APPENDICES

Appendix A. Publications

The ***Land Development Guidelines for the Protection of Aquatic Habitat*** were published in May 1992, by F&OC and MELP. Although recent research has identified the need for wider leave strips and tighter stormwater controls, especially in urban areas, the document provides detailed guidelines on all aspects of land development potentially affecting the aquatic environment, including sediment control, fish passage and instream works.

Ministry of Environment, Lands and Parks: Water Management ***- A Users Guide to Working In and Around Water*** - this document guides developers through the Section 9 of the *Water Act* and Part 7 of the *Water Act* Regulation and whether the changes proposed in and about streams require a Notification or require an Approval. The document is available at the BCE Regional office.

The ***Stream Stewardship Series Guides*** were written by the F&OC and MELP, between 1993 and 1997 and will have been circulated to most local governments and the development community.

The following is a list of selected references:

Access near Aquatic Areas: A Guide to Sensitive Planning, Design and Management, F&OC, BCE, 1996.

Community Stewardship: A Guide to Establishing Your Own Group, FRMP 1995

Community Greenways: Linking Communities to Country, & People to Nature, 1996

Environmental Stewardship in the Municipal Act: A Synopsis of Local Government Powers, 1996 F&OC

Green Space and Growth:
Conserving Natural Areas in BC Communities

Giving it Away: Tax Implications of Gifts to Protect Private Land, WCEL, 2000

Greening Your Title: A Guide to Best Practices for Conservation Covenants, WCEL 2000

Here Today, Here Tomorrow: Legal Tools for the Voluntary Protection of Private Land in British Columbia, West Coast Environmental Law (WCEL), 1994
http://www.wcel.org

Landowner Contact Guide for British Columbia

Naturescape British Columbia: Caring for Wildlife Habitat at Home, BCE 1995

Protection of Aquatic and Riparian Habitat on Private Land
Evaluating the Effectiveness of Covenants in the City of Surrey, 1995. Fisheries and Oceans Canada. The project found that up to 75% of landowners had encroached into

the covenanted zone (about the same level of impact without a covenant). Fencing drastically reduced the encroachment. Other options were also investigated.

Sensitive Ecosystems Inventory: East Vancouver Island and Gulf Islands 1993-1997

Volume 1: Methodology, Ecological Descriptions and results; CWS Technical Report Series Number 320. CWS/HCTF/MELP 1998. This technical report describes the SEI and the ecosystems that were inventoried, and analyses the results. It graphically demonstrates the need to protect the remaining sites.

Sensitive Ecosystems Inventory: East Vancouver Island and Gulf Islands 1993-1997, CWS Technical Report Series Number 345.CWS/HCTF/MELP2000 Volume 2: Conservation Manual This document discusses conservation needs, techniques and actions to ensure the survival of these remnant native plant communities.

Other **SEI** publications may be available through the **SEI** web address: http://www.env.gov.bc.ca/cdc

Stewardship Bylaws: A Guide for Local Government, 1997

Stewardship Options: A Guide For Private Landowners in British Columbia, CWS 1996

Stewardship '94 Proceedings:
Symposium on the voluntary conservation of nature on private land & revisiting the land ethic

Stream Stewardship: A Guide for Planners and Developers, 1994

Urban Stream Stewardship: From Bylaw to Partnership
An assessment of mechanisms for the protection of aquatic and riparian resources in the Lower Mainland. 1996 F&OC

Watershed Stewardship:
A Guide for Agriculture

Urban Runoff Quality Control
Guidelines for British Columbia, 1992, Ministry of Environment, Lands and Parks. This document provides information on urban runoff characteristics and sources, BMPs for urban runoff quality control and methodology for developing a stormwater management plan.

Appendix B. Biology of Identified Species of Concern

Bald Eagle Populations

In the Vancouver Island Region, the bald eagle is a common sight, widely distributed in association with aquatic habitats. Yet, the movements of the Pacific Northwest population are still poorly known.

Those eagles that nest along the east coast of Vancouver Island and the Gulf Islands are described as the resident breeding population. These birds remain in the area around their nesting territory for about 10 months of the year (October to July).

In addition to the breeding population, the Strait of Georgia also hosts large numbers of wintering bald eagles from elsewhere in BC and possibly Alaska (particularly juveniles). Winter numbers peak in December and January, in response to food availability, such as spawned out salmon carcasses. Staging and spawning Pacific Herring and Eulachon runs are also seasonally important food sources.

Breeding and Nesting Biology

Bald eagles mature at five or six years of age, characterized by the change in the brown or mottled plumage to the white head and tail of the adult. At this time they pair up, if habitat is available, usually for life, and establish and start defending a territory and engaging in breeding activities. Nest building, nest repair and egg laying can occur from mid-February to late June in British Columbia, but most occurs between late April and mid-May. One to three eggs (usually two) are laid by the female and incubated by both parents for approximately 35 days. Chicks are raised by both parents, remain in the nest for 10 to 11 weeks on average, and stay in the nest vicinity for up to another month.

Only about 10% of the young reach maturity, but adult eagles have a low mortality rate (can live 20+ years) and have a breeding span of 10+ years. Only a portion of the adult population breeds every year (60% is typical for Vancouver Island). Some pairs may breed every year but others may miss years or not breed at all. Reasons for this are not known but may relate to all available territories being occupied, food supply or disturbance at the nest site causing abandonment.

The nest is the focal point of the eagles' territory. Fidelity to a nesting territory is very high, with most pairs using the same site for all their breeding life. Frequently there are two active nests within a breeding territory (dependent on nest tree availability), and sometimes old or degraded nests are present, as well. They may use one nest or alternate between nests within their territory in different breeding seasons. This fidelity or attraction also extends to future breeding pairs. New pairs will establish in vacant territories and build new nests or often repair and use old nests. Nests are semi-permanent structures representing a considerable investment of energy as the eagles repair and add to their nests each breeding year and throughout the breeding season. Causes of abandonment of a particular nest within a territory, both permanent and temporary, are tree damage or removal, severe nest damage, or human disturbance at or around the nest during the critical nesting period (January 30 to June 30). Nests are often damaged by storms and occasionally fall because of their own weight.

Nest Tree Requirements

Eagle nest trees are typically large, very old trees near the water. A large open crowned tree, with strong upper branches is required to support the heavy, bulky nests. Trees selected are almost always the dominant or co-dominant trees in a stand, occupying a prominent location with an unobstructed view of a nearby aquatic environment. The prominent height and position are advantageous for observing prey or food on the beach or in the water, advertising that the site is occupied, and defending the site from other eagles. Eagles are large birds requiring unobstructed flying access to the nest from at least a couple of directions. **Eagle nest tree requirements are, therefore, considered to be specialized**. Although second growth trees (over 100 years old) are sometimes used, they generally don't have the size and structure necessary to support eagles' nests and nest failures often occur.

Most eagle nest trees on the east coast of Vancouver Island (81%+) are veteran Douglas firs over 150 years of age, usually found within a kilometer of the shoreline. In the past, most old growth Douglas fir forests on southeast Vancouver Island have been logged and have given way to settlements but, until recently, enough small stands of old growth or lone veteran trees amongst smaller second growth have remained to support a sizeable nesting eagle population. However, accelerating land development (e.g., waterfront subdivisions) and logging of lands fringing Georgia Strait have caused the loss of many current and future nest trees, threatening the long-term maintenance of a breeding population of eagles.

Breeding bald eagles are territorial and on Vancouver Island, nests are typically 1,000 – 2,000 metres apart (occasionally 600 – 700 m), where suitable habitat exists. Removal of nesting habitat in one area will not result in displaced eagles crowding into remaining available habitat. Loss of nest trees means a permanent reduction in the nesting population. Gradual loss of nesting habitat is considered to be the most significant factor affecting bald eagle abundance in British Columbia. Long-term prospects for the species in the Strait of Georgia approximate those in adjacent Washington State where the bald eagle is already designated as threatened. In that state, both the eagle and the nests are protected by laws similar to those in British Columbia, but in addition, landowners having eagle nests on their property are required by law to develop management plans showing how the nest trees are is to be preserved.

References:

Blood, D.A, 1989. *Conservation Plan for Bald Eagle Nesting Trees in the Nanaimo Area*. Prepared for the BC. Ministry of Environment, BC. Conservation Fund.

Blood, D.A., and G.G. Anweiler, 1994. *Status of the Bald Eagles in British Columbia*. Draft Report prepared for BC. Ministry of Environment, Lands and Parks.

Campbell, R.W., N. K. Dawe, I. McTaggart-Cowan, J.M. Cooper, G.W. Kaiser and M.C.E. McNall, 1990. *The Birds of British Columbia*. Volume Two. Non-passerines. Diurnal Birds of Prey through Woodpeckers. Royal British Columbia Museum. Victoria, BC.

Martin, T.D. 1995. *Georgia Strait Bald Eagle Nest Tree Inventory*. Regional District of Comox-Strathcona. Prepared for MELP, Vancouver Island Region.

Martin, T.D. 1996. *Georgia Strait Bald Eagle Nest Tree Inventory*. Report 2, Regional District of Nanaimo. Prepared for MELP, Vancouver Island Region.

Martin, T.D. 1998. *Georgia Strait Bald Eagle Nest Tree Inventory.* Report 3, Gulf Islands, BC. Gabriola, Salt Spring, North and South Pender, and Galiano Islands. Prepared for MELP, Vancouver Island Region.

Vermeer, K. and K.H. Morgan et al, 1989. *Populations, nesting habitat and food of Bald Eagles in the Gulf Islands (in The Ecology and Status of Marine and Shoreline Birds in the Strait of Georgia, BC. Special Publication).*

Other Birds of Prey

Species of regional significance and for whom some inventory information is being/has been collected include: Cooper's Hawks, Northern Goshawks, Peregrine Falcons, Western Screech Owls, Northern Saw-Whet Owls, Vancouver Island Pygmy Owls, Barred and Great-Horned Owls. Northern Goshawks (*laingi subspecies*) are "red-listed", i.e., *candidate for threatened and endangered status*), and Peregrine Falcons are "red-listed" and 'blue-listed", i.e., *vulnerable*, depending on the subspecies. Cooper's Hawks are not considered endangered or threatened, but are included because they are noteworthy urban residents and some inventory information is available in the Greater Victoria area. Other birds of prey on Vancouver Island which are "blue-listed" (i.e*. vulnerable, or at risk*) are the Vancouver Island Pygmy Owl, the Western Screech Owl and the Barn Owl.

As a general rule, hawks and owls nest in large tracts of forests or dense clumps of trees which offer seclusion/security of the nest and young and easy access to prey. Although they do not always maintain the same nest for decades like eagles do, most will use the same general area or clump of trees. Typical prey species are primarily birds and/or mammals for the species listed above, except the small owls, who also feed on insects, amphibians and reptiles.

