
Appendix XX Wildlife Program

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WILDLIFE INVENTORY

Wildlife inventory projects on TFL 37 include the following: Bald eagle nest, marbled murrelet, owls, northern goshawk, black-tailed deer, deer winter range inventory, wildlife habitat area wildlife inventory, wildlife tree, stream invertebrates and forest birds in four stand-level biodiversity treatments.

Bald Eagle Nests

Bald eagle nests, both active and inactive, are protected under Section 35 of the Provincial Wildlife Act. Canfor's eagle nest tree policy is to protect these nest trees during normal harvesting operations by leaving the tree and at least a 10 m buffer. Up until 1996, bald eagles were blue-listed by the Ministry of Environment, Lands and Parks and may be included in Volume 2 of the *Identified Wildlife Management Strategy*.

Canfor has been inventorying eagle nest sites on TFL 37 for the past seven years. The objectives of the project are:

- Inventory and map both active and inactive bald eagle nests on TFL 37.
- Monitor nesting success of bald eagles on TFL 37.

In 1990, it was found that ground-based surveys were inefficient in locating nest sites. Canopy closure and the vertical structure of the forest made the nest locations very difficult to determine from the ground. Each year new nest sites are located. A combination of ground and aerial surveys in 1990 located 23 nest sites compared to over 90 nests in 1997 by aerial surveys. Each nest tree is mapped on GIS.

Marbled Murrelets

In 1991, Canfor participated in an Island-wide survey to estimate Marbled Murrelet populations. These surveys on TFL 37 and FL A19233 have continued annually from 1991-1996 (inclusive) in order to monitor annual population changes.

In 1996, additional landscape level surveys were conducted in Schoen-Strathcona, Woss-Tsitika, and Pinder-Atluck Special Management Zone (SMZs) (formally known as Low Intensity Areas). Also, stand level surveys were conducted in proposed cutblocks in the SMZs.

Owls

Owls have been used as an indicator of the health of ecosystems throughout the world. Reductions in owl numbers in the 1950s was traced to pesticides used to control rodent populations. A more recent example occurred in the Pacific Northwest with the Spotted Owl. Preservationists stated that populations of this species was declining at an alarming rate due to habitat alterations by logging. The U.S. government responded by significantly curtailing logging in the region.

Many owls have been linked to mature and overmature forests for nesting habitat. Some owl species are termed secondary-cavity nesters, since they nest in cavities created by woodpeckers or natural cavities. On TFL 37, four of the five owl species are dependent on cavities in standing dead trees for their survival. As a result of this habitat association on Vancouver Island, the Northern Pygmy-owl is blue-listed by the Ministry of Environment Lands and Parks. The Northern Pygmy-owl may be included in Volume 2 of the *Identified Wildlife Management Strategy*.

The distribution and relative abundance of owls on northern Vancouver Island is largely unknown. In 1993, Canfor conducted a survey which located 17 Western Screech-owls, 7 Northern Pygmy-owls, 3 Northern Saw-whet Owls, 3 Barred Owls and 2 Great Horned Owls (Deal, 1993). In 1995, the first year of a more comprehensive owl inventory of TFL 37 was carried out. The survey resulted in 82 Western Screech-owl detections, 37 Northern Pygmy-owl detections, 22 Northern Saw-whet Owl detections, 22 Barred Owl detections and 1 Great Horned Owl detection. The 1996 and 1997 owl inventories examined the year to year variability of locations.

The primary objectives of the inventory are:

- To inventory owls and map the location of owl detections on TFL 37.
- To determine the relative abundance of each owl species occurring on TFL 37.
- To determine the effect of elevation on the distribution of owls.
- To determine the temporal effects of owl response times.

The project deliverables are:

- 1:20,000 and 1:50,000 maps showing the location of each owl by survey number and if requested, digital information, in ArcInfo format, can be provided to provincial ministries to integrate with existing provincial data.
- A report detailing the following: trends in species number, response times, effects of elevation, and distance to lake or river; general distribution patterns across the landscape; distribution of each species detection by snowzone and biogeoclimatic subzone.

Northern Goshawks

In 1995, we partnered with MoELP on an northern goshawk inventory and research project on TFL 37. Since the projects were initiated 10 nests (2 new ones in 1998) have been located on TFL 37. In addition to the MoELP projects, in 1996, we initiated a cutblock level inventories for Northern Goshawks in Schoen-Strathcona, Tsitika-Woss, and Pinder-Atluck Special Management Zones. This project will be continued in 1999.

