

# Wildlife News

Vancouver Island Region, BC Environment



## WHAT'S INSIDE

### Second Wildlife Newsletter

Thank you to everyone who responded so favourably to our first Wildlife Newsletter. We are following it up with a second that will contain abstracts from our 1997/98 Wildlife Inventory Projects in Region 1. We also hope to include:

- an update on what is happening with the Forest Renewal Inventory Program;
- an article that shows links between the Watershed Restoration Program and Wildlife;
- an update on the Adam and Eve Cougar Study;
- hip chain hazards to wildlife;
- a species profile on the Marbled Murrelet; and,
- Purple Martins - North Island.



MARBLED MURRELET

### Release of the Identified Wildlife Guidebook!!

After a long wait, the Identified Wildlife Management Strategy was finally announced by previous Environment Minister Cathy MacGregor at the Species and Habitats at Risk Conference held in Kamloops, Feb 15-19, 1999.

<http://www.elp.gov.bc.ca/wld/identified/index.html>

The "Strategy" consists of a two-page report called the Identified Wildlife Management Strategy complete with

an Appendix listing the current suite of "Identified" wildlife species. Included with the "Strategy" are two volumes: (1) Managing Identified Wildlife: Procedures and Measures Volume 1 and, (2) Species and Plant Community Accounts for Identified Wildlife Volume 1.

All documents are available on the World Wide Web at the URL listed in the box below (clickable for email recipients).

### BC Bird Watch Field Reports

For rare bird sightings and birding tips check out this neat website:

<http://birding.bc.ca/nanaimo/index.htm>

Make inquiries about bird identification - or share your bird sighting information!!

### WILDLIFE PROJECTS 1999/2000:MELP REGION 1,

## INSIDE

- ① Introduction
- ② Wildlife & WRP;
- ③ Cougars, Deer Winter Range; TEM;
- ④ Hip Chain Hazard to Wildlife
- ⑤ Profile: Murrelets, Abstracts 1997-1998

## VANCOUVER ISLAND

Wildlife work continues in the Vancouver Island Region under the funding of Forest Renewal B.C. During the fiscal year 1999/2000 we have facilitated several projects with licensees on key wildlife species. The Queen Charlotte Goshawk project continues with work in the south island (nest monitoring with Timberwest), Gold River (on Western Forest Product's TFL#19 - continued inventory for new nests), and in the Woss area (with CANFOR on TFL#37 and MB on TFL#39 - continued inventory & monitoring). Erica McLaren, field crew coordinator, has initiated a M.Sc. study on goshawk in the Woss area with Dr. P. Kennedy of Colorado State University.

Three licensees (Timberwest, Weyerhaeuser and CANFOR) continue with work on Marbled Murrelet, specifically conducting nesting habitat assessments using a MELP Region 1, and RIC standardized protocol. Licensees have used existing habitat mapping and airphotos to highlight areas on their TFLs with large patches of older aged, large trees that are potentially suitable for this Red-listed species. A ground-truthing exercise uses RIC standard habitat collection methods to evaluate the suitability of potential areas. If an area is deemed suitable for murrelets based on the ground surveys, it is listed as a candidate area as a Wildlife Habitat Area under the new Identified Wildlife Management Strategy.

MELP Region 1 and Interfor have both initiated foraging habitat surveys for grizzly bear in key watersheds on the mainland coast. The protocol, established through MELP with grizzly bear specialists, uses habitat mapping and airphotos to delineate areas with potentially suitable spring, summer or fall foraging habitat for bears. Ground evaluations determine habitat quality and describe key forage species and the importance of that particular area relative to the habitat available in the watershed of interest. This information will be key in determining grizzly bear conservation strategies for MELP Region 1's grizzly bear populations.

CANFOR continues to conduct deer winter range habitat assessments in TFL#37 using a protocol developed jointly by MELP ungulate specialist

Kim Brunt and CANFOR biologist, John Deal. Contentious areas for wintering black-tailed deer were ground assessed using a structured, vegetation and topographic habitat assessment procedure. This information will be key in determining areas of the highest importance for black-tailed deer in the Nimpkish Valley.

MELP continues its own project on Ungulate Winter Range in Region 1. Winter range boundaries will be confirmed for all grandparented winter ranges in the Vancouver Island MELP Region. MELP Habitat Staff will be working with a database contractor to confirm correct boundaries and to confirm established agreements operating within each of the winter ranges for Roosevelt elk, black-tailed deer or mountain goat. Along with a set of correct maps and overlays indicating boundaries will be the accompanying spatial database and an MS Access database where continuing information regarding winter range agreements will be stored.

## WILDLIFE ENHANCEMENT OCCURRING IN RIPARIAN RESTORATION PROJECTS

Through the MoELP delivery of the Watershed Restoration Program (WRP) in Region 1 an effort is being made to enhance the opportunities for wildlife in the riparian zones of two west coast watersheds.

Many observers already know that the main focus of MoELP's WRP delivery is instream restoration, but another lesser known aspect of the WRP program is the Riparian Restoration initiative which is attempting to rehabilitate or restore riparian resources that have been adversely impacted by past forestry practices.

One such watershed is the Malksoppe River where previous harvesting activity has resulted in a mosaic of second growth vegetation types within the riparian management zone of the river. Prescriptions to treat the reserve portion of this zone (50m) were completed in March of 1998 and works commenced in the fall of 1998.

Of the four Riparian Vegetation Types (RVT) surveyed on the river, one type in particular was considered to have

low wildlife value in its present state. Similar to the other RVTs on the river, this type lacked mature wildlife trees, suitable for primary and secondary excavators. In addition some polygons lacked an abundance of light and, therefore, lacked understory forage species such as huckleberry, elderberry and salmonberry. These overstocked conifer plantations with over 4000 stems per hectare (sph) were delineated and prescribed for variable thinning regimes.

Several measures were prescribed for wildlife protection and/or enhancement. All standing snags, although small, were maintained and several snags per hectare were created from the largest diameter fir trees on site (40cm dbh). The fir trees were topped at 8 meters above the ground. Any existing wildlife trails were also maintained. The stands were spaced to a density range of 550 -650 sph while maintaining some dense understory hemlock thickets for ungulate cover and protection. Light levels to the forest floor will increase in the treated areas allowing the return of understory forage species where they did not already exist.

The proponent, the Kyoquot Management Board (KMB), is also responsible for the installation of bird and bat houses built to the specifications provided by MoELP. In the early spring of 1999 six bird houses were installed in the reserve zone which will target six species of birds: American Kestrel, Downy Woodpecker, Northern Flicker, Western Screech Owl, Tree Swallow and the cavity nesting waterfowl (potential species include: Wood Duck, Harlequin Duck, Bufflehead, Goldeneye and mergansers).

Four Nursery Bat houses will be installed adjacent to previously constructed channel ponds. These pond locations will provide good insect feeding opportunities for the bats and allow for the houses to be surveyed during the ongoing monitoring program of the pond structures. Bat species which could potentially occupy these houses include: little brown myotis, yuma myotis, long-legged myotis, long-eared myotis (keen's and western), and possibly big brown bat.

Similar silvicultural restoration techniques and enhancement plans are scheduled for the Little Zeballos watershed in March of 1999. Ongoing monitoring of both treatment areas will record the effectiveness of the activities and hopefully encourage similar prescriptions elsewhere in the region.

- contributed by Dave Donald, HPO-WRP, MELP Region 1, Campbell River District Office, [dsdonald@campbell.env.gov.bc.ca](mailto:dsdonald@campbell.env.gov.bc.ca)

## ADAM AND EVE RIVER COUGAR STUDY

FOR THE LATEST RESULTS, SEE THE COUGAR STUDY WEBPAGE

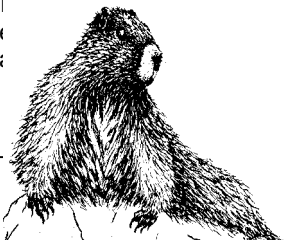
<http://extra.newsguy.com/~contact/CougarStudy/html/Main.html>

Karen Goh and Aaron Gladders recently presented the results of their Forest Renewal B.C. funded Cougar work at the Pacific Ecology Conference in Parksville, Feb. 6&7, 1999. Both are completing their M.Sc. studies at the University of British Columbia and expect to have their theses completed by April 1999. Included here are the abstracts submitted to the 1999 Pacific Ecology Conference Proceedings (I. Hamilton, Y. Morbey, editors/organizers).

**Predation success of Vancouver Island cougar in relation to habitat.**  
Aaron Gladders, Wildlife Research Group, University of British Columbia.

British Columbia is thought to hold most of Canada's cougar (*Puma concolor*) population (4000 out of 5000), although no reliable census methods exist. Vancouver Island holds up to 25% of these animals. Unfortunately, there is little information on cougars, their habitat, or their habits - only 1 B.C. study has been published. A joint study by the Ministry of Environment and UBC was initiated in 1996 to examine general habitat use and predation by cougar on North Vancouver Island. The predation results indicate that female cougar consume largely deer in a variety of forest stands ranging from young second growth to old growth.

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landscape-scale characteristics. Habitat preference will be tested using a resource selection function. These results, in conjunction with general habitat use will indicate cougar habits from a broad to fine scale.

**Habitat use characteristics of Vancouver Island Cougar (*Puma concolor vancouverensis*).** Karen Goh, University of British Columbia.

Vancouver Island cougar (*Puma concolor vancouverensis*) contend with habitat alteration, in addition to the stresses of game management and human conflicts. Despite this, cougar habitat use is not addressed by the literature or existing finished research. Results of this research will indicate any cougar specialization for micro- or macro-habitat features such as edge use, forest age, canopy density, and features of importance to their primary prey, deer, such as slope, aspect and the size of clearcuts used. This knowledge will be used towards forest management and habitat conservation and understanding increasingly complex human-cougar conflict issues. This project conforms to the Forest Practices Code's strategic plan to maintain biological diversity while ensuring sustainable management. It is based at the Wildlife Research Group at the University of British Columbia and is supported by Forest Renewal B.C., MacMillan Bloedel, and the Ministry of Environment, Lands and Parks.

