DEPARTMENT OF NATIONAL DEFENCE

ESAC

ENVIRONMENTAL SCIENCE ADVISORY COMMITTEE

CANADIAN FORCES BASE ESQUIMALT

Member Agencies:

Canadian Forces Base Esquimalt

Canadian Forest Service

Canadian Wildlife Service

B.C. Ministry of Forests

University of Victoria

Royal Roads University

2001 Annual Report

Canada

Prepared July 2002 for the Committee by:

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P. Kingman - Forestry canopy research station, Rocky Point *(centre photo)*
T. Oldfield, littlefish design company - Salal *(top left)* and Royal Roads University grounds *(bottom right)*
J. R. Hill III, Purple Marten Conservation Association - Purple Martin *(top right)*

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EXECUTIVE SUMMARY

The purpose of this Annual Report is to provide a summary of the research and activities conducted during 2001 under the Department of National Defence (DND) Environmental Science Advisory Committee – Canadian Forces Base (CFB) Esquimalt. The Environmental Science Advisory Committee (ESAC), established in 1994, is a multi-agency technical advisory committee that sets up a formal permitting system to facilitate the tracking of proposals to do research on CFB Esquimalt properties.

Camas in a Garry oak meadow

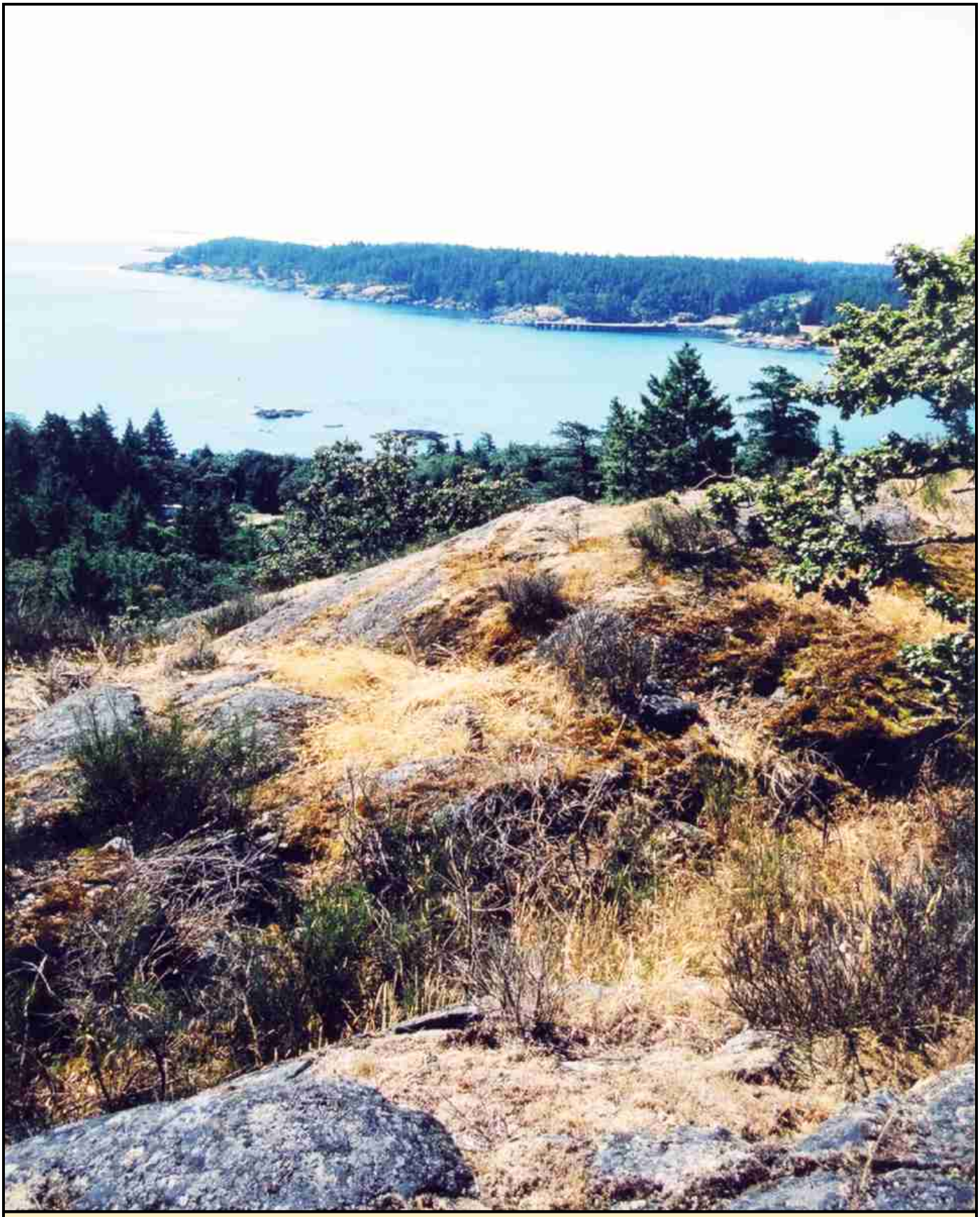
Photo by: T. Oldfield

A 5-year regional MOU (2001-2006) was signed between CFB Esquimalt and the Canadian Forest Service (CFS) to solidify the level of commitment between the two participants to deliver and manage a new Natural Resources Program which replaced the DND/CFS Forest Resources Management Program. Consequently, ESAC activities are now overseen by the Steering Committee of the DND/CFS Natural Resources Program.

In 2001, the Committee met 4 times to review proposals and discuss project status. A total of 14 proposals were received and 14 permits were issued, of which 8 were renewals of previous permits. In comparison to previous years, these numbers have decreased. Each year, ESAC sponsors an annual workshop. The 2001 Annual Workshop was held in February 2002 at Royal Roads University, in Victoria, B.C. Thirteen individuals presented findings of the research they conducted on CFB Esquimalt properties during 2001.

A GIS database, initiated in 1997, of forest cover, ecological types, special features, and research areas was updated in March 2001. Map corrections and updates on forest cover, various map features, archaeological data, and rare species data were added to the database. A total of 26 map sheets were formatted to provide printed coverages for 16 properties. A CD-ROM containing the data update was distributed to member agencies.

The ESAC website was revised and updated to include the ESAC Annual Report for 2000. The site also contains background information on the committee as well as links to all ESAC Annual Reports from 1995 to 2000. The site can be found on the Canadian Forest Service website at: http://www.pfc.forestry.ca/programs/esac/index_e.html. A link to the web site can also be found on the CFB Esquimalt, Formation Environment Defence Information Network (DIN) site for internal use by the Department of National Defence.



View of Rocky Point from Mary Hill

Photo by: T. Oldfield

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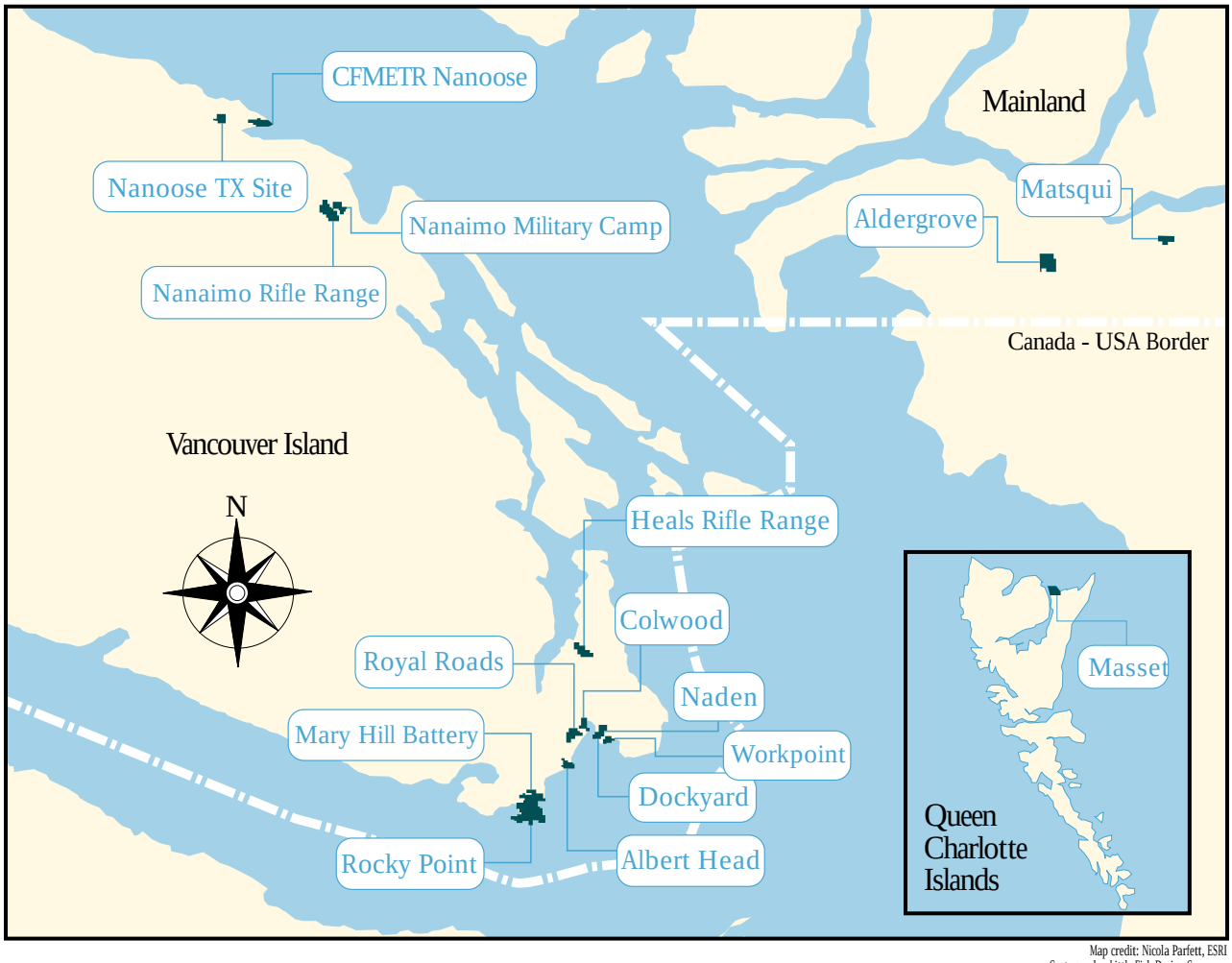
CFB ESQUIMALT PROPERTIES

CFB ESQUIMALT PROPERTIES - Total Area (ha)

Dockyard / Signal Hill / Yarrows	62.7	Heals Rifle Range	212.4
Naden	45.4	Nanaimo Rifle Range	351.0
Work Point	66.0	Nanaimo Military Camp	85.0
Colwood	90.0	Nanoose TX Site	105.0
Royal Roads	229.0	CFMETR / Nanoose Bay	288.4
Albert Head	92.7	Masset, Queen Charlotte Islands	824.0
Mary Hill	178.1	Aldergrove	514.0
Rocky Point	1078.0	Matsqui	95.1

TOTAL AREA: 4,316.7 ha



Map credit: Nicola Parfett, ESRI
Cartography: Little Fish Design Company

BACKGROUND

HISTORY

CFB Esquimalt administers over 4,300 hectares of land on 16 different properties, of which over 3,200 are forested. As human disturbance is minimal within these areas, they have become a refuge for many species. A number of the properties support rare plants and animals and remnants of threatened ecosystems such as Coastal Douglas-fir forests and Garry oak meadows. These properties provide unique opportunities to conduct a variety of environmental research. Various individuals and organizations have carried out research on CFB Esquimalt properties for many years. As most of this research was ad hoc and uncoordinated, there was no process in place for tracking the research activities and associated findings.