Cooper's Hawks are well adapted to our urban environment, using nest sites on large lots with stands of older forest, parks and even between fairways in golf courses. They feed primarily on small birds, especially starlings and robins. The Greater Victoria area has one of the highest densities of nests in North America, making Cooper's Hawks an interesting sight for residents near bird feeders. The loss of nesting sites or the young of the year could potentially affect their long-term survival and hence their ability to keep the starling population in check.

Goshawks generally nest in large tracts of older forest or second growth forest over 60 years of age. They require huge tracts of primarily forested land for hunting territories, generally a mosaic of different ages of trees, to provide the variety of prey species they feed on (squirrels, robins, grouse, etc.). Although they generally breed in remote areas well away from urban land development, their presence should be considered when forested land is subdivided. Their vulnerability, again, lies in the large territories required to support a breeding pair – it is estimated that Vancouver Island only supports about 200 pairs. The young inexperienced birds tend to spend at least part of the winter near urban and rural areas, and prey on domestic fowl such as chickens.

The Western Screech Owl has declined significantly over southern Vancouver Island due to loss of nesting habitat and possibly predation by free-roaming cats. Other small owls, such as the Northern Pygmy Owl and the Saw-Whet Owl, inhabit forested areas around Victoria and also need consideration to maintain nesting areas.

Where hawks and owls are known or suspected of nesting in an area that is being developed, the same development layout considerations and buffers should apply to them as to eagles and osprey. The presence of avian predators in the urban environment helps provide natural controls on undesirable species like starlings, house sparrows, rats, mice and feral rabbits; and maintaining secure nesting and roosting areas are critical to encouraging their presence.

Other rare and endangered species on Vancouver Island

There are many other living organisms which have been identified as being rare, endangered or threatened, raging from Orange Acorn Worms to Contorted-Pod Evening-Primrose to the Vancouver Island Water Shrew. A list, and information on their status (as well as explanations of the categories) is available through the CDC or from Regional MELP staff. The CDC's web page is: http://www.elp.gov.bc.ca/rib/wis/cdc/. The Wildlife Branch, and the CDC have produced brochures for some species and ecosystems at risk. These are available from the Wildlife Branch or Regional MELP staff. The Wildlife Branch's web page is: http://www.elp.gov.bc.ca/wld/ Handout pamphlets on the various sensitive ecosystems are being developed, and will be distributed to local governments when available.

Schedule 1 – Vancouver Island and Area Environmental Contractors

MELP cannot recommend specific environmental consultants and monitors. This is not our role. We can provide a list of firms that have experience doing this kind of work. It is the responsibility of the developer and/or land development approving agency or authority to assess the qualifications of consultants.

This schedule provides suggested criteria for determining qualified individuals to conduct assessment, design, and/or construction of fish and wildlife habitat associated with urban/rural land use and development. We have also provided a partial list of local fish, wildlife and vegetation contractors.

Contractors should be evaluated for their knowledge of MELP's and F&OC's habitat management legislation, guidelines, policy and procedures and for their expertise in the following categories of specialization, as appropriate:

Fish
- Species and habitat inventory and assessment
- Habitat enhancement and restoration
- Fish stream channel habitat design and construction
- Riparian habitat design and construction
- Habitat construction or mitigation monitoring

Wildlife
- Species and habitat inventory and assessment
- Habitat enhancement and restoration
- Wildlife habitat design
- Habitat construction or mitigation monitoring

Wetland/Marsh
- Species and habitat inventory and assessment
- Habitat enhancement and restoration
- Wetland/marsh habitat design
- Wetland/marsh habitat construction
- Habitat construction or mitigation monitoring

Sensitive Ecosystems, Rare and Endangered Species and Plant Communities
- Species and habitat inventory and assessment
- Habitat enhancement and design
- Protection mechanisms, design and construction

To evaluate the competency of contractors, we suggest the agency or developer request copies of at least three (3) completed projects for each subcategory of interest. Information requested should include:

- complete supporting text and photographic documentation confirming completion of the project to approval agency requirements. Submissions must indicate successful project completion and respectful liaisons with environmental agencies, as well as confirmed accuracy, completion and success throughout the assessment, design, monitoring and/or construction processes where appropriate.
- follow-up assessment and monitoring including, but not limited to:
  - approval letters,
  - additional agency communications,
  - monitoring reports,
  - client references.
- list of project personnel including their present status with the company (i.e,. full time, part time contract or sub-contract), qualifications and experience, indicating which staff would be qualified for each of the subcategories.

Vancouver Island Fisheries Contractors (Not complete)

Applied Ecological Solutions Corp.
Craig Barlow, R.P. Bio
4189 Happy Valley Rd.
Victoria, BC V9C 3X8
Phone/Fax:(250) 478-9918

Aquaterra Environmental Service
Rob Hanelt, R.P.Bio
6141 Somerside Pl
Nanaimo BC V9V 1T6
Phone/Fax (250) 751-1756 Cel (250) 714-6134

Aquametrix Research Ltd.
204-2527 Beacon Ave
Sidney BC V8L 1Y1
Phone: (250) 655-3255 Fax: (250) 655-3265

Archipelago Marine Research Ltd.
Brian Emmett, R.P Bio
200 - 525 Head St
Victoria BC V9A 5S1
Phone: (250) 383-4535 Fax: (250) 383-0103

Axys Environmental Consulting Ltd.
2035 Mills Rd
Sidney BC V8L 5X2
Phone: (250) 656-7966

Fax:(250) 656-4789

Carolla Environmental Consulting
Caroline Heim, R.P.Bio
Box 527
Heriot Bay BC V0P 1H0
Phone: (250) 285-2557 Fax: (250) 285-2560

Peter Bruce and Associates
Peter Bruce, R.P.Bio
RR 3 Tiesu Rd
Ladysmith BC V0R 2E0

Castor Consultants Ltd.
Rob Waters, R.P.Bio
13719 Jennifer Rd RR 3
Ladysmith BC V0R 2E0
Phone: (250) 245-0225 Fax: (250) 245-0339

Coast Forest Management
Kathryn Willis
152 Dallas Rd
Victoria BC V9V 1A3
Phone: (250) 385-4711 Fax: (250) 385-2402

Tripp Biological Consultants Ltd.
Derek Tripp
1784 Extension Rd
Nanaimo BC V9X 1C9
Phone: (250) 754-1540 Fax: (250) 754-2877

Vancouver Island Fisheries Contractors (Not complete)

D. Burt and Associates
David Burt
2245 Ashlee Rd
Nanaimo BC V9R 6T5
Phone: (250) 753-0027 Fax: (250) 753-0027

D. L. Bernard Contracting
Dan Bernard
RR 1 Site 37 Comp 37
Fanny Bay BC V0R1W0
Phone: (250) 335-2025 Fax: (250) 335-2067

Don Sinclair
2009 Manston Rd
Black Creek BC V9J 1A6
Phone: (250) 337-5854 Fax: (250) 338-5651

FishTech
Charles Thirkill
611 Shaughnessy Pl.
Nanaimo, BC V9T 4V1
Phone: (250) 729-4928

Gaia Environmental Consulting Services
Ken Bond
1965 Dzini Rd
Black Creek, BC V9J 1H1
Phone: (250) 337-8336

ENKON Environmental Ltd.
Niko Zorkin
Suite 309-703 Broughton St.
Victoria BC V8W 1E2
Phone: (250) 480-7103

Hamly Environmental Technology (H.E.T.)
James Hamly
501 Obed Ave.
Victoria, BC V9A 1K6
Phone/fax: (250) 380-7026

J.C. Lee and Associates
Charlene Lee and Bruce Cousens
5331 Hammond Bay Rd.,
Nanaimo BC V9T 5M9
Phone/Fax: (250) 758-2922

D. R. Clough Consulting
David Clough, R.P.Bio
6966 Leland Rd
Lantzville BC V0R 2H0
Phone: (250) 390-2901 Fax: (250) 390-2901

Ecologistics Ltd.
John Schildroth
130 Dallas Rd
Victoria BC V8V 1A3
Phone: (250) 387-7183 Fax: (250) 387-5130

Fishfor Contracting
Lynne Broekhuizen
PO Box 646
Port McNeill BC V0N 2R0
Phone: (250) 956-3939 Fax: (250) 956-3939

F.A.T.T.
Brent Lyon
270 Ladyrose Pl.
Nanaimo, BC V9S 5N5
Phone/Fax: (250) 729-7067 Cel: (250) 716-8228

Georgia Basin Ecological Assessment and Restoration Society
133-4176A Departure Bay Rd.
Nanaimo BC V9T 4V7
Phone/Fax: (250) 758-2922

P.A. Harder and Associates Ltd.
Paul Harder
#201 – 560 Johnson St.
Victoria BC V8W 3C6
Phone: (250) 383-7715
Fax: (250) 383-0511

M. J. Lough and Associates
Mike Lough, R.P.Bio
608 Bruce Ave
Nanaimo BC V9R 3Y7
Phone: (250) 755-1283 Fax: (250) 755-1283

LGL Ltd. Environmental Research Assn
Karl English
9768 2nd St
Sidney BC V8L 3Y8
Phone :(250) 656-0127

Vancouver Island Fisheries Contractors (Not complete)

Madrone Consultants Ltd.
Gordon Butt, Gillian Radcliffe, R.P.Bio
1081 Canada Ave
Duncan BC V9L 1V2
Phone: (250) 746-5545 Fax: (250) 746-5850

Northern Van Island Salmonid Enhancement Assoc
Graeme Bull
Box 1409
Port Hardy BC V0N 2P0
Phone: (250) 949-9022

Shawn Hamilton and Associates
Shawn Hamilton, R.P.Bio
1210 Alturas Pl
Victoria BC V8P 1Z6
Phone: (250) 388-3754 Fax: (250) 385-5658

Solander Ecological Research
Todd Hatfield, R.P.Bio
1324 Franklin Terrace
Victoria BC V8S 1C7
Phone: (250) 480-0050 FAX: (250) 480-0046

JA Taylor and Associates
John Taylor
11409 Sycamore Dr RR 3
Sidney BC V8L 3X9
Phone: (250) 656-0163

Toth and Associates
Steve Toth
6821 Harwood Dr.
Lantzville BC V0R 2H0
Phone: (250) 390-7608 Fax: (250) 390-7603
Cel: (250) 741-6608 Email: thoths@telus.net

M.C. Wright and Associates
Mike Wright
2231 Neil Dr
Nanaimo BC V9R 5K3
Phone: (250) 753-1055

Northwest Ecosystem Institute
Mark R. S. Johannes
Box 513, 7126 McGill Rd
Lantzville BC V0R 2H0
Phone: (250) 390-9060

Raven River Habitat Services
Barry Baldwin, R.P.Bio
PO Box 53
Quathiaski Cove BC V0P 1N0
Phone: (250) 285-2110 Fax: (250) 285-2113

Ship Environmental Consultants
Ted Harding
1028 Fort Street
Victoria BC V8V 3B3
Phone: (250) 361-1512 Fax: (250) 361-1547

Strathinnes Forestry Consultants Ltd.
J.M. Mitchell
475 Brookhaven Rd RR 3
Victoria BC V8X 3X1
Phone: (250) 658-8827 Fax: (250) 658-0997

