisited in 10 years for further snag opportunities.
\2 Remainder of stand, exclusive of already delineated units.

Table 6. Summary of Snag Management Through 2009 - Spada Lake Tract

UNIT	ACRES	NUMBER CREATED	AVG. DBH (in.)	AVG. HT. (ft.)	# PER ACRE	NOTES
9-48	**113**	**555**	**14.6**	**59.5**	**4.91**	√ Includes created snags only
9-8	106	326	15.2	60.5	3.3	√ Includes natural and created snags
9-24 \2	12.1	19	15.7	62.0	2.1	Includes natural and created snags
9-35	4.5	13	15.9	54.9	3.9	√ Includes natural and created snags
9-47	4.3	10	15.7	64.0	3.0	√ Includes natural and created snags
9-90	32	143	13.0	45.8	4.5	√ Includes created snags only
9-97	2.3	10	13.2	54.0	4.3	√ Includes created snags only
9-107 complex \1	33.4	121	14.5	48.7	6.4	√ Includes natural and created snags
9-108 complex \1	73	280	13.7	47.5	3.8	√ Includes created snags only
9-110	8.4	34	13.0	51.6	4.0	√ Includes natural and created snags

Table 6. Summary of Snag Management Through 2009 - Spada Lake Tract

UNIT	ACRES	NUMBER CREATED	AVG. DBH (in.)	AVG. HT. (ft.)	# PER ACRE	NOTES
9-114	53.0	178	13.5	53.7	3.3	√ Includes created snags only
9-120	41.0	234	14.11	55.9	5.7	√ Created snags only, from 2004 & 2006
9-121 complex \1	116.0	566	13.6	51.8	4.9	√ Natural and created snags from 2004 & 2006
9-125	32.9	167	14.5	40.1	5.1	√ Includes created snags only, from 2007 & 2008
9-142/ 150 complex	34.0	115	14.4	57.1	3.4	√ Includes created snags only
9-126	23.7	126	14.2	56.7	5.6	√ Includes natural and created snags
9-133	46.0	00	n/a	n/a	n/a	no trees of adequate size; re-visit in 10 years
9-135 complex \1	41.0	161	13.7	52.4	3.8	√ Includes created snags only, from 2006 & 2008
9-144	20.4	129	12.8	59.2	6.2	√ Includes created snags only
9-151 complex \1	28.7	86	13.9	47.3	3.9	√ Includes natural and created snags
9-165	9.2	58	14.2	49.7	3.6	√ includes created snags only
9-173	20.5	00	34.9	58.8	5.8	√ Natural snags only
9-180	7.4	14	21.4	65.0	4.2	√ Includes natural and created snags
9-184	11.0	2	13.1	45.0	3.2	√ Includes created snags only, from 2006 & 2008
The following units were examined for snag creation potential, but due to high tree density and small average diameter, no creation potential exits at this time. Units will be revisited 10 years from date of initial visit.						
9-86	6.3	0	2007. walk thru: 5-18" dense conifers; trees too small, wait 10 years			
9-87	3.2	0	2007. non-vegetated			
9-93	3.1	0	2007. slide area			
9-96	5.2	0	2007. riparian forest			
9-102	0.4	0	2007. deciduous forest; too narrow/ close to road.			

Table 6. Summary of Snag Management Through 2009 - Spada Lake Tract

UNIT	ACRES	NUMBER CREATED	AVG. DBH (in.)	AVG. HT. (ft.)	# PER ACRE	NOTES
9-137	9.1	0	2007. early successional, 3-9" alders; revisit in 10 years			
9-153	7.6	0	2007. early successional			
9-158	6.2	0	2007. recreation site 2			
9-160	31	0	2007. trees too small; wait 10 years.			
9-161	31.8	0	2007. non-vegetated/draw down zone			
9-162	22.6	0	2007. mostly mixed forest; some remnant OG on SW side of South Fork arm. revisit in 10 years			
9-164	17.5	0	2007. avg +/- 6" dbh; very few >11", mostly hardwoods; revisit in 10 years			
9-166	0.35	0	2007. grass meadow, < 1 ac			
9-168	5.3	0	2007. deciduous forest; 3-8" alders, very dense salmonberry understory.			
9-169	2.33	0	2007. mixed forest; 6-10" conifers & alders, very few > 11"; revisit in 10 years			
9-170	8.6	0	2007. deciduous forest; 6-10" alders, revisit 10 years			
9-171	2.4	0	2007. too small to treat individually; wait 10 years and look at combining with 9-162			
9-172	2.1	0	2007. shrub-brush			
9-178	3.8	0	2007. early successional			
9-181	3.2	0	2007. mixed forest; too close to lake and wetland.			
9-182	3.8	0	2007. wetland			
TOTALS	**669**	**2,658**	Totals for those 22 stands/complexes which meet WHMP requirements for number/acre.			
	1,050	**3,347**	Totals for all 45 stands/complexes having snag mgmt activity to date.			

BOLD denotes those units where snag management activity occurred in 2009

√ Meets WHMP requirements for number per acre, but due to lack of large trees, size class distribution cannot be met.

\1 A stand complex is a collection of stands, typically one larger stand with several small stands (less than 2 acres) scattered within its boundaries, which for the purpose of management, are combined and treated largely as a single unit.

\2 Trees not of adequate size for snag creation, re-evaluate in 10 years.

Table 7. Summary of Snag Management Through 2009 - Williamson Creek Tract

UNIT	ACRES	NUMBER CREATED	AVG. DBH (in.)	AVG. HT. (ft.)	# PER ACRE	NOTES
Stand 10-1 \1	21.2	68	16.4	57.1	3.2	√ Created snags only
Stand 10-2 \2	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	133.4	0	31.3	34.6	12.3	√ Natural snags only
Stand 10-7	68.8	0	29.3	38.5	11.1	√ Natural snags only
Stand 10-8	8.5	0	31.0	43.8	9.0	√ Natural snags only
Stand 10-9	3.7	0	24.2	45.0	9.5	√ Natural snags only
Stand 10-11	50.5	0	32.3	46.0	6.0	√ Natural snags only
Stand 10-12	6.3	0	30.7	38.3	6.0	√ Natural snags only
TOTALS	**334**	**121**	Totals for those 10 units which meets WHMP requirements.			
	338	**121**	Totals for all 11 units having snag management activity to date.			

\1 No natural snags found during inventory.

\2 Trees not of adequate size for snag creation, re-evaluate in 10 years.