## UNGULATE WINTER RANGE MAP REVISION - REGION 1

Ungulate (Columbian black-tailed deer, Roosevelt elk and mountain goats) winter range maps are currently being revised and a data base developed containing all known information for each winter range in Region 1. Winter ranges were originally mapped 20 to 25 years ago. These maps are now outdated. The boundaries of many winter ranges have been altered by forest harvesting or the addition of adjacent patches of old growth. Mapping errors were also introduced when updating forest cover maps, through the use of different projections (NAD 27 and NAD 83) and during data translation for use in each successive geographic information system acquired by MELP.

The locations of ungulate winter ranges are often a contentious issue between MELP and the forest industry. The revision of ungulate winter range maps will reduce this conflict, speed block approval for forest harvest, provide predictability in timber supply thus fostering community stability, and aid in the management of ungulate populations.

## TERRESTRIAL ECOSYSTEM MAPPING WITH WILDLIFE INTERPRETATIONS FOR THE UPPER QUALICUM LOW INTENSITY AREA, VANCOUVER ISLAND

Terrestrial ecosystem and wildlife suitability mapping (1:20,000 scale) was conducted for 1,457 hectares of the Upper Qualicum Low Intensity Area. Wildlife interpretations were done for amphibians, cavity nesting birds, owls, bats, black bears, Columbian black-tailed deer and Roosevelt elk. This information will aid in the development of long-term strategies for integrating wildlife habitat needs with operational forestry activities and landscape unit planning.

## SILVICULTURE HISTORY ASSESSMENTS - PILOT PROJECT

Pilot silviculture history assessments were conducted for the Gordon, Cameron, White and Bonanza River watersheds. Information on silviculture histories were compiled in map (1:20,000 scale), Excel spreadsheet and report format. Compilation of silviculture histories involved recording all known information on each stand including when they were logged, the silviculture system used, site index, method of regeneration, forest site preparation, species planted, stocking densities, juvenile spacing, conifer release, fertilization, pruning and commercial thinning. Cutblocks were grouped and colour-coded according to the decade in which they were harvested. Colour-coded harvest maps provide a very useful visual representation of seral stage distribution, and the location of rock/alpine, wetlands and stands of old growth. The resulting silviculture history information will be used to guide future wildlife and fish habitat enhancement projects, integrated resource management and landscape unit planning. The completion of

silviculture history assessments is recommended for all major watersheds in Region 1.

### The Western Section of the Wildlife Society (TWS/WS)

has expanded its web site and moved it onto its own server; the site is now located at

<http://www.tws-west.org>

This site provides information about TWS – meeting information, news, jobs, etc. It also has a link to Other Wildlife Resources which include government sites, newsgroups, links to professional societies, and links to other member's websites.

### Subject: RE: Hip chain string a hazard to wildlife

Hip chain string represents a real hazard to wildlife. MELP and MOF staff have been requested to:

- only use hipchain when absolutely necessary. Use two people and a retrievable 100 m cord where possible;
- only use the most biodegradable hipchain (although even this stuff hangs around long enough to kill birds and other wildlife - sometimes for 3 or 4 years according to some reports);
- wherever and whenever possible, design routes so that they can return along them and remove the thread on their way back;
- where it isn't possible to retrace their paths (some forestry "one-way" applications), at least stop every so often and pull on the thread behind you until it breaks and collect up what you can (this also makes the rest of it fall lower to the ground, therefore reducing the chance of trapping some birds).

In terms of mortalities, there has been research conducted that shows that hip chain does kill wildlife - birds in particular - mostly low level foraging birds such as sparrows. However, it also has killed predatory birds such as owls and hawks (there are even records of Spotted Owls being snared) and grouse.

Most of this is based on anecdotal reports from people finding dead birds wrapped up in the stuff and reporting it. There is concern that this is a larger problem than it may seem at first glance, as there are bound to many more birds killed for each one found and reported. The unfortunate thing is that it's really unnecessary as alternative methods exist - they're just not as cost effective.

The only published article I have is a "short communications" in *Wilson Bulletin*, 109 (2), 1997, pp 353-355. The author reports on finding an American Dipper dead in a line he set which prompted him to conduct an informal survey amongst colleagues. 19 respondents reported at least 13 species trapped of which more than 24 were found dead and 9 released alive.

Animals killed included 4 bats, 5 Western Screech-owls, 4 Northern Spotted Owls, at least 3 unidentified songbirds, 2 unidentified thrushes, 2 American Robins, 2 Varied Thrushes, a Wood Thrush, a Belted Kingfisher and a Steller's Jay. Animals released alive included 2 American Robins, a Red-tailed Hawk, a Long-eared Owl, a Northern Saw-whet Owl, a Spotted Owl, a Western Screech-owl, a Flammulated Owl and a Northern Pygmy Owl.

As a result of these concerns, we circulated a note making it basically mandatory for all bird surveys by gov't personnel or contractors to require retrieval of flagging tape and hipchain thread used to set out transects. We passed that request onto MOF contacts asking them to spread the word.

- courtesy of Myke Chutter  
Provincial Bird Specialist, Victoria BC

### Purple Martins Return to the Campbell River Estuary!

Spring 1998 a pair of purple martins (PUMA) were seen using nest boxes in the Campbell River estuary and at Oyster Bay. PUMA are on BC's Red-list (rare or endangered) and have not been seen in the Campbell River area for almost 10 years. The estuary pair successfully fledged three young (two were banded right leg, red band #168 & 169, left leg, aluminum band #25441, & 25442), a second pair in the estuary hatched 5 young (banded right leg, red band #170 to 174, left leg aluminum bands #25443 to 25447). These chicks probably hatched out on July 20 or 21 and fledged between August 14-20. The nest at Oyster Bay hatched out three young (banded right leg, red bands, #165, 166, 167). The Oyster Bay chicks hatched on July 24<sup>th</sup> and fledged sometime after August 24<sup>th</sup> (the nestling period lasts from 26 to 31 days).

Interestingly, on the 15<sup>th</sup> of June, 1999, a birder in Nanoose Bay noted

a Purple Martin with a red-leg band on its right leg (#170) - a juvenile bird from the previous year banded in the CR estuary!

MELP put up 5 new PUMA boxes in 1998 in the CR estuary on new pilings cooperatively set up by Department of Fisheries and Oceans during their efforts to rehabilitate the estuary. As of spring 1999 - two of the new boxes were occupied. So it is true.....if you build it - they will come.....



### Update – Purple Martins 2000

In the Campbell River estuary, 5 young fledged from the nest box closest to the seaplane area during June and August. The newer boxes near the old drysort boom pocket were of interest to a few birds who showed some nest building activity, but no nesting occurred. It is possible that the young birds from successful nests may return in the spring 2001 and take over these new nest boxes. Local naturalist Ed Silkens has also installed 4 nest boxes in snags on the west side of Fry lake, far enough away from the campsite to discourage vandalism.

### Marbled Murrelet (*Brachyramphus marmoratus*)

(info from IWMS Guidebook)

#### Distribution

#### Ecoprovinces: Ecosections

- COM: NWC, HEL, KIR, NAB, NAR, APM, BOR, EPR, NPR, OUF, SPR, QCL, SKP, WQC, NWL, NIM, WIM GED: LIM, NAL, FRL, GEL, SGI, SOG

#### Biogeoclimatic units

- CDF, CWH, MH

### Status

- RED-listed by BC MELP
- designated as THREATENED in Canada by COSEWIC
- main threat to this species is the loss of old growth nesting habitat
- the marbled murrelet is considered an old growth dependent species.
- additional threats to the species are oil spills and possibly gill net fishing

### Habitat (Marbled Murrelet)

- 7: old forest (>250 years - age class 9, but 8 is acceptable if older forest is not present)

### Critical habitats and habitat features

- mature large trees (i.e., 37-55 m in CWH and CDF, and 28-37 m in MH).
- Large (>50 m) Sitka spruce, Douglas-fir, western hemlock and western redcedar, and
- large (>30 m) yellow-cedar and mountain hemlock
- Marbled murrelets select large limbs higher than 15 m above the ground with platforms greater than 18 cm across (branch and moss combined).
- Dwarf mistletoe, growth deformities that create nesting platforms (e.g., broken tops, multiple leader trees), and moss covered branches are assets.

### Ecology

#### Feeding

- diving seabird, feeds on small fish especially Pacific sand lance but also northern anchovy, and small Pacific herring
- May and June small fish are widespread and abundant, as waters warm in summer, murrelets concentrate on the richest areas such as tidal rapids
- may dive 43 m or more, but uses mostly short dives that last less than 30 seconds
- a brief splashing bath usually marks a successful fishing effort

### Nesting

- marbled murrelet may nest up to 85 km inland from salt water, but areas within 30 km of the ocean are likely more important

### Nonbreeding Range

- lives at sea outside the breeding season
- common resident on salt water throughout coastal B.C.
- densities vary widely within and between years.