T and E Consultants Inc.
G. Daniel Hooper
2945 Haliday Cres
Nanaimo BC V9T 1B2
Phone: (250) 751-0053 Fax: (250) 751-0063

Triton Environmental Consultants
Iain Cuthbert
413 Campbell St.
Nanaimo BC V9R 3G8
Phone: (250) 753-8339 Fax: (250) 753-8349

GB Vardy and Associates
George Vardy
Constitution Road
Black Creek, BC
Phone: (250) 337-8125

Vancouver Island Wildlife and /or Plant Contractors (Not Complete)

Jennifer Balke, R.P.Bio
6080 Lacon Rd
Denman Island BC V0R 1T0
Phone: (250) 335-2151

Foul Bay Ecological Research Ltd.
Ian Moul, R.P.Bio
Box 28, Manson's Landing
Cortez Island, BC V0P 1K0
Phone: (250) 935-6870 Fax: (250) 935-6877

Donald Blood and Associates Ltd.
Donald Blood, President, R.P.Bio
5771 Kerry Lane
Nanaimo BC V9T 5N5
PHONE: (250) 758-0872

Monica Mather
Box 497,
Lantzville, BC V0R 2H0

Ursus Environmental
Joe Materi, R.P.Bio
2126 Newcastle Lane
Nanaimo, BC
Phone/Fax: (250) 753-0097
ursusnanaimo@telus.net

Ecologic Consulting
Sally Leigh Spencer
5632 Menzies Rd
Duncan BC V9L 6G7
Phone: (250) 748-3047 Fax: (250) 748-6068
CEL: (250) 701-1825

Forestec Consulting Services
Jan Teversham, R.P.Bio
3025 Cameron-Taggart Road
RR #1, Cobble Hill, BC V0R 1L0
Phone/Fax: 743-1163

MADRONE CONSULTANTS LTD.
GORDON BUTT
1081 CANADA AVE
DUNCAN BC V9L 1V2
PHONE: (250) 746-5545 FAX: (250) 746-5850

Ron Beuchert
Box 116
Qualicum Beach BC V9K 1S7
Phone: (250) 752-0848

Terri Martin
Box 311, Heriot Bay
V0P 1H0
Phone: (250) 285-2060

Lanarc Consultants
Harriet Rueggeberg
20 Front St Suite 12
Nanaimo BC V9R 5H8
Phone: (250) 754-5651
Fax: (250) 754-1990

TRITON ENVIRONMENTAL CONSULTANTS
IAIN CUTHBERT
413 CAMPBELL ST.
NANAIMO BC V9R 3G8
PHONE: (250) 753-8339 FAX: (250) 753-8349

Carex Environmental Group Ltd.
Giles Stevenson
3610 Glenora Rd
Duncan BC V9L 6S3
Phone: (250) 748-4688 Fax: (250) 748-0980
Cel: (250) 715-8601

Ecodomain Consulting
Carol Hartwig M.Sc, Ray DeMarchi R.P.Bio
934 Khenipsen Rd
Duncan BC V9L 5L3
Phone/Fax: (250) 746-4067

Polster Environmental Services
David Polster, R.P.Bio
5953 Deuchars Dr.
Duncan BC V9L 1L5
Phone: (250) 746-8052 Fax: (250) 746-5307

Mike Ryan, R.P.Bio
801 Frayne Road
Mill Bay, BC V0R 2P0
Phone: 743-3232

Vancouver Island Wildlife and /or Plant Contractors (Not Complete)

Aqua-Tex Scientific Consulting Ltd.
Lehne Malmkvist
Victoria BC
PHONE: (250) 598-7947

Arenaria Research and Interpretation, Ltd.
David Fraser, R.P.Bio
3400 Trans Canada Hwy
Victoria BC V9E 1K3

Phone: (250) 478-9414

Biolinx Environmental Research
Lennart Sopuck, R.P.Bio
1759 Colburne Pl.
Sidney, BC V8L 5A2

Phone: (250) 656-8981 Fax: (250) 655-4697

C.E. Jones and Associates
Suite 204, 26 Bastion Square
Victoria, BC V8W 1H9
Phone: 383-8375 Fax: 383-9354

LGL Ltd. Environmental Research Assn
Karl English
9768 2nd St
Sidney BC V8L 3Y8
Phone :(250) 656-0127

ENKON ENVIRONMENTAL LTD.
NIKO ZORKIN
SUITE 309-703 BROUGHTON ST.
VICTORIA BC V8W 1E2
PHONE: (250) 480-7103

Harvey Research Ltd.
Michael Harvey
6488 Old West Saanich Road
Saanichton, BC V8M 1W8
Phone/Fax: 652-1868
e-mail: ui983@victoria.tc.ca

Marc Johnson
285 Forest Ridge Rd
Saltspring Island BC V8K 1W4

Oluna Ceska
1809 Penshurst
Victoria BC V8N 2N6
Phone: (250) 477-1211

Shearwater Mapping Ltd.
Chris Clement, R.P.Bio
525 Head St
Victoria BC V9A 5S1
Phone: (250) 361-3979 Fax: (250) 361-1981

Solander Ecological Research
Todd Hatfield, R.P.Bio
1324 Franklin Terrace
Victoria BC V8S 1C7
Phone: (250) 480-0050
Fax: (250) 480-0046

Terrestrial Logic Consulting Ltd.
Karen Christie, R.P.Bio
4467 Fairmont Place
Victoria, BC V8N 4R2
Phone: (250) 477-6735 Fax: (250) 477-5875
Cel: (250) 888-7236

Victoria Stevens, R.P. Bio
1525 Fell St.
Victoria, BC V8R 4V9
Phone/Fax: (250) 598-7004

Westland Resource Group
1863 Oak Bay Rd
Victoria BC V8R 1C6
Phone: (250) 592-8500 Fax: (250) 592-1633

Visit the Association of Registered professional Biologists website for further information regarding registered biologists standards and qualifications: www.apbbc.bc.ca

TERMS OF REFERENCE FOR AN URBAN BIO-INVENTORY

INDEX

A. INTRODUCTION

The Ministry of Environment, Lands and Parks recommends a bio-inventory assessment of a site when there is insufficient information available on an area or habitat to make appropriate recommendations:

- for layout design and prescriptions to best protect fish and wildlife habitat and sensitive ecosystems; and/or
- for compensation for permanent habitat loss or degradation associated with, or adjacent to, a proposed development.

The bio-inventory should document plant communities, aquatic and wildlife habitat values, aquatic and wildlife species presence, sensitive ecosystems and rare species, adjacent land use and threats, site stability and flood issues or other factors affecting lot layout and, where appropriate, potential habitat enhancement/protection opportunities.

To minimize controversy related to the biases and/or accuracy of the report produced, we recommend that the local government hire the consultant(s) and oversee the inventory work, but that the proponent pay the cost of this service.

B. INVENTORY LEVELS

Development Process Stage

The issue of what level of bio-inventory is needed at what stage in an urban development process requires some analysis, and is to some extent site specific. A detailed survey provides the greatest level of comfort when assessing whether a proposed rezoning – or development - is appropriate for a property, but this must be weighed against the cost of the investment when the rezoning or development may not be approved. At a minimum, enough data needs to be collected to be certain that the density and type of development being considered is appropriate for the site, whether the proposed layout conflicts with known environmental features, and if enough flexibility (of layout and density) exists to revamp a proposal if subsequent detailed inventory identifies additional sensitive features that need to be protected.

For example, a rezoning may be approved which shows greenspace for play fields on top of an existing wetland, and multi-family housing on a HT (rocky outcropping) sensitive ecosystem. If subsequent detailed inventory identifies high environmental values associated with those features, but the topography negates the revision of the layout to relocate the land use elsewhere, then conflict arises as to whether density (or "development potential") is lost in order to protect the values or whether the environmental features must be compromised or lost.

As a minimum, we recommend that the site survey be done using the "Conservation Evaluation and Visual Inspection Forms". This form is attached and is available from the Conservation Data Centre (CDC) (250) 356-0928.

Parcel Size Criteria

- **sites under 2 hectares,** with limited known sensitive or complex issues: use existing inventory information from the local watershed atlas, bald eagle and heron inventories, FISS (see G. Aquatic Habitats and Species) and other available inventory sources;

- **sites over 2 hectares but under 5 hectares, OR** where the potential intensity of the development could destroy a sensitive ecosystem: carry out a **site quality survey** to help determine whether a more detailed inventory is needed;

- **sites over 5 hectares, OR** sites with known highly sensitive or complex issues or features: a detailed bio-inventory should be carried out.

Site Quality Overview

Step One - **What is the quality of the upland habitat?**

- A site that has been *extensively modified* (e.g., recently logged or cleared) may need only limited assessments for terrestrial habitats and species, rare and endangered species and sensitive ecosystems. However, any remnant patches (e.g., older forests or trees, wetlands, rocky outcroppings) that show potential biological value should be inventoried or where local knowledge suggests those existing values may be at risk.
- A site that was originally farmed but has been idle for many years may have patches or extensive areas of rehabilitated terrestrial habitats (such as oldfield sites with numerous hawthorn and similar bushes); the potential for some rare and endangered species; and remnant sensitive ecosystems. Wetlands and channelized watercourses may have re-established good environmental values and should be inventoried.
- If the site is a re-development, the environmental values may range from extremely compromised, for paved and/or manicured properties, to extremely high, for old estates with basically undisturbed sensitive ecosystems or wildlife habitat patches. Design the inventory process accordingly.
- If the identified environmental features are going to be protected by return to Crown or equivalent protection, and human disturbance prevented during and after site development, a detailed bio-inventory of that feature is not necessary. However, if the final lot layout is unknown or sensitive habitats may be destroyed during development, a detailed inventory should be undertaken.

Step Two - Look for the presence of watercourses**.** Even ephemeral channels, which only carry water during storm events, should be noted and considered in aquatic habitat and stormwater assessments.

- **Check existing inventory information regarding fish presence:** If fish are known to be present in nearby reaches of the watercourse, no new fish inventory is necessary. Other aquatic and stream reach inventory information may still need to be collected if changes are anticipated to the watercourse or its hydrology.
- **If fish presence in the watercourse is not confirmed** and the developer wishes to have the site designated non-fish-bearing, extensive inventory will be needed to

- conclusively identify a watercourse as non-fishbearing. Refer to "G. Aquatic Habitats and Species" for further information.
- **Wetlands** need to be inventoried for all values (amphibians, plant communities, invertebrates, etc.), not just fish. Any proposals to alter wetlands to enhance fish habitat or for stormwater management need to consider all other values and the implications on those resources (such as sensitive ecosystems, plant communities, amphibian breeding sites, etc.).

C. DATA COLLECTION AND REPORT COMPOSITION

Bio-inventories are to be carried out by registered professional biologists or equally qualified personnel.

A review of all existing records on the area, including historical and current aerial photographs and rare elements/plant communities/ecosystems likely to be present, should be conducted prior to the commencement of any field studies.