Surveys were carried out in late-May to the end of June. Cassette decks were used to broadcast pre-recorded calls of Northern Goshawks in various stands to elicit a response. If a goshawk was detected, the stand was intensively searched for the nest.

Black-Tailed Deer

We have assisted Ministry of Environment, Lands and Parks since 1978 with a black-tailed deer monitoring program. Designated clearcuts are surveyed in the spring for deer by night-time spot-light counts.

Deer Winter Range Inventory

In 1983, an ungulate winter range plan for TFL 37 was approved by Cabinet. At that time, a total of 5,868 ha of deer winter range and 500 ha of elk winter range were approved. Currently, there are approximately 5900 ha of designated deer winter range, 650 ha elk winter ranges and 250 ha elk summer range on TFL 37 and there is an additional 2,500 ha that the Ministry of Environment, Lands, and Parks have identified as an "areas of interest" for deer winter range assessments². These "areas of interest" are causing conflicts

² These recent figures were not used in the timber supply analysis for MP 8 as they include areas within newly established parks. They reflect continuing work on ungulate winter ranges within TFL 37, in accordance with Section 69 of the Code's Operational Planning Regulation. These figures will not be included as deferrals/reductions in the Chief Forester's determination.

between industry, MoELP, and MoF with short term planning for timber harvest. Whenever a cutblock is proposed within the 2,500 ha, it is recommended for deferral by MoELP. The 2,500 ha equates to approximately 2 million m³.

The objectives are as follows:

- Inventory deer and elk winter ranges classified in 1983 as low quality to determine their habitat quality.
- Inventory MoELP's priority "areas of interest" for deer and elk winter range potential.
- In partnership with MoF and MoELP, propose alterations to the 1983 ungulate winter range plan that would see no net loss of volume while protecting critical winter range.

The field assessments are scheduled to begin in 1998. Recent changes to the Code (Bill 47) may influence objective 3.

Wildlife Habitat Area Wildlife Inventory

Currently, 5% of the operable landbase of TFL 37 has been designated as either deer or elk winter ranges (DWRs). Many of these areas were part of the old firebreak system and were designated as deer winter range based on their elevation and aspect. Many other wildlife species use these DWRs, but to date, inventories for other vertebrates or plants have not been carried out. As resource managers we need to know if these areas will provide critical habitat for red, and blue-listed and regionally important plants and animals.

In 1995, Canfor began a wildlife inventory of existing DWRs in Special Management Zones. This overall inventory was intended to focus on mammals, birds, reptiles, amphibians, and plants. Ground vegetation, coarse woody debris, and Wildlife Trees were inventoried in 1995. The project was postponed in 1996 due to funding restrictions.

Stream Invertebrates

In 1992, Canfor assisted students from Simon Fraser University who were studying the invertebrate communities in streams in the CWH biogeoclimatic zone. They were examining the ability of stream communities to resist logging induced disturbance by determining the relationship between the proportion of the watershed disturbed and stream invertebrates.

Wildlife Tree

As a result of all the projects being carried out on cavity users and information being passed on from field staff, we have data on over 1000 wildlife trees. A database was developed to track all the known wildlife trees. This database includes black bear dens, eagle nests, hawk nests, woodpecker nests, and other significant trees.

Forest Birds in Four Stand-level Biodiversity Treatments

With the introduction of the Code, many new rules governing forest land use, planning and practices were developed. For example, the Code requires management for biodiversity. The Biodiversity Guidebook was developed to assist forest planners with this task. A fundamental premise of the guidebook is to implement strategies at both the landscape and stand levels to maintain biodiversity. Stand-level recommendations are designed to maintain or restore important structural attributes such as wildlife trees, coarse woody debris, and vegetation diversity.

The Guidebook recommends several ways that biodiversity should be managed at the stand-level, such as wildlife tree patches. Many of the recommendations within the guidebook are perceived to be "good" for

wildlife, but to date, very few extensive inventories have been carried out on Vancouver Island to examine the effectiveness of stand-level biodiversity initiatives on forest birds.

The overall objective of the *Inventory of Forest Birds within Four Stand-level Biodiversity Treatments in the Nimpkish Valley* is to determine the effectiveness of stand-level biodiversity treatments as prescribed by the Biodiversity Guidebook.

