

NATURE

Without Borders

Second Edition, 2013



Comox Valley Conservation Strategy

Produced in Collaboration with the CVCS Community Partnership
by Lynda Fyfe, Juniper Environmental Services

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Executive Summary

The way that we plan, develop and govern the communities and watersheds of the Comox Valley will have long-term impacts on the sustainability and health of the region. Continuing habitat loss and fragmentation in the Comox Valley reflects a world-wide trend of biodiversity loss that is a great cause for concern. Nature Without Borders 2nd Edition addresses this alarming trend of disappearing sensitive natural areas by calling for a regional and proactive approach to biodiversity protection and proposes a set of recommended actions for local governments.

The primary goals of the Comox Valley Conservation Strategy Community Partnership (CVCSCP) are: to stop the loss of sensitive natural areas, protect and restore biodiversity and natural system processes, preserve healthy water resources and preserve access to nature and trails. To achieve these goals, the guiding principles of precaution, connectivity, and conservation of ecosystem services, must be integrated into all levels of land use planning. Measurable and sustainable steps and actions will need to be taken toward meeting the following objectives:

1. Create Effective Regional Structures for Conservation
2. Conserve and Protect Remaining Sensitive Ecosystems
3. Restore Degraded Sensitive Ecosystems
4. Maintain Natural System Function
5. Maintain and Improve Landscape Connectivity
6. Maintain and Restore Riparian Areas
7. Conserve and Protect Estuaries and Foreshore Areas
8. Conserve Healthy Water Resources
9. Develop and Maintain a Regional Recreational Trail Network

The CVCSCP identifies, maps, and describes the following priority ecological areas for protection and restoration: aquatic and upland habitat corridors, sensitive ecosystems, and water resources including estuaries. To assist our conservation partners, tools are identified and described including a conservation database, a regional conservation priorities atlas and map, a property evaluation tool, and a framework for environmental status monitoring and reporting. Preliminary targets and indicators are identified to monitor the outcome of land use activities.

The CVCSCP believes that opportunities for conservation will increase when a regional conservation vision is shared by all local governments and community organizations, and an appropriate and effective regional administrative conservation structure(s) is established. However, significant challenges to conservation remain including:

- gaps in environmental information and outdated inventory data;
- gaps in water course, aquifer, and water use mapping;
- lack of information on unique local ecosystems and plant communities;

- lack of data on critical habitats for species at risk;
- loss of First Nations traditional ecological knowledge;
- lack of consistency in conservation terms and definitions between governments;
- location of many sensitive natural areas on private lands;
- and the need for inter-agency cooperation and a regional administrative structure.

The CVCSCP believes that the challenges that remain for conservation in the Comox Valley can be overcome and will bring new opportunities for collaboration and proactive planning. With a stronger commitment to conservation and collaborative partnerships between local governments and community organizations, creative approaches to conservation are both possible and necessary.

1 Introduction

The current pace of biodiversity loss on our planet is a serious threat to human survival. We are experiencing the largest extinction event since the disappearance of the dinosaurs 65 million years ago. Human activities, resulting in habitat

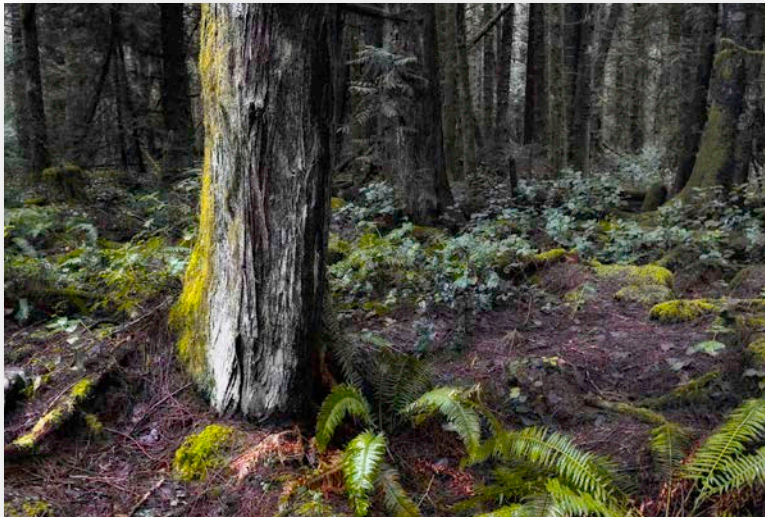


Photo by Tony Gusman

destruction, the introduction of invasive species, and carbon emissions affecting climate change, are the major contributors to this crisis. Biodiversity is foundational to food security, health and culture: it is key to maintaining our life support systems on the planet. The way that we plan, develop and govern the interconnected communities that make up the Comox Valley is determining now, and for the future, the long-term health, sustainability and ecological integrity of our region.

1.1 Purpose of this Report

This report is an attempt to address the continuing loss and fragmentation of sensitive natural areas in the Comox Valley by updating and revising the information, data and maps contained in the 2008 “Nature Without Borders: the Comox Valley Land Trust Regional Conservation Strategy, Phase I - Final Report” (NWB First Edition).

This updated version of Nature without Borders is intended to:

- build environmental understanding and support for regional conservation planning
- clarify CVCS guiding principles, vision, goals and objectives
- provide updated descriptions of, and information about, priority conservation areas
- describe strategy implementation tools and actions

- assess current opportunities and challenges for conservation
- promote a regional approach that incorporates other regional plans including the Comox Valley Regional Growth Strategy (RGS), the Comox Valley Sustainability Strategy (CVSS), the Regional Water Supply Strategy (RWSS), and the Courtenay River (K'omoks) Estuary Management Plan (CREMP)
- provide text and maps that are relevant, inspiring and that encourage positive action
- assist project partners and all local governments to move toward a new way of decision-making in which natural ecosystem processes and biophysical limitations are carefully considered at all levels of decision making.¹

Within the Comox Valley Conservation Strategy project area (shown on Map 1), measures of recent habitat destruction reflect the world-wide trend in biodiversity loss, and are of growing concern to many agencies and individuals. In the early 1990's, a *Sensitive Ecosystem Inventory* (SEI) was conducted by the BC government on eastern Vancouver Island and the adjacent Gulf Islands. Sensitive

Ecosystems are rare and/or fragile remnants of the variety of ecosystems that were once abundant on the East Coast of Vancouver Island. Some of these remnant ecosystems now have global significance for biodiversity and provide year-round or seasonal refuge to an increasing number of rare and threatened species. In 2002, the original SEI mapping was re-



Photo by Tony Gusman

¹ Brandes, O., Ferguson, K. M'Gonigle, M. and Sandborn, C. (2005). *At a Watershed: Ecological Governance and Sustainable Water Management in Canada*. Prepared by the POLIS Project on Ecological Governance.

evaluated to determine the level of disturbance to *sensitive ecosystems* over that decade.

The SEI showed that between 1991 and 2002:

- 42 percent of the Comox Valley's identified rare and threatened sensitive ecosystems (Older Forest, Coastal Bluff, *Wetland*, Riparian, Woodland, Sparsely Vegetated and Terrestrial Herbaceous *ecosystems*) were either lost, fragmented or reduced in size; and
- 97 percent of the identified Older Second Growth Forests and Seasonally Flooded Agricultural Fields in the Comox Valley were fragmented and reduced in size.²



Photo by Kerry Dawson

These dramatic losses and impacts to the nine ecosystem types identified by the SEI are detailed on Map 3. An explanation of the methods used to derive Sensitive Ecosystems Inventory data for the Comox Valley is provided in Appendix 9.1.

Within the East Vancouver Island and Gulf Island SEI study area (Figure 1), the province determined that by 2002, the seven rare and threatened sensitive

ecosystem types that were once abundant, then covered only 7.5 percent of the landscape. In other words, only 7.5 percent of the landscape remained “relatively unmodified” by human activities.³

² Data derived from Ward, P., G. Radcliffe, J. Kirkby, J. Illingworth and C. Cadrin. (1998) *Sensitive Ecosystems Inventory: East Vancouver Island and Gulf Islands, 1993-1997. Volume 1: Methodology, Ecological Descriptions and Results*. Technical Report Series No. 320, Canadian Wildlife Service, Pacific and Yukon Region, British Columbia.

³ Axy's Environmental Consulting Ltd. Revised June 2005. *Redigitizing of Sensitive Ecosystem Polygons to Exclude Disturbed Areas, Summary Report*. Canadian Wildlife Service.