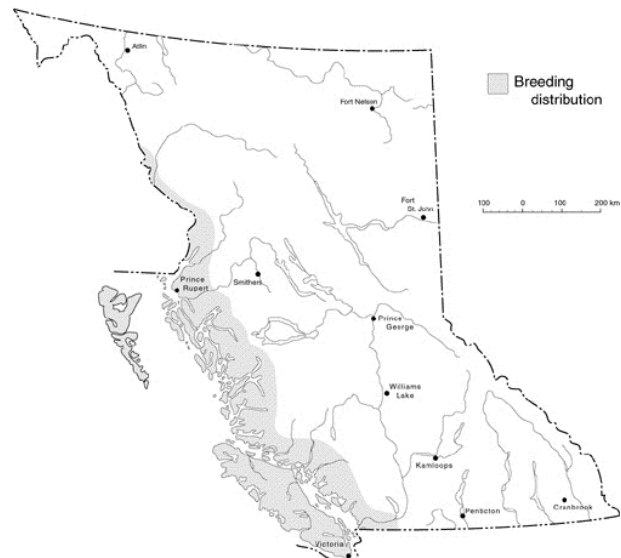
### Identified Wildlife Recommendations for Murrelet Wildlife Habitat Areas

- maintain nesting habitat with interior forest conditions throughout the range of the species
- maintain suitable habitat in an unfragmented condition
- WHAs should be a minimum of 200 ha, but may be smaller where 200 ha are unavailable, WHAs should be a minimum of 600 m in width
- if nesting habitat is narrower than 500 m, a buffer of ~ 100 m of old forest or advanced second growth (>60 years) should be included around the nesting habitat
- WHAs less than 200 ha should also include a 100 m buffer and, wherever possible, no more than 50% of the WHA boundary should be exposed to early seral stages (<40 years)
- windfirmness should be considered
- WHA location should be based on inventory and habitat information and murrelet presence should be confirmed
- from spp. Account, *suitable habitat is defined as forest in Coastal Western Hemlock (CWH), Coastal Douglas-fir (CDF) and Mountain Hemlock (MH) biogeoclimatic zones within 85 km of saltwater in age class 9 and 8 (structural stage 7)*

The following characterize suitable habitat further:

- CWH and CDF are preferred over MH
- in CWH and CDF, tree height classes 5-6 are preferred over lesser classes
- in MH, tree height classes 4 are preferred over lesser classes
- lower elevations are preferred
- sites closer to saltwater are preferred (i.e., within 30 km is optimum)

Marbled murrelet  
(*Brachyramphus marmoratus*)



- age class 9 is preferred but 8 acceptable if older forest is not available
- larger contiguous areas are preferred over smaller contiguous areas and fragmented areas
- large limbs higher than 15 m above grounds with platforms >18 cm across
- dwarf mistletoe, growth deformities, and moss covered branches
- Sitka spruce, Douglas-fir, western hemlock, western redcedar >50m in height
- yellow-cedar and mountain hemlock >30m in height (if above tree species are unavailable)

### General Wildlife Measures

- no roads (except with variance)
- seasonal constraints on roads
- no recreation sites
- no harvest (except salvage with variance)
- priority protection of WHA from fire
- in second-growth use silvicultural techniques to enhance old-growth characteristics

### Landscape Unit Planning Considerations (Identified Wildlife Guidebook)

- habitat conservation critical in the Georgia Depression Ecoprovince due to severe depletion of nest habitat
- higher BEO options should be considered in areas with suitable MAMU habitat
- further evaluation of MAMU habitat needs will be required to meet 10-12% estimate for landscape unit planning process

- habitat needs may overlap with Goshawk and grizzly bear  
Northern Goshawk, Queen Charlotte

## ABSTRACTS

### Forest Renewal B.C. Funded Wildlife Inventories - 1997/98

#### AMPHIBIANS

Wind, E., B. Beasley, and D. Newsom. 1998. *Clayoquot Sound amphibian inventory 1997. Long Beach Model Forest Society. Unpublished report for the Ministry of Environment, Lands and Parks, Vancouver Island Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program.* 48 pp.

#### ABSTRACT

We conducted an inventory of amphibians in two watersheds in Clayoquot Sound from May through November of 1997. Of the two watersheds, the Tofino Creek watershed has been extensively harvested, while the Clayoquot River watershed remains in a relatively pristine state. During Phase I of the study, between May - August, we identified and characterized the breeding sites of aquatic-breeding species at high and low elevations. During Phase II of the study, between September - December, we returned to low-elevation breeding sites to sample amphibians in the terrestrial environment surrounding ponds (i.e., in the riparian area). We also sampled the riparian area along stream reaches.

During Phase I of the study, we found a few widely dispersed breeding sites at low elevations and clusters of small breeding ponds within isolated plateaus at high elevations. Many of the wetlands at low elevations were not permanent, making them unsuitable for Northwestern Salamanders and Roughskin Newts. All low elevation ponds in the Tofino valley were in areas where forest management had occurred (i.e., in or adjacent to clearcuts, beside roads, etc.).

We sampled amphibians in wetlands using basic pond searches and aquatic funnel traps. Species presence varied between watersheds, and between high and low elevations. Some species were not found in locations where they had been previously identified (e.g., the Western Toad was not found in the Tofino Creek watershed and the Pacific Treefrog was not found at low elevation in the Clayoquot River watershed). The location of breeding sites for the Western Toad remains unknown. Confirmed breeding sites were located for the Northwestern Salamander (*Ambystoma gracile*; 33 of 51 wet areas sampled), the Pacific Treefrog (*Hyla regilla*; 20 of 51 wet areas sampled), the Roughskin Newt (*Taricha granulosa*; 4 of 51 wet areas sampled), and the Red-legged Frog (*Rana aurora*; 4 out of 51 wet areas sampled). Of the 618 egg masses found, 86% were from Northwestern Salamanders and 14% were from Pacific Treefrogs.

During Phase II, we sampled amphibians along four 30 m long transects set parallel to the shore at 1, 11, 21 and 41 m from the high-water mark of ponds and streams. We tried three sampling techniques: visual night searches, pitfall traps, and artificial cover boards, and were successful with the first only. The door design of the pitfall traps was flawed and the artificial cover boards were not in place long enough to become weathered and attract amphibians. The majority of individuals found during visual night searches were Western Redback Salamanders (*Plethodon vehiculum*) (245 sightings). We found low numbers of Northwestern Salamanders (16 sightings), Clouded Salamanders (*Aneides ferreus*) (14 sightings), and Red-legged Frogs (4 sightings).

There was a decline in the number of Western Redback Salamanders as we sampled further away from the water's edge in all habitats of the Tofino watershed but not the Clayoquot watershed. There may be a greater moisture gradient within harvested than unharvested watersheds.

We found a positive relationship between the number of Western Redbacks and the size of the coarse woody debris measured along each transect beside clearcut but not old-growth ponds. There were no other strong habitat associations.

We recommend that amphibian inventories be continued and extended to include other watersheds within Clayoquot Sound. Larger sample sizes (more sites and more samples per site) are needed to generalize the distribution patterns found in 1997. In addition, research is needed to investigate the potential impacts of forest harvesting on aquatic breeding sites, terrestrial habitats and dispersal patterns. Virtually nothing is known about some species in their terrestrial environment (e.g., the Northwestern Salamander). A long-term monitoring program should be established in Clayoquot Sound to follow changes in population dynamics in response to forest management in both developed and undeveloped watersheds and in accordance with other amphibian monitoring programs throughout North America.

#### BALD EAGLES

##### Clayoquot Bald Eagles

Moul, I.E. 1998. *Nest Inventory and Productivity Assessment for Bald Eagles in Clayoquot Sound, British Columbia. Prepared for BC Ministry of Environment, Lands and Parks (Region 1), and the BC Ministry of Forests (Research Branch). Unpublished report for the Ministry of Environment, Lands and Parks, Vancouver Island Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program.*

**(NOTE: In lieu of an abstract, the complete discussion has been included here).**

The production of eagle chicks in Clayoquot Sound, with a five year mean of 0.39 chicks per occupied territory, was much lower than the 0.7 chicks per occupied territory considered necessary to sustain an eagle population (Sprunt et al. 1973). Compared to other locations on the British Columbia coast (Table 3)(Elliott et al. 1998), Clayoquot Sound was not out of the range of remote areas. It is very interesting to note a trend in reverse to expectations, that the closer we get to "wild" areas less influenced by human activity, the lower the production of eagle chicks. Areas of highly modified

landscape, around Vancouver and the lower Fraser Valley, provide conditions that result in three to four times the eagle chicks per occupied territory compared to remote areas such as Clayoquot Sound, Johnstone Strait and South Moresby.

While it is difficult to make a definitive statement as to why eagle productivity is higher in settled areas, it must be linked to habitat factors such as acceptable nesting sites and the availability of food. Eagles nest in defined territories that span between 0.8 and 1.2 km of coastline (Personal observation; Terri Martin personal communication). In all areas surveyed, both remote and settled, whether the habitat was pristine, logged or developed, there was usually at least one suitable nest tree in an area used as a habitat. Eagles are known to nest throughout south-western British Columbia and appear to have habituated very well to human activity. In the past twenty years, eagles have joined gulls and crows as common visitors to local garbage dumps (Personal observation). In locations where there is a lot of fishing, eagles routinely perch in trees waiting for the tossed off heads and entrails of fish being cleaned (Personal observation). In a study to monitor feeding of eagle chicks and prey delivery rates, Chris Gill (Personal communication) regularly observed eagles returning to their nests with by-catch discarded by both commercial and sport fishermen. Food availability is most likely the prime limiting factor on eagle productivity in Clayoquot Sound. This is supported strongly by the fact that four out of the eleven most productive eagle nests were in either Ucluelet Inlet or just off the mouth of Ucluelet Inlet, directly on the route of numerous private and commercial fishing vessels.

### Nimkish Bald Eagles

Deal, J., and M. Setterington. 1999. *The 1995-1997 Nimkish Bald Eagle nest inventory: Final Report. Unpublished reports for the Ministry of Environment, Lands and Parks, Vancouver Island Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program.* 32 pp.

#### ABSTRACT

This report summarizes the results of bald eagle (*Haliaeetus leucocephalus*) nest surveys conducted in the Nimkish Valley on northern Vancouver Island, British Columbia, from 1995 to 1997. The surveys were conducted by Canadian Forest Products Ltd. on Tree Farm License (TFL) 37 and Forest License (FL) A19233. Bald eagle nests, whether occupied or unoccupied, are protected under Section 35 of the British Columbia *Wildlife Act*.

Four aerial surveys (by helicopter) were conducted from mid- to late-May to mid- to late-July in selected areas in the study area from 1995 to 1997 inclusive. Four observers on each survey located a total of 92 nest sites by the last survey in 1997. One golden eagle (*Aquila chrysaetos*) nest site and one great blue heron (*Ardea herodias*) nest colony was also found (included in the total number of nest sites found). Eighty-one percent of the nests were in Douglas-fir (*Pseudotsuga menziesii*) trees, and smaller proportions of the nests were in western hemlock (*Tsuga heterophylla*), Sitka spruce (*Picea sitchensis*), black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) and western redcedar (*Thuja plicata*) trees.

Typical of bald eagle nest position throughout their range, nests were located in exposed parts of the tallest trees of the surrounding habitat. In the Nimkish Valley, nests were most likely to be found in tall, veteran old-growth (>250 year old) Douglas-fir trees, in exposed parts of the canopy that provided visibility to the surrounding areas. Nest sites were often near a section of a river with a slow rate of water flow (wide areas, or gravel bars); at the junction of a main channel and a tributary; near the mouth of a river or creek where it enters a lake; and within 350 m of shoreline.