The contents of the bio-inventory report should include:

- names, qualifications and area of expertise for all personnel involved in fieldwork, analysis and reporting;
- background information on the surveyed area, including sources and people contacted, their affiliation and phone number;
- a description of the methodology, results and a discussion of potential impact and mitigation/compensation measures;
- collected field data including photo-documentation;
- study area maps indicating inventory collection sites, environmental elements and other features, such as watershed boundaries.

The bio-inventory report should provide, but not be limited to, summarized data including the following information:

1. vegetation – an overview of the various plant species and plant communities present, with particular emphasis on sensitive ecosystems and their characteristics (e.g., size, degree of degradation, location in relation to proposed development components, etc.);
2. wildlife - a list of species found, methods of assessment and expected/potential wildlife use;
3. threatened, rare and endangered species – any records of the area, potential species based on habitat and locale and survey results;
4. watercourse presence, fish distribution, other aquatics present/potential, as per wildlife section above;
5. adjacent land-use and potential impact on the development site - including review of environmentally sensitive area (ESA) status, agricultural and/or forest land reserve (ALR, FLR) status and local government zoning if appropriate;
6. a development impact assessment (see Section H) of the impact of the projected changes to the site's hydrology and land use on the biological components present.

All field data forms should go back to the originating agency, for inclusion in future data base updates.

Locators
Locators are required to ensure that all data collected is compatible with Environment, Lands and Parks' Geographical Information System (GIS). Locators must be in Universal Transverse Mercator (UTM) units (NAD 83), as well as latitude and longitude. There are Resource Inventory Committee (RIC) GPS standards to follow. Locators are required for the following data recorded during a bio-inventory and should be shown on the site plans and maps:

- threatened, rare and endangered species' capture or identification sites (including plants and plant communities). If the site is a polygon, this must be delineated and mapped;
- specific biological components identified (vegetation communities, wildlife sightings, etc.); raptors; threatened, rare or endangered birds; Section 34 birds' nest sites.

Photos
Photos are to be provided for all nest/breeding sites, significant habitat features and all other plant communities. These should be referenced and indexed as necessary.

Mapping
Mapping is to be completed for each bio-inventory. The following survey parameters are to be indicated on map sheets:
Location Map (e.g., 1:10,000 scale) – shows the property in relationship to easily identifiable landmarks and roads.
Specific Maps (1:5,000 scale or larger) - indicates the property overlaid on the most current cadastral map. To keep the map from being too 'busy', additional mapsheets or mylars should be provided. See Glossary of the BMP document for definitions.

The following information should be included:

1. contours at 1 metre intervals or as appropriate for the size of the development;
2. survey data collection points and transects;
3. appropriate roads and landmarks;
4. major and rare plant communities and sensitive ecosystem polygons;
5. raptor/heron nest/roost sites and other important wildlife features;
6. wildlife species capture or identification sites (including major use areas for nesting, bedding, migration routes, etc.);
7. threatened, rare or endangered species capture or observation sites;
8. wetlands and watercourses including ditches and ephemeral streams;
9. aquatic habitat features including fish distribution and obstructions;
10. 'top of bank', and/or distance from the 'natural boundary', for the portions of the development that would be affected by setbacks and buffers; and
11. potential or known threat sources (e.g., adjacent logging or property slated for intensive housing project).

- **Map Legend** – clear description of all symbols used on the map (e.g., reach break symbol), as per RIC standards.

D. TERRESTRIAL HABITATS AND SPECIES

All upland field collection of data should follow criteria as outlined in "The Field Manual for Describing Terrestrial Ecosystems" - Land Management Handbook #25 (especially 'Ground Inspection Form') and the relevant standards from the series "Standard Components of British Columbia's Biodiversity" (especially the "Species Inventory Fundamentals) prepared by the RIC (see RIC website http://www.for.gov.bc.ca/ric)**.** Certain components of bio-inventories do not yet have appropriate RIC or other MELP standards. Contact Jan Kirkby [(250) 387-0732] at the Conservation Data Centre http://www.env.gov.bc.ca/rib/cbs/cdc for suggestions regarding other inventory systems.

Plant Communities

One of the first steps in the bio-inventory is to map the various plant communities on site. This will allow the consulting team to focus their attention on those areas most likely to provide results. For forested communities, apply the Ministry of Forests' Biogeoclimatic Ecosystem Classification, identifying each site series occurring in the area. The site series can then be correlated to the CDC rare plant community occurrences. For wetland and other **non-forested ecosystems**, provide a detailed description to allow plant community correlation at a later date. The CDC staff is available to help identify non-forested communities.

For all wildlife:

A survey should be carried out to identify vertebrate species (present/not found) on the site.

- a survey should be conducted to locate all raptor or heron nest sites on or adjacent to the property;
- if not already included in the MELP bald eagle or heron inventories, contact planning and assessment staff for data forms;
- location and date-stamped photo-documentation is required of each nest site;
- once identified, heron nesting sites should not be disturbed during the nesting season (herons are very susceptible to disturbance during that time and have been known to permanently abandon a colony that has been established for many years);
- include other wildlife species that could reasonably be expected to occur on the site.

E. RARE AND ENDANGERED SPECIES AND PLANT COMMUNITIES

Many aquatic and terrestrial habitats in Region 1 support threatened, rare or endangered (i.e., red-listed), and vulnerable (i.e., blue-listed) species and ecosystems. **The Conservation Data Centre (CDC) should be contacted prior to the initiation of any field surveys** (CDC website at http://www.env.gov.bc.ca/rib/cbs/cdc or phone (250) 356-0928) **for information on what species and plant communities are now being ranked as 'rare' or 'uncommon' and for guidance on the surveys themselves.**

Areas with the potential to support red- and/or blue-listed mammal, bird, or invertebrate species should be assessed for the presence of those species, in the appropriate seasons. Every effort should be made to identify the species in the field. If voucher specimens are needed for ID or confirmation of a species in an area, please follow the RIC standards for Voucher Specimen Collection in "Standards for Components for BC's Biodiversity No. 4a and 4b". If you have questions about when and what type of voucher should be collected, please contact the Royal BC Museum.

F. SENSITIVE ECOSYSTEMS (SEI)

An inventory of the sensitive terrestrial ecosystems in the eastern coastal lowlands of Vancouver Island and the adjacent Gulf Islands was carried out between 1993 and 1997(SEI), through air-photo interpretation and field checking. The publications and results (which indicated that less than 8% of the study area is left relatively unmodified) are available at http://www.env.gov.bc.ca/rib/cbs/sei. Maps may be viewed at the local government offices, through planning and assessment staff at the Nanaimo MELP office or through the CDC in the Victoria MELP office.

Using the ecosystem description and data collection forms outlined in "Sensitive Ecosystems Inventory: East Vancouver Island and Gulf Islands 1993-1997. Volume 1: Methodology, Ecological Description and Results" and "Volume 2: Conservation Manual", as well as the "Guidelines for Site Conservation Evaluation" available through the CDC, all sensitive ecosystems, *regardless of size*, should be mapped and recorded.

G. AQUATIC HABITATS AND SPECIES

Freshwater resources

Biological values exist for all aquatic systems; from lakes to ephemeral streams, storm ditches to dug ponds and winter wetlands. Hence an assessment needs to start out by mapping **all channels,** wet or dry, which are components of the local drainage system if not already correctly located on large scale maps. Even isolated winter wetlands are components in the hydrologic regime for a site, as well as potentially supporting unique species (see F. Sensitive Ecosystems section).

Marine coastal sites
Any proposals involving potential changes below the high tide line need to be referred to Fisheries and Oceans Canada, as well as British Columbia Assets and Land Corporation. Proposed changes to the nearshore habitats, or within 100 m of an estuary, should be included in this bio-inventory, as part of the "Terrestrial Habitats and Species" component.

- **Known fish and fish habitat information:** Check the local watershed atlases, *A Guide to the Streams of the East Coast of Vancouver Island* (MELP regional office), as well as the Fisheries Information Summary System (FISS) through the BC Fisheries website at http://www.bcfisheries.gov.bc.ca/fishinfobc.html.

- **If fish presence is not confirmed and the developer wishes to have the site designated non-fish-bearing extensive inventory will be needed to conclusively identify a watercurse as non-fishbearing.** See the Forest Practices Code Fish-stream Identification Guidebook (Revision2) http:www.for.gov.bc.ca/tasb/legsregs/fpc/FPCGUIDE/Guidetoc.htm for fish

  Other useful references include the "*The Streamkeepers Manual: A Practical Guide to Stream and Wetland Care" 1995 or "Stream Habitat Inventory Mapping" 2000* for watercourse surveys, depending on the level of detail required. Use the RIC standard: *Reconnaissance (1:20,000) Fish and Fish Habitat Inventory: Standards and Procedures and* the MOF/MELP *Fish Stream Identification Guide (Revison2).* For fish presence/non-fishbearing studies see website at http://www.for.gov.bc.ca/tasb/legsregs/fpc/FPCGUIDE/Guidetoc.htm

- **Wetlands**: Detailed information on the various components of a wetland are needed, especially if the proposal involves draining, filling, changing the natural water levels through use for stormwater retention or as an aesthetic feature, or affecting the flow regime due to stormwater changes. The first stage is a detailed mapping and analysis of the watershed affecting the wetland, plus its winter boundary and area extent at peak storms (the topographical mapping is useful here). The bio-inventory should look at the following resources: water quality at various seasons, flow regimes, aquatic organisms (from fish to amphibians to Daphnia) plants and plant communities (all submergent, emergent, ephemeral and riparian communities) and soils. For recommendations about inventory methodology and forms, contact the CDC at http://www.env.gov.bc.ca/rib/cbs/cdc.

Note: any proposed changes to any watercourse, including road or pipeline crossings, water storage structures, dredging, or instream works, are covered by the *Water Act*. Acceptance of this bio-inventory or other aspects of the development proposal does not preclude the need to apply for the appropriate *Water Act* approval. This process takes time, so allow adequate lead-time. (Nor does an approval under the *Water Act* constitute an acceptance of other aspects of a development, such as lot layout.) If the watercourse is fish bearing or fish resources are present downstream, contact Fisheries and Oceans Canada to determine if alteration of fish habitat may occur.

H. DEVELOPMENT IMPACT ASSESSMENT

The development impact assessment should detail how the environmental features will be protected, and any risks from the proposed layout or from the cumulative effects of this development combined with other developments in the watershed, including hydrologic changes. An analysis of the impact of the proposed development upon the habitat present on the site should include (but not necessarily be limited to) the following points:

Area

- Is this site in a natural state (naturally vegetated vs. cleared)? Are there significant trees or treed areas?
- Are there signs of instability (steep slopes, slumping, windthrow) that could be aggravated by the development?
- Is there sufficient area of land outside of the identified biological features for a reasonable building envelope on each proposed lot? ("Reasonable" as determined by site constraints, average size/footprint of buildings and setbacks, with room for normal "yard" activities)?
- Do the species at risk require a buffer to maintain their use of a site; and if so, how large? Is the site large enough to accommodate our recommended buffers with the development as proposed?