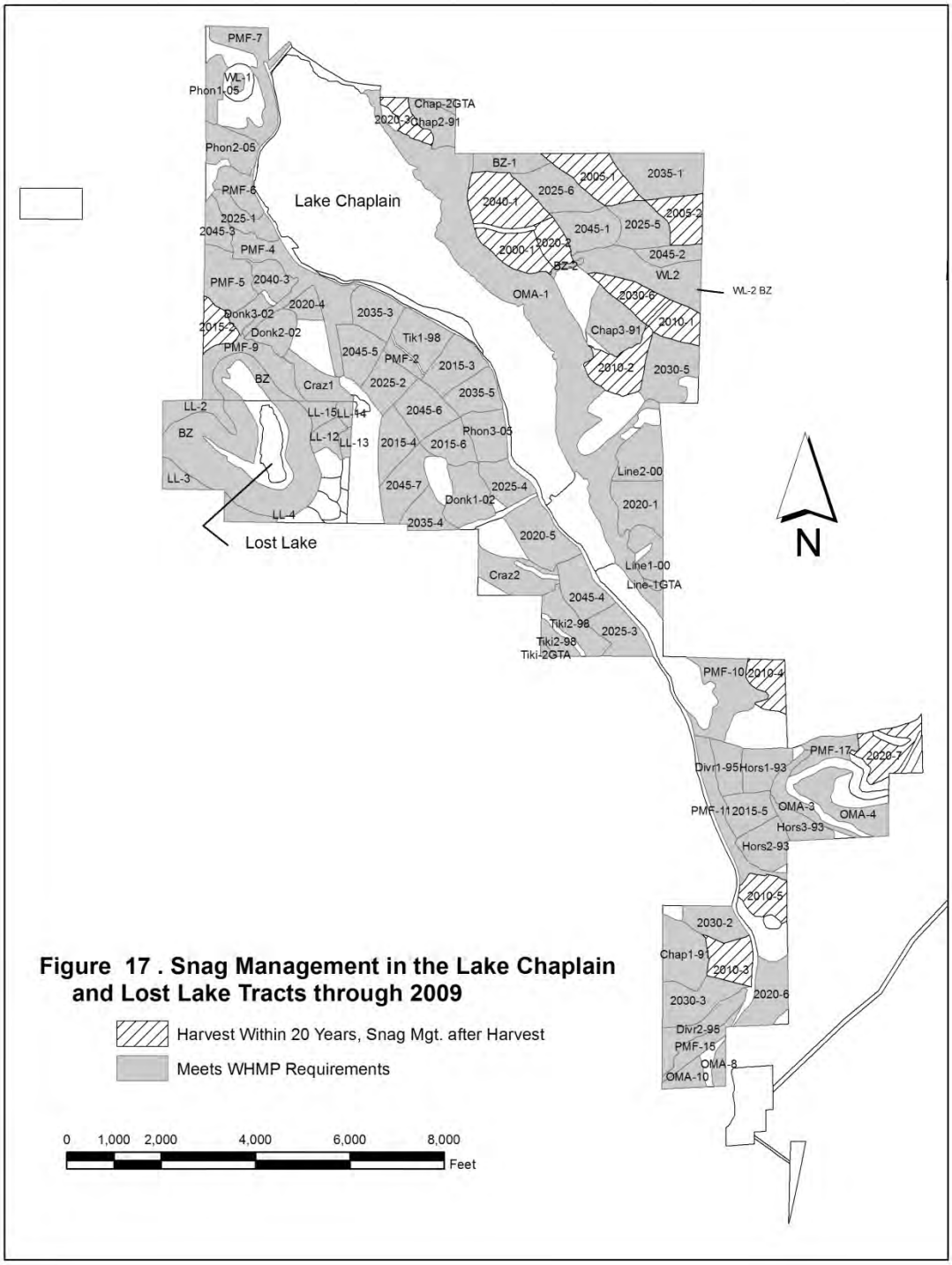

FIGURE 17. SNAG MANAGEMENT IN THE LAKE CHAPLAIN AND LOST LAKE TRACTS THROUGH 2009

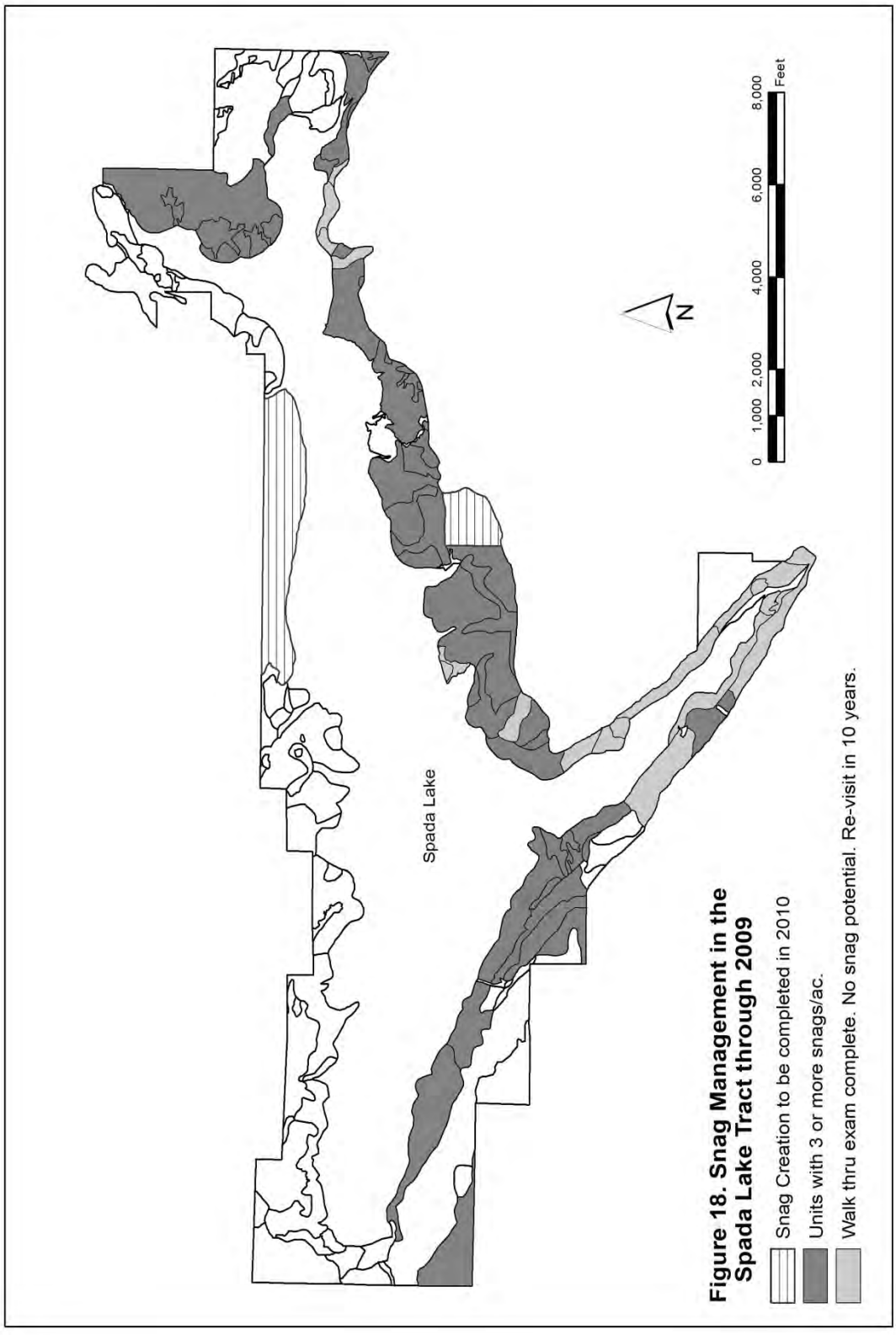

FIGURE 18. SNAG MANAGEMENT IN THE SPADA LAKE TRACT THROUGH 2009

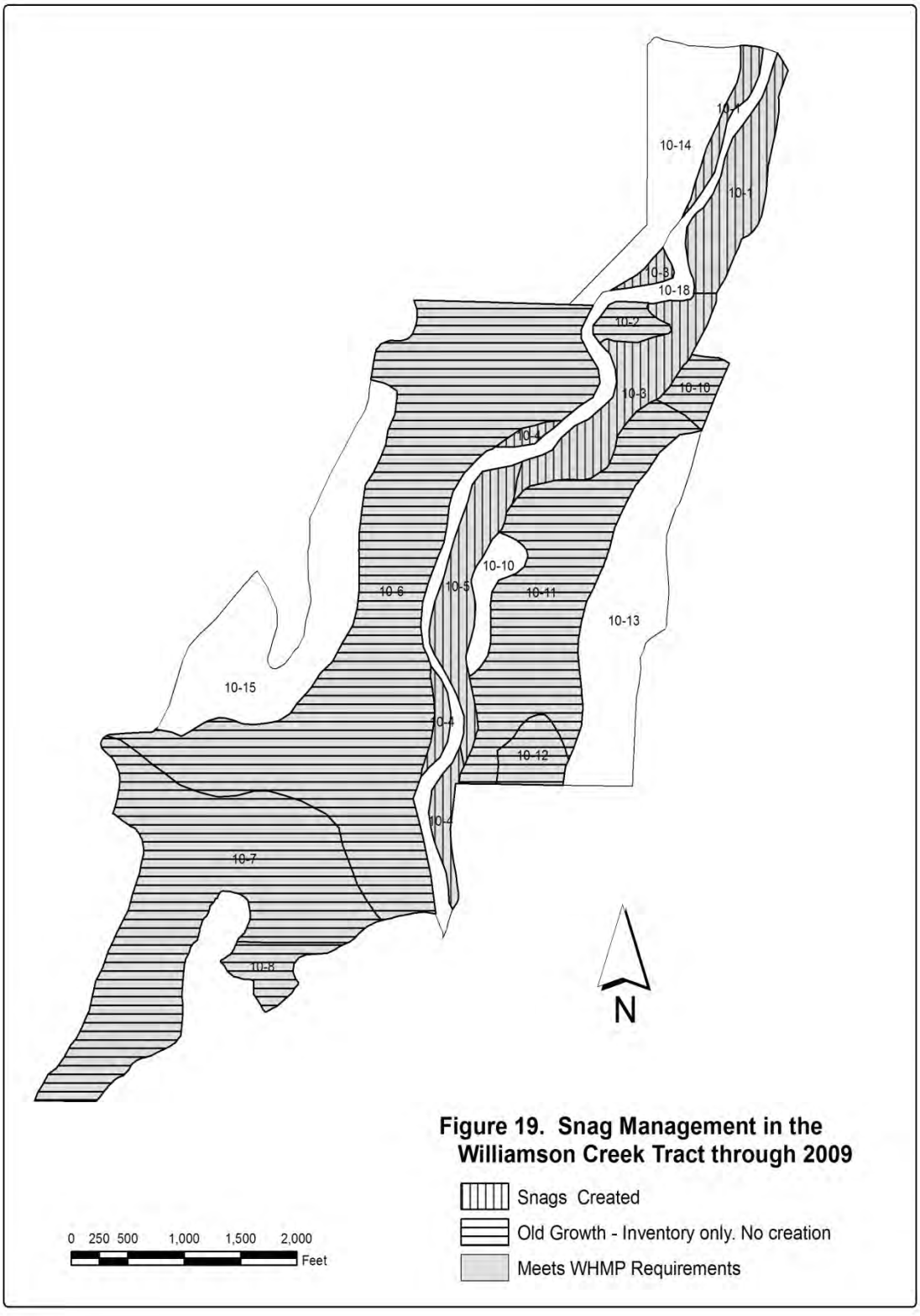

FIGURE 19. SNAG MANAGEMENT IN THE WILLIAMSON CREEK TRACT THROUGH 2009

4.2 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 subsequent 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. Table 8 lists CWD logs created on harvest units from 1995 to date.

4.3 REVEGETATION AND NOXIOUS WEED CONTROL

A Noxious Weed Inventory (Study Plan 8) was conducted in 2007 and the Final Technical Report was filed with FERC in January 2008, as part of the relicensing studies for the Jackson Project, to document the occurrence of species of noxious weeds and invasive non-native plants. The study area included WHMP lands where Project operations or Project-related maintenance, land use practices, or human activities could promote noxious weeds. National Forest System lands within the riparian corridor between Culmback Dam and the Diversion Dam were also inventoried. Approximately 1,089 acres of land were inventoried. Nineteen species of weeds were recorded. See the District's relicensing web site for the entire report (Jackson Hydroelectric Project Study Plan 8: Noxious Weed Inventory; 2008 Technical Report): **http://www.snopud.com/Site/Content/Documents/relicensing/Study%20Reports/Jackson2157_SP8_FTR_Jan2008.pdf**. The Noxious Weed Management Plan has been included in the FLA and Settlement agreements.

Noxious weed control has been conducted using a contract herbicide applicator since 2003, primarily on the pipeline ROW, when the District's policy document governing herbicide usage was modified to allow herbicide application on the Jackson Project. However, chemical herbicide application within the Spada Lake watershed is still restricted in cooperation with the City of Everett. Testing of the effectiveness of biochemical herbicides (primarily acetic acid and citric acid- based products) are currently being tested within the Spada Lake watershed.