Specifically, the objectives are:

- To inventory forest birds using clearcuts with artificial snags; clearcuts with artificial snags and nest boxes; clearcuts with wildlife tree patches; clearcuts with treed gullies; clearcuts with no treatment; and old-growth.
- To determine if breeding bird density and diversity is significantly different between clearcuts with no treatment; clearcuts with artificial snags; clearcuts with artificial snags and nest boxes; clearcuts with wildlife tree patches; clearcuts with treed gullies; and old-growth.
- To examine temporal variation in the forest bird community by year and treatment.

In 1995, data were collected for this project. Further data will be collected in the future.

WILDLIFE HABITAT RESEARCH

Wildlife habitat research on TFL 37 include the following projects: small mammals, forest birds, woodpeckers, bears, bats and forest fragmentation.

Small Mammals

In 1992, Canfor initiated a study to examine small mammal habitat. The objectives of the Nimpkish Small Mammal Habitat study were to inventory small mammals in seven age classes of Douglas-fir, identify habitat requirements and to determine the effects of pre-commercial and commercial thinning on small mammal abundance and distribution.

Preliminary results show that deer mice were most abundant in clearcuts. Microhabitat information has not been statistically analysed to date.

Forest Birds

In 1993, Canfor initiated a 3 year breeding forest bird study to examine bird communities and habitat use within 9 forest age classes within 3 biogeoclimatic subzones/variants. The objectives were:

- To determine the breeding bird communities and spring/summer bird utilisation of nine forest age classes (where possible) in CWH (Coastal Western Hemlock)xm2, CWHvm1, and CWHvm2 biogeoclimatic variants on TFL 37, near Woss B.C..
- To determine if there is a statistical difference in the frequency of each bird species (singing males only) between nine forest age classes (where possible) in the CWHxm2, CWHvm1 and CWHvm2 biogeoclimatic variants on TFL 37.
- To determine if the forest inventory data, site description data, and vegetation data (including plant phenology), as outlined in *Describing Ecosystems in the Field*, correlates significantly with bird species frequency.
- To determine statistically significant yield curves for breeding forest bird species found within second-growth forests in the CWHxm2 biogeoclimatic variant.
- To compare two types of bird censusing methods, namely, modified point counts and spot-mapping.
- To determine territory size of forest birds located in CWHxm2 old-growth patches.

- To determine the effect of species packing on territory size.
- To develop guidelines for managing breeding habitat for birds.

Woodpeckers

Woodpeckers are a group of forest birds that have unique habitat requirements and response to forest structure. To nest, they require a standing dead or live tree with a decay pocket. Woodpeckers are termed primary cavity nesters, since they create their own nesting, roosting, and feeding holes.

Woodpeckers are also ecologically important since they provide critical habitat for many other wildlife species which are unable to create their own holes in trees (secondary-cavity nesters). For example, the blue-listed Northern Pygmy-owl is dependent on tree cavities for their survival.

Many of the woodpecker studies conducted to date have examined woodpecker habitat in the boreal forest. Some of the research findings are applicable to the entire range of each woodpecker species, such as, dependence on standing dead trees for nesting habitat. However, more specific habitat requirements, such as preferred tree species and size class, will differ within the temperate rain forest of Vancouver Island.

It is necessary to determine these specific requirements for woodpeckers on TFL 37 so that Canfor can better understand and manage for their nesting habitat and stand-level biodiversity .

The objectives of the project are to:

- Inventory Pileated Woodpecker, Downy Woodpecker, Hairy Woodpecker, Three-toed Woodpecker, Northern Flicker, and Red-breasted Sapsucker nest sites on TFL 37.
- Determine nest tree characteristics of Pileated Woodpecker, Downy Woodpecker, Hairy Woodpecker, Three-toed Woodpecker, Northern Flicker, and Red-breasted Sapsucker on TFL 37.
- Determine if Pileated Woodpecker, Downy Woodpecker, Hairy Woodpecker, Three-toed Woodpecker, Northern Flicker, and Red-breasted Sapsucker have a preferred nest tree species on TFL 37.
- Determine if the cruise data can be used to categorise woodpecker nesting habitat.

This information obtained from this project will be used for habitat enhancement techniques such as artificial snag planting and wildlife tree patches to provide high quality habitat.