Site Constraints

- Are there significant constraints posed by topography, other environmental features or rights-of-way on the developable portion of the site?
- Have options been explored that would locate proposed structure(s) away from the sensitive area or provide for alternative layout options and /or design structures that adapt to the need for habitat protection?
- If development is proposed to the edge of the recommended buffer, have fencing or other exclusion techniques been explored?

For further information please contact:

Ministry of Environment, Lands and Parks
Planning and Assessment
Vancouver Island Region
2080-A Labieux Rd
Nanaimo BC V9T 6J9
Telephone: (250) 751-3100

Conservation Evaluation &Visual Inspection Form								
Proj. ID.						**Surv.**		
Poly			**Air Photo #**				**Date**	
ECOSYSTEM POLYGON SUMMARY						**TERRAIN POLYGON SUMMARY**		
	%	**SS**	**SM**	**ST**	**CC**		**%**	Classification
EC1						**TC1**		
EC2						**TC2**		
EC3						**TC3**		
Plot #			**Gr. Photo #.**			Mapsheet		
UTM Zone			Lat./North			Long./East		
Aspect	^{o}		Elevation	m		Slope	%	
Meso Slope			Soil Drainage			Soil Texture		
Ecosystem Component 1:								
TERRAIN COMPONENT 1								
DOMINANT / INDICATOR VEGETATION SPECIES								
Total %	**A:**		**B:**			**C:**	**D:**	

Species	L	%	Species	L	%	Species	L	%

Complete ❒ Partial ❒

% Fragmentation			
❑ UNFRAGMENTED (< 5% of polygon) ❑ PARTLY FRAGMENTED (5 - 25 % of polygon) ❑ HIGHLY FRAGMENTED (> 25% of polygon)			
DISTURBANCE HISTORY (ANTHROPOGENIC)			
❑ LOGGING	❑ GRAZING	❑ AGRICULTURE	
❑ CONSTRUCTION	❑ RECREATION	❑ OTHER	
DISTURBANCE HISTORY (NATURAL)			
❑ FIRE	❑ WINDTHROW	❑ DISEASE	
❑ WILDLIFE USE	❑ EROSION	❑ OTHER	
ADJACENT LAND USE:			
KNOWN THREATS:			
OTHER FACTORS:			
EVALUATION SUMMARY:			
QUALITY	❑ EXCELLENT	❑ GOOD	❑ MARGINAL ❑ POOR
CONDITION	❑ EXCELLENT	❑ GOOD	❑ MARGINAL ❑ POOR
VIABILITY	❑ EXCELLENT	❑ GOOD	❑ MARGINAL ❑ POOR
DEFENSIBILITY	❑ EXCELLENT	❑ GOOD	❑ MARGINAL ❑ POOR
NOTES (site diagram, exposure, gleying, etc.)			

Schedule 3A – Bald Eagle Nest Tree Update Form

This form is intended to provide updated information on nests that may have changed since the original survey. Report whether change is due to disturbance, change in vegetation cover, development or some other cause.

Date: _____

Source of Information

Name _____

Address:_____

_____

Phone_____

Inventory Area _____Capital Region District (CRD), Cowichan Valley (CVRD), Regional District of Nanaimo (RDN), Comox/Courtney, Islands Trust

New Nest Site, or Addition of New Nest(s) to Site

General Location : (legal description and street address)

_____

ATTACH SKETCH MAP OF HOW TO FIND THE NEST TREE, AND SHOW LOCATION OF NEST TREE IN RELATION TO OTHER FEATURES (EG PHYSICAL OR STRUCTURAL)

IF THE CHANGE INVOLVES THE ADDITION OF NEW NEST(S) PLEASE CONTACT THE MELP REGIONAL WILDLIFE PROGRAM OR PLANNING AND ASSESSMENT PROGRAM.

Existing Nest Tree Site Information

Existing Nest Tree # (if known) _____

Has the nest tree been signed with the MELP and MOF yellow sign? Yes_____ No _____

Has there been any change to the habitat around the nest tree? Yes____ No _____

If yes, describe change:

_____

General Comments

_____

_____

_____

Please send this sheet, with documentation photos, legal information (landowner) and sketch map of new location or changes to existing colonies to: Karen Morrison, Regional Fish and Wildlife Program, 2080 Labieux Rd., Nanaimo, BC V9T 6J9 (fax: 250-751-3103; ph: 250-751-3216).

NOTE: IF THE CHANGE INVOLVES THE ELIMINATION OR MODIFICATION OF A NEST OR NEST TREE PLEASE CALL AHEAD TO ADVISE MELP IN CASE A VIOLATION OF THE WILDIFE ACT HAS OCCURRED.

Schedule 3B - Heron Nest Tree Colony Site Information Update

This form is intended to provide updated information on heron nest tree colonies that may have changed since the original survey. Report whether change is due to disturbance, change in vegetation cover, development or some other cause.

Date: _____

Source of Information:

Name _____

Address _____

Phone _____

Inventory Area _____
Capital Region District area (CRD), Cowichan Valley area (CVRD), Regional District of Nanaimo area (RDN), Comox/Courtney area (RDCS), Islands Trust

New Heron Nest Tree Colony Site

NOTE: The boundary of a heron nest tree colony site is defined by the outermost nest trees

Is this a new colony?(Y/N)_____

Number of nests in colony, if known_____

General Location: (legal description and street address)_____

_____

ATTACH SKETCH MAP OF HOW TO FIND THE HERON NEST TREE COLONY, AND SHOW LOCATION OF NEST TREE COLONY IN RELATION TO OTHER FEATURES (EG PHYSICAL OR STRUCTURAL).

Please send this sheet, with any photos of site, legal information (landowner) and cadasatral map of new location to: Karen Morrison, Regional Fish and Wildlife Program, 2080 Labieux Rd., Nanaimo, BC V9T 6J9 (fax: 250-751-3103; ph: 250-751-3216).

Existing Heron Nest Tree Colony Site Information

Existing Colony # (if known)_____

Has each nest tree been signed with the MELP and MOF yellow sign, or with metal tags?

Yes_____ ***(if "yes" please identify as to whether a sign or tag)*** **No**_____

Has there been any change to the habitat around or within an existing colony?

Yes____ **No**____

If yes, describe change:

_____

General Comments

_____

_____

IF THE CHANGE INVOLVES THE ELIMINATION OR MODIFICATION OF A NEST OR NEST TREE PLEASE CALL AHEAD TO ADVISE MELP IN CASE A VIOLATION OF THE WILDIFE ACT HAS OCCURRED.

Schedule 4 - EXAMPLES OF TITLE ACT SECTION 82 AND SECTION 219 RESTRICTIVE COVENANTS

INFORMATION FOR RESTRICTIVE COVENANTS

The attached form is a sample of our standard restrictive covenant to be registered against the title of your property under Section 219 of the *Land Title Act.* It is required by the Fish, Wildlife and Habitat Program of the Ministry of Environment, Lands and Parks to protect valuable fisheries/wildlife habitat.

Please complete the form using the general wording supplied and by inserting specific information as it applies to your property. Delete whichever words/phrases are not applicable. Since this is a legal document, the services of a notary public or lawyer are necessary to sign off the document and ensure it is prepared correctly. All signatures must be in black ink; photocopies are not acceptable to the Land Title office.

The form must be accompanied by a sketch plan or explanatory plan with sufficient copies for all agencies. A sketch plan is done by a BC land surveyor, but it is not a legal plan; it goes into the body of the restrictive covenant as a schedule to the covenant. The explanatory plan which defines the exact area being restricted, in relation to the creek high water mark or top of ravine bank, is a registerable plan which goes with the covenant. We do not usually require a reference plan if a sketch plan will suffice. A Land Title Act Form C and D must also be included as a covering letter.

Once the form has been drafted, and before signing off, the proponent should forward a copy of the draft covenant to Fish, Wildlife and Habitat for review and preliminary approval. The covenant is then ready for final approval and signing off by the appropriate authority.

It should be noted that the Regional Fish, Wildlife and Habitat office requests one copy of the registered document for filing.

Thank you for your co-operation in this matter.

RESTRICTIVE COVENANT
(SECTION 219, *LAND TITLE ACT*)

THIS AGREEMENT made the day of , 2001.

BETWEEN:

(hereinafter called the "Covenantor")

OF THE FIRST PART

AND:

HER MAJESTY THE QUEEN in the Right of the Province of British Columbia, as represented by the Regional Fish, Wildlife and Habitat Manager, Ministry of Environment, Lands and Parks.

(hereinafter called the "Covenantee")

OF THE SECOND PART

WHEREAS:

A. The Covenantor is the registered owner of or has an equity of redemption in ALL AND SINGULAR that certain parcel or tract of land and premises situate, lying and being in the _____ (ENTER DISTRICT OR MUNICIPALITY) in the Province of British Columbia, and more particularly described as: _____

_____

(hereinafter called the "said lands")

B. Section 219 of the Land Title Act provides, interalia, that there may be registered as a charge against the title to land a covenant, whether of a negative or positive nature, in respect of the use of the land or the use of a building or to be erected on land, in favour of a municipality of the Crown.

C. An unnamed creek (commonly known as _____) is situated upon and runs through a portion of the said lands as shown on the plan prepared by _____ BCLS dated for reference _____ Drawing No. _____ a true copy of which is annexed hereto as Schedule "A" to this Agreement (hereinafter called the "said creek").

D. The Covenantor has agreed to restrictions on the use of a portion of the said lands adjacent to the said creek.

NOW THEREFORE THIS AGREEMENT WITNESSETH that pursuant to Section 219 of the *Land Title Act*, and in consideration of the sum of one dollar ($1.00) now paid to the Covenantor to the Covenantee (the receipt and sufficiency whereof is hereby acknowledged), the parties hereto hereby covenant and agree each with the other as follows:

1. THE COVENANTOR COVENANTS AND AGREES with the Covenantee that:

   (a) no building or structure, fencing or any part thereof, including any fixed equipment, mobile home or modular home shall be constructed, reconstructed, moved, extended or located nor shall any landfill, land clearing or other disturbance take place within _____ meters of the top of bank/natural boundary/centreline/top of the ravine bank, including the ravine
   (DELETE WHICHEVER IS NOT APPLICABLE)
   of the creek shown on Schedule "A";

   (b) the Covenantor shall not, without the prior written consent of the Covenantee, which consent to be in the Covenantee's sole discretion, cut down, trim, prune, defoliate, alter, remove or in any way tamped with or work on any trees, shrubs, plants, bushes, ground cover, vegetation or any other form of plant life within that portion of the said lands within a distance of _____ meters from the natural boundary/top of bank/centreline/top of ravine bank, including the ravine
   (DELETE WHICHEVER IS NOT APPLICABLE)
   of each side of the said creek, as shown on Schedule "A", so that the said trees, shrubs, plants, bushes, groundcover, vegetation and other forms of plant life remain in a naturally vegetated state in perpetuity;

   (c) the Covenantor shall ensure that any clearing and/or excavation done on the said lands shall be completed in such a manner to ensure that the release of silt, concrete, leachate or any other deleterious substances shall not fall into the said creek via ditches, storm sewers or overland flow. And the Covenantor shall further ensure that all construction and excavation wastes, overburden, soil, or other substances deleterious to aquatic life shall be disposed of or placed in such a manner as to prevent their entry into any watercourse or storm sewer system; and

(d) the Covenantor shall, at the expense of the Covenantor, do or cause to be done all acts reasonably necessary to grant priority to this Agreement over all charges and encumbrances which may have been registered against the title to the said lands in the Victoria Land Title Office save and except those specifically approved in writing by the Covenantee or in favour of the Covenantee;

(e) the Covenantor shall not construct dwellings within _____ meters of the covenant boundary as boldly outlined on Sketch Plan annexed hereto as Schedule "A".