4.3.1 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. One sedge species became somewhat 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.

Table 8. Summary of Created CWD on Lake Chaplain Harvest Units

UNIT	ACRES	NUMBER LOGS CREATED	# LIVE TREES	# SNAGS AND EXISTING LOGS	AVG. DBH OF TREE	# LOGS/ ACRE
Divr1-95	15.6	120	34 Douglas fir	0	25.4	7.7
Divr2-95	19.7	160	30 Douglas fir	18 Douglas fir	23.7	8
Tiki1-98	21	166	32 Douglas fir	5 Douglas fir, 2 Hemlock	29.9	7.9
Tiki2-98	23.8	189	42 Douglas fir	5 Douglas fir, 9 Hemlock	27.9	7.9
Line 1-00	14.8	124	29 Douglas fir	5 Douglas fir, 1 Hemlock	26	8.4
Line 2-00	22	176	44 Douglas fir	3 Hemlock	25.3	8
Donk 1-02	23.5	190	42 Douglas fir	9 Douglas fir, 11 Hemlock	24.2	8.1
Donk 2-02	14.3	115	22 Doug fir, 3 Cedar, 4 Hemlock	2 Hemlock	26.4	8
Donk 3-02	7.1	61	13 Douglas fir	1 Douglas fir, 1 Hemlock	25.4	8.6
Phon 1-04	10.5	21	*	19 Hemlock, 2 Cedar	17	tbd*
Phon 2-04	18.1	30	*	30 Hemlock	18	tbd*
Phon 3-05	18.3	153	33 Douglas fir	9 Douglas fir, 6 Hemlock	24.2	8.4
Craz 1-07	17.8	153	22 Douglas fir	2 Douglas fir, 1 Hemlock	26.9	8.6
Craz 2-07	23.2	196	23 Douglas fir	2 Douglas fir, 4 Hemlock	26.8	8.4
Sum	**193.1**	**1505**	**327**			

* Snags and CWD were not created in Phon1-04 and Phon2-04, as described in the 2002 Annual Report, Sec. 3.1.3, p.4. Edge of unit and adjacent GTA provide sufficient logs/acre.

4.3.2 Power Pipeline ROW

Annual maintenance on the Pipeline ROW includes mowing to reduce tree growth and to keep the tall grasses from impeding visual inspection of the pipeline corridor. Off-road vehicle intrusion on the Marsh Creek portion has been reduced greatly compared to the early 1990's, and now occurs primarily when gates are left open during logging operations or to allow recreational access. The lower ROW near the powerhouse, however, is subject to public use during all hours, as the gates are left open.