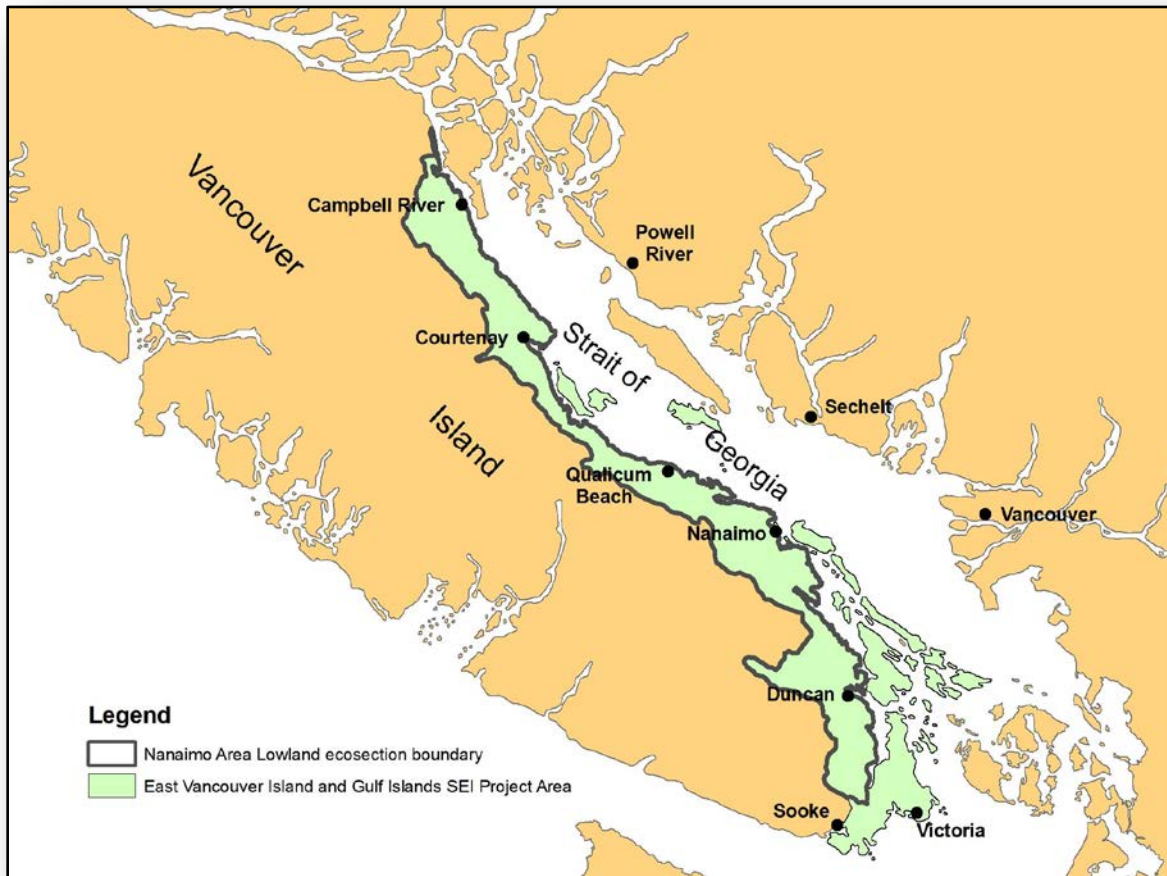


Figure 1: Area in pale green shows the East Vancouver Island and Gulf Island Sensitive Ecosystems Inventory Study Area.⁴

The Comox Valley Conservation Strategy (CVCS) is a *regional conservation planning* framework, initiated to stop the cumulative and alarming loss of sensitive natural areas in the Comox Valley. It is a landscape-scale, proactive approach to biodiversity protection that requires regional cooperation and community support. The CVCS presents an alternative to the ongoing fragmentation of land and the damage to *natural systems* that results. The framework can assist land use planning and growth management by identifying lands for protection before they are allocated for development. It

⁴ Image modified from source: Ward P., et. al. (1998).

“From time immemorial, nature has fed us, cured us, and protected us. But today the roles have switched. We need to feed nature, we need to cure it and protect it if we want to secure a healthy and prosperous future for our children.”⁶

represents the hope for conservation certainty in the face of dramatic growth-related change.⁵

The Comox Valley Conservation Strategy Community Partnership (the Community Partnership) believes that human caused extinctions can be halted, natural ecosystem function sustained and biodiversity restored – but that this challenge demands us to rekindle our relationship with nature. We must incorporate understanding of the environment into all our decisions and actions.

1.2 Background

The CVCS was developed by the Comox Valley Land Trust (CV Land Trust) based on environmental research and information from the 2008 NWB First Edition report. The CVCS represents a significant step toward fulfilling two key recommendations made to local governments by the province following the SEI:

1. develop a local ecosystem plan; and
2. develop a conservation strategy with tools for protecting sensitive ecosystems on private lands.⁷

The CVCS identifies a regional *natural areas network* that can be expanded and improved upon with additional time and resources; it promotes ecosystem connectivity by proposing protected areas linked by regional-scale aquatic and terrestrial corridors; it offers updated conservation tools in report, map and database format; and its partners include experts in environmental inventory, mapping and policy development.

Between June and July 2008, the Comox Valley’s four local governments unanimously endorsed the goal of protecting a network of natural areas through regional conservation planning when they passed the following motion: “THAT the [local government] endorses regional conservation planning,

⁵ McDonald (King), L.A., Allen, W. L., Benedict, Dr. M. A., and Keith O’Conner. Journal of Conservation Planning Vol 1(2005) 6-25 *Green Infrastructure Plan Evaluation Frameworks*.

⁶ International Union for Conservation of Nature. *Why is Biodiversity in Crisis?* <http://www.iucn.org/iyb/about/biodiversity/>. Page last updated: July 8, 2011. Hit: September 25 2012.

⁷ McPhee, M., P. Ward, J. Kirkby, L. Wolfe, N. Page, K. Dunster, N.K. Dawe and I. Nykwist. (2000) *Sensitive Ecosystems Inventory: East Vancouver Island and Gulf Islands, 1993-1997. Volume 2: Conservation Manual*. Technical Report Series No. 345, Canadian Wildlife Service, Pacific and Yukon Region, British Columbia.

as defined by ‘Nature Without Borders: The Comox Valley Land Trust Regional Conservation Strategy’, as a first step in land use and regional growth management planning.”⁸

Most of the priority conservation areas in the Comox Valley are on unprotected private lands and some are governed by multiple jurisdictions. On completion of the NWB First Edition, the CV Land Trust determined that the scope of work required to promote and implement a regional conservation strategy required the coordinated effort of community organizations, governments, First Nations, businesses, landowners and local citizens. The Community Partnership was created in 2008 to embody this coordinated approach. This updated version of Nature Without Borders is strengthened by the broad consensus of the Community Partnership, which has grown to include twenty local organizations in 2012.

In working to implement the CVCS, the Community Partnership works with government agencies, community groups, conservancies, landowners and the public to:

1. promote regional, multi-agency partnerships and organizational structures to facilitate long-term conservation, protection and restoration of priority conservation areas
2. improve environmental understanding, improve and share data, identify and meet conservation targets, and develop and maintain conservation planning tools
3. implement conservation measures, trail inventories, and land stewardship initiatives on and adjacent to priority *recreational greenway trails*
4. build on conservation plans and priorities identified by the larger community
5. assist in identifying and responding to conservation opportunities and challenges
6. encourage and support voluntary land protection efforts, such as conservation covenants and backyard stewardship agreements

REGIONAL CONSERVATION PLANNING

Regional conservation planning identifies a network of critical natural areas and implements measures to protect and restore those areas. Results are regularly assessed to ensure that the conservation goals of ecosystem representation, landscape connectivity, groundwater protection, and habitat and species protection are being met. This approach considers long-term changes to climate and infrastructure. Regional conservation planning assists compatible, managed growth by identifying lands that are unsuitable for infrastructure and development; it is a critical first step in growth management planning.⁹

⁸ This motion was passed by Courtenay, Comox and Cumberland municipal governments during Council meeting proceedings in June 2008 and by the CVRD at their monthly board meeting in July 2008.

⁹ The Stewardship Series. *Green Bylaws Toolkit for Conserving Sensitive Ecosystems and Green Infrastructure* (March 2008). Prepared by Environmental Law Clinic, University of Victoria Faculty of Law, and Deborah Curran & Company.

7. promote land use that is compatible with regional conservation goals.



Oregon Grape

Photo by Kerry Dawson

A key achievement of the Community Partnership is the inclusion of the following specific objectives in the Comox Valley Regional Growth Strategy (RGS): (1) identify and map areas for conservation; (2) use the principles of precaution, *connectivity* and restoration; (3) promote environmental best practices in Agricultural Resource Areas; and (4) ensure access to parks and recreation areas.¹⁰ The RGS provides a Regional Conservation Framework

Concept, with Conservation Areas including: estuaries, *riparian areas*, sensitive ecosystems, *other important ecosystems* (seasonally flooded agricultural fields and second growth forests), critical *watersheds*, *biodiversity corridors*, and existing and proposed parks and greenways. RGS policies, if implemented consistently by local governments, have the potential to result in concrete actions to build the regional conservation network.

Another achievement of the Community Partnership is the inclusion of important elements of Nature Without Borders into the Comox Valley Regional District (CVRD) parks and greenways strategic plan. For example, the CVRD has created 'Conservation Areas' as a new park classification, allowing them to restrict access and infrastructure for the protection of sensitive ecosystems. The plan identifies as its number one goal to: "protect and connect ecosystems over time."¹¹ Importantly, the CVRD states its intention to support the targets for conservation and restoration of ecosystems that

¹⁰ Comox Valley Regional District (adopted March 29, 2011). *Comox Valley Regional Growth Strategy Bylaw No. 120, 2010*. Prepared by Urban Strategies Inc., Ecoplan International Inc. and Ear to the Ground Planning. pp 33-38.