Results of the inventory will be used to ensure the protection of bald eagle nest trees in the long-term. Some preliminary management practices include protecting known bald eagle nest trees and leaving site specific treed buffers around the nest trees. Those spatial buffers will be dependent on terrain, tree species composition, wind firmness, and proximity to Riparian Management areas and other areas already removed from production forest. Temporal buffers will include maintaining a No Disturbance area of at least 250 m during the nesting and post-fledgling periods (timing will be nest-specific, but within the period 01 Feb –15 Aug). When harvesting between the mouth of the Nimkish River and Nimkish Lake, or along the coast, at least one suitable nest tree per kilometre of shoreline will be retained. Finally, bald eagle nest monitoring surveys should be continued with a greater emphasis on determining nest productivity and structural integrity within various patch sizes.

### BATS

#### Mt. Cain Bats

Kellner, A. 1999. *Ecology and habitats of montane bats. Unpublished report submitted to the Habitat Conservation Trust Fund. Component project of the Montane Ecosystems Coastal Biodiversity Project, Mt. Cain, B.C.*

#### ABSTRACT

I examined species composition and distribution of the bat community in the montane zone (>600m) of temperate rain forests in coastal British Columbia. *Myotis volans*, *M. californicus*, *M. lucifugus*, *M. yumanensis*, *M. evotis/keenii*, and *Lasionycteris noctivagans* were caught in mist nets. To examine elevational and temporal gradients in relative activity levels, I conducted monthly surveys using Anabat detectors at ponds from valley bottom (200m) to subalpine (1200m). Bats were present at snow-covered high elevation sites when I began sampling in mid-May, and continued to use high elevation sites throughout the summer, with activity levels occasionally equaling or even surpassing those at lower elevations. The capture of pregnant or lactating females or of juveniles indicated that 4 species (*M. volans*, *M. californicus*, *M. lucifugus* *M. evotis/keenii*) were likely reproducing in the montane zone. Most bats that were captured and radio-tagged at high elevations roosted in snags at high elevations, in patches of old growth forest. In spite of the cool, damp weather in coastal mountains, high elevation forests are widely used for foraging and roosting by bats.

#### Clayoquot Bats

van den Driessche R., M.H. Mather, E. Grundmann and T.A. Chatwin. 1998. *Inventory of bats in Clayoquot Sound, Vancouver Island, British Columbia 1996, 1997. Unpublished report for the Ministry of Environment, Lands and Parks, Vancouver Island Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program. 27 pp.*

#### ABSTRACT

We began bat studies in 1996 to inventory bat species in Clayoquot Sound and identify their critical habitat requirements. Our data will assist in planning for the delineation of protected habitats and management guidelines in Clayoquot Sound and other similar areas in British Columbia. To date we have completed two field seasons. We used mistnetting to determine and confirm the presence of six species of bats: Big Brown Bat (*Eptesicus fuscus*), Keen's Myotis (*Myotis keenii*), Western Long-eared Myotis (*M. evotis*), California Myotis (*M. californicus*), Little Brown Myotis (*M. lucifigus*) and Yuma Myotis (*M. yumanensis*). We located two roost sites by following two radio-tagged, lactating Little Brown Myotis. One was discovered in a large western red cedar snag of diameter 3.17 metres. The second was roosting in a rock crevice in a broad cliff band at 900 metres elevation. Estimates of relative bat abundance were examined in relation to habitat features in different forest types. Higher indices of bat abundance were found in open forests at low elevation and slope. We suggest that forest structure affects the flying and foraging activities of bats as dense stands and dense foliage reduces bat flight maneuverability. We also found differences in bat activity between stands that differed in dominant canopy species. The low elevation, outer coast (CWHvh1) had more bat passes than the cooler and moister sites inland and at higher elevations (CWHvm2).

#### BEARS

##### Black Bear

MacHutchon, A.G. 1998. *Black Bear inventory, Clayoquot Sound, B.C. - 1997 Progress Report. Unpublished Report for the Ministry of Environment, Lands and Parks, Vancouver Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program, 67 pp.*

#### ABSTRACT

A black bear (*Ursus americanus*) inventory project was initiated in Clayoquot Sound, B.C. by B.C. Ministry of Environment, Lands and Parks, Nanaimo in 1997. The overall goal of black bear inventory in 1997 was to obtain baseline data on food habits, habitat value, and distribution and abundance within Clayoquot Sound.

A number of activities were carried out to meet the specific objectives of the inventory project. Interviews were conducted with Nuu-Chah-Nulth people and non-native residents to gain information on the traditional use and ecological knowledge of black bears in Clayoquot Sound. Scats were collected and analyzed to describe the seasonal diet and food habits of black bears. Vegetation plot data was collected in the field and obtained from the B.C. Government to quantify available resources for black bears (e.g., food) within defined habitats of Clayoquot Sound. The food distribution analysis above and field data and experience were used to rate the seasonal suitability of biogeoclimatic site series in Clayoquot Sound for black bears. Hair capture and DNA analysis were used to examine the genetic variability within the Clayoquot Sound black bear population.

##### Kingcome/Wakeman Grizzly Bears

Himmer, S. 1999. *Kingcome/Wakeman Grizzly Bear DNA Inventory. Abstract only. Submitted to MELP Region 1, unpublished report.*

#### ABSTRACT

The Kingcome grizzly bear inventory was conducted during the summer of 1997 in two watersheds of south coastal, BC. The overall goal of the project was to obtain information on grizzly bear distribution and abundance in the Kingcome, Wakeman and surrounding drainages, which was to provide population estimates for management purposes and future comparisons. Specific objectives were:

1. to establish baseline data on grizzly bear population numbers and density;
2. to establish baseline population dynamics data on sex composition and litter size;
3. to compare grizzly bear numbers with Fuhr and Demarchi (1990) habitat capability estimates from existing 1:250,000 scale Broad Ecosystem Unit mapping;
4. to evaluate the DNA mark-recapture technique as an estimator of grizzly bear density or population numbers in south coastal BC;

The study area is located on the mainland coast 100 km northeast of Port Hardy. The study area was chosen for several reasons:

1. It was thought to be representative of the grizzly bear habitats found in Region 1 in terms of Biogeoclimatic zones and subzones;
2. It has one of the best potentials for providing geographic population closure due to the location of extensive icefields to the north and east and major saltwater channels to the south and west;
3. When compared to other watersheds within Region 1, Kingcome and Wakeman have experienced low levels of grizzly bear hunting activity in the last 20 years (Ministry of Environment unpublished data);
4. the logging development in Kingcome and Wakeman represents a middle ground between a pristine watershed and a fully developed watershed;

5. Interfor (Port Hardy division) is currently logging in the Kingcome watershed and began conducting small scale logging in the Wakeman watershed beginning in 1997. As a result, accommodations for field crews and access on logging roads aided with sampling logistics.

Following RIC draft standards for absolute DNA mark recapture inventory, hair collection sites were set up to collect grizzly bear hair. Simulation modeling conducted by biometrician, John Boulanger, suggested that coastal grizzly bear populations likely would have some type of heterogeneity variation in capture probability. In addition, behaviour and time variation was possible. As a result, the sampling protocol was designed to accommodate the use of program CAPTURE with the field data, requiring 5 sequential sampling sessions for the mark-recapture study area. Optimum session length was determined to be 10 days. Grid cell size was chosen to allow female grizzlies with home ranges as small as 45 km<sup>2</sup> to encounter hair capture sites. Grid cell placement within the study area was determined by overlaying a grid of 7 x 7 km (49 km<sup>2</sup>) cells on a 1:50,000 scale NTS map. The grid was fit to maximize the number of cells within the study area boundary. All cells were sampled regardless of habitat type and topography.

Watersheds in the study area are rugged, steep-sided and thickly vegetated. These factors were a major constraint on the selection of appropriate hair capture sites. Ideally sites would be placed randomly within each grid cell. Realistically, sites were placed in the best grizzly bear habitat that was close to adequate helicopter or road access points within each grid cell. Site work consisted of locating a helicopter landing site near good grizzly habitat with large enough trees to hang bait out of the reach of bears. The best site in the area with minimal undulations, without large debris and enough suitable live trees for hanging the wire was chosen. Understorey vegetation within 1-2m on either side of the barbed wire perimeter was removed and any trees too close to the bait were also removed. The wire was tightly stretched and stapled to the outside of trees so that it formed a perimeter approximately 3-5 m in radius from the central hanging bait. The barbed wire was strung approximately 50 cm off the ground (slightly higher than the shoulder height of a 2.5 year old grizzly). A bait lure, consisting of commercial fish fertilizer and 2 to 3 salmon carcasses (obtained from a nearby salmon farm), was hung between 2 trees such that it was centered in the barb wire perimeter. The bait was hung in burlap sacks approximately 5 - 6 m off the ground and at least 4 m from any tree within the site.

UTM coordinates and other details of grizzly and black bear sightings both inside and adjacent to the study area were recorded. In several cases bears were observed entering thick brush during the sighting. Field teams returned to the area at a later time and attempted to find and collect hair from these sightings. This was done to determine if some bears were not visiting the bait sites, this was especially important where bears were observed close (within 1 km) to bait sites.

From one session to the next, sites within the same cell were located a minimum of 1.5 km straight line distance from all other previous sites within the same cell and from any sites in adjacent cells. In some cells it was only possible to move the sites once or twice because of limited grizzly bear habitat, lack of bait hanging trees, snow or lack of helicopter landing sites. In these cells sites were alternated between 2 or 3 locations in subsequent sessions (reuse sites). Ten of the grid sites could not be moved because the treed area within the cell was smaller than 5 km<sup>2</sup>, these sites were rebaited during each session. Re bait cells were generally at the end of tributary creeks surrounded by glaciers and rock. No sites were set up in cells that contained only rock and ice. To determine if bears were moving in and out of the study area 4 sites were located in mountain passes and 2 sites were located along the saltwater shore near the mouths of the Kingcome and Wakeman rivers. All movement sites were set up permanently and visited during each session to collect hair, add bait and repair any loose or broken wire.