Noxious weed control is conducted several times each year, as different species are in different stages of growth at different times of the growing season. Mowing helps to reduce some of the noxious weed infestations and prevent seed production in some cases, but herbicide applications outside of riparian buffers and the City of Sultan's watershed are the most effective and efficient means of control. Mapping with GPS has helped to promote repeated visits to sites that in previous years were infested, enabling closer monitoring and control of weeds.

4.3.3 Lake Chaplain Tract

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 greater than 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 area was reseeded in 2001 following alder removal.

Species planted in 1993 adjacent to Chaplain Marsh included western red cedar, English holly, huckleberry, serviceberry, red-osier dogwood, nootka rose and red-flowering current. Many volunteer shrubs have grown on the margin of the marsh as well, including Pacific willow, western hemlock, Douglas fir, big-leaf maple, twinberry, spirea, salmonberry, thimbleberry, vine maple and trailing blackberry. The required plantings 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 temporarily, but the desired species composition was retained. Holly was removed in 2008, as requested by the Forest Service. At the time of this annual report, the planted and volunteers shrub layer is sufficiently dense to screen the marsh from view from the road.

4.3.4 Powerhouse Site

Shrub and tree plantings were monitored at least twice each year as have volunteer native thimbleberry, red alder and salmonberry. Volunteer *Buddleia* have been removed annually since 2004. They have proven to be very resilient, and will continue to be removed wherever they appear. Alder trees that encroach on the shrub/tree clusters have been removed, and will continue to be removed as well.

4.4 NEST STRUCTURES

All of the nest structures that were required by the WHMP have been installed and monitored annually thereafter. In 1990, two floating nest platforms and two duck nest boxes were installed at Lost Lake. One osprey platform was installed at Lost Lake in 1990 and two at Spada Lake in 1992. The additional nest boxes, floating platforms and osprey platform at Lost Lake, Chaplain Marsh, Powerhouse and Spada Lake were installed by the District and provide nesting opportunities beyond what is required in the WHMP.

4.4.1 Floating Nest Platforms

The floating nest platforms provided by the co-licensees have primarily been used for resting and loafing by otters, and occasionally by waterfowl. On only a few occasions nesting or nesting attempts have been noted, and as a result, monitoring is conducted infrequently, while performing other duties at each location.

4.4.2 Nest Boxes

From a high of 53% use to a low of 4.5%, nest box success over the past 20 years has varied greatly. For the past five or six years, black bear predation has been the greatest cause of nest box damage and associated reduction in availability to nesting waterfowl. Typically, little evidence exists to determine with any certainty whether nesting had occurred prior to the box being damaged, but studies show that empty boxes are typically not targeted. Numerous studies have shown that cold and/or wet spring weather can result in reduced nesting attempts and lower success rates. Temperature and precipitation records for February, March and April (the peak nesting period) show slightly higher than average daily temperatures but slightly higher precipitation for Jackson Project lands during those critical months.

4.4.3 Osprey Nest Platforms

Since the osprey platform was installed at Lost Lake in 1990, there have been 5 or 6 years with nesting attempts, with 2 fledglings produced in at least 2 of those years. The osprey returned to the platform only one year since abandoning it, but that nesting attempt was unsuccessful.

The two platforms at Spada Lake have never been successfully used to fledge young. The platform near the South Fork Sultan River was partially built up in 1994, and adults were observed setting on the nest early in the 1995 nesting season, but apparently the nesting attempt failed. In 1996, a natural nest was constructed in the Sultan River gorge about a quarter mile downstream of Culmback Dam; that nest was used for 3 years. When the top of the snag broke, the osprey constructed another nest on the same hillside in 1999. This nest site has been only casually observed, since it is not on Project lands and is not easily viewed, therefore, use is uncertain.

Four osprey were frequently seen on or near the additional osprey nest platform installed in 2007 north of the Powerhouse between the Sultan River and the District's microwave tower. No activity was noted in 2009.

4.4.4 Bald Eagle Nest

The natural bald eagle nest constructed along the east shore of Lake Chaplain in 1996 has fledged at least 11 eaglets since initiation, plus an additional chick that left the nest prematurely in 2006. In conjunction with the Washington Department of Fish and Wildlife, the City of Everett created a nest site management plan that restricts timber harvest within 800' of the nest site from February 1 through August 15.

4.5 FOREST VEGETATION MANAGEMENT - LAKE CHAPLAIN TRACT

4.5.1 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 7. Spur roads were constructed to provide access to individual units as needed for harvest. The RMAP for the Lake Chaplain Tract was completed in 2002, and implementation is continuing.

4.5.2 Timber Harvest

Harvest activity and sale layout to date are depicted in Figure 7.

There have been some substitutions of final harvest units, as summarized below in Table 9. However, the final harvest program complies with the WHMP's schedule to date, as well as requirements such as the restriction on harvest unit size. To date, a total of 18 units (approximately 336 acres) have been clearcut. The WHMP's 15-year green-up period between adjacent harvest units has been followed within the Tract, but some units adjacent to clear cuts on State land did not allow the full 15-years. The WHMP allows some flexibility in scheduling harvests (i.e. harvest may occur 5 years before or after the target year) on the Lake Chaplain Tract, and the co-licensees attempt to provide as much green-up time as possible within the WHMP's schedule.

The commercial thinning schedule in the WHMP 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 10. Two units (38 acres) that were not scheduled in the WHMP were thinned in 1993 (Table 10).

4.5.3 Management of Roads and Post-Harvest Units

All final harvest units at Lake Chaplain were seeded with a grass/forb mix on bare areas, and planted with Douglas fir seedlings; most were also planted with red cedar seedlings. Road ROW's were also seeded, and access roads outside the closed watershed have been gated to prevent vehicular access by the public.

Seedling survival plots have been established in all harvested units after planting, and the results are monitored for at least two years. One unit, Tiki1-98, was replanted one year after initial replanting due to excessive mountain beaver damage.

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.

Other timber salvage work took place in 2004 following severe winter storm blowdown.

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 was 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 and Chap2-91 was precommercially thinned in 2004.

Table 9. Modifications of the Final Harvest (FH) Schedule on Lake Chaplain Tract

Unit Name	Scheduled FH	Reasons for Modification
2005-5 ("Gold Camp")	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 1990-5 in 1995
2020-7 ("Gold Camp")	2005	Recent clearcut on adjoining ownership. Harvest will be delayed until 2020 to allow 15 years of green-up. Unit 2000-1 will be harvested instead of 2005-5
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)
2015-4	2045-6	Rescheduled to avoid future green-up conflicts
2015-6	2000-5	
2025-2	2045-5	
2045-5	2025-2	
2045-6	2015-6	
2045-7	2015-4	

Table 10. Modifications of the Commercial Thinning (CT) Schedule on Lake Chaplain Tract

Unit	Scheduled CT	Reasons for Modification
2010-1	1990	Wet soil; timber type (hemlock) not suited to CT
2010-2	1990	Wet soil; timber type (hemlock) not suited to CT
2015-2	1995	Wet soil
2020-1	1990	Wet soil
2030-2	2005	Steep slope
2030-3	1990	High potential for blowdown; no benefit expected from CT
2025-5	2005	Wet soil; timber type (hemlock) not suited to CT; forage production increasing due to ongoing overstory mortality
2035-1	2005	Wet soil; timber type (hemlock) not suited to CT; forage production increasing due to ongoing overstory mortality
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

4.6 FOREST VEGETATION MANAGEMENT - SPADA LAKE TRACT

4.6.1 Spada Lake Tract Supplemental Plan

The first Supplemental Plan for the Spada Lake Tract for approximately 1,745 acres of land surrounding Spada Lake that were acquired in 1991 was approved by the FERC in 1997. The Spada Supplement called for commercial and precommercial thinning of some forest stands on the Tract. The first Supplement originally called for thinning treatments on as much as 600 acres, depending on feasibility, during the period 1996-2005. After the Supplement was approved, however, 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 20). The road had become inaccessible east of Recreation Site 8 due to a massive landslide in 1997, and the DNR chose to perform the work needed to properly abandon the road, and not to maintain it for vehicular use. Therefore, some of the planned forest management activities, including commercial thinning and precommercial thinning, in units formerly served by this road were affected. With the loss of road access, the only option for future commercial harvest north of the lake would be helicopter logging. The second Supplemental Plan, approved by the FERC in 2008, reflects new management techniques and limitations on road access to the Tract.