¹¹ Comox Valley Regional District (January 2011). *A Natural Selection: Rural Comox Valley Parks and Greenways Strategic Plan 2011-2030* (Final draft), pp 22.

were identified in the Comox Valley Sustainability Strategy including: conserving currently unprotected sensitive ecosystems; ensuring widespread access to recreational parks, greenways and large conservation areas or natural parks; and ensuring quick access to trails and cycling paths. The parks and greenways plan documents significant public support for protection of sensitive ecosystems and other natural areas, and recognizes the need for a regional governance structure for ecosystem protection.¹²

1.3 Report Format

Words shown in italics throughout the text are terms that are defined in the glossary (Appendix 2). Section 2 of the report describes the guiding principles of the CVCS. Section 3 describes the Community Partnership's vision, goals and objectives. In Section 4, the priority conservation areas are described, with updated information. Tools for implementing the CVCS are outlined in Section 5, while Section 6 gives an updated list of recommendations and actions for local governments. Section 7 addresses current challenges and opportunities for conservation. Section 8 contains thumbnails and internet links to a series of maps designed to describe the plan and provide useful background information to assist with implementation. The maps are too large to reproduce fully in this report but are described in brief below.

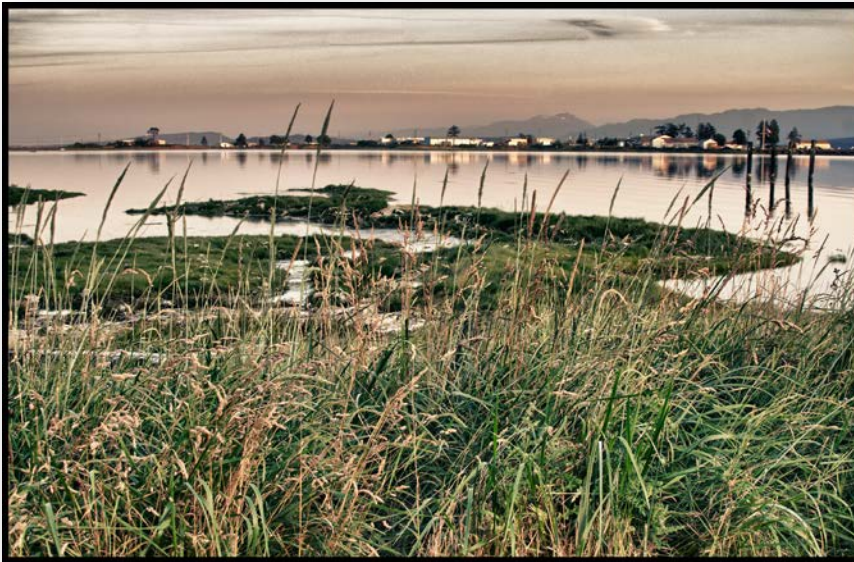
Map 1 displays the CVCS project area boundary - defined by Deep Bay in the south and Oyster River in the north. To the west, the project area boundary follows the height of land in the Vancouver Island and Beaufort ranges. To the east, it follows the coastline, including intertidal and estuarine waters. The project area excludes Denman and Hornby Islands as these lie within a separate regional conservation planning area overseen by the Islands Trust.¹³

The provincial government has developed systems of ecosystem classification, as a way to better understand and display BC's great number of habitat types. Map 2 describes the four Biogeoclimatic (BGC) zones of the Comox Valley Conservation Strategy project area: Coastal Western Hemlock, Coastal Douglas Fir, Mountain Hemlock and Coastal Mountain

¹² Ibid.

¹³ Islands Trust Fund. *Islands Trust Regional Conservation Plan 2011-2015*.

Alpine. These units contain ecosystems with similar climate, soils and vegetation. The BGC zones facilitate broad scale biodiversity planning.¹⁴



Comox Bay

Photo by Kerry Dawson

Map 2 also shows the Comox Valley's two ecosections: the Nanaimo Area Lowland (the coastal plain along the east coast), and the Leeward Island Mountains (the lands that extend from the edge of this coastal plain to the height of land in the Vancouver Island and Beaufort Mountain ranges). Ecosections are areas considered to have minor variations in climate, physiography,

oceanography, hydrology, vegetation and wildlife potential; but they are best understood within the context of the Biogeoclimatic Zone classification.¹⁵ The ecosections of the Comox Valley are especially significant to this project because the province's SEI has mapped sensitive ecosystems in the Nanaimo Area Lowland, but not in the Leeward Island Mountains. The SEI provides us with a level of understanding about the impacts of human development on sensitive ecosystems in the Nanaimo Area Lowland. Although the lands within the Leeward Island Mountain ecosection have also been impacted by human use; there is no publicly available ecosystems information currently available in this area.

Map 3 summarizes sensitive ecosystem disturbance information from the province's SEI.

Map 4 displays the protected lands of the Comox Valley. This map illustrates that the amount of protected land in the

¹⁴ British Columbia Ministry of Environment. *Ecoregions of British Columbia Home*. <http://www.env.gov.bc.ca/ecology/ecoregions/>

¹⁵ Ibid.

Nanaimo Area Lowland portion of the CVCS project area is very small. The Province identifies the Nanaimo Area Lowland ecosection as a rare and special region of Canada. With its mild climate, extended growing season and variety of ecosystem types, it supports many rare species of plants and animals, and plant communities. It is also one of two areas in British Columbia where the greatest loss of natural systems is occurring, due to extreme development pressures.¹⁶

Map 5 and 6 display the CVCS Priority Ecological Areas for conservation including Lands and Water Resources.

Map 7 displays the CVCS Priority Recreational Greenway Trails for conservation.

¹⁶ British Columbia Ministry of Environment, Ecosystems Branch, Sensitive Ecosystems Inventories, *East Vancouver Island & Gulf Islands*.
http://www.env.gov.bc.ca/sei/van_gulf/index.html

2 Guiding Principles

The Community Partnership has identified three guiding principles that underlie our conservation work: precaution, connectivity and conservation of ecosystem services. These essential principles must be placed at the forefront and integrated throughout all levels of the land use decision-making process in order to achieve sustainability and protect biodiversity in the Comox Valley. In 2010 these three principles were incorporated into the objectives of the RGS Bylaw for natural areas and water source protection.¹⁷

2.1 Precaution

Underpinning the *precautionary principle* is a humble respect for the complexities of interacting ecosystems. These complexities, operating in time and space, are far greater than our limited scientific understanding can ever grasp; therefore,



Courtenay Air Park Walkway

Photo by Kerry Dawson

the full ecological effects of human activities on ecosystems can never be accurately predicted. Synergistic effects of different events may produce sudden, catastrophic results when unknown thresholds are crossed.¹⁸ The precautionary principle is a response to this uncertainty in the face of risks to the environment and human health. It is a more effective tool for guiding decisions that relate to the highly unpredictable and changeable systems of nature than the conventional tools of risk

assessment and cost-benefit analysis – although these tools can be complementary for implementing the principle. It is a way for the public and decision makers to put the burden of proof on the proponent of a potentially damaging activity to show

¹⁷ Comox Valley Regional District (adopted March 29, 2011). *Comox Valley Regional Growth Strategy Bylaw No. 120, 2010*, pp.33-37 and 54.

¹⁸ Brandes, O., Ferguson, K. M'Gonigle, M. and Sandborn, C. (2005).

with certainty that their activity will not cause unacceptable harm and will encourage the design of innovative alternatives.

There is agreement amongst the international community that it is better to prevent harm from happening in the first place than to try to remediate and compensate after damage is done.

In 1992, Canada signed the Rio Declaration and thereafter became bound to broadly apply the *Precautionary Principle* as stated in Agenda 21:

“Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”¹⁹

Across the country, the precautionary principle is being utilized at the municipal government level in pesticide management regulations - both the City of Courtenay²⁰ and Town of Comox²¹ refer to the principle in their pesticide bylaws. The RGS directs local governments to embody the precautionary principle in their approaches to environmental, natural resource and water source protection.²²

The precautionary principle is triggered when two factors are in place: threat of harm and scientific uncertainty (if cause and effect are well established, the action taken is considered to be preventative, not precautionary). Decision-makers will know to implement the principle by asking a series of questions to the proponent of an action:

- what is the full range of anticipated impacts of the proposed action (direct and indirect, magnitude, spatial, temporal, reversibility)?
- what are the known and unknown variables involved with these anticipated impacts?

¹⁹ United Nations Environment Programme (UNEP). *Rio Declaration on Environment and Development*. (United Nations Environment Programme), <http://www.unep.org/Documents.multilingual/Default.asp?DocumentID=78&ArticleID=1163> Accessed: May 2011.

²⁰ City of Courtenay. Pesticide Use Bylaw No. 2504. *A Bylaw to regulate the non-essential use of pesticides within the City of Courtenay*.

²¹ Town of Comox, Pesticide Use Bylaw No. 1527. *A Bylaw to regulate the non-essential use of pesticides within the Town of Comox*.

²² Comox Valley Regional District (adopted March 29, 2011). *Comox Valley Regional Growth Strategy Bylaw No. 120, 2010*.