The first hair collection site was set up on 01 June 1997. By 07 June 1997, 53 sites were set up. Site setup generally required 5 to 6 long days of intensive work by 3 teams of 2 people each. During session 1, each team set up 3 to 4 sites per day. During sessions 2 to 4, each team was collecting hair samples from all previous session sites, removing or rebaiting and repairing the site and then resetting 3 to 4 sites per day. The final session (session 5) consisted of hair collection and removal of all site materials. Sampling and deactivation of sites was finished on 27 July. In total 137 unique sites were set up to collect bear hair. With the exception of 1 site in the Mountain Hemlock (MH) biogeoclimatic zone, all sites were in the Coastal Western Hemlock (CWH) zone (108 in vm1 subzone and 28 in vm2 subzone). Most sites (72%) were in moist to wet habitats (site series 6 to 14, including floodplains) where grizzly bears were most likely to be found during the sampling period.

A total of 4408 barbs of hair were encountered and 3277 sample envelopes of bear hair were collected at hair collection sites. Grizzly bear and suspected grizzly bear hair samples accounted for 45% (n=2045) of all barbs and envelopes at hair collection sites. Barbs having black bear and suspected black bear hair accounted for 52% (n=2369) of all barbs at hair collection sites. However, only 47 % (n=1107) of all black bear hair samples were collected. Because of a lack of envelopes a large number of black bear barbs were only subsampled. Hair samples from bears of unknown species accounted for 3% (n=125) of all barbs at hair collection sites. An additional 45 samples of grizzly bear hair were collected following incidental observations as described above.

DNA analysis of hair samples was done at the University of Alberta. Species determination of the samples was done by analyzing mitochondrial DNA. Short tandem repeat markers (also referred to as microsatellites) were used to identify individuals (also referred to as DNA fingerprinting). Markers located on the X and Y chromosomes were used to identify sex.

In 1998, DNA was extracted from a subsample of 1438 hair samples using the chelex-based method. Grizzly bears accounted for 550 of the samples, 698 were black bears, 13 were a mixed sample of grizzly and black bear hair and 177 could not be given a species type. Subsequent polymerase chain reaction (PCR) analysis of these samples yielded very poor results. Only 155 (28%) of the 550 grizzly bear samples yielded at least 1 loci. Of these, only 10 samples yielded a complete genotype at 6 loci; 15 samples were complete at 5 loci; 14 were complete at 4 loci; and 116 were complete at 3 or fewer loci. The lab felt that 39 samples (identified by 4 or more loci) yielded a positive individual identification a further 25 samples yielded a probable individual identification (identified by 3 loci). Out of the samples that had enough loci to be able

to see a difference in genotype, 18 individual grizzly bears were found. Only 12 samples had enough DNA for sex identification and of these only 7 yielded a positive result (5 males, 2 females and 5 unknown sex). It was determined that the chelex extraction method did not yield enough DNA from the Kingcome samples.

As a result of DNA species identification it was determined that black bear and grizzly bear hair samples were correctly identified in the field 95% and 94 % of the time respectively. Samples made up of both species were identified correctly 50% of the time. The positive results of visual species identification of hair samples will be used to further analyse only those samples identified as grizzly bear samples to save money. Because of the positive results of visual species identification of hair samples, we also looked at the number of grizzly bear vs. black bear visitations within each grid cell. During the entire sampling session 47 out of 55 (85%) grid cells had grizzly bear visitations. All grid cells had black bear visitations.

A relatively new extraction procedure known as the QIAamp method appears to be more promising at maximizing DNA from the Kingcome hair samples. In a test of 30 samples, 29 yielded enough samples for proper individual identification. The University of Alberta lab has begun extracting and analysing 650 grizzly and suspected grizzly samples. Results should be available sometime during the summer of 1999.

### Coastal Montane Biodiversity

McNay, R.S., J. Joy, and J. Voller. 1998. *Managing Coastal Montane Biodiversity: Progress Report 1996-97. Prepared for BC Ministry of Environment, Lands and Parks (Region 1), and the BC Ministry of Forests (Research Branch). Unpublished report for the Ministry of Environment, Lands and Parks, Vancouver Island Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program.*

#### ABSTRACT

The Coastal Montane Biodiversity project developed from a BC Forest Service initiative focused on maintaining long-term health and sustainable management of forests located at high elevations in coastal BC. In 1995, several coincidental and general changes in forest management led to this initiative: (a) A more noticeable shift in the geographic location of timber extraction from low elevation forests to high-elevation forests; (b) The impending Forest Practices Code (FPC) and implicit use of component management guidebooks (e.g., higher level plans guidebook, riparian guidebook, biodiversity guidebook, and identified wildlife guidebook); and, (c) An increased criticism from society on the manner in which forests are managed.

These changes meant that, as foresters began a new era of resource extraction at higher elevations, they would be using an unfamiliar series of management guidelines under the watchful eye of a sensitive public. This difficult situation worsened when we considered the apparent lack of information upon which to make resource management decisions in montane environments. Little was (or still is) known about many of the wildlife species that live there and only a relatively small amount of literature existed to detail silvicultural aspects of montane forests. The guidelines for managing these ecosystems remains relatively untested even in the more familiar sub-montane regions, much less in the montane regions. We considered that a comprehensive study of coastal montane ecosystems was in order and the initiative was provided with funds from Forest Renewal BC (FRBC) to "scope out" a research direction in 1995-96 (McNay 1995).

Our five objectives for the scoping study were to: 1) Determine which ecosystems were legitimately referred to as "coastal montane"; 2) Ascertain the status of forest harvesting in those ecosystems; 3) Determine what silvicultural- and wildlife-related activities were currently underway; 4) Cross-reference a list of sensitive wildlife species with their most commonly used coastal montane ecosystems and with any currently ongoing wildlife projects; and, 5) Develop contacts for future pursuit of research on sensitive species, for selection of study sites and for construction of a working group.

We accomplished our objectives (Rasheed 1997) with site-visits to many areas of south coastal BC, with the organization of a workshop held in Victoria, and with various analyses of maps and other current data on wildlife distributions. We also developed a basic direction for research and for inventory (McNay 1996a, b). In making these proposals for research and inventory, we had several important motives: (a) To focus on providing new information about coastal montane ecosystems for use by operational staff at all levels within the BC Forest Service, by industry resource managers, and by biologists and foresters in other government agencies; (b) To provide support for implementation of the FPC by assessing the application of FPC-related management guidelines; (c) To adopt an ecosystem perspective allowing for the development of a "benchmark" upon which to judge changes in ecosystem health and sustainability due to management actions; (d) To provide an example of a study design for an effective and efficient, empirical based study of biodiversity; (e) To work with a member of the forest industry, within an operational setting, so as to maintain an operational relevance for the study and to provide for grass-roots extension of study results; and (f) To provide an opportunity for collaboration among several levels of educational institutions and agency-based research as an additional mechanism for extension of results.

With these motives in mind, we chose to focus our investigation on the study of biodiversity in coastal montane ecosystems. A study of biodiversity would provide the breadth of information necessary to understand ecosystem health and sustainability in montane areas. Such a study also had obvious implications for successful implementation of the FPC by applying, monitoring, and testing some aspects of the biodiversity guidebook. Furthermore, by focusing on application of the biodiversity guidebook, we could insure the operational relevance of the study. We viewed such a study to achieve many priority areas for forest research (Baker 1997): (1) The integration of non-timber resource values (biodiversity) into timber management; (2) The promotion of adaptive management including components addressing alternative silvicultural systems, to maintain biodiversity; (3) The development of new information for guidebook updates; (4) The development of monitoring variables to support the audit component of MOF's quality assurance program; (5) The assessments necessary to ensure the FPC guidelines are current, effective, and technically defensible.

The study is a relatively new approach because few studies of biodiversity exist in BC; although some notable exceptions in the interior of the province are (references). Some of the ideas for this project follow those chosen for the Interior Columbia River Basin Ecosystem Management Project in Oregon (e.g., Marcot 1996). Furthermore, the biodiversity approach adopted here is flexible enough to incorporate results from other similar studies (e.g., the Montane Alternate Silvicultural Systems study). For example, we expect to base alternative silvicultural prescriptions used operationally in this study on at least some results from the MASS study (Arnott and Beese 1995).

Fundamentally, the proposal for a Coastal Montane Biodiversity (CMB) project became a proposal to establish an infrastructure upon which to base a number of independently supported, but linked and coordinated sub-projects. Only in this way could we adequately address concepts of biodiversity empirically, which is explicitly counter to techniques based on simulation modeling. While the basic goal behind the initiative remained unchanged, the tactics evolved toward supporting a series of sub-projects that addressed our main objectives.

### Cougar

Robinson H. 1998. 1997 North Island cougar ecology project: final report. Unpublished report for the Ministry of Environment, Lands and Parks, Vancouver Island Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program. 39 pp.

#### ABSTRACT

This project was initiated by the Ministry of Environment, Lands and Parks (MOELP) to provide an inventory of cougars (*Puma concolor vancouverensis*) on northern Vancouver Island. Trapping of cougars began January 8 1997 and was ongoing until March 1998. A total of 18 cougars were radio collared, 13 of which remain on the air. Annual home range sizes for female cougars was calculated as 207.75 km<sup>2</sup> (95% MCP, n=4). Cougar densities were estimated as 1.68 adult cougars / 100 km<sup>2</sup> and 3.35 / 100 km<sup>2</sup> total. It is recommended that more research be conducted into population dynamics, and the effects of hunting and habitat modification on cougar populations. It is also suggested that cougars become a higher research priority of the MOELP in region one. This project was originally designed to last between three and five years but was cut to eighteen months due to budgetary constraints, therefore all results stated in this report are preliminary and should be treated as such. (Please see page 3 of the newsletter for further information on this project).

### Marten and Ermine

Mowat, G., C. Shurgot, and K.G. Poole. 1998. Using track plates and remote cameras to detect marten and Vancouver Island ermine in coastal cedar hemlock forests. Timberland Consultants Ltd., Nelson, B.C. Unpublished report for the Ministry of Environment, Lands and Parks, Vancouver Island Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program. 26 pp.