In 1993, CFB Esquimalt and Environment Canada held a workshop to determine what research and monitoring had been carried out on properties. Individuals were invited to make presentations on their research activities and projects. A report providing a compendium of the research projects and findings was produced. A recommendation from the workshop was the implementation of a formal tracking system for this type of research.

In 1994, CFB Esquimalt and the Canadian Forest Service (CFS) worked together with the Canadian Wildlife Service, B.C. Ministry of Forests, Lester B. Pearson College of the Pacific, and the University of Victoria to create and organize a multi-agency committee to oversee research being carried out specifically at Rocky Point. As a result, the DND Environmental Science Advisory Committee - CFB Esquimalt, commonly known as ESAC, was established under a Letter of Understanding (LOU) as a technical advisory committee reporting to the joint DND/CFS Forest Resources Management Committee. In 1995, the Committee increased its mandate to include all 16 CFB Esquimalt properties.

In 1996, the Committee expanded to include a representative from Royal Roads University. The first five-year term of the Committee's LOU came to an end in December 1998, at which time Lester B. Pearson College of the Pacific withdrew as a member agency of the Committee. The Committee reviewed its terms of reference and a new LOU was prepared and signed in 1999.

In 2001, CFB Esquimalt and the Canadian Forest Service signed a Memorandum of Understanding (MOU) to solidify a level of commitment between the two parties to create, deliver, and manage a joint Natural Resources Program for a five-year time frame (2001-2006). The program allows for the proper management of natural resources on CFB Esquimalt properties. As a result, ESAC activities are now overseen by the Steering Committee of the DND/CFS Natural Resources Program.

MEMBERS

The Environmental Science Advisory Committee (ESAC) is a multi-agency committee composed of representatives from the following member agencies:

- CFB Esquimalt (Department of National Defence)
- Canadian Forest Service (Natural Resource Canada)
- Canadian Wildlife Service (Environment Canada)
- B.C. Ministry of Forests
- University of Victoria
- Royal Roads University

A complete list of ESAC members and contact information as well as a list of alternate contact names is located at the end of this report.

BACKGROUND

ROLES AND RESPONSIBILITIES

The terms of reference for the Committee provide a detailed overview of its roles and responsibilities. The Committee's primary functions are to review, evaluate, and provide expertise and advice to DND on proposals received to conduct research on CFB Esquimalt properties. The Committee provides a mechanism to track the proposals and permits and supervises the research and collection activities being conducted. As well, ESAC is responsible for collecting and archiving reports from permittees, making them available to member agencies and other interested agencies.

The Committee has also facilitated the establishment of, and reviewed projects for the Forest Canopy Research Station operating under the auspices of the Forest Canopy Research Station Operating Committee (FCRSOC), a subcommittee reporting to ESAC. The Operating Committee is led by the University of Victoria and is responsible for the day-to-day operation, safety, and maintenance of the station. The Lester B. Pearson College of the Pacific originally built this facility in 1994 to allow researchers access into the tree crowns in a stand of old Douglas-fir located on the Rocky Point property. In 1998, Lester Pearson College relinquished ownership of the Forest Canopy Research Station and withdrew as a member agency of the Committee.

PERMITTING PROCESS

Studies contributing to the knowledge and understanding of the functioning of ecosystems and environmental management is greatly encouraged on CFB Esquimalt properties. To facilitate the tracking of these activities the Committee developed and implemented a formal permitting process.

A permit is required for natural science activities within CFB Esquimalt properties. Activities for which a permit is required include, but may not be limited to the following:

- Observations, filming, photography
- Surveys and inventories
- Tagging
- Collection of flora, fauna, or geological specimens
- Intrusive surveys or research involving physical disturbance of the land
- Installation of scientific monitoring instruments and/or structures

Researchers must apply through the Committee to conduct research on CFB Esquimalt properties. The application process involves submitting a research proposal and application form to the Committee at least one month prior to conducting the research. The application form is available by contacting the Committee. The Committee will then review and evaluate each proposal and recommend it for approval by DND. Permits are issued on an annual basis and expire December 31st of that year. Permits may be issued for long-term projects (a maximum of three years in duration) but must be renewed annually.

Bald Eagle

Photo by: W. Christensen, Canadian Rangers

REPORTING ACTIVITIES

Salal

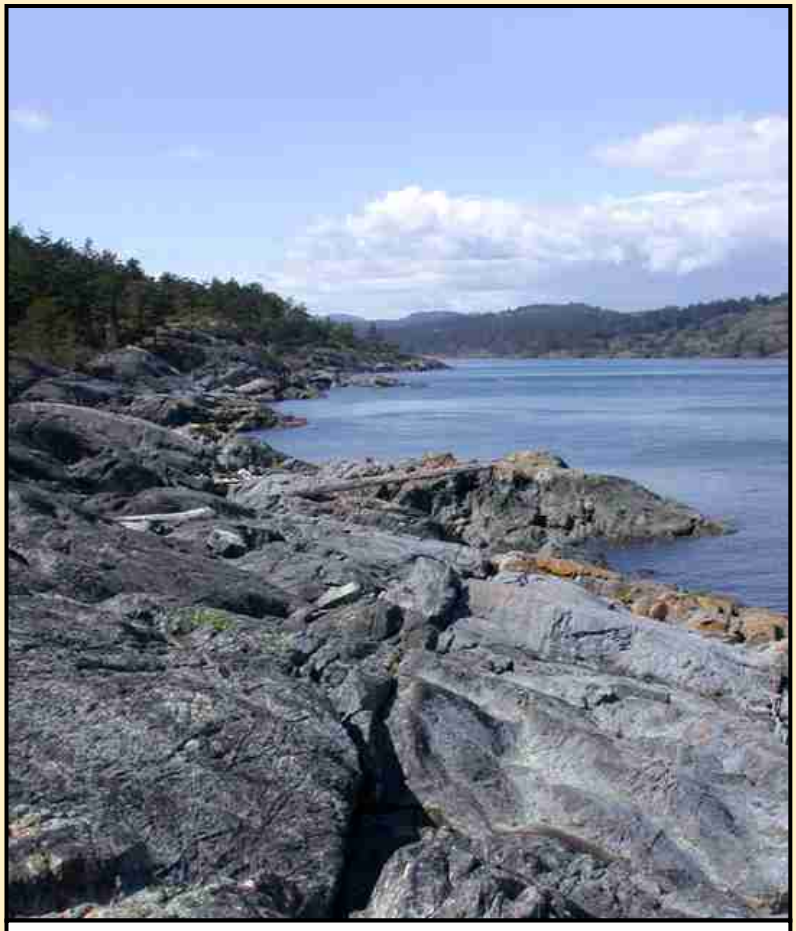
Photo by: T. Oldfield

As part of the reporting process, ESAC prepares an Annual Report to outline research and collection activities conducted by permittees throughout the year. All ESAC Annual Reports from 1995 to 2001 are available on the ESAC website at: http://www.pfc.forestry.ca/programs/esac/index_e.html.

Each year, permittees are required to submit a report on their research and findings of the work done throughout the year. These reports are compiled and published in the ESAC Annual Report. These reports can also be found at the Pacific Forestry Centre Library. To facilitate the sharing of information of the research conducted on CFB Esquimalt properties to others, the Committee hosts one annual workshop. The workshop allows permittees to present their research conducted throughout the year as well as their findings and conclusions. The workshop is open to everyone: member agencies, interested organizations, institutions, individuals, as well as other researchers and students. Information on the workshop can be obtained through the Annual Report.

COMMITTEE RECOMMENDATIONS

Committee members reviewed suggestions from the Victoria Natural History Society for a protected area and walking trail along the northern boundary of Albert Head and from Lester B. Pearson College for a protected area for a Cormorant roost along Pedder Bay. The Committee reviewed the suggestions and the Conservation Management Zoning currently in place for the areas. The Committee recommended to DND that current zoning and land use was sufficient to protect the environmental values for both of these areas. Installation of a trail at Albert Head would be a poor option from a wildlife perspective but it would be up to DND to consider this with the costs in fencing and land. A project should be initiated in 2002 to monitor the Cormorant roost area.



View of Pedder Bay, from Rocky Point

Photo by: T. Oldfield

RESEARCH & COLLECTION PERMITS

This year was the seventh full year of activity for ESAC. The Committee met four times during 2001 to review and track the status of the various proposals that were received. A total of 14 proposals were received and 14 permits were issued, of which 8 were renewals of previous permits. Table 1 shows the number of proposals received and permits issued each year. Since 1998, the number of proposals has declined, in part because of the completion of multi-year projects.

Table 1: Summary of ESAC proposals since 1995

Year	# of proposals	# of permits
1995	22	20
1996	25	24
1997	24	24
1998	26	26
1999	25	25
2000	19	16
2001	14	14

The titles and permit number of each approved proposal are listed in Table 2. Annual progress reports (for on-going research projects) and final reports submitted by each of the permittees in 2001 are found in the proceeding section.

Table 2: List of proposals and permits

Prop. #	Contact	Title	Permit #
01-01	Easton	Monitoring Neotropical Migratory Birds	P003-01*
01-02	Winchester	Community Ecology of the Canopy Forest Floor Insect/Arthropod Fauna	P006-01*
01-03	Mogensen	Green Spaces Inventory	P046-01*
01-04	Callan	Measurement of Fungal Biodiversity on Cut Alder Logs	P047-01*
01-05	Copley	Purple Martin Nestbox Program and Access for Bird Count	P018-01*
01-06	Greenwood	Bald Eagle Nest Tree Monitoring	P074-01
01-07	Humphrey	Environmental Technology Program Field Trip	P075-01
01-08	Finlay	Purple Martin Origins and Relationships	P044-01*
01-09	Roberts	Russulas of Southern Vancouver Island Coastal Forests	P076-01
01-10	Cocksedge	Sustainable Harvesting Potential of Salal	P068-01*
01-11	Munroe	Invasive Species Removal on East Ballenas Island	P077-01
01-12	Hebda	Advanced Field Methods in Restoration	P041-01*
01-13	Sampson	Bald Eagle Nest Tree Project	P078-01
01-14	Collinson	Garry Oak Acorn Survey	P079-01

* Renewed from previous years

One of the major challenges faced this year was the heightened security and restricted access to CFB Esquimalt properties due to the events of September 11th. As a result, access to the properties was limited for all non-DND personnel, including ESAC permittees. In February 2002, ESAC permittees regained access to their research sites. However, this represented for some, a gap in their data collection.