If threat of harm and scientific uncertainty are established, then it is incumbent upon the proponent of an action to re-think their rationale and propose and assess safer alternatives. In the example of a development application to local government, after the required background information has been gathered, a level of precaution must be prescribed. It is the job of decision-makers to decide whether the impacts and

uncertainties are significant enough to delay or deny the application. For any proposed project the no-action alternative must be considered.



Northeast Woods

Photo by Kerry Dawson

Involvement of environmental and citizen scientists is critically important in this process as decision-makers may not have the understanding of cumulative and long-term impacts of certain activities, nor the parameters of uncertainty that are acceptable by the scientific community.²³ A process to engage stakeholders is key; however, ultimately the decision about whether to

require further scientific information, alternatives or modifications, or whether to halt the application, is a political one.

Whatever mode of action is approved, a mitigation plan must be required; and it must be acted on in a situation where a potential harm is realized. Critical for this process to be effective is the requirement for the applicant to hire an independent body to monitor and report on their activities and the requirement to post a bond up front, so that financial liability is clearly established if damage occurs.²⁴

2.2 Connectivity

²³ A description of categories of uncertainties can be found in Tickner, Joel, Carolyn Raffensperger and Nancy Myers. 1998. *The Precautionary Principle in Action: A Handbook*. First Edition. Science and Environmental Health Network (SEHN).

²⁴ Tickner, Joel, Carolyn Raffensperger and Nancy Myers. 1998. *The Precautionary Principle in Action: A Handbook*. First Edition. Science and Environmental Health Network (SEHN).

Since the mid-1980s, scientists have understood the necessity of ensuring connections between ecosystems in order to sustain populations and species.²⁵ Connectivity maintains the resilience of nature, increasing its ability to adapt to and recover from human and natural disturbances, including climate change.^{26,27} Unless functional linkages between natural areas in the landscape are made and maintained, sensitive ecosystems and other natural areas that serve as *habitat refuges* and *habitat reservoirs* become compromised over time, resulting in loss of biodiversity.

The science and practice of linking natural areas on the landscape is called connectivity conservation. Connectivity conservation is a long-term planning approach that involves the protection and rehabilitation of natural connections between important habitats and sensitive ecosystems, allowing for the movement of species and genetic material. The following basic principles underlie connectivity conservation:

1. Large habitat areas are better than small areas
2. Habitat areas closer together are better than areas far apart (i.e. connected habitats are better than disconnected habitats)
3. Areas with low fragmentation are better than areas with high fragmentation²⁸

Connectivity conservation proposes that functional linkages, called biodiversity corridors, be established between protected areas to: “(1) conserve habitat for the movement of species and for the maintenance of viable populations (2) conserve and enhance ecosystem services, and (3) promote and enhance local

²⁵ Noss, Reed, F. and Harris, Larry, D. (1986) *Nodes, Networks and MUMs: Preserving Diversity at All Scales* in Environmental Management Vol. 10, No. 3, pp 299-309.

²⁶ Connectivity conservation as described by the Papallacta Declaration (Ecuador 2006) in International Union for Conservation of Nature (IUCN) (July 23 2007). *Connectivity Conservation: International Experience in Planning, Establishment and Management of Biodiversity Corridors* (Background Paper). http://cmsdata.iucn.org/downloads/070723_bci_international_report_final.pdf. Hit: September 25, 2012.

²⁷ World Health Organization (2010), WHO>Programmes and projects > Climate change and human health > Biodiversity. <http://www.who.int/globalchange/ecosystems/biodiversity/en/index.html>. Hit: June 1, 2010.

²⁸ Diamond, J.M. (1975). *Assembly of Species Communities*. In J.M., Diamond and M.L. Cody (Eds). *Ecology and Evolution of Communities* (342-444) President and Fellows of Harvard College and Forman, Richard, T.T. (1995) *Land Mosaics: the ecology of landscapes and regions*. Cambridge, UK: Cambridge University Press.

community welfare through the conservation and use of natural resources.”²⁹

Local governments have a responsibility to incorporate connectivity conservation into their policies and bylaws. For example, zoning bylaws can designate conservation zones with allowed and restricted uses that support connectivity. Figures 2 and 3 show examples of land use components that make up a natural areas network.

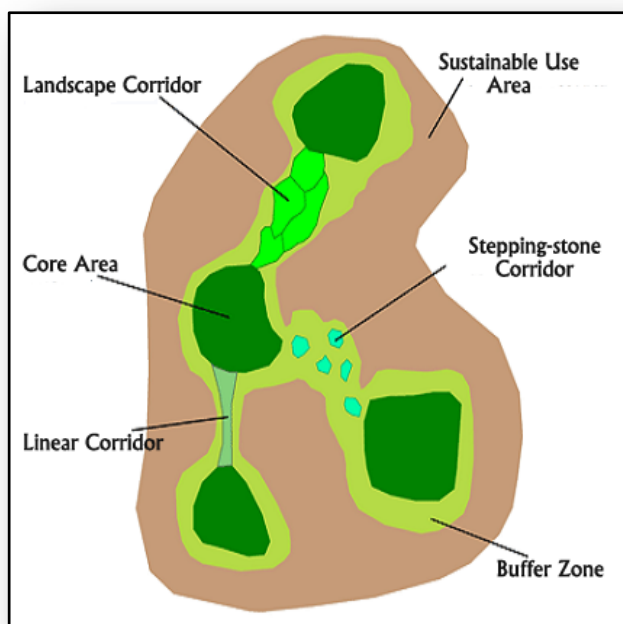


Figure 2: Components of a natural areas network: a mosaic of land uses that can support biodiversity maintenance.³⁰

²⁹ International Union for Conservation of Nature (IUCN) (July 23 2007). *Connectivity Conservation: International Experience in Planning, Establishment and Management of Biodiversity Corridors* (Background Paper).

³⁰ Image from the Biodiversity Conservation Corridor Initiative in International Union for Conservation of Nature (IUCN) (July 23 2007). *Connectivity Conservation: International Experience in Planning, Establishment and Management of Biodiversity Corridors* (Background Paper), pp 3.

| Conservation Zone | Land Use |
|------------------------------|--|
| <i>Core areas</i> | Parks, reserves and protected areas - such as sensitive ecosystems, critical habitats and large forested areas |
| <i>Buffer areas</i> | Zones of transition that protect core areas from adjacent uses |
| <i>Corridors</i> | Land and water corridors that link core areas; they can include intact and restored areas, and some areas under human use, such as forestry and agriculture. |
| <i>Sustainable Use areas</i> | Lands designated for human settlement and use – they can be established outside of corridors as well as within both buffer and corridor zones. |

Figure 3: Conservation zones for implementing a natural areas network.

In the Comox Valley, a site-by-site response will often be necessary to achieve connectivity in the context of a diversity of land uses, tenures, and regulatory scenarios. For any proposed development - especially larger developments, roads and other linear projects – an environmental assessment is needed to ensure that habitat connections, biodiversity and wildlife movement will not be compromised.³¹

2.3 Conservation of Ecosystem Services

Ecosystem goods and services are free benefits that humans and other life forms derive from healthy functioning ecosystems. Ecosystem goods and services include but are not limited to soil creation and stabilization, erosion and flood control, air and water purification, climate regulation, carbon sequestration, biodiversity and pollination of food crops. Many attempts have been made to apply a monetary value to these goods and services; however, they are extremely difficult to quantify. Regardless of the replacement



Photo by Kerry Dawson

³¹ McPhee M., P. Ward, J. Kirkby, L. Wolfe, N. Page, K. Dunster, N.K. Dawe, and I. Nykwist (2000). *Sensitive Ecosystems Inventory: East Vancouver Island and Gulf Island 1993–1997. Volume 2: Conservation Manual* Technical Report Series No. 345, Canadian Wildlife Service, Pacific and Yukon Region, B.C.

value assigned to them, ecosystem goods and services are indispensable: they are the foundation upon which all life depends.

The RGS recognizes the importance of natural area restoration to maintaining ecosystem services: “where cost effective, consider the restoration or creation of natural systems to provide sustainable environmental services (e.g. storm water ponds for improving water quality; tree cover for capturing carbon and reducing GHG emission).”³² Restoration is a necessary and important part of regional conservation planning; however, efforts to protect biodiversity before impacts occur are much cheaper and have a much greater probability of maintaining the flows of ecological goods and services on which human survival depends.³³

| ECOSYSTEM SERVICES | | |
|--|--|---|
| Provisioning <ul style="list-style-type: none"> - Food - Fresh water - Fuel - Wood and Fiber | Regulating <ul style="list-style-type: none"> - Climate regulation - Flood regulation - Disease regulation - Water purification | Cultural <ul style="list-style-type: none"> - Aesthetic - Spiritual - Educational - Recreational |
| Supporting <ul style="list-style-type: none"> - Nutrient cycling - Water cycling (the hydrologic cycle) - Soil formation - Primary production | | |

Figure 4: *Types of Ecosystem Services*³⁴

Biodiversity, the variety of life found on Earth, gives rise to the many ecosystem services that we depend on.³⁵ It is composed of three levels: ecosystem diversity, species diversity and genetic diversity.

³² Comox Valley Regional District (adopted March 29, 2011). *Comox Valley Regional Growth Strategy Bylaw No. 120, 2010*, pp 36.