2. IT IS MUTUALLY UNDERSTOOD AND AGREED by and between the parties here that:

(a) In this agreement the term:

(i) "natural boundary" means the visible high water mark of the said creek where the presence and action of the water are so common and usual and so long continued in all ordinary years as to mark upon the soil of the bed of the said creek a character distinct from that of the banks thereof in respect of vegetation as well as in respect of the nature of the soil itself;

(ii) "centreline" means a line running between and equi-distant from the natural boundaries of the said creek; and

(iii) "top of ravine bank" means first significant break in the slope of a ravine;

(b) nothing contained or implied herein shall prejudice or affect the rights and powers of the Covenantee in the exercise of its functions under any public and private statutes, bylaws, orders and regulations, all of which may be fully and effectively exercised in relation to the said lands as if this Agreement had not been executed and delivered by the Covenantor;

(c) the covenants set forth herein shall charge the said lands pursuant to Section 219 of the *Land Title Act* and shall be covenants the burden of which shall run with the said lands. It is further expressly agreed that the benefit of all covenants made by the Covenantor herein shall accrue solely to the Covenantee and that this Agreement may only be modified or discharged by agreement of the Covenantee, pursuant to the provisions of Section 219(5) of the *Land Title Act*;

(d) notwithstanding anything contained herein, the Covenantor shall not be liable under any of the covenants and agreements contained herein where such liability arises by reason of an act or omission occurring after the Covenantor ceases to have any further interest in the said lands;

(e) wherever the singular or masculine is used herein, the same shall be construed as meaning the plural, feminine or body corporate or politic where the context or the parties so require;

(f) this Agreement shall ensure to the benefit of and be binding upon the parties hereto, their respective successors and assigns; and

(g) the parties hereto shall do and cause to be done all things and execute and cause to be executed all documents which may be necessary to give proper effect to the intention of this Agreement.

IN WITNESS WHEREOF the parties hereto have hereunto set their respective hands and seals on the day and the year first above written.

OR

IN WITNESS WHEREOF the Covenantor has hereunto affixed its corporate seal, attested by the hands of its officers duly authorized in that behalf, and the duly authorized representative of the Covenantee has hereunto set his hand and seal, the day and year first above written.
(DELETE WHICHEVER IS NOT APPLICABLE)

OR

The Corporate Seal of	SIGNED, SEALED AND DELIVERED
was hereunto affixed in the presence of:	By in the presence of:
_____ Authorized Signatory	_____ Name
_____ Authorized Signatory	_____ Address
	_____ Occupation
	(DELETE WHICHEVER IS NOT APPLICABLE)

This is the Instrument creating the condition of the covenant entered into under Section 219 of the *Land Title Act* by the registered owner referred to herein and shown on the print of the plan annexed hereto and initialled by me.

_____
Approving Officer

Schedule 5 - EXAMPLES OF RECOMMENDED DEVELOPMENT PERMIT AREA LANGUAGE

The following is an EXAMPLE of recommended development permit area language, taken from Islands Trust, Saltspring Island Development Permit

E.5.1 Description of Development Permit Area and Exemptions

E.5.1.1 Development Permit Area 4 is shown on Map 21. It is made up of the island's major lakes, streams and wetlands. It also encloses the land (measured horizontally) that is within 10 m of the natural boundary of streams, the land that is within 300 m of the natural boundary of Maxwell Lake and the land that is within 61 m of the natural boundary of all other island lakes, except for the land in Development Permit Area 3. Development Permit Area 4 is designated according to Section 879 (1) (a) of the *Municipal Act* to protect the natural environment.

Background Note: The official version of Map 21 is drawn at a scale of 1:20,000 and is available through the offices of the Islands Trust. The page size version of Map 21 bound within this Plan has been included for convenience.

E.5.1.2 **All** development in this Development Permit Area is exempted from the requirement to obtain a Development Permit, **except:**

a. Removal of trees within 10 m of the natural boundary of a lake or a stream (or within 300 m of Maxwell Lake).
b. Removal of other vegetation within 10 m of the natural boundary of a lake or stream (or within 300 m of Maxwell Lake) that results in the exposure of a total area of bare soil more than 9 m^2 in area.
c. Removal of vegetation in a wetland.
d. Installation of a septic field within 61 m of the natural boundary of a lake (or within 300 m of Maxwell Lake).
e. Development of an impervious surface within 10 m of the natural boundary of a lake or a stream(or within 300 m of Maxwell Lake).
f. Any works or installation of structures within a stream or below the natural boundary of a lake.
g. The subdivision of land parcels that creates additional new lots within this Development Permit Area.

E.5.1.3 Despite Section E.4.1.2, the following activities are also exempted from the requirement to obtain a Development Permit:

a. land alteration and vegetation removal on agricultural land that is more than 3 m from the natural boundary of a lake or stream (except Maxwell Lake), that is done for farming purposes and that is consistent with normal farm practices under the *Farm Practices Protection (Right to Farm) Act.*
b. forest management activities related to timber production and harvesting in the Forest Land Reserve.
c. fish habitat enhancement work approved by the Department of Fisheries and Oceans or the Ministry of Environment, Lands and Parks.
d. the emergency removal of a hazardous tree.

e. emergency works to prevent flood damage to structures or repair to public service utilities.
f. vegetation removal or other works within 10 m of a lake or stream (or within 300 m of Maxwell Lake) that has been approved in writing by the Ministry of Environment, Lands and Parks or by the Department of Fisheries and Oceans.
g. works below the natural boundary of a lake or stream or a wetland that have been approved in writing by the Ministry of Environment, Lands and Parks or by the Department of Fisheries and Oceans.
h. activities on land that is within 300 m of Maxwell Lake, but is outside the lake's surface catchment area, as demonstrated by survey.
i. the subdivision of land parcels where a conservation covenant satisfactory to and in favour of the Salt Spring Island Local Trust Committee or the Islands Trust Fund Board has already been registered for the maintenance of natural drainage and protection of environmentally sensitive areas.
j. works undertaken by a waterworks district that have been certified by a Professional Engineer as consistent with the *Land Development Guidelines for the Protection of Aquatic Habitat.*

E.5.2 Reasons for this Development Permit Area

E.5.2.1 The lakes and streams in this Development Permit Area provide natural fish and wildlife habitat. Many also supply drinking water to individual license holders or community water supply systems. If not carefully managed, development in this Area could result in degradation of water quality. Poor water quality would be detrimental to fish and wildlife populations and could lead to increased costs for remedial drinking water treatment.

E.5.2.2 This Development Permit Area contains riparian habitat that is important to many different species and is particularly susceptible to disturbance. Development in this Area could lead to the disturbance or loss of a disproportionately large number of different native plant and animal species.

E.5.3 Objectives of this Development Permit Area

E.5.3.1 To protect the quality of drinking water supplies.

E.5.3.2 To protect fish habitat.

E.5.3.3 To protect sensitive riparian habitat and the unique species that depend upon it.

E.5.4 Guidelines for New Development

Background Note: Development Permits that are issued for developments in this Development Permit Area could contain conditions that are based on the following guidelines. Not all guidelines will apply to every permit. Permits will not contain conditions that are unrelated to these guidelines. The conditions on a Development Permit will not prevent a property from being used as the local zoning bylaw allows.

While forest management activities within the Forest Land Reserve are excluded from the Permit process, voluntary compliance with the guidelines of this section are encouraged for such activities.

E.5.4.1 All work that takes place in this Development Permit Area should be done in a way that minimizes degradation in water quality and disturbance to natural drainage patterns.

E.5.4.2 All work that takes place on land within 10 m of the natural boundary of a lake or stream (or within 300 m of Maxwell Lake) or within a wetland should be planned and carried out in a way that is consistent with the *Land Development Guidelines for the Protection of Aquatic Habitat* (Appendix 7).

E.5.4.3 Native vegetation and trees are to be retained or replaced to control erosion, protect banks and protect fish and wildlife habitat.

E.5.4.4 New roads and septic fields should not be located in this Development Permit Area. If such a location cannot be avoided, then the design and construction of the road or septic field should be supervised by a qualified professional to ensure that the objectives and guidelines of this Area are met. Septic systems that are adjacent to lakes or to streams that drain to lakes should be designed to minimize both nutrient loading and coliform contamination of lake waters.

E.5.4.5 Where this Area includes unique native species dependent on riparian habitat which have been identified by a qualified professional as worthy of particular protection, their habitat areas should be left undisturbed. If development is permitted, it should be undertaken only under the supervision of a professional who is qualified in environmental protection, with advice from the Ministry of Environment, Lands and Parks, the Department of Fisheries and Oceans, or Environment Canada.

E.5.4.6 To assist in the preparation of development permits for larger projects, the Trust Committee could request an applicant to provide a report, prepared by a qualified professional with experience in surface water management and the protection of habitat. The report should indicate the type of conditions that should be incorporated into the development permit to achieve the objectives and comply with the guidelines of this Development Permit Area.

E.5.5 Guidelines for Subdivision

E.5.5.1 If a proposed land subdivision is to create additional new lots within this Development Permit Area, then any new lots, roads, building sites, septic fields and driveways should be located and constructed in a way that meets the objectives of this Area. A covenant should be registered against the part of the property that is within this Area to guide future development and meet the objectives of this Area."

Schedule 6

GLOSSARY

The definitions in this glossary, except where noted, have been taken from the following references:

East Vancouver Island and Gulf Islands Sensitive Ecosystem Inventory, 1993-1997 Volume 2: Conservation manual CWS/HCTF/MELP 2000

Draft, Agricultural Watercourse Maintenance Guidelines, March, 2001

Dunster, J. and K. Dunster, 1996. *Dictionary of Natural Resource Management*. Vancouver: UBC Press.

Regional Water Management Policy for Vancouver Island Region, 1996.

British Columbia, Ministry of Forests: *Glossary of Resource Planning Terms*, Edition 1, April, 1996.

British Columbia, Ministry of Aboriginal Affairs - Treaty Mandates Branch: *Glossary of Treaty-related Terms*, May, 1996.

Brown, Daryl: *Commission on Resources and Environment - Strategic Land Use Planning Source Book*, March, 1996.