Bears

A joint MoELP-Canfor study was initiated in 1993 to examine the seasonal habitat requirements of Black Bears and to determine the general impacts from logging, silviculture, and roads. This study ended in 1996.

Bats

In general, little is known about bats because their small size, nocturnal behaviour, and mythical status hinders our ability to study them. The information that is presently available suggests that bats, as the second most diverse order of mammals, may be an important component in forest ecosystems. For example, bats are the major predators of nocturnal flying insects, and may thus play an important role in the biological control of forest insect pests. Further, bats may be important in the nutrient dynamics of a forest, as bats typically forage over a large areas and disperse their nitrogen rich guano throughout forests. As bats may play a significant role in forested areas, this group of animals may be important in monitoring the health and environmental sustainability of forest ecosystems.

In natural situations, many bat species are dependent on the cavities and loose bark of standing dead trees for roost sites. As a result of this habitat association, the maintenance of bat diversity and abundance may be closely linked with sustaining sufficient forest habitat of a suitable type (e.g., age class, species composition, stand size). Of the ten species of bats thought to occur on Vancouver Island, nine of these have been classified as wildlife tree users. The status of the tenth bat (Townsend's Big-eared Bat, *Plecotus townsendii*) is unknown. In addition, one of the ten species is red-listed (Keen's Long-eared Myotis, *Myotis keenii*) and one is blue-listed (Townsend's Big-eared Bat).

The distribution, diversity, relative abundance, and habitat requirements of bats on northern Vancouver Island is largely unknown. For example, the status of a number of bat species is undetermined for high elevations of the Mountain Hemlock Biogeoclimatic Zone in British Columbia. Recent work includes an ongoing study in the southern part of Vancouver Island, a coastal survey, and a preliminary survey. The latter two projects were only designed to assess presence or absence of bats. Recommendations from these studies suggest that summer roosting sites and density for Keen's Long-eared Myotis, and other species, need to be identified. Therefore, a much more detailed study of the diversity, abundance, and roosting habitat requirements of bats is proposed.

To date, many bat studies have been limited in their success because of the difficulties associated with positively identifying species (especially between Keen's Long-eared Myotis and the Western Long-eared Myotis, *M. evotis*). Dave Nagorsen of the Royal BC Museum along with federal museum staff have developed a genetic test for positively identifying Keen's Long-eared Myotis based on the removal of a small skin sample. Once a few individuals of each species have been positively identified on the basis of genetic tests, it may be possible to distinguish larger numbers of individuals by analysing their ultrasonic calls with the use of Anabat bat detectors and associated computer software.

Further limitations of past studies include: problems arising from the broad nature of surveys with little or no replicate sampling at each site using only a bat detector for a short time period and sampling only on southern Vancouver Island. The proposed research project will build upon results of previous studies by adding replicate sampling on northern Vancouver Island. It is important that sampling occur on northern Vancouver Island because the species distribution may be quite different from the south island due to different forest types, (including the possibility that Keen's Long-eared Myotis may occur more frequently on northern Vancouver Island), and the possibility of geographic variations in bat calls (which would hinder positive species identification if reference calls from another location are used).

Given recent advances in the technology of bat research and the poorly known status of bats, it is recommended that a detailed study be conducted in the managed forests of northern Vancouver Island, in particular on Canfor's TFL. This project will build on the knowledge of the biology and habitat requirements of bat species by examining the roosting ecology and habitat associations in a managed forest.

This study will identify specific ecological functions and values of forests, maintaining biodiversity through the understanding of habitat requirements of sensitive bat species, and assessing the effects of forest practices on bats and their habitats. Once the diversity, distribution, roosting and habitat requirements of bats have been determined, recommendations can be made to avoid or mitigate potential negative effects of forest harvesting on this group of animals.

The goal of this project is to determine the diversity, distribution, and roosting habitat requirements of bats on northern Vancouver Island.

The objectives of the project are:

- Determine preferred roosting habitats for bat species, particularly red and blue-listed species (Keen's Long-eared Myotis and Townsend's Big-eared Bat, respectively) on northern Vancouver Island.
- Determine activity levels and habitat use patterns in different habitat types (e.g., riparian, forest, edge, clear-cut) and varying elevational and biogeoclimatic subzones on northern Vancouver Island.
- Identify bat species diversity and distribution on managed forest lands on northern Vancouver Island.