4.6.2 Silvicultural Treatments

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 20).

4.6.3 Timber Harvest

A forestry consultant 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 commercial thinning, and Forest Practices applications were approved by the DNR in 2002. Harvest unit boundaries were modified in 2003, following a detailed timber cruise and cost/benefit analysis, and areas requiring road construction or reconstruction were eliminated from the plan. The modified units (approximately 104 acres) were sold in 2003. Logging began adjacent to unit 9-135 in October 2003 and was completed on the remaining units in May 2004 (Figure 20). Currently, no other units with harvestable timber exist on the Tract where roads would not need to be built or reconstructed on unstable soils.

4.7 BIOSOLIDS APPLICATION

The City of Everett applied biosolids on various occasions to harvested units on the Lake Chaplain Tract, as summarized in Table 11.

Table 11. Summary of Biosolids Applications to Lake Chaplain Tract

Unit	Year	Product	Application Rate
Hors1-93	1996	biosolids	12.5 dry tons/ac.
Hors2-93	1996	biosolids	12.5 dry tons/ac
Hors1-93,	2000	2:1::biosolids:wood ash	37.5 dry tons/ac.
Hors2-93	2000	2:1::biosolids:wood ash	37.5 dry tons/ac.
Hors3-98	2000	2:1::biosolids:wood ash	45 dry tons/ac.
Divr1-95	2000	2:1::biosolids:wood ash	45 dry tons/ac.
Hors3-93	2005	Biosolids	24 dry tons/ac.
Divr1-93	2005	Biosolids	26 dry tons/ac.
Line2-00	2005	Biosolids	39 dry tons/ac.
Line2-00	2006	Biosolids	8.6 dry tons/ac.

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.

Two water quality monitoring sites were established on Chaplain Creek to identify possible contamination of the stream from biosolids applied to adjacent harvest units (Hors 1, and 2, and Divr1). Creek waters were sampled monthly beginning in August 1996 through the end of 2001 and at least quarterly afterward. Parameters examined were nitrates, phosphorus, fecal coliforms, ammonia, and chloride. Water quality monitoring has indicated no deleterious effect on the water quality parameters measured resulting from the biosolids application.

Figure 16 compares results from 2004, prior to the most recent biosolids application in the Chaplain Creek drainage, with results from 2005 through 2009. Earlier patterns were reported for fecal coliforms, nitrates and ammonia in the 2002 Annual Report, Section 3.10, and Figures 12-14. Chaplain Creek normally exhibits increases in fecal coliforms during the summer, and nitrates during the winter. The August 2005 spike in ammonia downstream from the biosolids application sites is within the normal range of variation for this contaminant in Chaplain Creek.