³³ Sodhi, Navjot S. and Paul R. Ehrlich (editors). *Conservation Biology for All*. Oxford University Press (2010), pp 213.

³⁴ Source: World Health Organization (2010). WHO>Programmes and projects > Climate change and human health > Ecosystem good and services for health. <http://www.who.int/globalchange/ecosystems/en/> Accessed: June 1, 2010.

³⁵ Ibid.

3 Vision, Goals and Objectives

3.1 Vision

The CVCS envisions a regional natural areas network of healthy land and water ecosystems that are valued and conserved. The network protects natural system function, preserves biodiversity and enriches community life in the Comox Valley for both urban and rural residents. It includes conservation and wilderness preserves, nature parks and ecological



Photo by Kerry Dawson

greenways, riparian areas, foreshore and estuaries, sensitive land and water ecosystems, areas in process of restoration, and areas of sustainable human use, including farm and forest lands. The regional natural areas network connects ecosystems and habitats from coastline to alpine, allowing the widest range of native species to flourish and adapt to changes in land use and climate conditions. It is accessible to residents of the Comox Valley through a system of regional recreational trails.

3.2 Goals and Objectives

The CVCS vision will be realized when the following goals and objectives are met:

Goals:

- Stop the loss of sensitive natural areas
- Protect and restore biodiversity and natural system processes
- Preserve healthy water resources
- Preserve access to nature and trails

Objectives:

Achievement of our vision and goals will require the Community Partnership, together with local governments, landowners, community groups and other stakeholders to take measurable and attainable steps towards achieving the following objectives:

1. Create Effective Regional Structures for Conservation
2. Conserve and Protect Remaining Sensitive Ecosystems
3. Restore Degraded Sensitive Ecosystems
4. Maintain Natural System Function
5. Maintain and Improve Landscape Connectivity
6. Maintain and Restore Riparian Areas
7. Conserve and Protect Estuaries and Foreshore Areas
8. Conserve Healthy Water Resources
9. Develop and Maintain a Regional Recreational Trail Network

4 Priority Conservation Areas

Priority conservation areas are the fundamental building blocks that make up the CVCS natural areas network. They are comprised of (1) priority ecological areas including lands and water resources, and (2) recreational greenway trails that could form the foundation of a Valley-wide non-motorized recreation network.

4.1 Priority Ecological Areas

The CVCS Priority Ecological Areas (Lands and Water Resources) include biodiversity corridors, sensitive ecosystems, aquatic ecosystems and community drinking water sources, and are shown on Maps 5 and 6. The Community Partnership considers the conservation, protection and restoration of these areas to be the minimum necessary to implement a regional natural areas network. The Community Partnership strives to incorporate further information about these areas - using standardized inventory and mapping methods - as resources are available. Priority ecological areas include both high quality habitat that must be maintained, and degraded habitats that require restoration.



Comox Boardwalk

Photo by Kerry Dawson

4.1.1 Proposed Biodiversity Corridors

Aquatic Habitat Corridors

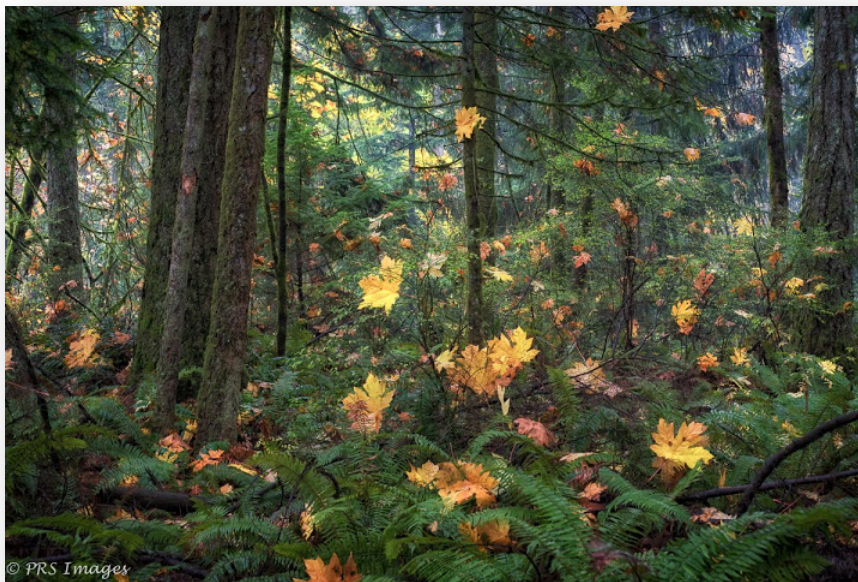
Proposed *Aquatic Habitat Corridors* incorporate minimum 30-metre buffers that protect aquatic and *riparian ecosystems*. Riparian ecosystems are the unique vegetated areas surrounding streams, lakes and wetlands. They are delineated

by site-specific vegetation, soil and elevation features. Their water sources may be permanent or ephemeral and they may or may not be connected to overland flows. Riparian ecosystems support high levels of biodiversity, they protect the health of adjacent aquatic areas, and they stabilize stream banks. They are critical refuges and natural corridors for wildlife. The 30-metre minimum buffer is measured from the *top of bank* (or the edge of the active flood plain; whichever is greater) of all streams, lakes and wetlands. In some cases - such as for community water sources or major rivers – this buffer may not be a sufficient minimum and may need to be offset from the edge of the 100 or 200 year floodplain.

Upland Habitat Corridors

Upland Habitat Corridors are broad terrestrial corridors that restore connectivity between isolated or fragmented sensitive

upland habitats such as forests, woodlands and wetlands, while including areas where compatible human activity can occur. They are mapped to recognize habitat refuges and reservoirs and the existing or potential connections between them. Because they are intended to maintain functional linkages for the safe passage of wildlife and maintenance of biodiversity, human activities must not



Millard Forest

Photo by Peter Sinclair

prevent or threaten this function (such as through the creation of impassable barriers); these are areas where conservation is fully integrated into land use planning. Biodiversity corridors are internationally recognized by conservation scientists as the means to maintain the survival of populations and species.³⁶ Protection, restoration and best management practices are all

³⁶ International Union for Conservation of Nature (IUCN) (July 23 2007). *Connectivity Conservation: International Experience in Planning, Establishment and Management of Biodiversity Corridors* (Background Paper).

key to maintaining these corridors. The Upland Habitat Corridors proposed by CVCS are one kilometer wide corridors that traverse the project area and incorporate a variety of land uses. Appendix 9.3 describes the process for assessing Upland Habitat Corridors and provides a more detailed description of those listed below.

Three northwest/southeast corridors that link sensitive ecosystems and habitats:

- Lazo to Oyster River Corridor
- Deep Bay to Oyster River Corridor
- BC Hydro Corridor

One West valley corridor – a corridor which connects approx. 1,010 hectares of forested Crown land to the BC Hydro Corridor

- Union Bay Forest Corridor

Seven east/west corridors to connect habitats and facilitate movement from upper to lower elevation areas and across river valleys:

- Beauforts to the East Coast Corridor (through the Tsable River Watershed)
- Millard *Estuary* to Comox Lake Corridor
- Comox Lake to Millard/Piercy Headwaters Corridor (via Morrison Creek Headwaters and the Morrison Creek/Lake Trail Road underpass)
- Strathcona Park to Seal Bay Corridor
- Tsolum River to Kitty Coleman Watershed Corridor
- Tsolum River to Williams Beach Corridor
- Tsolum River to Miracle Beach Corridor

Three upland highway crossing corridors intended to protect and enhance the limited existing highway crossings for wildlife in the northern portion of the project area:

- Western Toad Tunnels (culverts located along the highway between Hamm Road and Millar Creek to allow movement of Western Toads from Keddy's Swamp to the Mount Washington foothills)
- Large Mammal Underpass (bottomless arch underpass suitable for wildlife - located approximately 2.5 km north of the Hamm Road turn-off)

- Large Mammal Overpass (overpass suitable for wildlife where Duncan Bay Main crosses the highway – approximately 4.0 km north of the Hamm Road turn-off).

4.1.2 Sensitive Ecosystems

The CVCS priority is to protect remaining Sensitive Ecosystems with a 30-metre buffer zone around them and to restore, over time, Sensitive Ecosystems considered to be fragmented.

Figure 5 presents the nine sensitive ecosystem types found in the Comox Valley identified by the BC Sensitive Ecosystem Inventory (SEI):³⁷

- seven rare and fragile ecosystem types: Coastal Bluff, Sparsely Vegetated, Terrestrial Herbaceous, Wetland, Riparian, Woodland and Older Forest
- two human modified ecosystem types that are important for biodiversity and wildlife and are becoming increasingly rare: Older Second Growth Forests (forest 60 to 100 years in age) and Seasonally Flooded Agricultural Fields³⁸

| Sensitive Ecosystem Type | Description |
|--|---|
| Coastal Bluff | - vegetated rocky islets, shorelines and coastal cliffs |
| Sparsely Vegetated | - dunes, spits and inland cliffs |
| Terrestrial Herbaceous | - mosaics of coastal grassland meadows and moss-covered rock outcrops |
| Wetland | - marshes, fens, bogs, swamps, shallow water, and wet meadows |
| Riparian | - vegetated floodplains, stream and lake shores and gullies |
| Woodland | - open forests dominated by deciduous trees with canopy cover less than 50% e.g. Garry Oak woodland |
| Older Forest | - forests older than 100 years, dominated by conifers |
| Older Second Growth Forests | - large stands of conifers 60-100 years old |
| Seasonally Flooded Agricultural Fields | - surrogate habitat for wetland species when natural wetland habitat is lost |

Figure 5: The nine SEI sensitive ecosystems

³⁷ These nine ecosystems types are identified in Comox Valley Regional District (2010). *Comox Valley Regional Growth Strategy Bylaw No. 120, 2010*, Map No. 4 Regional Conservation Framework Concept.