FOREST CANOPY RESEARCH STATION

This facility consists of four old growth trees that have been fitted with platforms in the canopy along with ladders leading to higher levels. Tree No. 1 is isolated from the other three trees by approximately 75 metres. A boardwalk made of "Superwood" (recycled plastic bags) connects the four trees on the ground. Trees No. 2, 3, and 4 are situated close to each other and are connected by "Burma" rope bridges. Access to the canopy of Tree No. 1 is by means of a bosun chair and a hand-operated winch attached to a nearby smaller tree. The person in the bosun chair is winched up to the platform. From there, access to the upper part of the tree is by ladders attached to the trunk. Access to the canopy of the other three trees is by means of a winch that hauls the person up to the platform of Tree No. 4. From this platform access to the other two trees is by means of rope bridges. Another rope bridge connects Tree No. 4 to an additional large tree approximately 25 metres away.

Forest Canopy Research Station

Photo by: P. Kingman

In 1996 a microclimate monitoring station was installed on Tree No. 4. Sensors were set up on the tree from the forest floor to the upper branches in order to monitor the microclimate at different positions. An automatic rain gauge was also set up in a nearby clearing. The data was relayed to and stored in a data logger at the base of the tree. The microclimatic station was up and running and weather data was downloaded during the year. In December of 2000, a nearby tree was blown over and as it came down it brushed against Tree 4. A number of sensors were damaged including the humidity sensor unit.

Since 1998, the University of Victoria has assumed responsibility for the microclimate station facility. The Forest Canopy Research Station Operating Committee (FCRSOC) is committed to increasing the use of the facility through more active promotion to the scientific community. During 2001, the maintenance and operation of the Forest Canopy Station and microclimate station were overseen by FCRSOC. There is, however, a proposal to hand over the operation and maintenance of the station to Royal Roads University. This would become part of their present and on-going attempts to monitor climate change and atmospheric transport of contaminant chemicals. This proposal is currently being reviewed by Dr. Jim McTaggart-Cowan from Royal Roads University. A decision on this proposal is expected some time early 2002.

Canadian Forest Service staff member

Photo by: S. Blouin

There has been very little activity at the Forest Canopy Research Station and Microclimate Station since the last safety inspection was carried out in March 2000. The only activity taking place at the Microclimate Station site in 2001 was a reconnaissance trip by all ESAC members along with some guests from Royal Roads University in December 2001. The main objectives were to determine the condition of the Microclimate Station, the integrity of the data-logger, its sealed container, and various sensor units, in particular, the rain gauge. Also, during the year, the Forest Canopy Research Station was visited by a number of tours, including a class of students from the Environmental Technology Program at Camosun College. During these tours, the purpose and activities of the facility were explained. The tours viewed the facility from the ground with no access to the canopy.

No annual safety check was performed in 2001; the next safety inspection is scheduled for early 2002.

GEOGRAPHIC INFORMATION SYSTEM

Over the last seven years, the Department of National Defence, the Canadian Forest Service, the Canadian Wildlife Service, and other agencies have collaborated extensively through the Environmental Science Advisory Committee in the delivery of environmental programs on CFB Esquimalt properties, particularly on southern Vancouver Island. During that period much information has been gathered to assess the ecological character of these lands.

The Committee initiated a project to merge these new data sets with the existing data and to begin a process of analysis to develop conservation management plans for the properties. Much of this information was in a variety of formats of varying quality. A common Geographic Information System (GIS) format, ArcInfo, was decided upon. The GIS project, funded by DND in January 1997, compiled and converted the existing spatial data sets. The initial phases of the project were completed with the preliminary compilation and conversion of all the identified baseline data sets on 19 properties into a common ArcInfo format. Additional point data (on rare species, special sites, etc.) were converted into map coverages. The data are stored as ArcInfo coverages at the Canadian Forest Service and are available to the three federal agencies of ESAC.

Remote access to these data sets by DND and other agencies was not possible due to technical difficulties. Instead,

Table 3: Status of DND/CFS Natural Resources Program/ESAC GIS Database

Location	File Type		Layers - Date of Last Update		
CFB Esquimalt	DXF Files	ArcView Shapefiles	Contours	Roads	Water
Albert Head		1998	1993	2000	2000
Aldergrove		1998	1993	2000	2000
CFMETR		1998	1993	2000	2000
Colwood		1998	1993	2000	2001
Dockyard		1998	1998	1999	1999
Heals Rifle Range		1998	1993	2000	2000
Mary Hill Battery		1998	1993	2000	2000
Masset		1998	1993	1993	1993
Matsqui TX Site		1998	1993	1993	2001
Naden	1993	1998	1998	1999	1999
Nanaimo M.C.			1993	1993	1993
Nanaimo Rifle Range	1993	1998	1993	2000	2000
Nanoose TX Site			1993	1993	1993
Pat Bay		1998	1998	1999	1999
Rocky Point		1998	1993	2001	2001
Royal Roads		1998	1993	1998	1998
Work Point		1998	1998	1999	1999

CD-ROM copies of the updated data were made on an annual basis and delivered to DND and CWS. It is anticipatedthat each year, pending funding, map coverages and point data will be reviewed for accuracy, databases updated and new versions of the database distributed. Data updates in 1999 and again in 2000 added the results of 1999 archaeological surveys carried out on a number of CFB Esquimalt properties. In addition, new data on rare species compiled from various sources.

CFB Esquimalt provided funding to conduct an update of the GIS database in early 2001. The thematic layers in the DND GIS database were updated, spatial and attribute errors corrected, and new information including various map features, archaeological data and rare species data were added to the database for the following properties – Albert Head, CFMETR, Colwood, Dockyard, Heals Rifle Range, Mary Hill Battery, Masset, Matsqui, Naden, Nanaimo Rifle Range, Aldergrove, Rocky Point, and Work Point. A total of 26 map sheets were formatted to provide printed coverages for 13 of the 16 properties. A CD-ROM containing the data updates was distributed to member agencies.

Canadian Forest Service staff member at computer with GIS database

Photo by: A. Robinson

Layers - Date of Last Update

Man-made Structures	Forest Cover	Cons.Mgmt Zones	Rare Species	Birds	Archaeological Sites	Research Plots	Contaminated Sites
2000	2001	1998	2001	1998	2001		1999
2001			2000				
2000	2001	1998	2001	1998	2001	1999	1999
2000	2001		2001	1998	2001		
1999	2001	n/a	1999		1998		1999
2000	2001		2001	1998	2001		
2000	2001	1998	2001	1998	2001	1998	
1993	2001				2001		
2001	2001				2001		
1999	1993	n/a			1998		1999
1993	1993						
2000	2000		1998	1998	2001		1999
1993	2001						
1999	1999	n/a					
2000	2001	1998	2001	2000	2001	2000	1999
1998	2001	1998	1998	1998	1998		
1999		n/a	1999		1998		

ANNUAL WORKSHOP

The 2001 Annual Workshop for projects conducted in 2001 was held in the Hatley Castle Drawing Room at Royal Roads University on February 7th, 2002. The workshop provided an opportunity for permittees to present an overview of their work and their findings. Twenty-seven individuals attended the workshop and thirteen presentations were given.

Royal Roads University, Colwood, B.C.

Photo by: T. Oldfield

WEBSITE

In 1999, the Committee undertook the development of a website to improve the availability of the research results described in the ESAC annual reports. The site includes an introduction to the CFB Esquimalt properties and to ESAC explaining how the committee was developed, the permitting process, and committee activities to date. Links to member agencies are included allowing Internet users to check on members' area of expertise and advice and also provides the members with the recognition they deserve for their work on these areas. A table listing the names and contact information for individuals serving on the committee is included.

Most of the site consists of the complete text of all annual reports from 1995 - 2000. In 2001, the site was further improved to make it more user friendly and updated with the contents of the 2000 ESAC Annual Report. Site users can access the individual project annual reports through the table of contents in each annual report or through a table in the introduction that lists all projects conducted under the auspices of ESAC since 1994. The table provides a direct link to the individual project reports in each annual report. A consolidated list of all other reports and papers is also included in the introduction.

In keeping with Government of Canada standards, the introductory section of the site is provided in English and French. The URL to the ESAC website has been provided to DND Headquarters – Environment, the CFS-PFC, and other member agencies to provide links from their websites.

The site can be found on the Canadian Forest Service, Pacific Forestry Centre website at the following URL:
http://www.pfc.forestry.ca/programs/esac/index_e.html

OUTLOOK FOR 2002

Great Blue Heron

Photo by: S. Blouin

The Committee will continue to review and track the status of various research projects on CFB Esquimalt properties, sponsor the annual workshop and prepare to reflect the Annual Report. The committee will also update the website from this Annual Report and to further facilitate the dissemination of information.

In efforts to make the permitting process more efficient, the application form for proposals will be revised and converted to an electronic format. The form will then be available on the ESAC website.

ESAC also plans to develop an information brochure or pamphlet to promote the Committee and its activities. Other information documents such as posters and trade show panels will be considered.

The DND GIS database will be reviewed during 2002 and updated. The data from a number of natural resources surveys carried out during the year will be added to the database. Additional map sheets will be developed to show specific themes such as terrestrial ecosystems.

Increased use of the Forest Canopy Research Station will be encouraged. The future of the Microclimate Station is expected to be resolved and data downloaded from the station on a regular basis.

Pacific Forestry Centre, Victoria, B.C.

Photo by: Natural Resources Canada / Canadian Forest Service

DEPARTMENT OF NATIONAL DEFENCE

ESAC

ENVIRONMENTAL SCIENCE ADVISORY COMMITTEE

CANADIAN FORCES BASE ESQUIMALT

REPORTS

Annual Progress Reports and Final Reports Submitted by Permittees for Research and Collection Activities Conducted in 2001

Monitoring of Neotropical Migratory Birds
P003-01

Project Contacts:	David Allinson (250) 480-9433 goshawk@telus.net	Wendy Easton, CWS (604) 940-4673
Organization:	Rocky Point Bird Observatory Society 3370 Passage Way Victoria, BC V9C 4J6 www.islandnet.com/~rpbo	
Location:	Rocky Point	
Start Date:	February 1, 2001	
Completion Date:	December 31, 2002	

Project Overview:

Large-scale population declines in forest songbirds, particularly neotropical migrants, have been documented by scientists in North America. Many of these bird species are not adequately monitored in Canada by traditional surveys such as the Breeding Bird Survey and Christmas Bird Counts. Migration monitoring and local monitoring in specific habitats play a key role in filling this gap. Breeding bird and migration monitoring at Rocky Point targets a large number of songbird species that utilize Garry oak meadows and Coastal Douglas-fir ecosystems of Rocky Point for breeding or critical stopovers during migration. To detect changes in the numbers and distribution of songbirds at Rocky Point, the site must be monitored annually for 5-20 years.