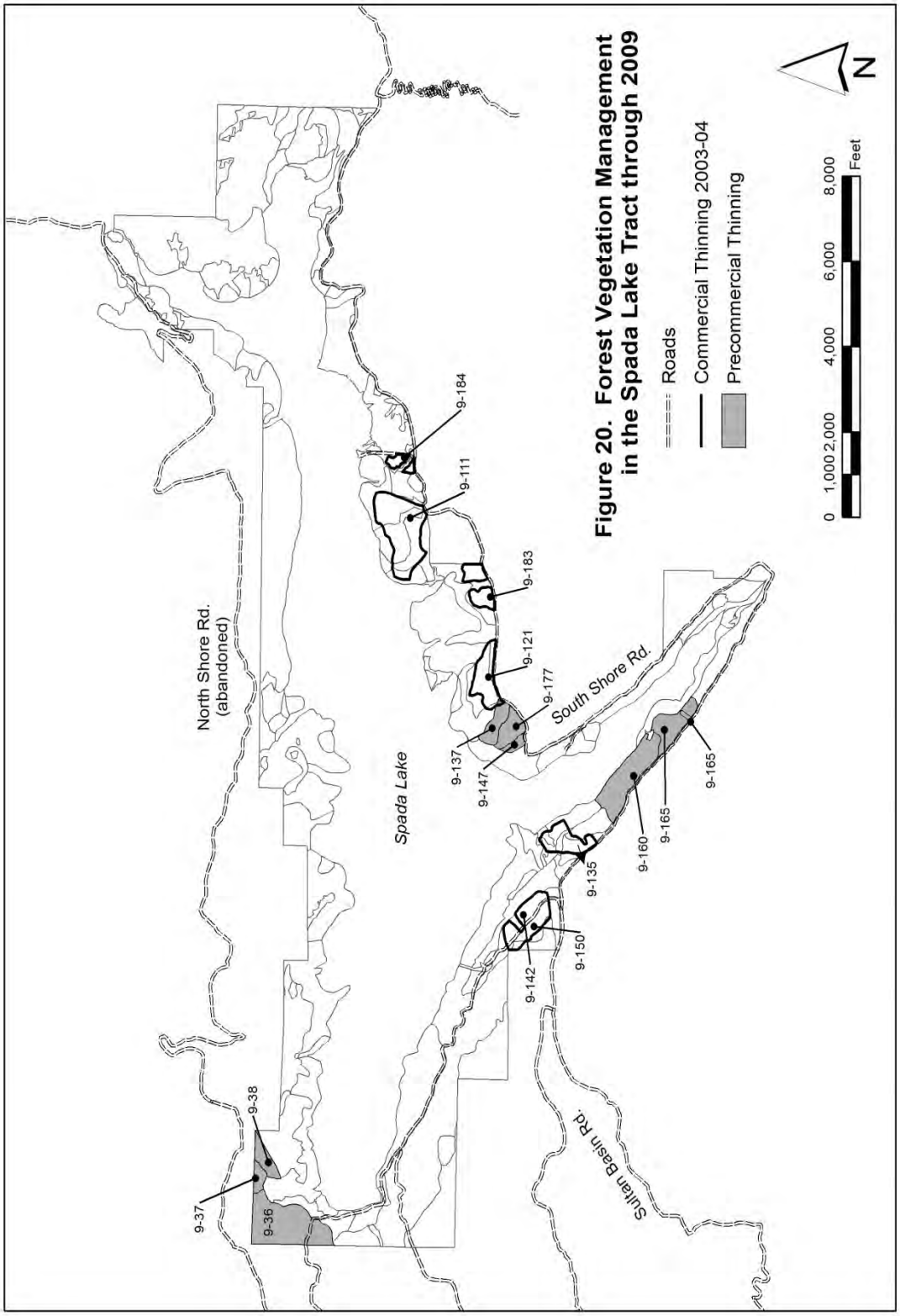

FIGURE 20. FOREST VEGETATION MANAGEMENT IN THE SPADA LAKE TRACT THROUGH 2009

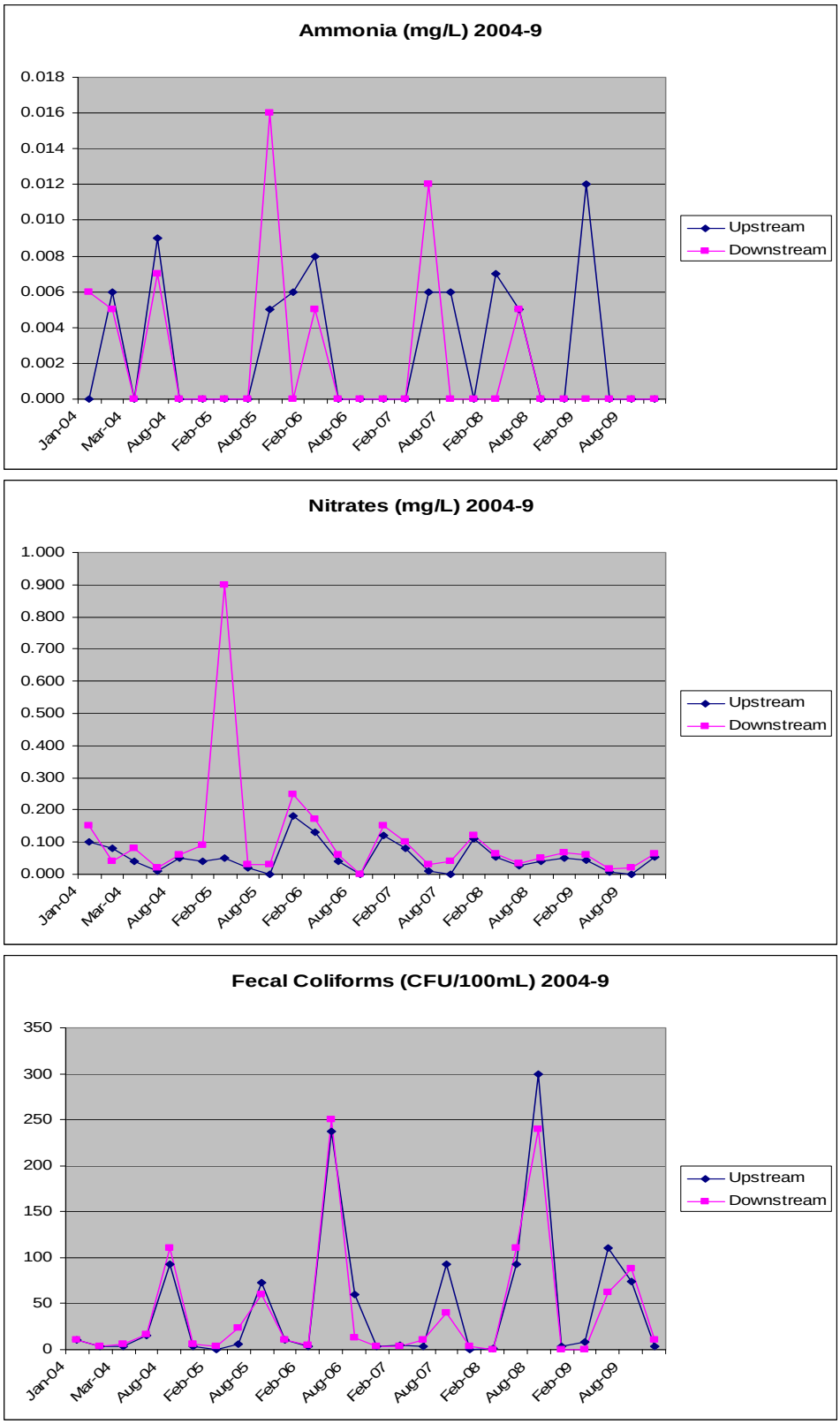

FIGURE 21. WATER QUALITY MONITORING 2004-2009

4.8 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 Lake Chaplain Tract harvest units, as described in the 2004 Annual Report, Table 9.

4.9 LAND ACQUISITION

In 1988 the District purchased the Lost Lake Tract as part of the WHMP requirement. This tract contains a high quality lake and wetland complex and other high quality wetlands.

The District/USFS/DNR land exchange was completed in 1991. The District acquired over 4,000 acres at Spada Lake and Williamson Creek. This included the entire Williamson Creek Tract identified for acquisition in the WHMP. The tract includes old growth, second growth, mixed forest, riparian forest and wetlands, all of which will be preserved and protected.

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 Spada Tract includes old growth forest, second growth, wetlands and riparian forest.

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.

4.10 WILLIAMSON CREEK TRACT

Monitoring of the Williamson Creek Tract focused on baseline inventories of the stands for snags, CWD, understory vegetation, wetlands and photo-documentation. The location and date of inventorying on each stand and inventory procedures are summarized in the 2008 Annual Report, Section 4.10 and Table 12, and results are described in Tables 13 and 14.

4.11 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.

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, SL-48 and SL-67 were officially abandoned in the Sultan Basin under WAC 222-24-052(3). The District hired a geotechnical engineer in 2003 to prepare plans for maintaining the road from Olney Pass to Culmback Dam, and the work was completed in spring 2005. Coordination has continued as new road repairs are needed.

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. Annual meetings are held between the co-licensees and DNR to discuss road and land management activities. Also in 2001, a supplemental easement was obtained on a portion of road CD-147 (see District RMAP) owned by DNR. Discussion between the District and DNR regarding the status of the South Shore Road have continued for several years and have resulted in the District planning on making modifications to its Recreation Sites 4 and 5, pending license amendment, prior to the DNR abandoning the South Shore road beyond recreation Site 3 and converting that portion of the road to a trail.

4.12 JACKSON PROJECT RELICENSING

The District and City filed the Notice of Intent and Pre-Application Document with FERC in December 2005. Scoping meetings were held by FERC in February 2006. A Proposed Study Plan was submitted in May 2006 and a Revised Study Plan was filed in September 2006. The first study season was conducted in 2007 and the Initial Study Report was filed in October of 2007. An Interim Comment Period was provided to the stakeholders by FERC and the District prepared and filed an Updated Study Report in 2008. All terrestrial studies and Final Technical Reports were completed and filed with FERC in 2008. A Preliminary License Proposal was filed with FERC in December 2008. A Noxious Weed Management Plan, Marbled Murrelet Habitat Protection Plan, Terrestrial Resource Management Plan, and Recreation Resource Management Plan were completed and filed with the Final License Application in May of 2009. A Settlement Agreement was signed and filed with FERC in October of 2009. That Settlement included a modified Recreation Resource Management Plan and an Off-License Agreement for Management of the Lake Chaplain Tract. All documents filed with FERC are on the District's website at:
http**://www.snopud.com/PowerSupply/hydro/jhprelicense.ashx?p=1197**.

5.0 WORK PLANNED FOR 2010

5.1 FOREST VEGETATION MANAGEMENT

The density and distribution of hardwoods will be evaluated on selected older units. The older plantations will be monitored for bear damage. In some units, including Divr2-95 and Tiki1-98, it is possible that hardwood density in certain patches may be reduced; however, the target hardwood overstory composition will remain at least 5 to 10 percent of total stem count.