³⁸ Ward, P. et. al. (1998), pp 45.

The provincial re-assessment of sensitive ecosystems highlights disturbance to the above ecosystem types over the 1991 to 2002 time period. The greatest losses were to Woodlands (27% or 6.5 ha); Older Forest (22% or 181 ha) and Older Second Growth Forests (22% or 2000 ha). These “lost” ecosystems were deleted from the provinces sensitive ecosystem map in 2002.

Forests, Woodlands, Riparian ecosystems and Wetlands were the most heavily impacted by fragmentation over the study period. Fragmentation can be caused by roads, linear infrastructure and even recreational uses.

This disturbance to sensitive ecosystems has serious consequences for native plant communities and the species that depend on them. Of the indigenous plant communities known to occur in the lowland forests of the Comox Valley, 61 percent are provincially Red Listed and 35 percent are Blue Listed.³⁹



Bitter Cress

Photo by Bruce Pirrie

³⁹ British Columbia Conservation Data Centre <http://www.env.gov.bc.ca/cdc/>. Search date: September 12 2012. Search Criteria: Search Type: Ecological Communities AND MOE Regions: 1- Vancouver Island AND Regional Districts: Comox Valley (CXRD) AND BGC Zone: CDF, CWH AND Ecosections: NAL. The Provincial Blue List includes ecological communities, and indigenous species and subspecies that are “of special concern” (formerly called “vulnerable”). The Provincial Red List includes ecological communities, and indigenous species and subspecies that are “extirpated, endangered or threatened” i.e. they are at risk of extinction in BC.

| Sensitive Ecosystem Inventory Disturbance - Comox Valley Statistics (*date report published) | | | | | | | | | | |
|--|-----------------------|--------------------|-------------|-----------------|----------------|--------------|-------------|---------------------|-------------------|-----------------------|
| Primary Ecosystem Type | 1998* Inventory | 2005* Reassessment | | | | | | | | |
| | Remaining Intact (Ha) | Lost (Ha) | Lost (%) | Fragmented (Ha) | Fragmented (%) | Reduced (Ha) | Reduced (%) | Total Impacted (Ha) | Area Impacted (%) | Remaining Intact (Ha) |
| Coastal Bluff | 8.3 | 0.0 | 0.0 | 2.0 | 24.1 | 0.0 | 0.0 | 2.0 | 24.1 | 6.3 |
| Terrestrial Herbaceous | 381.6 | 4.4 | 1.2 | 106.4 | 27.9 | 28.0 | 7.3 | 138.8 | 36.4 | 242.8 |
| Older Forest | 807.7 | 180.7 | 22.4 | 227.0 | 28.1 | 112.2 | 13.9 | 519.9 | 64.4 | 287.8 |
| Riparian | 2287.6 | 100.2 | 4.4 | 751.9 | 32.9 | 224.4 | 9.8 | 1076.4 | 47.1 | 1211.1 |
| Sparsely Vegetated | 41.4 | 0.0 | 0.0 | 4.3 | 10.4 | 0.0 | 0.0 | 4.3 | 10.4 | 37.1 |
| Wetland | 2895.9 | 48.0 | 1.7 | 875.2 | 30.2 | 48.1 | 1.7 | 971.3 | 33.5 | 1924.6 |
| Woodland | 24.3 | 6.5 | 26.7 | 10.1 | 41.6 | 1.9 | 7.8 | 18.5 | 76.1 | 5.8 |
| Seasonally Flooded Agricultural Fields | 470.9 | 6.5 | 1.4 | 124 | 26.3 | 184.1 | 39.1 | 314.6 | 66.8 | 156.3 |
| Older Second Growth Forest | 9055.9 | 2000.1 | 22.1 | 6557.7 | 72.4 | 390.5 | 4.3 | 8948.3 | 98.8 | 107.6 |
| TOTALS | 15973.6 | 2346.4 | 14.7 | 8658.6 | 54.2 | 989.2 | 6.2 | 11994.1 | 75.1 | 3979.4 |

Figure 6: Sensitive Ecosystems Inventory Re-assessment 2005 – Comox Valley Statistics

4.1.3 Water Resources

The Comox Valley is blessed with an incredible richness of water resources. Priority Water Resources identified by the CVCS include aquatic ecosystems such as lakes, ponds, streams, rivers, wetlands, estuaries, *aquifers* and springs. Lakes and watersheds that humans rely on for drinking water are also identified priorities (see Map 6). Essential to the health of these water resources is the *hydrologic cycle*, which drives and shapes the landscape, setting the basic character of a region.⁴⁰ Maintaining the natural function of the hydrologic cycle is critical for protecting aquatic ecosystems for habitat and human use.

The hydrologic cycle interconnects surface and *groundwater* flows. Surface water collects and moves through zones of a watershed including: hills and ridges (shedding or runoff zones); wetlands and lakes (collecting zones) or small and large streams (conveyance zones). As it moves, surface water

⁴⁰ Marsh, William M. (2010) *Landscape Planning: Environmental Applications 5th Edition*. John Wiley and Sons, Inc.: Hoboken, New Jersey.

transports and erodes sediments on the land. Surface water may move into the soil - through a process called recharge - and become groundwater. This process is critical to the replenishment of aquifers because it replaces water that is removed for human use, or through seepage into surrounding soil, or discharge into streams, lakes and wetlands.

Aquatic ecosystems themselves provide critical ecosystem services. They serve as habitats for an array of plant and wildlife species, and they maintain the water temperatures and flow velocities necessary to support aquatic life. Some aquatic ecosystems, such as wetlands, are able to naturally filter and purify water. Others provide water for drinking and personal consumption, hydro-electric generation, food production, fisheries, tourist and recreation activities, and intrinsic enjoyment.⁴¹



Goose Spit

Photo by Kerry Dawson

Due to their critical importance, estuaries were added to the list of priority ecological areas by the Community Partnership in 2009. Estuaries are the most productive ecosystems on the planet; they are rare, valuable and highly vulnerable. In BC they cover less than 3 percent of the shoreline but are used by 80 percent of coastal species.⁴² Estuaries encompass many habitat refuges such as wetlands, sloughs and side channels, and as a whole they provide habitat for aquatic, avian and terrestrial species. In function, they act like a heart - allowing the continual ebb and flow of water and absorbing the endless pulse of the tides.

Estuaries serve as an important part of a natural areas network that allows the movement of species from the ocean to upland rivers and streams and back to the ocean. The Valley's Courtenay River Estuary is internationally recognized as a

⁴¹ Jenssen, S. (2007) *Comox Valley's Drinking Water Reference Guide*. Prepared for the Comox Valley Water Watch Coalition.

⁴² British Columbia Ministry of Environment (March 2006) *Estuaries in British Columbia*. ISBN 0-7726-7723-9

crucial staging area for migrating waterfowl and shorebirds; it provides nesting and over-wintering habitat for thousands of birds, including over 10 percent of North America's Trumpeter Swans.



Black Oystercatcher

Photo by Kerry Dawson



American Goldfinch

Photo by Kerry Dawson

In the Comox Valley, human activities such as land clearing, urban development, shoreline modification,⁴³ road building, mining, and logging on private timber lands in upper watershed areas, have altered hydrological processes, aquatic ecosystems, and the quality and quantity of water resources. Such changes are evidenced by historically low returns of salmon, degraded spawning and rearing habitat for salmon, dramatic flooding and erosion, low or absent summertime flows, contamination of aquatic habitats, water use restrictions, and drying water wells. In 2006, local residents came within ten days of having no water come out of their taps due to water scarcity in the Comox Lake reservoir.⁴⁴ Water sustains all life, and in order to protect it, we need to ensure the functioning of the hydrologic cycle and the health of aquatic ecosystems. We need to do this for our own sake - but also for the multitude of other species that depend on healthy water for their survival.

⁴³ Over 50 percent of the shoreline of the Courtenay River Estuary has been modified and the majority of the land within the estuary boundary has been converted from estuarine habitat to human use.

⁴⁴ Ibid.