Objectives:

To monitor the use of habitat at Rocky Point by breeding and migrating songbirds. To detect changes in population trends of birds breeding and stopping over at Rocky Point. To band and census migrating birds daily during fall migration at Rocky Point.

Accomplishments to Date:

We have observed 273 species at Rocky Point (Table 1), of which 87 breed or are suspected of breeding in the area. Of the 290 landbird species found in all of Canada, over half of the species (n = 151) have been observed at Rocky Point from 1994 -2001 using standard survey techniques. Most of the landbirds surveyed at Rocky Point are considered target species for migration monitoring (n = 102) and are recognized nationally as species with a medium to high priority for conservation (Table 4). On average, approximately 38% of the individuals banded at Rocky Point are neotropical migrants. This group of species is of recent conservation concern given evidence of declines in some populations and threats to both breeding and non-breeding habitat. Most of the birds banded at Rocky Point are generally associated with riparian (31% of banded birds), conifer (30%), or shrub (22%) habitats. Analysis of long-term population trends and comparisons of data with other banding stations are underway.

We banded 2576 birds of 54 species during the 2001 fall migration monitoring season (23 July to 7 October 2001). Our ninetieth species banded/mist-netted since 1994 was banded on the last banding day of 2001 (Palm Warbler). The 10 most common species comprised 64% of the total number of birds banded in 2000 (Table 2). As in 2000, coverage of migrating birds during the 2001 field season was consistent and thorough. The use of three additional mist-nets was tested during the 2000 season and proved to be successful in producing high capture rates, particularly for target species such as Black-throated Gray Warblers and Townsend's Warblers. In 2002 we will begin using all 13 nets throughout the season.

Research Activities:

None.

Table 1. Bird species observed at Rocky Point (n = 273) List compiled by David Allinson, Feb. 2001

American Coot
American Goldfinch*
American Kestrel
American Pipit
American Redstart*
American Robin*
American Wigeon
Ancient Murrelet
Anna's Hummingbird
Arctic Tern
Baird's Sandpiper
Bald Eagle
Band-tailed Pigeon
Bank Swallow
Barn Owl
Barn Swallow*
Barred Owl*
Barrow's Goldeneye
Belted Kingfisher
Bewick's Wren*
Black Oystercatcher
Black Scoter
Black Swift
Black Turnstone
Black-and-white Warbler
Black-bellied Plover
Black-footed Albatross
Black-headed Grosbeak*
Black-headed Gull
Black-legged Kittiwake
Blackpoll Warbler*
Black-throated Gray Warbler*
Black-vented Shearwater
Blue Grouse
Blue Jay*
Blue-winged Teal
Bobolink*
Bonaparte's Gull
Brandt's Cormorant
Brant
Brewer's Blackbird
Broad-winged Hawk
Brown Creeper*
Brown Pelican
Brown-headed Cowbird*
Bufflehead
Buller's Shearwater
Bullock's Oriole
Burrowing Owl
Bushtit*
California Gull
California Quail*
Calliope Hummingbird*
Canada Goose
Canvasback
Caspian Tern
Cassin's Auklet
Cassin's Vireo*
Cedar Waxwing*
Chestnut-backed Chickadee*
Chipping Sparrow*
Cinnamon Teal
Clark's Nutcracker
Clay-colored Sparrow
Cliff Swallow*
Common Goldeneye
Common Loon
Common Merganser
Common Murre
Common Nighthawk*
Common Raven
Common Snipe
Common Tern
Common Yellowthroat*
Cooper's Hawk*
Dark-eyed Junco*
Dickcissel
Double-crested Cormorant
Downy Woodpecker*
Dunlin
Dusky Flycatcher*
Eared Grebe
Emperor Goose
Eurasian Wigeon
European Starling*
Evening Grosbeak*
Fork-tailed Storm-Petrel
Forster's Tern
Fox Sparrow*
Franklin's Gull
Gadwall
Glaucous Gull
Glaucous-winged Gull
Golden Eagle
Golden-crowned Kinglet*
Golden-crowned Sparrow*
Gray Catbird
Great Blue Heron
Great Egret
Great Horned Owl
Greater Scaup
Greater White-fronted Goose
Greater Yellowlegs
Green Heron
Green-winged Teal
Gyrfalcon
Hairy Woodpecker*
Hammond's Flycatcher*
Harlequin Duck
Heermann's Gull
Hermit Thrush*
Herring Gull
Hooded Merganser
Horned Grebe
Horned Lark
House Finch*
House Sparrow*
House Wren*
Hutton's Vireo*
Icleand Gull
Killdeer
Lapland Longspur*
Lazuli Bunting*
Leach's Storm-Petrel
Least Sandpiper*
Lesser Scaup
Lesser Yellowlegs
Lewis's Woodpecker
Lincoln's Sparrow*
Little Gull
Little Stint
Long-billed Dowitcher
Long-eared Owl
Long-tailed Duck
Long-tailed Jaeger
MacGillivray's Warbler*
Mallard
Marbled Murrelet
Marsh Wren*
Merlin
Mew Gull
Mountain Bluebird
Mourning Dove
Mourning Warbler*
Mute Swan
Nashville Warbler*
Northern Flicker*
Northern Fulmar
Northern Goshawk
Northern Harrier*
Northern Mockingbird
Northern Pintail
Northern Pygmy-Owl *
Northern Rough-winged Swallow +
Northern Saw-whet Owl*
Northern Shoveler
Northern Shrike*
Northern Waterthrush*
Northwestern Crow
Olive-sided Flycatcher*
Orange-crowned Warbler*
Osprey
Pacific Golden-Plover
Pacific Loon
Pacific-slope Flycatcher*
Palm Warbler *
Parasitic Jaeger
Pectoral Sandpiper
Pelagic Cormorant
Peregrine Falcon
Pied-billed Grebe
Pigeon Guillemot
Pileated Woodpecker*
Pine Siskin*
Pine Warbler
Pink-footed Shearwater
Pomarine Jaeger
Purple Finch*
Purple Martin
Red Crossbill*
Red Knot
Red Phalarope
Red-breasted Merganser
Red-breasted Nuthatch*
Red-breasted Sapsucker
Red-eyed Vireo
Red-naped Sapsucker
Red-necked Grebe
Red-necked Phalarope
Red-tailed Hawk
Red-throated Loon

Red-winged Blackbird*
Rhinoceros Auklet
Ring-billed Gull
Ring-necked Duck
Rock Dove
Rock Sandpiper
Rock Wren
Rough-legged Hawk
Ruby-crowned Kinglet*
Ruddy Turnstone
Ruffed Grouse*
Rufous Hummingbird*
Sabine's Gull
Sanderling
Sandhill Crane
Savannah Sparrow*
Say's Phoebe
Semipalmated Plover
Semipalmated Sandpiper*
Sharp-shinned Hawk*
Short-billed Dowitcher
Short-eared Owl
Short-tailed Shearwater
Snow Bunting
Snow Goose
Snowy Owl
Solitary Sandpiper
Song Sparrow*
Sooty Shearwater
Sora*
South Polar Skua
Spotted Sandpiper
Spotted Towhee*
Steller's Jay*
Stilt Sandpiper
Surf Scoter
Surfbird
Swainson's Hawk
Swainson's Thrush*
Swamp Sparrow*
Tennessee Warbler
Thayer's Gull
Townsend's Solitaire
Townsend's Warbler*
Tree Swallow
Trumpeter Swan
Tufted Puffin
Tundra Swan
Turkey Vulture
Upland Sandpiper
Varied Thrush*
Vaux's Swift
Vesper Sparrow
Violet-green Swallow*
Virginia Rail*
Wandering Tattler
Warbling Vireo*
Western Bluebird
Western Grebe
Western Gull
Western Kingbird
Western Meadowlark
Western Sandpiper*
Western Screech-Owl
Western Tanager*
Western Wood-Pewee*
Whimbrel
White-crowned Sparrow*
White-tailed Kite
White-throated Sparrow+
White-winged Crossbill
White-winged Scoter
Willow Flycatcher*
Wilson's Phalarope
Wilson's Warbler*
Winter Wren*
Wood Duck
Yellow Warbler*
Yellow-billed Loon
Yellow-headed Blackbird
Yellow-rumped Warbler*

Italics indicate accidental species (five or fewer records)
*Bird species mist-netted

Table 2. 2000 and 1994-2000 banding summaries for the ten most common species banded in 2000 at Rocky Point during fall migration monitoring. Banding data were compiled by Daniel Derbyshire, December 2000.

Species	2000				1994 - 2000		
	# Banded	% of Birds Banded	Rank		# Banded	% of Birds Banded	Rank
Ruby Crowned Kinglet	295	10.8	1		1034	9.3	1
Winter Wren	265	9.7	2		673	6.0	5
Pacific Slope Flycatcher	228	8.4	3		732	6.6	3
Wilson's Warbler	177	6.5	4		652	5.8	6
Lincoln's Sparrow	171	6.3	5		858	7.7	2
Yellow Warbler	139	5.1	6		473	4.2	9
Orange Crowned Warbler	125	4.6	7		633	5.7	7
Song Sparrow	120	4.4	8		581	5.2	8
Savannah Sparrow	115	4.2	9		683	6.1	4
Spotted Towhee	100	3.7	10		313	2.8	14
All Species	2723				11169		

Table 3. Total for all birds banded at RPBO in 2001, by species.

Species	Banded	Species	Banded
Sharp-shinned Hawk	2	Cedar Waxwing	4
Cooper's Hawk	1	Orange-crowned Warbler	220
Northern Pygmy-Owl	1	Yellow Warbler	109
Hairy Woodpecker	2	'Western' Palm Warbler	1
'Traill's' Flycatcher	24	Yellow-rumped Warbler	22
Hammond's Flycatcher	24	Black-throated Grey Warbler	6
Pacific-slope Flycatcher	187	Townsend's Warbler	10
Cassin's Vireo	3	MacGillivray's Warbler	43
Hutton's Vireo	4	Common Yellowthroat	93
Warbling Vireo	10	Wilson's Warbler	225
Steller's Jay	5	Black-headed Grosbeak	1
N. Rough-winged Swallow	4	Spotted Towhee	64
Cliff Swallow	1	Chipping Sparrow	11
Barn Swallow	1	Savannah Sparrow	55
Chestnut-backed Chickadee	50	Fox Sparrow	71
Common Bushtit	71	Song Sparrow	109
Red-breasted Nuthatch	5	Lincoln's Sparrow	102
Brown Creeper	10	White-crowned Sparrow	75
Bewick's Wren	48	White-throated Sparrow	5
House Wren	18	Golden-crowned Sparrow	28
Winter Wren	204	'Oregon' Junco	40
Marsh Wren	7	Red-winged Blackbird	4
Golden-crowned Kinglet	94	Brown-headed Cowbird	10
Ruby-crowned Kinglet	186	Purple Finch	9
Swainson's Thrush	57	House Finch	1
Hermit Thrush	43	Pine Sisken	37
American Robin	5	American Goldfinch	146
		Total Banded	2576
		Species	54

Table 4. B.C. landbirds observed at Rocky Point. Category titles in bold delineate target species that are not adequately monitored by the Breeding Bird Survey (BBS). Species in italics are recognized nationally as medium to high priority for conservation (n = 92). Species with an asterisk were accidental observations (n = 27).