Forest Fragmentation

CANADIAN WILDLIFE SERVICE

In 1992, Canfor assisted Rhonda Millikin with a study focusing on effects of forest fragmentation on birds. Many studies have shown that fragmentation of previously extensive forests into smaller, isolated patches has resulted in the loss of habitat for many bird species. The main objective of this study was to monitor bird populations in residual patches of old-growth Douglas-fir to determine the minimum size needed to retain viable populations of old-growth dependent bird species. Contrary to other fragmentation studies across boreal forests of North America, there were no apparent trends for increased number of bird species with increased patch size of mature forest.

SIMON FRASER UNIVERSITY

Canfor assisted Jim Schiek with a post-doctoral project on forest fragmentation. Sizes of forest fragments (patches) varied from 2 ha to 500 ha. This project examined birds, small mammals, and salamanders. No relationship was found between the number of mature forest species at the centre of the patch and patch size. The density of individuals at the centre of the patch was not related to patch size for any of the mature forest species except Red-breasted Nuthatches.

WILDLIFE HABITAT ENHANCEMENT

Wildlife habitat enhancement on TFL 37 focuses on the following species: deer, woodpeckers, owls and violet-green swallows.

Deer Habitat Enhancement

Canfor has been spacing (densities are approximately 630 stems/ha) and pruning 12-15 year old stands near Deer Winter Ranges over the past few years. A total of 6 sites have been treated to date with deer/elk winter habitat enhancement as the main objective.

Woodpecker Habitat Enhancement (Woodhenge)

Snags, or standing dead trees, are an important component of the forest structure. These snags serve as critical habitat for 23% of Vancouver Island's bird species and 48% of the mammals. Snags provide many kinds of critical habitat, including nest cavities and platforms, nurseries, dens, roosts, hunting perches and foraging sites.

Artificial snags are defined as logs or logging debris which have been left near a road of a harvested area by a log loader because the logs had too high a proportion of decay to be sawn into lumber. These logs are then "planted" vertically with an excavator during road rehabilitation or brush piling. Clumps of artificial snags are installed in groups of 10-12 snags. The spacing between the snags is approximately 3-5 m apart and the clumps are spaced at a distance of 50-100 m along all rehabilitated roads. The size target is a minimum of 7 m tall and a minimum dbh of 50 cm. Artificial snags are planted 1 m in the ground for every 6m out of the ground. Where possible, decayed Douglas-fir or Western White Pine are selected over decayed Western Hemlock.

Since the initiation of the study, approximately 800 artificial snags have been planted operationally on selected spur roads scheduled for debuilding. Artificial snag planting, while debuilding roads, provides an excellent opportunity to safely add old-growth attributes to second-growth forests and supplement habitat for some cavity-dependent species, with a minimal risk of blowdown and minimal cost. Planting artificial snags is prescribed on all roads scheduled for debuilding within Special Management Zones and will be incorporated into ecosystem restoration plans for the Tsitika-Woss Special Management Zones

Owl Habitat Enhancement

Many owl species utilise second-growth forests for foraging within TFL 37, however, nest site availability in older (40 to 70 year old) second-growth is low. Species, such as the blue-listed Northern Pygmy-owl, and Western Screech-owl and the yellow-listed Northern Saw-whet Owl, depend on large woodpecker holes or natural holes in standing dead trees for nest sites. Generally on TFL 37, the snags which develop in this habitat type result from suppressed trees and are too small in diameter to attract large woodpeckers to create nest sites for owls.

In 1993, Canfor began monitoring bird communities in eight forest stands that were 40-50 years old. During the fall of 1994, one Western Screech-owl/Northern Saw-whet Owl nest box and two chickadee nest boxes were installed at a height of 6m within four of these stands. Monitoring of these sites will continue in the long-term.

Beaver Cover Violet-Green Swallow Habitat Enhancement

Each year, ambrosia beetles are responsible for millions of dollars worth of damage to logs on coastal B.C. To date, biological controls have not been tested at the Beaver Cove Dryland Sort.

Violet-green Swallows are one of the major predators of ambrosia beetles. Thirty-four Violet-green Swallow nest boxes have been installed at the Dryland Sort in order to increase the available nest sites. In 1995, swallows used 75% of the boxes.