5.2 SNAG MANAGEMENT

In 2010, snag management will focus on completing snag creation on the Spada Lake stand where work began in 2009. Units at the Lake Chaplain Tract where 10 years have elapsed since initial snag creation began will also be revisited. These units will be re-inventoried and the status of created snags will be verified to characterize use by wildlife. Any deficiencies in snag quotas will be remedied at that time. Also, stands along both the South and North Shores at Spada Lake will be inventoried, with creation to follow as time allows.

5.3 REVEGETATION

5.3.1 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 is in the vicinity.

5.3.2 Power Pipeline Right-of-Way

Weed survey data from Study Plan 8: Noxious Weed Inventory 2007 Technical Report will be used to target control efforts, with new locations and control efforts added to the GIS database.

5.3.3 Lake Chaplain Tract and Powerhouse Site

Monitoring and routine maintenance will be conducted as in previous years. Volunteer alders encroaching on the plantings in the powerhouse bridge area will be thinned to encourage survival of the planted shrubs.

5.4 NEST STRUCTURES

Floating nest platforms will be monitored when other activities are conducted at Lost Lake and Spada Lake, and will be checked at the end of the nesting season to record any signs of use.

Nest boxes will be cleaned and repaired as necessary by the end of February in preparation for the upcoming nesting season. Due to the increasing problem of predation, when reinstalled, boxes will be placed further apart and each tree will be

wrapped with three to four vertical feet of flashing, in an attempt to deter bears from climbing the trees. Until the success of these measures can be determined, boxes that have been damaged may not be replaced. Boxes will be checked in early summer to record species use and nesting success rates.

The osprey platforms at Spada and Lost Lakes, and the bald eagle nest at Lake Chaplain will be monitored in conjunction with other activities, but typically at least once per month, to record nesting use.

5.5 DEER FORAGE MONITORING

The following Lake Chaplain Tract harvest units will be monitored in 2010: Donk2-02, Hors3-93, and a control unit in proposed harvest unit 2005-1 (see Figure 12).

5.6 WILLIAMSON CREEK TRACT

Baseline inventories have been completed on the Williamson Creek Tract. Monitoring may occur on the wetlands, old growth and mixed forest stands on a continuing, but less intense basis.

5.7 LAND MANAGEMENT

The District will submit a letter to DNR requesting to no longer be subject to the provisions of the RMAP because it qualifies as a small forest land owner. The City will continue to implement its RMAP on the Lake Chaplain Tract.

5.8 JACKSON PROJECT RELICENSING

The FERC is scheduled to issue a Draft EA on May 5, 2010. Comments on the Draft EA will be due on June 4, 2010. Filing of Modified Mandatory Terms and Conditions is scheduled for August 3, 2010. The Final EA is scheduled to be issued on November 1, 2010.

5.9 SPADA LAKE TRACT SUPPLEMENTAL PLAN

The Spada Supplemental Plan for the period 2006-2015 will continue to be implemented.

5.10 SECURITY MEASURES AT LAKE CHAPLAIN/JACKSON PROJECT FACILITIES

The City and District will continue existing security measures at Lake Chaplain and at Jackson Project Facilities.

6.0 PLANNED ACTIVITIES FOR 2010

Major Activities	Location	Quantity/Description
Monitor Thinning Units	Spada Lake Tract	All commercial thinning units
Final harvest unit monitoring	Lake Chaplain Tract, Crazy Bear, older plantations	2 units, others TBD
Snag Inventory	Spada Lake Tract & Lake Chaplain	4+ units at Spada Lake; 10+ units due for 10-year re-inventory at Lake Chaplain
Snag Creation	Spada Lake Tract & Lake Chaplain	4+ units at Spada Lake; as required by 10-year re-inventory at Lake Chaplain
Nest Structures	Lost Lake, Spada Lake, Project Facility Lands Tract and Chaplain Tract	Clean and repair existing structures as needed
CWD Creation	n/a	No units slated for harvest in 2010.
Revegetation:		
Grass seeding/fertilizer Shrub plantings	Pipeline ROW	As needed to improve bare spots
Monitoring:		
Revegetation Site Monitoring/ Maintenance	West side, Chaplain Marsh North end, Lake Chaplain Powerhouse site Pipeline ROW	Monitoring of all planted/seeded areas as time allows. Maintenance as needed: Weeding, brush thinning, etc.
Deer Forage	Lake Chaplain Tract	Donk2-02, Hors3-93, 2005-1
Snags	Lake Chaplain, Lost Lake Tracts	Subset of created snag trees to document use and longevity
Nesting Structures	Lost Lake, Spada Lake, Project Facility Lands, and Chaplain Tract	Monitor & maintain all structures
Williamson Creek monitoring	Williamson Creek Tract	Wetlands

Major Activities	Location	Quantity/Description
Noxious weeds	All WHMP lands	Develop monitoring plan SOP and control weeds as needed
Understory monitoring		None planned
Water quality monitoring	Chaplain Creek	2 stations
GTA and BZ Management	All established units	Set up in conjunction with harvest unit boundary placement.
Land Management	Spada Lake Tract	Conversion of South Shore Road beyond Site 3 to trail.
Road Maintenance	Lake Chaplain Tract	RMAP implementation
Relicensing	All WHMP lands	Participate in EA process as needed.
Spada Lake Tract Supplemental Plan	Spada Lake Tract	Focus actions on South Shore Road area

APPENDIX 1 – WHMP IMPLEMENTATION MILESTONES & PAST REPORT CROSS-REFERENCE TABLE

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	Phone Line Sale	2002 (3.1.3, p.4), 2004(3.1.1 p.9), 2005 (3.1.1, p.7), 2006(3.1.1 p.4)
	Lake Chaplain	Crazy Bear Sale	2004 (3.1.5, p.11), 2005 (3.1.2, p.7), 2006 (3.1.2, p.4), 2007 (3.4.1, p. 14), 2008 (3.4.1)
	Lake Chaplain	Salvage Sales	1993 (3.1.2, p.6), 1998 (3.1.1, p.2), 1999 (3.1.1, p.2), 2004 (3.1.4, p.9)
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)
	Lake Chaplain	Crazy Bear Sale	2007 (3.4.1, p. 14)
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)

General Activity Category	Management Tract	Milestone	Annual Report Reference – (Section/page #)
Forest Vegetation Management	Lake Chaplain	Precommercial Thinning, Hardwood Reduction	1999 (3.1.5, p.5), 2001 (3.1.4, p.4), 2002 (3.1.4, p. 7), 2004 (3.1.2, p.9), 2006 (3.1.3, p.4)
	Lake Chaplain	NE Corner	2008 (3.4.2)
	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)
	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), 2003 (3.2, p.2),
	Spada Lake	Commercial Thinning	2004 (3.2, p.11), 2006 (3.2, p. 4)
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), 2005 (3.3, p. 11)
	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), 2006 (3.3.1, p.4), 2008 (3.1.1, p.5)
	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), 2003 (3.3.1, p.9), 2003 (3.3.2, p.10)
	Williamson Creek Spada Lake	Snag Creation Snag Creation	2002 (3.4.1, p.10)) 2002 (3.4.1, p.10), 2003 (3.3.1, p.4), 2004 (3.3.1, p.11), 2006 (3.3.2, p.6), 2007 (3.1.2, p.5), 2008 (3.1.2, p.5)
	Williamson Creek	Snag Inventory	2002 (3.10, p.33)