A. Species with < 50% of North American (Canada & U.S. only) breeding range covered by BBS, and < 60% of their winter range in U.S. and Canada.

American Pipit	Blackpoll Warbler*	Lincoln's Sparrow
Northern Waterthrush	Orange-crowned Warbler	Savannah Sparrow
Swainson's Thrush	Tennessee Warbler*	Wilson's Warbler

B. Species with < 50% of North American breeding range covered by BBS, but 60% of winter range in U.S. and Canada.

Dark-eyed Junco	Fox Sparrow	Golden-crowned Sparrow
Lapland Longspur*	Yellow-rumped Warbler (Myrtle)	Northern Shrike*
Ruby-crowned Kinglet	Short-eared Owl*	Snow Bunting*
Swamp Sparrow	Varied Thrush	White-crowned Sparrow
White-throated Sparrow	White-winged Crossbill*	Palm Warbler*

C. Species with < 60% of their Canadian and Alaskan breeding range (but 50% of North American range) covered by BBS, and < 60% of their winter range in U.S. and Canada.

American Redstart*	Bank Swallow*	Barn Swallow
Black and White Warbler*	Black Swift	Black-throated Gray Warbler
Cassin's Vireo	Chestnut-backedChickadee	Chipping Sparrow
Clay-coloured Sparrow*	Cliff Swallow	Common Nighthawk
Common Yellowthroat	Dusky Flycatcher*	Hammond's Flycatcher
MacGillivray's Warbler	Olive-sided Flycatcher	Pacific-slope Flycatcher
Red-eyed Vireo*	Rufous Hummingbird	Say's Phoebe*
Townsend's Warbler	Tree Swallow	Vaux's Swift
Violet-green Swallow	Warbling Vireo	Western Tanager
Western Wood-Pewee	Yellow Warbler	Yellow-headed Blackbird*

D. Species with < 60% of their Canadian and Alaskan breeding range (but > 50% of North American range) covered by BBS, but > 60% of their winter range in U.S. and Canada (includes some irruptive species and irregular migrants).

American Robin	Belted Kingfisher	Brewer's Blackbird*
Brown Creeper	Cedar Waxwing	Downy Woodpecker
European Starling	Golden-crowned Kinglet	Hairy Woodpecker
Hermit Thrush	Horned Lark	Long-eared Owl*
Marsh Wren	Northern Flicker	Northwestern Crow
Pine Siskin	Purple Finch	Red-breasted Nuthatch
Red-breasted Sapsucker*	Red-winged Blackbird	Song Sparrow
Townsend's Solitaire*	Vesper Sparrow*	Winter Wren

E. Species with > 60% of both their Canadian and North American breeding range covered by BBS, and < 60% of their winter range in U.S. and Canada.

Band-tailed Pigeon	Bobolink*	Calliope Hummingbird*
Gray Catbird*	House Wren*	Hutton's Vireo
Lazuli Bunting	Nashville Warbler*	Northern Oriole
Northern Rough-winged Swallow	Purple Martin	Western Bluebird
Western Kingbird*	Willow Flycatcher	

F. Species with > 60% of both their Canadian and North American breeding range covered by BBS, and > 60% of their winter range in U.S. and Canada.

American Goldfinch	Bewick's Wren	Blue Jay*
Brown-headed Cowbird	Evening Grosbeak	House Finch
Mourning Dove	Red-naped Sapsucker*	Spotted Towhee
Western Meadowlark		

Community Ecology of the Canopy-Forest Floor Insect / Arthropod Fauna from an Old-Growth Forest

P006-01

Project Leader:	Dr. N.N. Winchester Department of Biology, University of Victoria P.O. Box 3020, Victoria, BC V8W 3N5 Tel: (250) 721-7099 • Fax: (250) 721-7120 tundrast@uvvm.uvic.ca
Location:	Rocky Point Forest Canopy Research Station
Start Date:	June 1994
Completion Date:	Ongoing (renewal)

Project Overview:

Community structure of forest canopy and ground arthropods in the coastal ancient forests on Vancouver Island is virtually unknown and information concerning responses of these communities to forest management practices is lacking. Conservation of biological diversity is a major environmental issue and this study area is a high priority area in terms of biodiversity research, conservation area planning and land use planning. The reasons for maintaining biodiversity have been clearly identified and results from my six years of study in the Carmanah Valley and four years of study at the Rocky Point Forest Canopy Research Station support the theory that a unique ancient forest insect community exists, with several new species that are specific to microhabitats within these forest systems. In addition, the canopy fauna seems to contain a unique set of individuals that have evolved to form a separate arboreal community. The study at the DND site continues to offer an opportunity to explore trends in canopy arthropod communities and apply this information across a wide geographic region that includes different ancient forest mosaics. These canopy studies represent the only long-term Northern temperate ancient forest research on arthropods and will be used to form an integral part of an international network on global canopy studies.

Objectives:

A large part of this project continues to be dedicated to resolving taxonomic problems with the aim of cataloguing and describing the unique and previously undescribed species that make up biologically distinct communities (e.g. canopy fauna). The influence of environmental factors on insect/arthropod distributions, host-plant interactions and survivourship will be examined in the field to elucidate variables that contribute to the observed community structure.

Accomplishments to Date:

(see previous reports, 1994-2000)

Highlights:

Analysis of results is dependent on identifications to species in the target taxa groups. To date this data is only available for the Asilidae. A summary of these results can be found in the following: Cannings, R., Green, G., Winchester, N. 1995. Selected invertebrate inventory. In Baseline Inventories of Rare Species and Ecosystems of Department of National Defense Properties of Southern Vancouver Island. (Ed.) K.H. Morgan. Canadian Wildlife Service, Environment Canada. pp. 120. Identifications for the Arachnida, Sphecidae, Staphylinidae, and Curculionidae are now complete (December, 2000).

Research Activities (2001):

None
A paper on the robber flies of Rocky Point is in preparation authors are R.A. Cannings and N. N. Winchester. This paper will be submitted to ESBC in the New Year. Identification continue on the Aleocharine (rove beetles).

Extension and Demonstration:

Documentary with the Nature of Things (CBC) – The Salmon Forest- was aired in February, 2001. There is a segment on the ancient forest canopy system and the importance of canopies to the maintenance of biodiversity in these forests. The canopy segment of this film was shoot at Rocky Point. This segment has been used in courses that Drs. Ring and Winchester teach at the University of Victoria.

Purple Martin Nestbox Program
P018-01

Project Leader:	Darren R. Copley, B.Sc. 657 Beaver Lake Road Victoria, B.C. V8Z 5N9 Tel: (250) 479-6622
Location:	Colwood
Start Date:	March 01 2001
Completion Date:	December 31, 2001

Project Overview:

This site is one of only 15-20 Purple Martin colonies in the entire province. It is the largest colony with over 75 birds. This large swallow is on British Columbia's Red List and presently nests only in human-made nestboxes that must be maintained and monitored throughout the year.

Objectives:

To increase the population of breeding birds to a size that will provide scout birds to start up other local colonies. This will make the Purple Martin less vulnerable if we can spread the population around to many different sites on Vancouver Island, especially protected areas. With a larger, stable population, we can start some research pertaining to life history, migration patterns, etc.

Accomplishments to Date:

Western Purple Martins are adaptable to human disturbance and can co-exist with humans in a high traffic area. Accurate population estimates can only be attained by physically opening and checking for active nestboxes, as well as using the natural mobbing tendency of Martins to count adults in the air.

Research Activities:

Nestlings have been banded for the past 6 years, however not under this permit (contact Laura Darling of Wildlife Branch or Cam Finlay at 479-9833 for a detailed report). Our work consisted of cleaning-out and maintaining the nestboxes, as well as monitoring of the population for any possible disturbances to a successful breeding season.

Extension and Demonstration:

None.

Advanced Field Methods of Restoration Course, University of Victoria

P041-01

Project Contact:	Richard Hebda
Organization:	Restoration Program, Environmental Studies University of Victoria P.O. Box 1700, Victoria, B.C. V8W 2Y2 Tel: (250) 472-4569
Location:	Mary Hill and Rocky Point
Start Date:	September 17, 2001
Completion Date:	December 31, 2001

Project Overview:

Provide instruction to students in observation of slope stability, terrestrial ecosystem mapping, stream monitoring using Royal Roads' gravel pit, forested ecosystems and Cottonwood Creek respectively.

Objectives:

To instruct 18-20 senior Restoration Students in Advanced Restoration techniques.

Accomplishments to Date:

From September 17-21, 2001, fourteen students participated in the Advanced Field Methods course visiting several sites and collecting data according to Provincial standards required for terrestrial ecosystem mapping. Observations were made on species cover, coarse woody debris, soil texture, site topography, moisture regime, and other factors. Student plots were located in the Douglas-fir, Garry oak and western red cedar-dominated stands mostly east of Cottonwood (Colwood) Creek. Terrestrial ecosystem data were also collected in the estuary of Cottonwood Creek. Students were shown how to take standard measurements such as temperature, dissolved oxygen and others in the creek itself at the foot bridge. Students were instructed in collecting slope stability data and carry out an assessment in the gravel pit off Metchosin Road. Four groups surveyed four transects from the top of the pit to the bottom observing and recording critical features. They also recorded species cover for different plantcommunities in the pit and placed the communities in order of seral stages. The students also each prepared a Terrestrial Ecosystem map for the Royal Roads area which was marked by the instructor.

Purple Martin Origins and Relationships
P044-01

Project Leader:	Cam Finlay & Laura Darling 270 Trevlac Place Victoria, BC V8X 3Z1
Location:	Colwood
Start Date:	01 July 2001
Completion Date:	30 August 2001

Project Overview:

The Purple Martin (Progne subis) is on B.C.'s Red List and it is found nesting at this DND site – one of 14 known colonies of man-made nestboxes in B.C. Nestlings banded at 11 sites in 1997-1999 have been re-sighted at different colonies than their natal colonies. We suspect the B.C. colonies represent a single intermixed population but further confirmation is required. Purple Martin populations are on the increase in B.C. and the American coastal states, and they appear to be recovering in association with availability of man-made nest-boxes. It is possible that the current population is derived from the few birds that adapted to man-made nestbox colonies. If so, Purple Martin recovery may be hampered by a genetic bottleneck and inbreeding.