British Columbia, Ministry of Forests and BC Environment: *Forest Practices Code of British Columbia - Biodiversity Guidebook*, September, 1995.

The Scientific Panel for Sustainable Forest Practices in Clayoquot Sound: Report 5 - *Sustainable Ecosystem Management in Clayoquot Sound,* April, 1995.

GLOSSARY

agricultural land reserve (ALR): land designated and reserved for agricultural purposes under the ***Agricultural Land Commission Act*** (the reserve covers about five percent of the province and includes most of BC's high quality agricultural land). It includes both private and public lands, and covers land being farmed and land with agricultural potential. Non-agricultural uses on the ALR are regulated.

alluvial fan: an alluvial deposit of a stream where it issues from a steep mountain valley or gorge upon a plain or at the junction of a tributary stream with the main stream.

aquifer: a stratum of gravel, sand or porous, fractured or cavernous rock capable of holding and/or conducting water. When fully charged, an aquifer is saturated with water.

aspect: the compass direction of a slope or surface relative to the sun (e.g., a slope on the south side of a hill has a southerly aspect).

benthic: pertaining to organisms living on the floor of a water body.

biodiversity: refers to all varieties of life and their processes. Biodiversity encompasses the full range of natural variability, including genetic diversity, species diversity and ecosystem diversity. Genetic diversity refers to the variability among individuals of the same species (e.g., hair colour). It is genetic diversity that allows species or populations to adapt to changes in different site conditions. Species diversity refers to the richness and abundance of different plant and animal species within an area. Ecosystem diversity refers to the richness and abundance of different plant and animal species within an area. Ecosystem diversity refers to the broad range of diverse habitats with their associated plant and animal species. The maintenance of biodiversity at all levels is normally an important strategic land use plan goal.

biophysical: the biological and physical characteristics of an area (e.g., topography, soils, climate, landforms, watercourses, vegetation, etc.).

blue-listed species: taxa that are considered to be vulnerable and "at risk", but not yet endangered or threatened. Populations of these species may not be in decline, but their habitat or other requirements are such that they are sensitive to further disturbance. The blue list also includes species that are generally suspected of being vulnerable, but for which information is too limited to allow designation in another category.

buffer strip: a strip of land where disturbance is not allowed or is closely monitored to preserve or enhance aesthetic and other qualities along or adjacent to roads, trails, watercourses and recreation sites.

capability: the natural biological and physical ability of a given area of land to support a particular management activity or use (e.g., soil capability for agriculture; habitat capability for waterfowl). Capability is not concerned with social, economic, political or other such factors. Capability for individual uses is normally shown on land use capability maps that indicate the level to which various places are rated as having a capability to support the use in question.

constructed ditch: have no headwaters, carry water from local surface areas or subsurface drains and may be permanently or intermittently wetted

community: a group of living organisms connected by ecological processes to a particular ecosystem. Often named after the dominant vegetation. For example the red-listed Western red cedar – Indian plum plant community. Within this community are other associated plant species and other dependent species (animals, birds, reptiles, amphibians, invertebrates and micro-organisms).

connectivity: a qualitative term describing the degree to which late successional ecosystems are linked to one another to form an interconnected network. The degree of interconnectedness and the characteristics of the linkages vary in natural landscapes based on topography and natural disturbance regime. Breaking of these linkages results in forest fragmentation. Fragmentation due to forest harvesting should be viewed and managed to mimic fragmentation resulting from natural disturbance. The degree and characteristics of this "natural fragmentation" vary with differences in landscape type. Specific types of connectivity are defined below:

- upland to upland connectivity - describes how well late successional forests in the upland portion of the landscape were linked over time;
- upland to stream connectivity - describes how well late successional forests on the upland and stream riparian portions of the landscape were linked over time;
- upland to wetland connectivity - describes how well late successional forests on the upland and wetland portions of the landscape were linked over time;
- cross-elevational connectivity - describes how well late successional forests from low elevation valley bottoms and higher elevation portions of the landscape were linked with each other over time;
- wetland complex frequency - a measure of how many wetland complexes are in this NDT relative to other NDTS;
- stream riparian frequency - a measure of how many streamside riparian areas are in this NDT relative to other NDTS.

conservation covenant: a conservation covenant is a voluntary, written legal agreement in which a landowner promises to protect his/her land in specified ways. It can cover all or just part of the landowner's property. Such a covenant offers a way of protecting land for a variety of uses such as wildlife, habitat, watershed protection, scenic values, historic preservation, low-density residential use. The agreement is between the landowner and an organization, such as the Islands Trust Fund or a local conservancy, or any other group or government agency recognized or designated by the Minister of Environment, Lands and Parks. Conservation covenants protect the land by giving the covenant holder, e.g., the Islands Trust Fund, the authority to assume the long-term responsibility for monitoring and enforcing the agreement. The covenant is attached to the title of land, is registered in the Land Title Office and binds future owners of the land to the terms established by the first landowner. It is intended to last forever.

conserv*ation data centre*: a division of BC Environment that tracks species and plant communities that are considered threatened or endangered at the provincial, national or global level (**Interagency Planning Team**).

critical habitat: part or all of a specific place occupied by a wildlife species or a population of such species and recognized as being essential for the maintenance of the population or ecosystem processes. The habitats may be well defined, geographically concentrated, critical niches or species-specific critical ecological components widely distributed across the landscape. (from: *Draft Wildlife Habitat Areas Field Guide*, October 1994.).

deleterious substance: any substance that, if added to water, would degrade or alter the quality of the water so that it becomes damaging to fish or fish habitat, or becomes unsuitable for human consumption or any other purpose for which it is legally licenced (such as irrigation and livestock watering).

designated flood: a flood, which may occur in any given year, of such magnitude as to equal a flood having a 200-year recurrence interval, based on a frequency analysis of unregulated historic flood records or by regional analysis where there is inadequate streamflow data available. Where the flow of a large watercourse is controlled by a major dam, the designated flood shall be set on a site-specific basis.

designated flood level: the observed or calculated elevation for the designated flood, which is used in the calculation of the flood construction level.

ecological classification: an approach to categorizing and delineating, at different levels of resolution, areas of land and water having similar characteristic combinations of the physical environment (such as climate, geomorphic processes, geology, soil and hydrologic function) and biological communities (plants, animals, micro-organisms and potential natural communities).

ecological processes: the actions or events that link organisms (including humans) and their environment, such as disturbance, successional development, nutrient cycling, productivity and decay.

ecosystem integrity: the soundness or wholeness of the processes and organisms composing the ecosystem. The panel defines "maintaining ecological integrity" as maintaining functioning, self-sustaining ecosystems with characteristics similar to the original ones.

ecosystem: a complete system of living organisms interacting with the soil, land, water and nutrients that make up their environment. An ecosystem is the home place of living things, including humans. A functional unit consisting of all the living organisms (plants, animals and microbes) in a given area, and all the non-living physical and chemical factors of their environment, linked through nutrient cycling and energy flow. An ecosystem can be any size - a log, pond, field, forest, or the earth's biosphere - but it always functions as a whole unit. Ecosystems are commonly described according to the major type of vegetation - for example, old-growth ecosystem, or grassland ecosystem.

edge: the outer band of a patch that has a microclimate significantly different from the interior of the patch.

edge effect: habitat conditions (such as degree of humidity and exposure to light or wind) created at or near the more-or-less well-defined boundary between ecosystems, as, for example, between open areas and adjacent forest.

the penetration of wind, light and humidity creating differences in microclimate (air and soil temperature, wind, light, humidity), as well as sound, predation, and visibility, beyond and into vegetation bordering a zone of disturbance. The distance of edge effect penetration varies with the vegetation conditions of the forest and the adjacent opening, as well as aspect and topography. Edge effects can drastically reduce the area of a vegetated "island" that can function as "interior" forest, thus creating important habitat modifications for a wide range of species.

ephemeral streams: streams that flow throughout most of the year but may dry up during portions of the dry season.

environmentally sensitive areas (ESAs) means

- A term often used loosely to mean a site or area that has environmental attributes worthy of retention or special care. ESAs are important in the management of all landscapes and require tight definition to be defensible.
- An environmentally sensitive area is any parcel of land, large or small, under public or private control, that already has, or with remedial action could achieve, desirable environmental attributes. These attributes contribute to the retention and/or creation of wildlife habitat, soils stability, water retention or recharge, vegetative cover and similar vital ecological functions. Areas requiring special management attention to protect scenic values, fish and wildlife resources, historical and cultural values, and other natural systems or processes.

estuary: the embayed mouth of a river where the tide meets the river flow (locally, the term also connotes the lowermost, tidal reach of a river).

flood construction level or flood level: a designated flood level plus freeboard, or where a designated flood level cannot be determined, a specified height above a natural boundary, natural ground elevation, or any obstruction that could cause ponding.

floodplain: an area, which is susceptible to flooding from a watercourse, lake, or other body of water and that, which is designated in Section 2 of this bylaw.

floodplain setback: the required minimum distance from the natural boundary of a watercourse, lake, or other body of water to any landfill or structural support required to elevate a floor system or pad above the flood construction level, so as to maintain a floodway and allow for potential land erosion.

forest land reserve (FLR): land designated under the ***Forest Land Reserve Act***. This land includes private land within a tree farm licence and private land classed as managed forest land under the assessment act, as well as designated Crown land in the provincial forest. Removal of land from the reserve is restricted, as is use and subdivision of the land. The purpose of the reserve is to maintain the commercial working forest of British Columbia.

fragmentation: a process whereby large contiguous forest patches are transformed into one or more small patches surrounded by disturbed areas. Fragmentation occurs naturally by fire, disease, wind and insect attack. It also occurs in managed forests, influenced by the rate of cut, cut-block size, cut-block distribution and silvicultural systems used to re-forest. Fragmentation due to forest harvesting should be viewed and managed to mimic fragmentation resulting from natural disturbances.

freeboard: a vertical distance added to a designated flood level, used to establish a flood construction level.

freshet: a sudden and rapid rise in the level of a stream or river due to heavy rains or rapid snowmelt.

g.s.c.: Geodetic Survey of Canada Datum.

geomorphological processes: dynamic actions or events that occur at the earth's surface due to application of natural forces resulting from gravity, temperature changes, freezing and thawing, chemical reactions, seismic shaking and the agencies of wind and moving water, ice and snow.

greenway: a system of protected linear corridors of open space, managed for conservation and recreation purposes.

groin: a breakwater structure that extends seaward at a right angle to the shoreline, in order to alter or inhibit the drift of sediments along the shoreline.

habitable area: any space or room, including a manufactured home, that is or can be used for dwelling purposes, business, or the storage of goods which are susceptible to damage by floodwater.

habitat: the place where an organism lives, and/or the conditions of that environment, including the soil, vegetation, water and food. Habitat for various organisms may be classified in terms of its quality or importance and mapped to assist in land use allocation and management decisions.

habitat area: those parts of the environment (aquatic, terrestrial, atmospheric) often typified by a dominant plant form or physical characteristic, on which an organism depends, directly or indirectly, in order to carry out its life processes.