General Activity Category	Management Tract	Milestone	Annual Report Reference – (Section/page #)
CWD Management	Lake Chaplain	Implementation Decisions	1991 (3.10.2, p. 27), 1992 (3.9.2, p.12), 1993 (4.5, p.22), 1994 (3.6.6, p.10), 1995 (3.3.2, p.11), 1995 (Appendix A-Exhibits 1-3), 1996 (3.3, p.10)
	Lake Chaplain	CWD Inventory Results	1991 (3.10.2, p.27), 1993 (3.7.2, p.14), 1995 (Appendix A-Exhibit 4)
	Lake Chaplain	CWD Creation	1994 (4.7.6, p.18), 1995 (3.3.1, p.7), 1995 (Appendix A-Exhibit 4), 1998 (3.3, p.9)
	Lake Chaplain	CWD Monitoring	1998 (3.3, p.9), 1999 (3.3, p.5), 2000 (3.3.2, p.9)
	Williamson Creek	CWD Inventory Results	2002 (3.10, p.33)
Revegetation	Spada Lake	Drawdown Zone Test Plantings and Monitoring	1994 (3.3.1, p.6), 1995 (3.4.1, p.12), 1996 (3.4.1, p.10), 1997 (3.4.1, p.10, 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 and Monitoring	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), 2001 (3.5.1, p.14), 2002 (3.5.2, p.16), 2003 (3.4.2, p.11)
	Pipeline ROW	Plant shrubs and trees	1997 (3.4.2, p.11), 1998 (3.4.2, p.10), 1999 (3.4.2, p.12), 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 and monitoring	1992 (3.4, p.10), 1998 (3.4.5, p.12), 1999 (3.4.5, p.12), 2000 (3.4.2, p.13), 2001 (3.5.2, p.15)

General Activity Category	Management Tract	Milestone	Annual Report Reference – (Section/page #)
	Lake Chaplain	Plantings along Chaplain Marsh and monitoring	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 and monitoring	1993 (3.3, p.11). 1997(3.4.4, p.13), 1999 (3.4.3, p.12), 2003 (3.4.1, p.10)
Noxious Weed Control	Pipeline ROW	Mapping and control	2004 (3.4, p. 15), 2005 (3.4.2, p.11), 2006 (3.4.2, p. 10), 2008 (3.2.2, p.8)
	Lake Chaplain	Mapping and control	2004 (3.4, p. 15), 2005 (3.4.1, p.11), 2006 (3.4.1, p. 10), 2008 (3.2.1, p. 6)
	Spada Lake	Mapping and control	2004 (3.4, p. 15), 2006 (3.4.3, p. 10), 2008 (3.2.4, p 8)
	Transmission Line ROW	Mapping & Control	2008 (3.2.3, p. 8)
	Lost Lake	Mapping and control	2004 (3.4, p. 15), 2005 (3.4.3, p.11)
	Williamson Creek	Mapping & Control	2008 (3.2.5, p. 8)
	Project Lands	Inventory & Mapping	2007 (3.2 p. 8)
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 (3.62, p.18), 2003 (3.5.1, p.11), 2004 (3.5.1, p.16), 2005 (3.5.1, p.13), 2006 (3.5.1, p. 10), 2007 (3.3.1, p. 9), 2008 (3.3.1)
	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), 2003 (3.5.2, p.11), 2004 (3.5.2, p.16), 2005 (3.5.2, p. 13), 2006 (3.5.2, p. 11), 2007 (3.3.2, p. 9), 2008 (3.3.2)

General Activity Category	Management Tract	Milestone	Annual Report Reference – (Section/page #)
	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), 2003 (3.5.3, p.16), 2004 (3.5.3, p.22), 2005 (3.5.3, p. 18), 2006 (3.5.3, p. 11), 2007 (3.3.3, p. 14), 2008 (3.3.3)
	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.14).
	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), 2003 (3.5.2, p.11), 2004 (3.5.2, p.16), 2005 (3.5.2, p. 13), 2006 (3.5.2, p. 11), 2007 (3.3.2, p. 9)
	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), 2003 (3.5.1, p. 11), 2004 (3.5.1, p.16), 2005 (3.5.1, p. 13), 2006 (3.5.1, p. 10), 2007 (3.3.1, p. 9)
	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), 2003 (3.5.2, p.11, 2004 (3.5.2, p.16), 2005 (3.5.2, p. 13), 2006 (3.5.2, p.11), 2007 (3.3.2, p. 9)
	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), 2003 (3.5.3, p.16), 2004 (3.5.3, p.22), 2005 (3.5.3, p. 18), 2006 (3.5.3, p. 11), 2007 (3.3.3, p. 14)

General Activity Category	Management Tract	Milestone	Annual Report Reference – (Section/page #)
Bald Eagle Nest	Lake Chaplain	Monitoring	1997 (3.5.4, p.19), 1998 (3.5.4, p.18), 1999 (3.5.4, p.20), 2000 (3.5.4, p.20), 2002 (3.6.4, p.22), 2003 (3.5.4, p.16), 2004 (3.5.4, p.22), 2005 (3.5.4, p.18), 2006 (3.5.4, p.11), 2007 (3.3.4, p. 14), 2008 (3.3.4)
Biosolids Application	Lake Chaplain	Biosolids Application	1996 (3.8, p.18), 1998 (3.7, p.18), 2000 (3.7, p.20), 2005 (3.7, p.20), 2006 (3.7, p. 17)
	Lake Chaplain	Monitoring	1996 (3.8, p.18), 1997 (3.7, p.19), 2000 (3.7, p.20), 2002 (3.8, p.23), 2004 (3.7, p.24), 2005 (3.7, p. 23), 2006 (3.7, p. 19), 2008 (3.7)
Deer Forage Monitoring	Lake Chaplain	Implementation Decisions & Methods	1991 (3.10.1, p.21), 1996 (3.9, p.18) 1997 (3.8.1, p.19)
		Forage Availability Results	1991 (3.10.1, p.22), 1996 (3.9, p.18) 1997 (3.8.2, p.22), 1998 (3.8, p.18), 1999 (3.7, p.20), 2000 (3.8, p.24), 2002 (3.9, p.23), 2003 (3.8, p.18). 2004 (3.8, p.24), 2005 (3.8, p. 23), 2006 (3.8, p.19), 2007 (3.8, p. 17), 2008 (3.8)
		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)

General Activity Category	Management Tract	Milestone	Annual Report Reference – (Section/page #)
	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), 2004 (3.14, p.29)
	PUD Properties	Road Maintenance and Abandonment Plan	2002 (3.12, p.36), 2003 (3.11, p.24), 2004 (3.10, p.24), 2005 (3.10 p.23), 2006 (3.10, p.19), 2008 (3.10)
	Lake Chaplain	Road Maintenance and Abandonment Plan	2002 (3.11, p.36), 2005 (3.9, p. 23), 2006 (3.9, p.19), 2008 (3.9)
Special Agency Consultation	All management tracts	Agency tour of WHMP Sites FERC Environmental Inspection	1997 (3.9, p.22), 2004 (Appendix 1) 1999 (3.9, p.31), 2003 (3.13, p.27)
Security Measures	Lake Chaplain and JHP Facilities	Heightened security measures	1994 (3.3.2, p.7), 2002 (3.13, p.36), 2003 (3.12, p.27, 2004 (3.11, p.27), 2005 (3.11, p. 26), 2006 (3.10, p. 26)
Other Monitoring	Williamson Creek	Monitoring	1999 (3.8, p.26), 2000 (3.9, p.24), 2002 (3.10, p.24), 2003 (3.0, p.18)
Relicensing	All All	Follow ILP Conduct Studies	2004 (3.12, p.27) 2005 (3.12, p. 26), 2006 (3.12, p. 26)

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