Objectives:

To continue banding nestlings in nestboxes at the site, to monitor nest success and productivity, and to monitor for band returns, as part of an on-going nestbox monitoring and maintenance program.

Accomplishments to Date:

123 nestlings and two adults were banded in 2001, up from 119 nestling Purple Martins were banded at the site in 2000 – up from 109 plus 2 adults in 1999, 76 nestlings in 1998 and 47 nestlings plus 1 adult in 1997. Of the 53 solid nestboxes at the site, 41 had eggs or young (7 of these failed to produce live young at time of banding), with 4.56 eggs per pair recorded, up from 4.03 in 2000, and equal to the BC average. Productivity at this colony has remained stable or perhaps slightly increasing. A number of nestboxes that previously held eggs or very young nestlings were found empty at the last nest check – because the eggs and nestlings were not found in the nests. Predation is a possible cause. Thirty-two previously banded birds were observed at this site in 2001 – 16 were banded as nestlings at this site and 16 were banded at other colonies. Band returns from this site constitute 25% of this year's 116 re-sightings – a high percentage because of the relative ease of re-sighting access on the wharf.

Research Activities:

We collected a small drop of blood from one nestling per nest in 21 nestboxes at the DND site in 1999. We began analysis of these samples in early 2001, along with those from other sites in BC, Washington, Oregon, Alberta and Manitoba, through the Avian Genetics lab at the Royal Ontario Museum (Centre for Biodiversity and Conservation Biology) for mito-chondrial DNA control region sequencing analysis by Dr. Alan Baker. Preliminary analyses of half the samples indicated significant genetic difference of the west coast population from the eastern sub-species, and the variation within the west coast population was greater than that within the eastern samples. The completion of the analysis is underway with a small amount of funding yet to find.

Extension & Demonstration:

A paper has been submitted to AUK, a scientific journal specialising in avian biology and management, describing the productivity and inter-colony movements of Purple Martins in BC and the Pacific northwest, 1996 to 2000, including data from the DND colony.

Survey / Inventory of Mary Hill Battery and Extended Lands
P046-01

Project Contacts:	Tony Embleton Norman Mogensen	(VNHS Green Spaces Project Chair) (Mary Hill Inventory Coordinator)
Location:	Mary Hill	
Start Date:	October 11, 2000	
Completion Date:	Field work - July 31, 2001	

Project Overview:

Based on experience gained during the VNHS Green Spaces Project the existing ecosystem maps of the Mary Hill Battery site appeared to be overly simplified. In addition, it was felt that the maps could not be used for planning purposes. In January 2000, having learned that the future of this property was uncertain, it was considered urgent that a comprehensive (on-the-ground) survey be conducted.

VNHS has surveyed and inventoried the entire Mary Hill site, including 32 hectares along the north boundary of Pearson College of the Pacific, and the entire remaining 153 hectares of the property, extending eastward from the east boundary with Pearson College for approximately 1,600 meters to the shore of Parry Bay, and south to the shore of Pedder Bay. The only exclusion was an area of about 4 hectares on the south slope of Mary Hill, that had been used as an ordnance training range.

Objectives:

The intent of the general survey was to produce a map of all ecosystem polygons that could be found on the site, and to identify and map as many as possible of the special natural and human impact features that exist, to enable an objective evaluation of it from a conservation or non-conservation perspective.

A detailed ground survey was performed on the Mary Hill property, by way of a series of parallel crossings (at 50 meter separations) of each of 6 defined sub-blocks encompassing the entire Mary Hill property. We compiled a separate detailed field data record for each of the numerous crossings of each sub-block of the property, and on that we recorded all findings and measurements (along each crossing route and within 25 meters to the left and right of it). VNHS used compasses, retractable measuring tapes, laser scopes, and a hand held global positioning system (GPS) device to confirm precise locations. Four teams, each of two volunteers were assigned to repeatedly visit the series of "observation areas" we had established, at intervals throughout the spring of 2001, to identify and inventory all plant species observed at each. Later, the data from each of the field records was transcribed and carefully positioned (scale: 1/2500) on a cadastral map we created of each of the six defined sub-blocks of the property. All features are situated on the maps in accordance with their universal transversal mercator (UTM) coordinates.

Accomplishments To Date:

In year 2000 inventorying objectives had to be limited because of a delayed start. Thus in year 2000, we completed only a partial general survey of approximately 100 hectares. The permit was renewed for 2001 and the general survey continued throughout the spring and early summer of 2001 until the survey was completed.

VNHS used the services of 18 individual volunteers, to perform the survey. As only a limited number of amateur naturalists were available to conduct detailed inventories of individual plant species, only 63 species "observation areas" were established on this 185 hectare site. The data from the surveys were added to the ArcView GIS system and a map showing all ecosystem polygon boundaries at this site was generated in 2002.

• A final report was prepared and submitted to the DND Environmental Science Advisory Committee. The report included: A map showing all ecosystem polygon boundaries at this site (generated from our ArcView GIS system). All the polygons are separately numbered for easy reference to a related database table that provides a description of each. The map contains a legend, showing symbols (all separately numbered) for "observation areas" and for every kind of special feature found at the site. Database reports describe each numbered item in detail.

• A document entitled "CDC's Sensitive Eco-System Codes As Expanded Upon By VNHS", which is loaded into our database as the ecosystem type interpretation key for reported map details.

• Reports generated from our Access data base, describing in detail, each of the features (as shown on the map legend), by their reference numbers, including;

- descriptions of all individual eco-system polygons;
- summary of all ecosystem polygons by type and sub-type codes, and by area;
- flora inventoried at each "observation area";
- heritage and special trees;
- other natural features of interest;
- negative site features;
- archaeological and historical features;
- site photo record.
- a historical summary of the site
- highlights of inventory findings

Highlights of Inventory Findings:

It should be noted that the ecology of the site is much more complex and interesting than is shown on previous maps. Some of the highlights of our findings are elaborated upon here.

1. 68.54 hectares of the site is comprised of true old growth "coastal arid" climate zone habituated, dominant Douglas-fir forest. This site represents approximately 6.2% of the extent of this rare old growth forest type.

2. The area of old growth forest north of Pearson College, is the most pristine of all the ecosystems VNHS has examined in the Greater Victoria region, and as such should be regarded as highly valuable.

3. There is a far greater abundance, diversity and complexity of other types of sensitive, high value ecosystems on this site than were indicated from previous studies and maps resulting from previous studies. This includes riparian systems, wetlands, Garry Oak and Arbutus woodlands, terrestrial herbaceous forest openings and coastal bluffs. These are all now rapidly diminishing in this region generally, and they presently comprise only a small remnant of what once existed here.

4. There is a limited amount of human disturbance by of the rest of the site.

5. Most of the early human caused disturbance was from repeated burning of parts of the site by First Nations cultures, primarily to promote Camas bulb (and possibly Garry Oak acorn) growth as food source. The openness was continued after the cessation of native burning, by a further 75 years of sheep grazing at the site.

6. We found 45 archaeological features scattered around the site. Including old grave cairns, many culturally modified trees (in several patches), and what appears to be a fortified observation post (at least 3 strategically located pits), at Wier's Point.

7. While Broom and Himalayan Blackberry are the two invasive species that are most out of control on the south slope of the site. However, they are still relatively benign and controllable on the north slope. Other invasive species that are present and still controllable with early eradication action, are Ivy, Holly and Daphne laureola.

Conclusions:

We strongly believe the natural values and importance of this site have been largely under-appreciated. Clearly this is a very high value site, both in terms of its intact natural ecology and its still easily discernable role in the early and more recent human history of the area. We strongly believe the site should be permanently protected as a publicly owned "Green Space", with parts of it strictly reserved as wildlife habitat. We intend to work in a collaborative and objective manner with the owners and other responsible stakeholders, to pursue those goals. We believe that is clearly warranted by the findings of this inventory. We would be pleased to show and explain any aspects of our inventory findings to representatives of the Department of National Defence. We offer to help DND to subject our findings to an independent expert review, if that is considered by them to be appropriate.

Survey / Inventory of all of Royal Roads University's Custodial (DND) Lands
P046-01

Project Contacts:	Tony Embleton Norman Mogensen	(VNHS Green Spaces Project Chair) (Royal Roads Inventory Coordinator)
Location:	Royal Roads	
Start Date:	August 30, 2001.	
Completion Date:	Field work – December 31, 2001. Anticipated by late 2002.	

Project Overview:

This project is the second part of the permit and consists of a survey/inventory of the Royal Roads property.

Objectives:

A series of surveyed transects of the site were undertaken from a common baseline. Careful measurements was taken and recorded on transect specific Field Data Records, to accurately position and identify each significant feature found along each transect line. Survey transect lines were separated by 50 meter intervals. This process continued until an entire site (or sub-divided portion, if a large site) was covered. From the completed Field Data Records for each transect, the site data were applied to a large-scale (1:2500) paper site map, and from there it to our GIS (ArcView) system. Certain other data were transcribed into special data input forms for our ArcView related "Access" database, to capture various special feature information.

Accomplishments To Date:

The survey has completed approximately 42 hectares of Royal Roads University property. A preliminary report was submitted to the DND Environmental Science Advisory Committee. We intend to continue our inventory during 2002, until all of the (DND) lands have been surveyed.

Highlights of Preliminary Findings on the Initial 42 Hectares at RR/U:

Some of the highlights of the preliminary findings are as follows:

• Of the initial 42 hectares, approximately 8 hectares is old growth (over 250 year old) Coastal Douglas-fir forest.

• Two large Douglas-fir (over 200 cm diameter) were found and they will be recommended as a candidate for "heritage tree" status.

• We encountered numerous (at least 12) shell middens, some quite deep, throughout the area.

• Set within the surrounding Douglas-fir forest, on a distinct well-drained slope, is a large forest polygon of almost exclusively Western Red Cedar. This appears to be unusual because cedars require high levels of moisture.

• Roadside plantings of alien species have naturalized and become widely invasive, especially along the Belmont Estate Road.

• Several of the older (larger) Douglas-firs along the interior service road, to the east of the jail have been culturally modified,

• South of the Belmont Park service road, and east of Cottonwood Creek, there is a large seepage zone that remains wet and flowing throughout the mid-summer dry season.

Measurement of Fungal Biodiversity on Cut Alder Logs
P047-01

Project Leader:	Dr. Brenda Callan, Mycologist Natural Resources Canada, Canadian Forest Service, Pacific Forestry Centre 506 West Burnside Rd. Victoria, BC V8Z 1M5 Tel: (250) 363-0744 • Fax : (250) 363-0775 bcallan@pfc.forestry.ca
Start Date:	Sept. 1, 2000
Completion Date:	Sept. 1, 2002

Project Overview:

There are few tested sampling protocols for studying the biodiversity of pioneer saprophytic fungi on thin-barked trees. This project was designed to develop a sampling technique that is reliable, using trees that are easily accessed from Pacific Forestry Centre, yet are relatively protected from vandalism. The mature alder stands at Rocky Point provide excellent potential study sites because they are protected and relatively undisturbed. Large, windthrown alder logs on the site currently are known to serve as repositories for a number of pyrenomycetes unknown from other regions North America (ref. to report on Permit P047-98). Although some preliminary species lists have been compiled we have no data on how these fungi develop on the tree after it falls, and how the decay succession takes place. For comparison purposes we propose to start with similar-aged sound trees which will be dropped in situ and monitored for two seasons.