#### ABSTRACT

We studied marten (*Martes americana*) and short-tailed weasel (*Mustela erminea anguinæ*) distribution on northern Vancouver Island, British Columbia from 1996 to 1998. We tested a combination of track plates, remote cameras, and hair removal methods to detect marten and weasels in 4 broadly different habitats: early seral cut-blocks, regenerating cut-blocks, old forests, and grassy edge habitats. We measured vegetation structure at many sample sites in order to describe the sites where marten and weasels were detected. We detected marten in all of the low elevation stands we sampled in northern Vancouver Island, even the early seral and regenerating stands. Weasels were detected at sites with open forest and little structure compared to forested stands. Most sites that detected weasel were edge habitats associated with a forest opening or riparian area; many sites were dominated by grass ground cover. Coarse woody debris was most abundant in recently cut areas, and abundance declined with stand age. Standing dead trees were much more abundant in old forest than any logged stands. Coarse woody debris is abundant in recently logged stands on northern Vancouver Island but older regenerating stands are structurally simpler because there are few trees left to recruit as woody debris.

Track plates worked well for detecting marten and weasels though we suggest extending both ends of the box 20 cm beyond the floor to provide greater protection from rain. We used rotten bait and lure so that sites would attract marten better and for longer time periods than fresh bait. We also conducted 7-day trap checks which allowed us to trap more sites than if we used shorter trap check intervals. Cameras were expensive, heavy, and failed to detect marten more often than track plates. We suggest they be used to identify unknown tracks or early in a study for methods development. Track boxes did not confine marten enough to remove hair effectively. The glue patches we used were also rendered useless after several days by the humidity in the area we worked.

### Northern Goshawk

McClaren, E. 1998. "Queen Charlotte" Goshawk (*Accipiter gentilis laingi*) population inventory summary for Vancouver Island, British Columbia (1997/1998). Unpublished report for the Ministry of Environment, Lands and Parks, Vancouver Island Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program. 54 pp.

#### ABSTRACT

Between May and September 1997, the Ministry of Environment, Lands and Parks Wildlife Program, conducted the third year of an ongoing intensive inventory of the "Queen Charlotte" Goshawk (*Accipiter gentilis laingi*) on Vancouver Island, British Columbia. Two crews of four individuals concentrated surveys in the northern (Woss/Sayward) and Port Alberni regions of Vancouver Island, respectively. Survey areas were categorized by landscape type as: 1) continuous old growth; 2) continuous second growth (>40 yrs); and 3) fragmented forests. On northern Vancouver Island, goshawk surveys were repeated for the fourth year whereas in Port Alberni they occurred for the first year. Goshawk surveys were conducted using two standardized Resource Inventory Committee (RIC) methods: 1) broadcast call surveys; and 2) stand-watches. All goshawk detections resulted in an intensive nest search within a 300 m radius around the detection. In total, 797 call stations and 54.6 stand-watch hours were conducted between May and September. Using these survey

techniques, 19 goshawk detections occurred, corresponding to an average survey success of 1.6 detections per 100 call stations and 11.0 detections per 100 stand-watch hours. Nine new goshawk nest territories were located, three as a result of broadcast surveys and six incidentally. Of these nine territories, two were located in continuous old-growth forests, six in continuous second-growth forests and one in a fragmented old-growth forest. Reoccupancy of previously known goshawk nest territories was relatively low with only 47.3% of the 19 known nest territories active. Productivity per successful nest averaged  $1.67 \pm 0.49$  fledglings for all active nests ( $n=18$ ) on Vancouver Island in 1997. As part of a continued effort to capture, band and affix radio transmitters to "Queen Charlotte" Goshawks, a total of eight adult and six immature (9 female, 5 male) goshawks were captured in 1997 using dho-gazas and box traps.

Low detection rates and few new nests discovered per unit of effort continue to suggest that the "Queen Charlotte" Goshawk population density on Vancouver Island is low. However, it is difficult to determine whether these low numbers reflect a population decline or low historical levels of goshawks on Vancouver Island. Nest site and stand level habitat data remain relatively consistent with previous findings on Vancouver Island and with studies across North America. Goshawks nest on the bottom to middle portion of mature (>40 year) second-growth and old-growth forested slopes that have relatively closed canopies and open understories. Previous to 1997 all nests were located in western hemlock (*Tsuga heterophylla*) and Douglas fir (*Pseudotsuga menziesii*) trees. In 1997, goshawks were also found nesting in red alder (*Alnus rubra*). Data collected on Vancouver Island between 1994 and 1997, suggest goshawks reuse nest territories from year to year. When previously known territories were assessed for activity in 1997, most were occupied by one or two goshawks, although few contained a nesting pair. Also, nest productivity was lower per successful nest in 1997 than in previous years. It is difficult to explain these low breeding rates and decreased reproductive success for goshawks in 1997 as their main prey items appeared to be present at levels equal to or greater than in previous years. However, heavy snowfall conditions during the winter and a cool, wet spring may have decreased the reproductive fitness of breeding females causing them to be unable to lay eggs or to continue through their full incubation period. At this point in time there are insufficient data to make home range size and habitat use/availability estimates for tagged individuals. However, radio telemetry during the winter suggests that goshawk populations on Vancouver Island are non-migratory.

## OWLS

### Forest Owls – Nimpkish Valley

Settington, M. 1998. Owl abundance and habitat in the Nimpkish Valley, Vancouver Island. Axys Environmental Consulting Ltd., Sidney, B.C. Unpublished report for the Ministry of Environment, Lands and Parks, Vancouver Island Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program. 93 pp.

#### EXECUTIVE SUMMARY

This report comprises the final results of a three year owl inventory program in the Nimpkish Valley, northern Vancouver Island. The owl inventories were conducted by W.M Resource Consulting, Comox B.C under the direction of John Deal, Habitat Forester with Canadian Forest Products Ltd., Englewood Logging Division, Woss, B.C. Canadian Forest Products Ltd. requested that Axys Environmental Consulting Ltd. prepare this report. This report presents the results of the 1995-1997 owl surveys and is partly based upon two progress reports summarizing the 1995 and 1996 surveys (Deal and Lamont 1996; Matoski 1997).

Owl populations can be used to monitor the effects of forest management on wildlife across a landscape and those effects can be managed through changes in landscape pattern and stand dynamics. There have been no documented multiple-species owl surveys in Pacific Northwest forests. Therefore, to assess owl populations in the Nimpkish Valley (TFL no. 37) on northern Vancouver Island, extensive call playback surveys were conducted from February to May in 1995 to 1997. Mature forests with road access were surveyed for the presence of western screech-owl (*Otus kennicottii*), great horned owl (*Bubo virginianus*), northern pygmy-owl (*Glaucidium gnoma*), barred owl (*Stix varia*) and northern saw-whet owl (*Aegolius acadicus*). Western screech-owl, northern pygmy-owl and northern saw-whet owl were relatively common in the Nimpkish Valley. Barred owls were uncommon and great horned owls were rare. Abundance indices are provided for each species for each year, but due to the nature of the surveys and the short duration of the project, no statistical comparisons were made among species or among years. All owl response locations were mapped with UTM coordinates and digitized into a GIS layer. Maps of all owl locations were submitted as a separate document to this report.

Owl habitat use was described using habitat attributes obtained from forest cover and biogeoclimatic zone maps. Owl habitat attributes were acquired from forest cover, biogeoclimatic zones and riparian data for TFL no. 37. Information from 40-ha circular plots placed around all response locations and an equivalent number of random plots to each species of owl, were then extracted from the digital files. A number of attributes including basal area, crown closure, tree species composition, distance to nearest stream and landscape composition within the 40-ha plots were examined. There were few biologically significant differences between the plots around each owl location and the plots around random points. This could have been the result of inaccuracies of plotting owl locations, using a plot size that did not represent habitat selection (40-ha), or the result of the scale of information available in the digital files. Based on the scale of measurement and the habitat attributes used, a definition of habitat use by owls was not possible for the Nimpkish Valley. Future work that includes ground truthing of owl locations and nest and roost searches will help to narrow the focus of habitat attribute measurement. Habitat measurement of owl activity sites and an assessment of the availability of those attributes across the landscape will provide tools for the forest manager to manage owl habitat with greater confidence and understanding. To determine if forest management affects owl populations, comparisons must be made between owl populations in an unmanaged forest ecosystem (natural control) to owl populations in a managed ecosystem. This report provides baseline owl abundance and habitat use measurements in a managed forest ecosystem and will hopefully stimulate future projects in the Nimpkish Valley and similar forest types.

### Owl Inventory

Holroyd, S.L., M. Eggen, and S. Ross. 2000 *Owl Inventory in Clayoquot Sound, Vancouver Island 1997*. Prepared for BC Ministry of Environment, Lands and Parks (Region 1), and the BC Ministry of Forests (Research Branch). Unpublished report for the Ministry of Environment, Lands and Parks, Vancouver Island Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program.

#### ABSTRACT

We conducted an owl inventory in Clayoquot Sound in the spring of 1997. The objectives of the study were to determine the species composition of the owl community, distribution of owls, habitat associations of owl species with biogeoclimatic variants, and to determine owl nesting habitat, if possible. We used call playback sampling methods (following RIC standards, RIC 1997, Ethier 1996) and surveyed local sources of knowledge to determine the owl community in Clayoquot Sound during the breeding season. We also provide an assessment of further research needs and recommendations for a monitoring program for owls.

The survey period was split into two sampling sessions, early spring (Feb 25-April 4) and late spring (April 6-May 14). After sampling 72 plots in 10 sampling areas within three different biogeoclimatic variants (CWHvh1, CWHvm1, and CWHvm2) we recorded 40 owl detections (39 auditory and 1 visual). With the call playback method, we detected five owl species during the breeding season (Western Screech Owl, *Otus kennicottii*; Great Horned Owl, *Bubo virginianus*; Northern Pygmy Owl, *Glaucidium gnoma*; Northern Saw-whet Owl, *Aegolius acadicus*; and Barred Owl, *Strix varia*). Local naturalists indicated the presence of three owl species in the Clayoquot Sound area that were not detected during our sampling efforts. These included: Short-eared Owl, *Asio flammeus*; Great Grey Owl, *Strix nebulosa*; and Snowy Owl, *Nyctea scandiaca*.