4.2 Priority Recreational Greenway Trails

Recreational greenway trails are off-road greenways that are designed for low impact uses such as walking, cycling and nature viewing and are intended to preserve public access to natural areas. They may be located adjacent to sensitive ecosystems, habitat areas and forestry and agriculture lands; however, they are specially managed to minimize disturbance to these areas. They are surfaced with pervious

and environmentally benign materials and disallow motorized vehicles except wheel chairs and scooters used by persons with mobility impairment. The Community Partnership has not made any additions to the list of the CVCS priority recreational greenway trails (identified in the NWB First Edition as “recreational areas”). The trails were identified based on assessment of map layers displaying:

- existing and proposed parks and greenways for the Comox Valley; and
- Community Conservation Features – *recreational greenways* identified by the plans and reports recorded in the Conservation Database

The following considerations by the CV Land Trust Board were also taken into account in choosing the Priority Recreational Greenway Trails:

- involvement of the CV Land Trust in conservation and stewardship activities along or adjacent to trails;
- trail character (pervious surface and current trail uses) based on existing information and the knowledge of the CV Land Trust Board; and,



Northeast Woods, Comox

Photo by Kerry Dawson

- historical values based on the knowledge of the CV Land Trust Board

The four priority recreational trails are: One Spot Heritage Railway Trail, Wellington Colliery Railway Trail, Comox Lake to Comox Trail, and Brooklyn Creek Trail. If developed, these trails would become the backbone for a region-wide network for walkers, cyclists and other non-motorized users, linking the communities of the Comox Valley together and providing access to natural areas. With the establishment of these trails, it is anticipated that many opportunities for expansion and additional connections will be identified.

Map 7 displays the following CVCS Priority Recreational Greenway Trails, described in detail in Appendix 9.4.

5 Strategy Implementation Tools

Several conservation tools have been created or developed by the CV Land Trust and the Community Partnership. These tools have assisted in the identification of the priority conservation areas and, with further development, they can provide assistance to conservation partners in implementing the Comox Valley Conservation Strategy.

5.1 Conservation Database

Prior to the release of NWB First Edition, the CV Land Trust created a searchable Community Conservation Features Database containing conservation reports and land use plans (including Official Community Plans). These reports and plans contain information, recommendations and actions pertaining to lands and environmental features in the Valley identified as having conservation significance (i.e. Conservation Features). Each Conservation Feature has a separate entry in the database that provides a description of documented environmental and cultural values, as well as conservation recommendations made by the author and partnering agencies. Appendix 9.5 shows a list of the bibliographic entries in the Conservation Database.

5.2 Regional Conservation Atlas

During the creation of the NWB First Edition, the CV Land Trust compiled a comprehensive library of digital map layers, depicting many aspects of Comox Valley conservation and land use information. The map is being further developed so it can be displayed in a Comox Valley Conservation Atlas. The purpose of the atlas is to supplement existing online map applications by making a higher level of conservation detail available to anyone with internet access.

5.3 Regional Priorities Map

Maps 5 and 6 display the CVCS natural areas network composed of priority lands, and water resources. The Community Partnership considers the areas identified on these maps as the minimum necessary to protect, restore and properly manage a regional natural areas network over the long term. The maps can serve as a guide for regional planning and decision-making.

5.4 Property Evaluation Tool

Appendix 9.6 contains a matrix for conservation decision-making at the site or property level. This tool can be used by conservation partners to determine ratings for (1) conservation importance and (2) urgency for protection (based on identified threats). Once a piece of land has been identified as a local priority, there are many ways that the community can work together to ensure that it is protected (see Section 6 for a list of recommendations and actions).

5.5 Environmental Status Reporting

An important aspect of the CVCS is monitoring the outcome of land use and conservation activities. The Community Partnership intends to report regularly on the region's environmental performance as it pertains to our targets for conservation and protection of remaining sensitive ecosystems. The Community Partnership will also report regularly on specific actions taken by partnership members. Performance monitoring and action reporting will be the basis for accountability within the CVCS; it will be a way to increase public knowledge and understanding of conservation issues, and will be key to gaining support and momentum for the natural areas network.

At this time, the Community Partnership has selected three preliminary regional targets and *indicators* related to our objective of conserving and protecting remaining sensitive ecosystems. These targets were chosen because they are consistent with regional planning processes including the

CVSS,⁴⁵ the RGS and the Whistler 2020 Program;⁴⁶ and because they are supported by baseline data, which provides the basis for measuring change. These targets and indicators are still in the process of development, and may evolve as improved information becomes available.

| Indicators | Baseline | Target | Data Sources |
|---|---------------------------------|--|---|
| Total hectares of Sensitive Ecosystem in the Nanaimo Area Lowland | 1998 Provincial SEI | No further loss of Sensitive Ecosystems in the Nanaimo Area Lowland ecosection (NAL) | Up-to-date aerial imagery; Sensitive Ecosystem disturbance mapping using SEI protocols |
| Total hectares of Protected Area* in the Nanaimo Area Lowland and the Leeward Island Mountain Ecosections | 2007 protected areas assessment | 20 percent of CVCS project area protected by 2020 | Municipal and regional parks and greenway data; provincial parks and protected areas data; provincial conservation database |
| Total hectares of mapped Sensitive Ecosystems that are protected | 2007 protected areas assessment | 100 percent increase in Sensitive Ecosystems protected by 2050 | See above |

Figure 7

**Protected area includes nature or conservation park, ecological greenway, conservation covenants, fee simple conservancy land, provincial park, provincial wildlife or ecological reserve.*

⁴⁵ Comox Valley Regional District (2010). *Comox Valley Sustainability Strategy Final Plan*, February 18, 2010. Refer to Section 3: Implementation and Monitoring, pp135-148.

⁴⁶ *Whistler2020: Moving Toward a Sustainable Future*. <http://www.whistler2020.ca>

6 Recommended Actions and Measures

The Comox Valley's four local governments endorsed the list of recommended policies, regulations and actions that were published in June 2008 in NWB First Edition (see Appendix 9.7). Since that time, the Community Partnership has undertaken an analysis of the relationships between environmental policy and watershed health for the Millard-Piercy Watershed;⁴⁷ made detailed policy submissions to the Comox Valley Regional Growth Strategy, Official Community Plan updates and other local government planning processes; and promoted *collaborative watershed governance*, growth management, use of green bylaws tools⁴⁸ and environmental best management practices.⁴⁹ Through these processes, the original list of recommendations have been expanded and refined. The following updated recommendations for local governments and the Community Partnership are grouped below according to the nine objectives presented in Section 3.2. The Community Partnership will prioritize and track the implementation of specific actions related to our recommendations.

⁴⁷ LeBlanc, V. Gerard (December 2009). *Millard-Piercy Watershed Gap Analysis: Toward a Watershed-Based Planning Framework for the Comox Valley*.

⁴⁸ The Stewardship Series. *Green Bylaws Toolkit for Conserving Sensitive Ecosystems and Green Infrastructure* (March 2008).

⁴⁹ Province of British Columbia, Ministry of Environment (March 2006). *Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia*.

6.1 Establish Effective Regional Administrative Structures for Conservation

| I. Establish Effective Regional Administrative Structures - Actions |
|---|
| Local Government |
| 1. Consult with the K'omoks First Nation on all matters of land use and conservation planning; demonstrate respect for legal rights, historic and cultural use of the land, waters, and estuaries, and traditional ecological knowledge. |
| 2. Establish resilient multi-agency structure(s) for regional conservation implementation that allow parties to: communicate common areas of interest, negotiate differences, and establish effective implementation and enforcement procedures: <ul style="list-style-type: none"> • utilize reputable and transparent continual improvement environmental management system(s) that incorporates regular progress reporting • establish a structure to coordinate actions to achieve the sustainability targets for Water and Ecosystems set out in the CVSS • establish a regional parks function to fund the acquisition and maintenance of regionally significant natural areas. • adopt the cooperative governance model identified in the CREMP. |
| 3. Adopt the water supply framework and implement the recommendations proposed in the Regional Water Supply Strategy. |
| 4. Report on progress toward RGS and CVSS targets in annual reports (required by Section 99 of the Community Charter). |
| 5. Develop a multi-partner agreement to establish a regional system for sharing digital environmental information, including standards for mapping and data collection. |
| 6. Adopt regionally consistent definitions and policies for ecological greenways, to clearly distinguish them from recreational greenways, and designate them as areas for biodiversity and habitat protection (see Appendix 9.2). |
| 7. Establish a Regional Water Advisory Panel to represent water purveyors, users and other stakeholders including NGOs and the public; and to provide a forum to discuss watershed protection issues relating to potable water ⁵⁰ and rainwater management. |
| 8. Incorporate the RGS Conservation Areas into Official Community Plans. ⁵¹ |

⁵⁰ Comox Valley Drinking Water Reference Guide 2011. (September 2011)
Prepared by Sonya Jenssen for Comox Valley Water Watch Coalition.
Chapter 1, pp.18.

⁵¹ RGS Conservation Areas include: estuaries, riparian areas, sensitive ecosystems, other important ecosystems, critical watersheds, biodiversity corridors and existing parks and proposed parks and greenways.