Objectives:

To use 6 felled Alnus rubra logs (mature) with intact bark and no external indicators of decay to measure the pattern of fruiting body development of saprophytic fungi (pioneer decay fungi, predominately ascomycetes). Other data, such as host-fungus associations will also be noted.

Accomplishments to Date:

Six trees at two sites were selected (see attached map). In late October, the alder stands were surveyed for candidate trees while still bearing some foliage, to ensure that only trees with sound crowns (no dead tops or branches) were chosen. The candidate trees were flagged, and on November 21, 2000 after most of the leaves had fallen, they were cut down. Length, diameter, aspect, and slope of each tree was recorded. The trees were also marked with signs and orange and black-striped flagging tape. The first survey for fungi took place in February, 2001. At that time, no fungi had begun to fruit from the bark, but the epiphytic lichens and mosses were beginning to die on the trunks due to shading and the death of the host bark. Tracts of dead lichens were decayed by the basidiomycete saprophyte Botryobasidium laeve, which covered the thalli with whitish webs of hyphae. Due to the lack of fruiting, of other fungi the entire exposed bark surface of each tree was closely examined for saprophytes but very few were found at this time.

The second measurement took place in June, 2001. By this time, the logs were covered in large areas by masses of pimple-like fungal fruiting bodies (pycnidia) breaking through the bark. The fruiting bodies had begun to exude masses of spores (conidia) in tendrils. At this time the sampling procedure followed the protocol detailed in the permit application. To briefly summarize this procedure, each tree was sampled at half-meter intervals along the length of the trunk that was greater than 20 cm in diameter. At each interval, a band of bark 10 cm wide was divided into 4 quadrants, and the percent area covered by each type of fungus fruiting body encountered was estimated and recorded. Small (1cm diam) discs of bark were excised and collected, so that the fungi could be microscopically examined and cultured to confirm field identifications. Over 50 cultures were initiated from these collections, and some required incubation and transfer to specialized agars in order to induce sporulation, a process that took up to 6 months. Over 90% of the fungi isolated were, in order of occurrence: Pseudovalsella thelebola ; sexual stage of Diatrypaceae (probably a Eutypella sp. but it is just starting to fruit in culture as of February 2002) Melanconis marginalis.

The third survey was initiated on October 10, 2001, but was interrupted due to increased security measures on DND land. The survey was restarted in January 2002, but samples have not been fully processed. A few field observations are noted herein: Some of the earliest formed fruiting bodies of the fungi observed in June were beginning to senesce, and were rapidly becoming colonized/parasitized by a fungicolous ascomycete, Cosmospora episphaeria. Log #1 at the drier site was colonized at the cut end by the basidiomycete Chondrostereum purpureum, which was beginning to decay the wood. This fungus was fruiting prolifically on the bottom 2 meters of the tree. Data are being entered into spreadsheets as the fungi are identified, so that populations on the tree can be mapped over time.

Extension and Demonstration:

None

Sustainable Harvesting Potential of Salal *(Gaultheria shallon)*
P068-01

Project Leader:	Wendy Cocksedge
Organization:	University of Victoria PO Box 1700 STN CSC, Victoria BC V8W 2Y2 250-721-6352
Location:	Two plots at Rocky Point
Start Date:	February 2000
Completion Date:	September 2002

Project Overview:

There is currently very little information on most non-timber forest products (NTFPs), including salal. Few studies have been completed regarding habitat requirements, regeneration ability, and effects of harvesting of NTFPs. These biological and ecological criteria must be established in order to reduce the likelihood of over-harvesting forest resources, and to develop reasonable and effective stewardship practices.

Objectives:

To provide a better understanding of the effects of commercial harvest on salal. By comparing yearly plant increase of vegetative matter (ie branches and leaves) with yearly commercial removal of vegetative matter, the sustainable harvesting levels can be better assessed. The effect of harvest on re-growth patterns and quantity is also important to determine short and long term effects of commercial levels of harvest.

Accomplishments to Date:

The data from Rocky Point is being integrated with data from the Capital Region Watershed. Commercial harvesting levels and techniques have been discussed with salal harvesters and buyers, and applied to the research sites and to the findings. Data from the two field seasons and two sites are still be analyzed. Anecdotal and literature research is also being examined to explore possible methods of stewardship for the commercial harvest of salal.

Research Activities:

The two plot areas previously identified, harvested, and sampled were revisited. Two subplots (1999 harvest and a control) within each plot were sampled for the 2000 growth rates of the salal.

Bald Eagle Nest Tree Monitoring
P074-01

Project Leader:	Gwen Greenwood (with Kerri-Lynne Wilson and Terri Martin) 8590 Alec Rd, Saanichton, BC V8M 1S4 Tel: (250) 652-2876 tggreenwood@shaw.ca
Organization:	Sponsored by BC Hydro, Ministry of Environment, and Federation of BC Naturalists
Start Date:	April 9, 2001
Completion Date:	Dec 31, 2001

Project Overview:

The Bald Eagle nest tree monitoring program is to establish a baseline of eagle nesting success and to monitor the stability of nest trees. The program will also monitor how eagles can adapt to habitat changes. Two nest trees at CFAD Rocky Pt. Will be included in this monitoring program. The monitoring will be carried out each year to provide a long-term observation of these sites. The project was initiated and supervised by Kerri-Lynne Wilson (BC Hydro) and Karen Morrison and Terri Martin (MELP)

Objectives:

To monitor two eagle nest trees at CFAD Rocky Point

Accomplishments to Date:

Two nest sights have been monitored at Rocky Point - one off the East Perimeter Rd and one on the SE side of Church Hill.

Five visits were made during the year 2001. The nest off E. Perimeter Rd was active and produced one eaglet. The nest tree is a Douglas-fir; approximately 30 metres in height, 1.2 metres DBH and is a Class 1 tree.

Environmental Technology Program Field Trip
P075-01

Project Contact:	Dianne Humphrey
Organization:	Environmental Technology Program Camosun College 3100 Foul Bay Rd. Victoria BC V8P 5J2 Tel: (250) 370-3432
Location:	Rocky Point Forest Canopy Station/ Rocky Point
Start Date:	June 22, 2001
Completion Date:	June 22, 2001

Project Overview:

First Year Environmental Technology Students have an opportunity to view 'old growth' forest/canopy station. Students gain a 'first hand' impression of old-growth forest in order to compare it to a second growth forest and newly harvested areas.

Objectives:

To introduce students to 'old growth' forest
To view the canopy research station and learn about the canopy study.

Accomplishments to Date:

The Spring 2001 ENVR TECH Year 1 class toured Rocky Point under the guidance of Arthur Robinson on June 22, 2001. This class had an opportunity to view the canopy research station and experience the old growth forest. They recorded information for later comparison to a second growth forest and a newly forested area. The experience was extremely worthwhile and hopefully can be repeated in subsequent years.

Students learned about the gorse situation and the general history of the Rocky Point property. They will be able to draw upon this information in further program endeavors.

Research Activities:

None

Extension and Demonstration:

None

Russulas of Southern Vancouver Island Coastal Forests
P076-01

Project Leader:	Christine Roberts 2589 Wentwich Road Victoria, BC V9B 3N5 Tel: (250) 478-2976
Organization:	University of Victoria
Location:	Royal Roads (see note below)
Start Date:	June 1 2001
Completion Date:	December 31, 2001

Project Overview:

The study investigates the species of Russula present in the coastal forests of Southern Vancouver Island and describes any new species or those that differ from published descriptions. This study also seeks to evaluate DNA analyses using RFLP patterns of Hinfl, Alul and Sau3As and simple chromatographic analyses of cuticle pigments as aids to identification and to clarify the relationships of local species within the genus Russula.

Objectives:

Collect and identify or describe species of Russula in the coastal Douglas. fir moist maritime zone, as part of a study which includes identification of the Russulas of the Western hemlock very wet hypermaritime zone in the southern half of Vancouver Island. Relate species to habitats which may differ from known species/habitat associations on the mainland and inland. The study will be a contribution towards a monograph of Russulas of this region.

Accomplishments to Date:.

a) Summary of findings to date

Eight species or species forms were collected and documented from Royal Roads University forested grounds, three more were observed in abundance but not collected. Two collections remain to be satisfactorily identified to species. The RFLP patterns of HinfI, AluI and Sau3A restriction enzymes of the ITS region of nuclear rDNA were obtained for 5 species. Details are as follows:

Russula brevipes var. acrior Shaffer	not collected
R . nigricans (Bull.) Fries	not collected
R. xerampelina var. xerampelina	collected 27 Nov. 2000
R.sanguinea-“dry type”	collected 11 Nov. 2001
R. murrilli Burl.	collected 02 Dec.2000, 20 Oct. and 11 Nov. 2001
R. murrilli –pink and ochre form	collected 20 Oct. 2001
R. sororia	not collected
R. sp. raoulti group.	collected 08 Nov. 2000
R. alutacea group	collected 20 Oct. 2001
R. granulata Peck	collected 02 Dec. 2000
R.veternosa lvar.veternosa Fries	collected 08 Nov. 2000
R. stuntzii Grund	collected 27 Nov. 2000

b) Details of Observations

Russula brevipes is a very common species found abundantly along the coastal forests in association with Douglas. fir and Western hemlock. It is also found in its parisitized form, commonly known as the lobster mushroom, in which Hypomyces lactifluum is the parasite. Royal Roads has R. brevipes in mature second growth and areas with old growth.

Russula nigricans was not common in previous years but was particularly abundant in the fall of 2001 in all coastal forests visited including Royal Roads in similar habitats to R. brevipes.

R. sororia was similarly abundant in the late fall. This species was observed in grassy habitats and by road and trailsides rather than in closed canopy forest. Its fruiting around the Douglas. firs alongside the Royals Roads entrance road by the sportsfield indicate an ectomycorrhizal association with that tree species. Observations in other locales support this Douglas. fir association.

c) Details of Collections

Russula xerampelina var. xerampelina was observed in October and November of 2000 (when samples were collected) and 2001. It is generally found with large (dbh ≥ 0.5m) or veteran Douglas. firs with mature or understory Western hemlocks. The Royal Roads population has a distinctly clean yellow tinge to the gills and flesh, more so than the Koksilah or Oregon populations. The HinfI and AluI restriction fragment length polymorphism patterns of the ITS region of the rDNA do not reveal any difference between the Koksilah and Royal Roads populations. More analyses are planned for the various subspecies and populations of R. xerampelina collections.