We determined sampling locations for call playback stations using biogeoclimatic subzones and variants, accessibility and concerns for safety. Efforts at nest searches proved unsuccessful. Western Screech Owls were the most common species detected in all three biogeoclimatic variants. Great Horned Owls made up the next largest proportion of detections followed by Barred Owls. Great Horned Owls were not detected in the CWHvm2, but were detected in the CWHvm1 and vh1. Barred Owls were only detected in the CWHvm2. Northern Pygmy Owls and Northern Saw-whet Owls were the least common species, and were detected in equal proportions but only in the CWHvh1. Overall, proportionally more owls were detected in the CWHvh1, followed by CWHvm1 and CWHvm2. Northern Pygmy Owls and Northern Saw-whet Owls were equally likely to respond at dusk or dawn. Western Screech Owls responded more often during dusk playback sessions than dawn sessions. Barred Owls responded more often during dusk sessions and Great Horned Owls more often during dawn sessions.

The call playback methodology adequately addressed the question of which species are present in the Clayoquot Sound area, however it did not address the question of habitat use. Future more detailed work on the specific habitat requirements of these owl species is required to provide wildlife and forest managers with the information required to manage forest habitat to maintain appropriate features for these birds of prey.

### Sharp-Tailed Snake

Engelstoft, C. and K. Ovaska. 1998. *Sharp-tailed snake study on the Gulf Islands and southeastern Vancouver Island, March - November 1997: final report*. Alula Biological Consulting. Unpublished report for the Ministry of Environment, Lands and Parks, Vancouver Island Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program. 58 pp.

#### EXECUTIVE SUMMARY

This report presents the results of the second year of a study of the Sharp-tailed Snake (*Contia tenuis*), a red-listed species in British Columbia, on southeastern Vancouver Island and southern Gulf Islands, from March to November 1997. We confirmed the continued presence of the species at four of the seven historic locations with previous observations in southwestern British Columbia: North Pender (one of two sites), South Pender, Saltspring, and Metchosin, Vancouver Island. We did not find the species in the Cowichan District (3 person hours of search in 1997), or on Galiano (5.5 person hours of search in 1996), but the search effort was limited, and the exact locations of both historic sites were unknown. We also did not locate the species at one of the two sites on North Pender, although searches were more intensive (24 visits in 1997 to check artificial cover objects).

At two mark-recapture sites (Magic Lake, North Pender, and Vesuvius, Saltspring), from March to November 1997, we caught a total of 32 individual Sharp-tailed Snakes under artificial cover objects and under rocks. In contrast, we caught 113 individual Northwestern Garter Snakes, *Thamnophis ordinoides*, at these sites. The snout-vent length of the Sharp-tailed Snakes ranged from 88 mm to 323 mm. There were more small snakes of both species at the Vesuvius than at the Magic Lake site, and several Sharp-tailed Snakes caught in March probably had hatched the previous fall (snout-vent length less than 100 mm). The south-facing, rocky slope at the Vesuvius site probably provided an oviposition and/or nursery area for the snakes.

At both mark-recapture sites, most observations of the Sharp-tailed Snake occurred from March to April, and from mid-September to October. The snakes were most likely to be found on the surface when the daily maximum temperature was below 18 °C and the daily minimum temperature was above 1°C; all captures occurred when the daily maximum temperature was below 23°C. Occasional captures from May to mid-September occurred after a relatively high rain fall (total precipitation above 15 mm within three days before capture).

Of the three types of artificial cover objects (black tar roofing, tin roofing, and plywood), tar roofing was the most successful in attracting both Sharp-tailed Snakes and Northwestern Garter Snakes. The thermal properties of the tar roofing potentially allowed the snakes to warm up rapidly on cool mornings. Because little habitat disturbance is associated with this method, artificial cover objects are recommended for future studies that require repeated visits to the same site, such as long-term monitoring or intensive mark-recapture studies, or for searching sensitive habitats, such as talus slopes.

We experimentally implanted tags for the harmonic direction finder under the skin of juvenile Northwestern Garter Snakes and Sharp-tailed Snakes to track movements of snakes. The plastic-coated tag, consisting of a Schottky diode mounted in the middle of a 7 cm long copper antenna, weighted circa 4 mg. Using a RECCO® transmitter/receiver unit that broadcast wavelengths of 917 MHz at 4-5 W, we were able to follow movements of one Sharp-tailed Snake at the Magic Lake study site from 11 September to 8 November. Although the relatively short detection distance (from 7 m to less than 2 m for a snake underground), the method holds promise for obtaining detailed habitat use data of these secretive and apparently largely fossorial animals.

Because Sharp-tailed Snakes are difficult to find even under optimal conditions, surveys of snakes during future studies should be supplemented by the delineation of critical habitats, for example, through aerial surveys. Our study suggests that small openings (less than 1 ha) along south-facing, rocky slopes in Douglas Fir - Arbutus forests may form such habitats, and provide hibernation and egg-laying sites for the snakes. Future studies should also focus on determining characteristics of foraging habitats around these sites, for example, by following movements and habitat use of individuals at known sites throughout the seasons. The harmonic direction finder system may facilitate such studies.

## UNGULATES

### Mountain Goats

Brunt, K.R. 1999. *Coastal mountain goat winter habitat use and forest development implications. Unpublished report for the Ministry of Environment, Lands and Parks, Vancouver Island Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program.*

#### ABSTRACT

Previous studies have indicated the requirement of coastal mountain goats for old-growth coniferous forests for winter survival. Expanding forest development through recent innovations in forest harvesting technology, especially the increased use of helicopter logging to access timber that was previously inaccessible using conventional logging practices, has highlighted the need to determine critical winter habitat requirements of coastal mountain goats. Winter habitat use of 15 radiocollared mountain goats in south coastal British Columbia was studied during two winters using aerial telemetry. Characteristics of home ranges and habitat selection were determined by overlaying animal locations with topographic and terrestrial ecosystem data using a geographic information system. The results of this study which identify important characteristics of mountain goat winter range are being used to map critical winter habitat for input to operational forestry plans as well as broad-scale regional landscape level planning processes in coastal British Columbia.

### Roosevelt Elk

Koshowski, D. 1998. *Nimpkish Roosevelt elk project: final report 1998. Unpublished report for the Ministry of Environment, Lands and Parks, Vancouver Island Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program. 50 pp.*

#### ABSTRACT

A total of 1,627 locations were collected for 31 radio-collared Roosevelt elk (*Cervus elaphus roosevelti*), between November 15, 1996 and July 22, 1998. The objectives of this study were to determine population parameters, seasonal movements, habitat use, and identify calving areas for Roosevelt elk within the Nimpkish Valley, on Vancouver Island.

Two females and one male were determined to be migratory in their seasonal movements. Another female is thought to have emigrated from the study area. Mortality rates were calculated to be 10.9 % per year for females (2.7 % predation, 8.2 % legal hunting), and there were no mortalities observed within the collared male elk population.

Seasonal range sizes were determined for each study animal using the 95% Minimum Convex Polygon (MCP) method and program CALHOME. Mean (+SD) winter range sizes of non-migratory elk were 7.0 + 4.0 km<sup>2</sup> for females and 4.3 + 2.5 km<sup>2</sup> for males in 1996/97. In 1997/98, average winter range sizes were determined to be 9.2 + 5.6 km<sup>2</sup> for females and 10.3 + 1.5 km<sup>2</sup> for males. Summer range sizes averaged 16.3 + 12.0 km<sup>2</sup> for females and 18.1 + 6.0 km<sup>2</sup> for males, and were significantly larger than winter ranges.

A chi-square test, with 95% Bonferroni simultaneous confidence intervals, was used to determine disproportionate use of available habitats by non-migratory female elk. Young coniferous forests (8-19 yrs), swamps, and clearcuts (1-7 yrs) were used more than expected in both winter's 1996/97 and 1997/98, and summer 1997.

Vegetation and other physical site characteristics were described for 12 calving sites identified during May and June 1997 (n=5) and 1998 (n=7). Six of the calving sites were located in young coniferous forests (8-19 yrs), four sites were found in mature forests (>120 yrs), one was in an immature forest (27 yrs), and one was found to be on the boundary between a swamp and immature forest. Vegetative and/or topographical cover, as well as, distance to edge, water, and human activity may be important factors in the selection of calving sites by cow elk.

### Vancouver Island Marmot

deLaronde, M., S. Holroyd and A. Bryant. 1998. *Vancouver Island marmot 1997/98 inventory summary: FRBC Wildlife/Wildlife Habitat Inventory Program PA-96-487-IN. Unpublished report for the Ministry of Environment, Lands and Parks, Vancouver Island Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program. 14 pp.*

#### ABSTRACT

Vancouver Island marmots (*Marmota vancouverensis*) are listed both nationally by the Committee on the Status of Endangered Species in Canada (COSEWIC) and provincially by the BC Ministry of Environment, Lands and Parks, as an endangered, endemic species. Results from the 1997/98 Forest Renewal BC inventory of marmot colonies at fourteen mountain locations (thirty-six known or potential colony sites) indicate that populations in 1997 are comparable to 1996 but are still declining compared to previous years data. In 1997, the population was estimated to be 101 animals (70 adults, 31 young-of-the-year) based on field observations of colonies. Estimates from 1996 total 103 animals (72 adults, 31 young)

which is a marked decline from the 1994 total of 161 animals (97 adults, 64 young). Recommendations as a result of this study include, continued intensive surveys of known colonies, expanding the search area to include more of the Mt. Washington area, continue relocating radio-tagged marmots on Mt. Washington, expanding the inventory crew to increase sampling effort to new areas and to assist in research of the rodent plague (*Yersinia fredrecksonia*) a potentially population-limiting disease affecting the Vancouver Island marmot that was found this year. Public education activities should also continue.

### Vancouver Island Water Shrew

Hartman, L. 1998. Location of red-listed Vancouver Island Water Shrew (*Sorex palustris brooksi*) occurrences recorded during summer of 1997. Memorandum submitted to MELP Region 1, March 24, 1998 pending completion of final report.

#### ABSTRACT

Enclosed is a summary of location data for 14 water shrews captured on Vancouver Island in 1997, as part of the FRBC-funded Vancouver Island Water Shrew Inventory (FRBC #PA96186-IN). This was the second year of an inventory that was originally scheduled as a 3-year project. FRBC funding was significantly reduced during this season, and has been cancelled for the final year of the study. Consequently, results of this project are inconclusive with respect to the originally stated goals, which were to describe the distribution and broad habitat associations of the species.