habitat management: management of the forest to create environments, which provide habitats that meet the needs of particular organisms.

healthy ecosystem: an ecosystem in which structure and function allows for the maintenance of ecosystem integrity.

hydrological features: water-related features visible at the land surface, such as stream channels, seepage zones, springs, and soil moisture, including soil moisture characteristics as deduced from vegetation characteristics.

hydrological regime: the pattern of occurrence in time of water at or near the surface of the earth; e.g., temporal changes in streamflow, soil moisture, groundwater levels, precipitation.

large organic debris (LOD) or (LWD): entire trees or large pieces of trees that provide channel stability or create fish habitat diversity in a stream channel.

littoral zone: strictly speaking, the intertidal zone; customarily, the zone between the upper limit of wave action (the back of the storm beach or cliff base), and the seaward limit of frequent wave action on the seabed (approximately the 10 m depth contour).

marine sensitive zone (MSZ): area of the sea or seabed supporting an easily disturbed ecosystem; includes herring spawning areas, shellfish beds, marsh areas, juvenile salmonid rearing areas, and adult salmon holding areas.

natural boundary: the visible high watermark of any lake, river, stream, or other body of water where the presence and action of the water are so common and usual and so long continued in all ordinary years as to mark upon the soil of the bed of the lake, river, stream, or other body of water a character distinct from that of the banks thereof, in respect to vegetation, as well as in respect to the nature of the soil itself, as defined in Section 1 of the Land Act, and also includes the edge of dormant side channels of any lake, river, stream, or other body of water.

natural disturbance: an event that causes a change in the composition or structure of the ecosystem with minimal influence from human activity.

natural ground elevation: means the undisturbed ground elevation prior to site preparation;

non-point source pollution: a source of atmospheric, aquatic, or terrestrial pollution in which naturally occurring or human-induced pollutants are discharged over a wide-spread area or from a number of small inputs, rather than from one distinct identifiable source (point source).

old growth attributes: structural attributes and other characteristics of old growth forests, which may include: large trees for the species and site; wide variation in tree sizes and spacing; accumulations of large dead standing and fallen trees; multiple canopy layers; canopy gaps and understory patchiness; elements of decay such as broken or deformed tops or trunks and root decay; and the presence of species characteristic of old growth.

old growth: forest that contains live and dead trees of various sizes, species, composition and age classes. Old growth forests, as part of a slowly changing but dynamic ecosystem, include climax forests but not sub-climax or mid-seral forests. The age and structure of old growth varies significantly by forest type and from one biogeoclimatic zone to another.

pad: a paved surface on which blocks, posts, runners or strip footings are placed for the purpose of supporting a manufactured home, or a concrete pad for supporting a habitable area.

patch: a spatially distinct instance of a particular habitat.

plant community: an abstract unit based on sample plots of climax vegetation that possesses similar vegetation structure and native species composition and occurs repeatedly in similar habitats (**Interagency Planning Team**).

polygon: a series of points that are joined to form an unbroken line delineating the perimeter of an area (e.g., ecosystem) on a map. A polygon is used to graphically represent and sort the features of an area by various attributes and represents a unique site in the SEI inventory.

population: a group of individuals of the same species that inhabit an area in which they can interact and potentially breed with one another.

protected area: existing areas such as provincial parks, federal parks, wilderness areas, ecological reserves, and recreation areas that have protected designations according to federal and provincial statutes. Protected areas are land and freshwater to marine areas set aside to protect the province's diverse natural and cultural heritage (**Protected Areas Strategy**).

rare ecosystem: an ecosystem (either site series - sites capable of producing the same late seral or climax plant communities within a biogeoclimatic zone or variant, or surrogate - to elect as substitute) that makes up less than 2% of a landscape unit and is not common in adjacent landscape units.

recharge: the addition of water to an aquifer that occurs naturally from infiltration of rainfall and from water flowing over earth materials that allow water to infiltrate below the land surface.

red-listed species: the taxa on the red list are either extirpated, endangered or threatened, or are being considered for such status. Any indigenous taxon (species or subspecies) threatened with imminent extinction or extirpation throughout all or a significant portion of its range in BC is endangered. THREATENED taxa are those indigenous species or subspecies that are likely to become endangered in BC if factors are not reversed. (from: ***Draft Managing Identified Wildlife Guidebook,* February 1996**)

regionally important species: species which are not red- or blue-listed, that require management practices that differ from standard integrated resource management guidelines in order to differ from standard integrated resource management guidelines in order to fulfill critical habitat needs; or locally or regionally threatened or declining species or those that may reasonably be expected to decline without protection of critical habitats.

reserves: areas established to protect ecosystem integrity or various forest resources. These areas are normally excluded from development.

riparian: ". . . those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables, and soils that exhibit some wetness characteristics." (**Dunster and Dunster**).

riparian habitat: a distinct wildlife habitat zone located in riparian areas (land adjacent to the banks of rivers, streams, lakes and wetlands). Riparian areas are dominated by continuous high moisture content and influenced by adjacent upland vegetation. they incorporate ecosystems that are biologically diverse, frequently containing the highest number of plant and animal species found in a forest. Riparian areas provide critical habitats, home ranges and travel corridors for wildlife and serve to maintain ecological linkages throughout the forest landscape by connecting hillsides to streams and upper-elevation stream headwater areas to valley bottoms (from: ***Riparian Management Area Guidebook*, December 1995**).

run-off: the part of precipitation and snowmelt that reaches streams and rivers by flowing over or through the ground. Surface runoff flows away without penetrating the soils. Groundwater runoff enters streams by seeping through soils.

salmonid: refers to all species of trout char and salmon, and includes; five species of Pacific salmon (Chum, Chinook, Sockeye, Pink, Coho), Rainbow and Cutthroat trout, Lake trout, Brook trout and Dolly Varden.

sedimentation: the process of deposition of matter carried in water; usually the result of the reduction of water velocity below the point at which it can transport the material.

sensi*tive ecosystem*: those remaining natural terrestrial ecosystems which are considered fragile and/or rare in the SEI study area, and other modified or non-natural sites functioning as important wildlife habitats, as buffers between developed lands and more fragile ecosystems, and as reservoirs for biodiversity in otherwise highly developed and urbanized landscapes. All are increasingly threatened by development.

siltation: deposition of silt (mud or fine soil) causing build-up of material.

species at risk:

- any wildlife species that in the opinion of the deputy minister of MELP or a person authorized by that deputy minister is threatened, endangered, sensitive or vulnerable,
- any threatened and endangered plants or plant communities identified by the deputy minister of MELP or a person authorized by that deputy minister, as requiring protection, and
- regionally important wildlife as determined by the deputy minister of MELP or a person authorized by that deputy minister (***Forest Practices Code***).

stand: a community of trees sufficiently uniform in species composition, age, arrangement, and condition to be distinguishable as a group from the forest or other growth on the adjoining area, and thus forming a silviculture or management entity.

standard dyke: a dyke built to a minimum crest elevation equal to the flood construction level and meeting standards of design and construction approved by the Ministry of Environment, Lands and Parks and maintained by an ongoing authority, such as a local government body.

stream under the FPA: includes a permanent, or non-permanent watercourse or source of water supply, whether usually containing water or not, a pond, lake, river, creek, brook, or ditch and provides fish habitat, and a spring or wetland that is integral to a “stream” and provides fish habitat.

stream under Section 9 of the Water Act: includes a natural watercourse or source of water, whether usually containing water or not, ground water, and a lake, river, creek, spring, ravine swamp and gulch

subtidal zone: the area between the low tide line and the outer limit of the littoral zone.

terms of reference: a written description of the purpose, scope, roles, responsibilities, timing, methods, products, budget, structures, etc., of a particular land use planning process. The planning process ground rules and a specific work plan might be incorporated into a process terms of reference.

terrain: (i) a comprehensive term to describe a tract of landscape being studied with respect to its natural features;

(ii) pertains to maps showing surficial materials, material texture, surface expression, present day geomorphological (geological) processes, and related features.

threatened or endangered species: indigenous species that are either threatened or endangered, and identified as 'red-listed' by the Ministry of Environment, Lands and Parks. (from: ***Biodiversity Guidebook*, September 1995**).

top of bank: a) the point closest to the boundary of the active floodplain of a stream where a break in the slope of the land occurs such that the grade beyond the break is flatter than 3;1 at any point for a minimum distance of 15 metres measured perpendicularly from the break, as confirmed by a qualified advisor (***Streamside Protection Regulation***), and

b) for a floodplain area, the edge of the active floodplain where the slope of the land beyond the edge is flatter than 3;1 at any point for a minimum distance of 15 metres, measured perpendicularly from the edge, as confirmed by a qualified advisor (***Streamside Protection Regulation***).

topography: the general configuration of the land surface, including relief and position of natural and man-made features (**Interagency Planning Team**).

understory: any plants growing under the canopy formed by others, particularly herbaceous and shrub vegetation under a tree canopy.

viable population: a self-sustaining population with a high probability of survival despite the foreseeable effects of demographic, environmental and genetic variability and of natural catastrophes.

vulnerable species: species that are not threatened or endangered by are sensitive and particularly at risk, and identified as 'blue-listed' by the Ministry of Environment, Lands and Parks. (from: ***Draft Wildlife Habitat Areas Field Guide*, October 1994**)

watercourse (Water Act): any natural or man-made depression with well-defined banks and a bed 0.6 metres or more below the surrounding land serving to give direction to a current of water at least six (6) months of the year or having a drainage area of 2 square kilometres or more upstream of the point of consideration.

watershed: an area generally defined by heights of land that collect and discharge water into a single main stream through a series of small tributaries. A watershed may be defined as a major system or as a smaller tributary.

wetland: means land that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support vegetation typically adapted for life in saturated soil conditions. This includes swamps, marshes, bogs, fens, estuaries and similar areas, that are not part of the active floodplain of a stream.

wildlife management area (WMA): areas of critical wildlife habitat or rare ecosystems that are administered by the Ministry of Environment, Lands and Parks. WMAs are not equivalent to wildlife habitat areas (**Interagency Planning Team**).

wildlife tree: a standing live or dead tree with special characteristics that provide valuable habitat for the conservation or enhancement of wildlife. Characteristics include large diameter and height for the site, current use by wildlife, declining or dead condition, value as a species, valuable location, and relative scarcity.

wildlife: (a) a vertebrate that is a mammal, bird, reptile or amphibian prescribed as wildlife under the *Wildlife Act*, S.B.C. 1982, c.57

(b) a fish, or including (i) any vertebrate of the order petromyzoniformes (lampreys) or class osteichthyes (bony fishes), or (ii) any invertebrate of the class crustacea (crustaceans) or class mollusca (mollusks), from or in the non-tidal waters of the province, and

(c) an invertebrate or plant listed by the Minister of Environment, Lands and Parks as an endangered, a threatened or a vulnerable species, and includes the eggs and juvenile stages of these vertebrates, invertebrates and plants. (from: ***Wildlife Act***).