Russula sanguinea collected from Royal Roads in November has so far been of the “dry type”. The “dry type” fruits in dry habitats associated with Douglas. fir, Western hemlock and pines. In Royal Roads in November 2001 a large fruiting occurred under the pines planted between the upper parking lot and the entrance road to the University. The other type, dubbed “boggy” was found on Mount Douglas park and in the Long Beach area, thus in the two moisture extremes of coastal forests. The boggy type fruits in moist seeps in mature forests with Western hemlock, a month or two earlier in the season. As this habitat is found in Royal Roads and at Rocky Point then both R. sanginea types could occur there The dry type differs from the boggy type in its macroscopic appearance, the former being stockier with a shorter stipe relative to cap size, a more matte cuticle surface which has more white patches than the latter, and in habitat. Microscopically they are very similar but their RFLP patterns differ.

*R. murrilli in its normal, purple form was collected on 02 December 2000 and 20 October 2001. A pink and ochre form, which was identical to the normal form in all but a lack or reduction of the blue pigment, was collected in 2001, both under mature Douglas. firs at several sites in the forest. The two forms grow together, and intergrade somewhat. The pale colour morphotype is unlikely to be due to weathering since both colour forms were seen at all stages of maturity, and their growth close together under the same apparent conditions reduces the likelihood of environmental factors being involved. (Light differences are observed to affect the development of the magenta pigment in R. atropurpurea and some R. xerampelina varieties.)

R. sp. raoulti group was collected under an old growth Douglas. fir in old woody debris and branch litter. RFLP analysis suggested that the collection was not R. cremoricolor, the description of which it resembled, its RFLP patterns showed more similarities to other members of Section Piperinae Quel., which includes R. raoultii. The Royal Roads collection differs from the descriptions of R. raoultii in the larger spore size. R. alutacea group. This collection requires more analyses to confirm species. It was found under a garry oak alongside the entrance road.

*R. granulata was not found in 2001 in the sites it fruited in 2000. This specie has not previously been reported from the area. It associates with mature Douglas-fir.

*R. veternosa, was abundant in 2000 and 2001 and found in both the coastal biogeoclimatic zones of Vancouver Island, probably in association with Western hemlock. The RFLP patterns of the Royal Roads collections match those of a collection from the Oregon cascades.

*R. stuntzii is almost always found in very decomposed coarse woody debris in association with Western hemlock in old growth stands. It has also been found in Long Beach rain forests, Mystic Vale, and Discovery Island but is not frequent.

*Previously unrecorded for Vancouver Island.

Research Activities:

Research was limited to Royal Roads. Collections were made of Russula species not previously collected or for which a fresh collections was required. Only specimens in good condition were collected. Habitat data including GPS readings when possible were taken.

Invasive Species Removal on East Ballenas Island
P077-01

Project Leader:	Paula Hesje, Vancouver Island Warden
Organization:	The Land Conservancy of BC 5793 Old West Saanich Road Victoria, BC V9E 2H2 Tel: (250) 479-8053 Fax: (250) 744-2251 paula@conservancy.bc.ca
Start Date:	September 15, 2001
Completion Date:	September 15, 2001

Project Overview:

The Land Conservancy, TLC, has a long-term vision to purchase or see some form of protection of the islands comprising the Ballenas-Winchelsea Archipelago. TLC considers invasive species removal to be fundamental in restoring and maintaining ecosystem health and biodiversity for the archipelago. TLC has an extensive weed management plan for South Winchelsea Island which was adhered to for the work completed on East Ballenas Island. Invasive species pose a tremendous threat to native vegetation and often, without any human intervention, the exotic species may completely extirpate native species. In concordance with TLC's vision, a plan was developed to begin invasive species removal on East Ballenas Island with the help of volunteers.

Objectives:

Objectives were as follows: to educate volunteers about the importance of invasive species removal and techniques to remove Scotch Broom, to complete a reconnaissance survey of East Ballenas to determine areas concentrated with invasive species; to remove invasive species from a small area and choose a burn site. TLC has a policy to not use any chemicals or herbicides in its efforts to remove invasive vegetation. The Land Conservancy opted for mechanical removal of the mature and well-established broom found in one location on the island. Timing of removal is critical for all invasive plant species in order to eliminate the seed bank. For young broom or older plants that are uprooted, removal in late fall when the soil is soft does minimal damage to the surrounding flora. Care was taken to disturb the soil as little as possible.

Accomplishments to Date:

Volunteers were educated on invasive species, removal techniques and native flora. A partial survey was completed of the island; due to the thick plant growth, some areas were impenetrable and require further exploration. Areas found to have invasive plant species were plotted on a map for future reference. A substantial amount of broom was removed from a small area of the northeastern portion of the island. Removal involved cutting all the live and dead stalks at the base with the aid of loppers and chainsaws. This method kills the plant as there are no buds left at the base of the root crowns. Vegetation was transported to a burn site via tarps.

Extension and Demonstration:

Invasive species still need to be removed and burned. It is TLC's hope that invasive species removal on East Ballenas will continue in the future.

Bald Eagle Nest Tree Project
P078-01

Project Leaders: John Maher, Regional Environmental Coordinator, BC Hydro
Ron Speller, Regional Chair – Vancouver Island, FBCN
Karen Morrison, Wildlife Technician, MWLAP

Organizations: BC Hydro
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Ministry of Water, Land and Air Protection
2080-A Labieux Road, Nanaimo, BC V9T 6J9
Tel: (250) 751-3216
karen.morrison@gems9.gov.bc.ca

Enhancement Date: September 28, 2001

Project Overview:

Accelerating land development and logging of remnant old-growth stands fringing the Georgia Strait is endangering Bald Eagle nest sites along the east coast of Vancouver Island and the Gulf Islands. This rapid loss of nesting habitat is expected to be the most significant factor affecting the Bald Eagle's abundance in B.C. and is the reason the Ministry of Water, Land and Air Protection classified the Bald Eagle as a Regionally Important species in need of special management consideration for conservation. The preservation of eagle nest trees and future potential nesting habitats is urgent if the present eagle nesting population is to be maintained.

Bald Eagles have specialized nest tree requirements with nest tree selection dependant on tree height/dominance and structure. The nest trees are tall, dominate trees (generally, also the oldest) that provide commanding perches for eagles to survey the surrounding area for food and potential threats. These trees have a stronger and more open branch structure for supporting their large nests and providing easy access for the eagles, to land and take off. It is also important when the young eagles are fledging.

Objectives:

The specific goals for this project were to locate, map, complete assessments and determine risks to Bald Eagle nest tree sites on the southeast coast of Vancouver Island. From this information, some nest sites were designated for possible mitigation or enhancement action.

On the DND lands in Nanoose, three nest trees had previously existed. One of the nests had degraded, we could not to locate one, and the third tree had lost its nest. In view of these findings, it was determined that the site was in need of enhancement.

Accomplishments to Date:

We worked with the resident Commander and the Federal Lands Office to select trees to enhance and to obtain a permit for the work. We chose the former nest tree at Wallace Point that had lost its nest and an adjacent tree of equal size and age. On September 28th, 2001, we contracted a certified tree trimmer to climb the two trees and prune out branches in the crown above some strong, supporting branches to create the open branch structure needed for nesting habitat. With some of the removed branches, vegetation was stripped off and added to the site as a start for nest building. A local monitor for the FBCN will observe the new nesting site to watch for use and nest building of the enhanced trees by the resident eagle pair.

Garry Oak Acorn Survey
P079-01

Project Leader:	Paul Courtin, Research Pedologist David Peter, Ecologist, Constance Harrington, Research Forester	
Organization:	BC Ministry of Forests, Vancouver Forest Region 2100, Labieu Rd., Nanaimo, BC V9T 6E9 paul.courtin@gems7.gov.bc.ca	U. S. Forest Service Olympia Forestry Sciences Laboratory 3625 93rd Avenue SW, Olympia, Washington 98512-9193 dpeter@fs.fed.us
Start Date:	September 1, 2001	
Completion Date:	Long term	
Completion Date:	September 15, 2001	

Project Overview:

The Oregon white oak (Garry oak) acorn productivity study was initiated in the summer of 1999 to explore factors influencing acorn production. Reasons for doing this study include: Oregon white oak ecosystems are rapidly disappearing or changing due to introduction of exotics and fire suppression. Acorns are a rich source of food for many wildlife species. Acorns are important for regeneration and dispersal of the species. There is very little published information on acorn crop sizes in Oregon white oak. This project is intended to be long term. We anticipate a minimum of 10 years data collection in order to evaluate periodicity in acorn production and climatic influences.

Objectives:

The project will determine how common good and bad acorn crops are, the variation in production between places and the environmental and biological factors that influence production. W e want to understand the conditions contributing to both individual tree and stand level production. This includes both local and regional environmental factors and biological interactions including acorn predation and community succession. We want to obtain as wide a sample as possible to determine if regional differences in acorn production exist. Because Oregon white oak has a wide latitudinal range and the sampling season is short (less than 2 months) we recruit volunteers and cooperating agencies to help with a simple survey following procedures published by Graves (1980). To assist volunteers and the public we have created a website with background information, methods and forms used in the survey and results of the survey (www.fs.fed.us/pnw/olympia/silv/oaksurvey/oak.htm).

Accomplishments to Date:

We have completed 3 years of data collection. Last year (2001) was the first year we obtained data from British Columbia. With the assistance of Kevin Brown and Paul Courtin, BC Min. For., 54 trees from 11 locations on Vancouver Island were sampled. Observations of acorn production have been made from Vancouver Island to southern Oregon with the help of volunteers and cooperators. To date more than 800 trees have been sampled of which more than 513 have been sampled in 2 years and 248 in three years.

Two DND properties were among the BC sites that were sampled. At CFMETR, Nanoose Bay, 6 trees were sampled, 3 on Wallis Point and 3 on Notch Hill. At Rocky Point 6 trees were also sampled. The results of the 1999 survey were analyzed and submitted for publication to Northwest Science where it is currently under consideration. Data from 1999 and 2001 are available in summarized form from our web site: (www.fs.fed.us/pnw/olympia/silv/oaksurvey/oak.htm).

Data collected in 2001 is being prepared for analysis so no results are available for it yet.

Results from previous years indicate that acorn production is influenced by competition (measured by basal area, tree shape and crown contact), moisture (indicated by precipitation, available soil water capacity, and moisture index), age, and fire history. Productivity tends to be highest on well watered, but well drained sites on trees at least 60-80 years old growing under little competition from neighbors. Our data also suggests that prescribed underburning may reduce acorn production in the year immediately following burning, but may also contribute to higher production 6-10 years after underburning. The year 2000 data provides the first indication that there are regional differences in levels of production. Production was much higher east of the Cascade Mountains than to the west and somewhat higher in southern Oregon than in the Willamette Valley or Puget Trough. The difference is even more striking if only the moist sites are compared. The moist sites on the east side of the Cascades and in southern Oregon produced at the acorn class 4 level whereas similar sites in the Willamette Valley and Puget Trough did not produce much differently than dry sites.

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