Fourteen *S. p. brooksi* were caught in 1997, on 16 surveyed traplines. One animal was released alive and the remaining 13 were prepared as museum skins and skeletons, with tissues extracted for genetic analysis as outlined in the project proposal. Skins and skeletons are housed at the Royal BC Museum and tissues samples are being stored and analyzed at Texas Tech University in collaboration with Dr. R.J. Baker. These 14 captures, which include the first documented capture on the west coast of Vancouver Island, add to our very limited information for this species. From 1934-1959 *S. p. brooksi* was recorded from only 5 localities on Vancouver Island. In the nearly 40 years since then, only 2 additional specimens were recorded prior to this study. Recent captures have now been documented in the vicinity of four of the original locality records (near Coombs, Black Creek, Victoria, and Port Alberni), and in two new areas (Salmon River and Kennedy Lake).

Detailed descriptions of all sites sampled are included in the project report (Hartman in prep.). *S. p. brooksi* was captured in both old and mid-aged forest stands, however data are inadequate to conclude anything about the vulnerability of this species to logging activities. Occurrence in mid-aged forests should not be interpreted as an indication that the species is not at risk due to forest practices. This question requires further study.

Increased road development and settlement along the eastern side of Vancouver Island is a potential concern for this species, as most occurrence records come from this part of the island. The 1996 captures in the Hamilton Marsh are adjacent to the new Qualicum Connector, and the proposed path of the new island highway directly crosses the 1997 Black Creek capture site, and falls within 1 km of capture sites on the Tsolum River and Woodhus Creek. Plans to raise the water level of the Sooke reservoir represent an additional concern with respect to habitat for this species. Two *S. p. brooksi* were captured on Rithet Creek, and captures were also made elsewhere in the Greater Victoria Water District (Veitch and Niagara Creeks). Plans to raise the level of the Sooke reservoir should be preceded by a thorough assessment of potential habitat loss for this species. Further information on the results of this project can be obtained on request, pending completion of the final report.

### Woodlot Wildlife

Urban, D. and A. Hopwood. 1998. Wildlife survey and management strategy for protection of biodiversity on Woodlot Licence 082 near Courtenay, BC. Unpublished report for the Ministry of Environment, Lands and Parks, Vancouver Island Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program. 51 pp.

#### ABSTRACT

Inventories of coarse woody debris (CWD), terrestrial salamanders, Northern Goshawks, and bats were conducted on Woodlot Licence 082 (132 ha) near Courtenay, BC in the final year of a two-year study. The data collected were used for developing a forest management strategy, with a focus on indicator wildlife species and wildlife habitat values. The field work was conducted between August and October 1997 and followed Resource Inventory Committee methodologies. The average volume of CWD ranged from 87 to 323 m<sup>3</sup>/ha depending upon the ecological site series. Forty-nine per cent of CWD was in the most advanced decay stage, while 8% fell into the early stages of decay. Of the recent CWD recruits, 77% were found in the areas infected by laminated root rot. The western red-backed salamander was the most abundant of the terrestrial salamanders; one each of the *Ensatina* and clouded salamander was found. Salamanders were closely associated with CWD in the moderate to advanced stages of decay. They were usually found under logs lying on the ground, between bark and logs, and within decaying logs. Two Northern Goshawk juveniles were sighted on the Woodlot but because of the lateness of the season, the nest was not located. Using a mist net, one bat species, California myotis, was caught. The forest structure and complexity of the Woodlot will be maintained and enhanced by periodically continuing the monitoring of wildlife and CWD, leaving CWD from logging on-site, preserving wildlife trees, designating sensitive habitat areas (riparian zones, wetlands, rock bluffs, etc.) and wildlife corridors, employing selection timber harvesting, using hand-falling, and conducting least-intrusive road construction and deactivation techniques.

### Woodlot Inventories - Sensitive Ecosystem Inventories

Triton Environmental Consultants Ltd. 1998. Hornby Island, Lantzville, Nanoose and Gabriola Island. Four reports and maps. Unpublished reports for the Ministry of Environment, Lands and Parks, Vancouver Island Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program.

### Summary Description

A series of four reports with mapping data on woodlots within the areas of Hornby Island, Lantzville, Nanoose and Gabriola Island. The four reports include introductions, study area descriptions and methods for data collection, field assessment of forest values and wildlife habitat features and mapping. The results and discussion sections include a description of site series present, a discussion of wildlife habitat values, and wildlife, plant and plant communities of management priority. Also included is a discussion of silviculture systems, recreation and resource use and recommendations for forest, riparian habitat, wildlife and biodiversity values and recreational use. The site series descriptions are detailed and are to be used in concert with the maps (which are available only in hard copy format). Wildlife discussions are brief and seem to be pulled mainly from the literature to determine species presence or absence. Sampling effort for wildlife species was minimal and results should be considered as very preliminary.

### Woodpeckers – Nimpkish Valley

Deal, J., and M. Setterington. 2000. Woodpecker nest habitat in the Nimpkish Valley, Northern Vancouver Island. Unpublished report for the Ministry of Environment, Lands and Parks, Vancouver Island Region 1 as part of the Forest Renewal B.C. Wildlife/Wildlife Habitat Inventory Program. 83 pp.

#### ABSTRACT

Tree cavity-nesting bird species are good indicators of the effects of forest management practices on wildlife because their life requisites include habitat elements that are often impacted by timber harvesting activities. Timber management practices that include removal of wildlife “danger” trees and reduced-age harvest rotations across the landscape can result in long-lasting changes in forest structure, reducing habitat for wildlife tree dependent species (i.e., woodpeckers). Management of habitat for primary cavity excavators will benefit other wildlife tree users such as smaller cavity excavators (e.g., nuthatches and chickadees), and secondary cavity using birds (e.g., some forest owls and other raptors, swallows, swifts, arboreal squirrels, and bats). To evaluate woodpecker nesting habitat use in temperate forests of northern Vancouver Island, a woodpecker nest inventory and habitat evaluation was conducted from 1994 to 1997 in the Nimpkish Valley (Tree Farm Licence No. 37). Of the 428 nests found, 329 were woodpecker nests, including 157 red-breasted sapsucker (*Sphyrapicus ruber*), three downy woodpecker (*Picooides pubescens*), 80 hairy woodpecker (*P. villosus*), two three-toed woodpecker (*P. tridactylus*), 85 northern flicker (*Colaptes auratus*), and two pileated woodpecker (*Dryocopus pileatus*). Incidental nest detections of other cavity nesters included 10 American kestrel (*Falco sparverius*), one western screech owl (*Otus kennicottii*), one Vaux’s swift (*Chaetura vauxi*), one tree swallow (*Tachycineta bicolor*), 21 violet-green swallow (*T. thalassina*), 46 chestnut-backed chickadee (*Poecile rufescens*), 13 red-breasted nuthatch (*Sitta canadensis*), and six brown creeper (*Certhia americana*). Due to sample size limitations, habitat analysis was limited to red-breasted sapsucker, hairy woodpecker and northern flicker nests within the CWHxm2, vm1, and vm2 biogeoclimatic zone (BEC) variants.

For each nest tree, we recorded characteristics that may have influenced nest tree selection by woodpeckers (e.g., wildlife tree class, snag height, diameter and species, bark retention, etc.). Of those characteristics, woodpeckers selected large diameter western white pine (*Pinus monticola*) trees and avoided using western redcedar (*Thuja plicata*). Woodpeckers generally preferred wildlife tree decay classes 4–6 trees with > 95% of the bark remaining for nesting, and trees in the 80–100 cm dbh class were used for nesting more often than expected relative to their availability. We found similar overall results for red-breasted sapsucker, hairy woodpecker and northern flicker. Birds likely selected western white pine because that species suffered high mortality within the Nimpkish Valley approximately 30 years ago. The decay pattern of those trees at higher elevations are such that they make for solid nesting structures with an appropriate amount of heart rot which are preferred by woodpeckers. Tree height and dbh are probably not limiting factors to nest tree selection. However, an abundance of trees in intermediate stages of decay in structurally stable habitat (i.e., windfall tolerance) may be important.

We compared habitat structures of nest plots and four randomly selected plots to evaluate nest site selection at the forest stand level. For each plot, we measured variables that may have influenced habitat use by woodpeckers (e.g., slope, aspect, basal area, tree density, species composition, local density of snags, etc.). Woodpecker nest sites were discriminated from the surrounding stand structures by the presence of larger diameter amabilis fir, Douglas-fir, western hemlock, and western white pine, a greater density of western hemlock and western white pine, and a greater volume of western hemlock. Usually, lower densities of yellow-cedar were found within woodpecker nest plots than in random plots. Evidence also suggested that woodpeckers selected sites on a 21–30% slope, as nests were found in that slope category more often than expected. The latter may be related to several micro-site characteristics including canopy and other habitat structural characteristics related to cover from predators, as well as climatic differences related to slope and slope position. While many of our results have been documented in the literature (e.g., woodpeckers selecting for tall, large diameter snags as nesting substrate), we identified some specific habitat requirements of woodpeckers in the Nimpkish Valley. Canfor is aware of conflicts between management for timber and habitat requirements of cavity nesting species, and is attempting to integrate timber and cavity nest habitat management needs across the landscape. Current management practices include planting of snags as part of watershed restoration activities, retention of wildlife tree patches (ranging in size from 2 ha to 8000 ha), and is considering longer harvest rotations to manage for other resources such as cavity nesting species. Wildlife tree patch management and snag planting practices are discussed in the Management Implications section. The long-term success of these management practices must be evaluated through continued population monitoring and evaluations of woodpecker use of wildlife tree patches compared to more extensive tracts of relatively undisturbed forest. To that end, Canfor has developed an adaptive management approach that will integrate timber management with other forest resources to ensure long term sustainability of cavity nesting habitat.

Photo Credit: Page 1, center, late winter plumaged Marbled Murrelet, Auke Bay, Alaska, photo by Gus van Vliet, taken from: Ralph, J.C., Hunt, G.L., Jr., Raphael, M.G., Piatt, J.F., eds., 1995. Ecology and conservation of the Murrelet. Gen. Tech. Rep. PSW-GTR-152. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Dept. of Agric., 420 pp.

Sketches: Page 1, Vancouver Island Marmot, by Cheryl Bryant, courtesy of Andrew Bryant

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