9. Address gaps in science-based environmental information within the region by undertaking the following:
 - rigorous data collection using Terrestrial Ecosystems Mapping Standards to integrate vegetation, terrain (surficial geology), and soil features.⁵²
 - improved water resource mapping including streams and wetlands, aquifers, groundwater areas, and estuaries
 - identification of species at risk habitats. A list of local species at risk is provided in Appendix 9.8.⁵³
 - detailed environmental inventory, particularly in the RGS Settlement Expansion Areas (all aquatic and terrestrial ecosystems, plant communities and critical habitats, existing and potential biodiversity corridors and recreational trails).
10. Require environmental assessment and mapping for new proposed developments; ensure that development does not proceed unless it can be shown with certainty that adverse environmental impacts will not result.
11. Utilize provincial⁵⁴ and federal⁵⁵ Recovery Strategies and Management Plans to protect the habitats of species at risk.
12. Provide information on the long term costs, anticipated environmental impacts and mitigation options of land use decisions to the public.
13. Establish regionally consistent incentives and funding programs to protect environmentally sensitive areas including:
 - A natural areas / ecological greenway levy; development cost charges
 - Riparian Tax Relief, Assessment Relief, Natural Areas Protection Tax Exemption Program, landowner education about Ecological Gifts Program.
 - density transfer, density/amenity bonus, transfer of development rights and alternative development standards.
14. Amend zoning bylaws to include Conservation Zone designations - as a tool to establish connectivity between sensitive natural areas and important habitats.

⁵² Resources Information Standards Committee (RISC). *Standard for Terrestrial Ecosystem Mapping in British Columbia*. This "bioterrain" approach results in comprehensive maps that include all structural stages, and the associated terrain attributes of ecosystems (genetic material, surface expression, qualifiers, geomorphological process, and soil drainage).
<http://www.ilmb.gov.bc.ca/risc/pubs/teecolo/tem/indextem.htm>

⁵³ List of species at risk known to occur locally is provided by the Comox Valley Naturalists. It has been derived from a search of species at risk for [search criteria] using the BC Ministry of Environment Species and Ecosystems Explorer tool.
<http://a100.gov.bc.ca/pub/eswp/>

⁵⁴ Government of British Columbia. Ministry of Environment. Recovery Planning in BC.
<http://www.env.gov.bc.ca/wld/recoveryplans/rcvry1.htm>
http://www.env.gov.bc.ca/wld/recoveryplans/recovery_doc_table.html

⁵⁵ Government of Canada. Species at Risk Public Registry.
http://www.sararegistry.gc.ca/sar/recovery/default_e.cfm

| |
|--|
| 15. Display the RGS Conservation Areas on all maps for planning purposes. |
| 16. Rezone or phase out land uses in or adjacent to riparian, foreshore and estuarine ecosystems that are, or have the potential to pollute and cause damage to these critical areas. |
| 17. Revise engineering standards and Development Approval Procedures region-wide; establish performance standards for rainwater capture (storage), stormwater detention and groundwater recharge for new building and site design. |
| 18. Require performance security as a condition of an environmental development permit. |

6.2 Conserve and Protect Remaining Sensitive Ecosystems

| II. Conserve and Protect Remaining Sensitive Ecosystems - Actions |
|--|
| Local Government |
| 1. Designate all remaining sensitive ecosystems, including foreshore and backshore areas, with minimum 30m buffer areas, as Environmental Development Permit Areas (EDPAs). ⁵⁶ |
| 2. Identify and secure agreements or long-term tenures of private lands to protect them as priority ecological areas, recreational sites and parks. |
| 3. Identify the locations of rare ecological communities. |
| 4. Continue to protect eagle and heron nests, habitat trees and the critical habitat surrounding them by designating them as EDPAs. Have qualified environmental professionals carry out annual reviews of nesting tree sites and include them in OCPs as an annual amendment. |

⁵⁶ See recommended buffer widths in *Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia*. BC Ministry of Environment. March 2006.
<http://www.env.gov.bc.ca/wld/documents/bmp/devwithcare2012/DWC-Section-4.pdf>.

6.3 Restore Degraded Ecosystems

| III. Restore Degraded Ecosystems - Actions |
|--|
| Local Government |
| 1. Implement the restoration actions identified in the CVSS. ⁵⁷ |
| 2. Continue to support invasive plant removal and native species re-vegetation initiatives within and adjacent to estuaries and riparian areas |
| 3. Support initiatives to restore fragmented ecosystems. |
| 4. Support initiatives to restore the Courtenay River floodplain to a healthy functioning condition with multiple channels, foreshore wetlands, saltmarshes and tidal flats. |

6.4 Maintain Natural Systems Function

| IV. Maintain Natural Systems Function - Actions |
|---|
| Local Government |
| 1. Require zero net balance for site runoff (use Water Balance Model). ⁵⁸ |
| 2. Undertake mapping of water shedding, collecting and conveyance zones in land use planning areas. |

6.5 Maintain and Improve Landscape Connectivity

| V. Maintain and Improve Landscape Connectivity - Actions |
|---|
| CVCS |
| 1. Partner with local governments to educate landowners about connectivity conservation and the public benefits of biodiversity corridors. |
| 2. Partner with the community, conservancies and local governments to purchase high priority lands within biodiversity corridors. |
| 3. Establish management agreements with private landowners, such as Ducks Unlimited's agreements with agricultural landowners to protect wintering waterfowl habitat. |
| 4. Work with private landowners to help protect land using a Section 219 (conservation) covenant and/or Ecological Gift through Environment Canada's Ecological Gift Program. |
| 5. Partner with local governments to advocate changes to BC Assessment rules to reward private landowners for voluntary conservation measures. |
| 6. Collaborate with local governments to assist in EDPA monitoring programs. |
| Local Government |

⁵⁷ Comox Valley Regional District (2010). *Comox Valley Sustainability Strategy Final Plan*, February 18, 2010, (pp.89-90).

⁵⁸ Water Balance Model: <http://waterbalance.ca/>

| |
|--|
| 1. Partner with ENGOs and senior governments to identify and map areas of high connectivity potential for wildlife and biodiversity - conduct habitat and connectivity mapping – as undertaken by Metro Vancouver in 2006. ⁵⁹ |
| 2. Establish Conservation Zones or downzoning to create larger lot sizes and setbacks to maintain landscape level corridors and to protect environmentally sensitive areas, buffers and habitat corridors (see Figure 3 above). |
| 3. Use the Development Approval Information Areas powers of the Local Government Act to require developer/proponents to identify sensitive ecosystems and important habitats on and adjacent to a proposed development site; to identify connections for wildlife and biodiversity; and to demonstrate how these connections will be maintained. |
| 4. Partner with ENGOs to purchase high priority lands within proposed biodiversity corridors. |
| 5. Partner with ENGOs to reward actions taken by private landowners that support connectivity conservation |
| 6. Municipalities: use Section 8 (j) of the <i>Community Charter</i> (Protection of the Natural Environment) to adopt environmental bylaws that establish connectivity corridor protection. |
| 7. Regional District: include a requirement for the dedication of land within the CVCS proposed biodiversity corridors as a condition to subdivision approval. |

6.6 Maintain and Restore Riparian Areas

| VI. Maintain and Restore Riparian Areas - Actions |
|---|
| Local Government |
| 1. Establish riparian areas (30 m buffer from the top of bank of watercourses and wetlands) as EDPAs. |
| 2. Improve mapping of streams and wetlands. |
| 3. Require riparian assessments to be supplemented with the Proper Functioning Condition (PFC) principles and assessment methods (Riparian Areas Regulation). ⁶⁰ |
| 4. Designate all floodplain areas as Hazardous Area DPAs and specify measures to avoid future property damage and liability due to erosion, sea level rise, flooding, and expected increasing severity of storms. |

⁵⁹ Metro Vancouver (December 2008) *Strategic Directions for Biodiversity Conservation in the Metro Vancouver Region*.

⁶⁰ U.S. Government, Bureau of Land Management, Riparian Area Management, Technical Reports 1737-15 1998 and 1737-16 1999, Revised 2003.

6.7 Conserve and Protect Estuaries And Foreshore Areas

| VII. Conserve and Protect Estuaries And Foreshore Areas - Actions |
|---|
| Local Government |
| 1. Update maps depicting land and water use, tenure, legal boundaries, and habitat classification within estuaries. |
| 2. Pass into law a new Courtenay River Estuary Management Plan (CREMP) with requirements for ongoing review and updating. ⁶¹ |
| 3. In cooperation with K'omoks First Nation, support the creation of a Wildlife Management Area (under Section 4 of the BC Wildlife Act) within the Courtenay (K'omoks) River Estuary. |
| 4. Promote and protect the globally recognized ⁶² Comox Valley Important Bird Area and other estuarine ecosystems. These areas support the habitat requirements of wildlife, migrating and over wintering birds, and the sustainable harvest of food fish and shellfish. |
| 5. Designate all foreshore areas as Coastal EDPAs and prohibit hardening of shorelines; allow shoreline cliffs and banks to erode; and restore the natural movement of gravel (longshore drift), a natural process that replenishes spawning beds for forage fish. |
| 6. Designate all foreshore areas as Hazardous Area DPAs and specify measures to avoid future property damage and liability due to erosion, sea level rise, flooding, and expected increasing severity of storms. |

6.8 Conserve Healthy Water Resources

| VIII. Conserve Healthy Water Resources - Actions |
|--|
| Local Government |
| 1. Improve mapping of aquifers and groundwater recharge areas. |
| 2. Implement the water conservation and stormwater management actions identified in the CVSS. ^{63,64} |
| 3. Provide incentives for private landowners to install rainwater harvesting systems and to retrofit existing developments using progressive rainwater management practices. ⁶⁵ |
| 4. Implement recommendations of the Regional Water Supply Strategy. |

⁶¹ Link to CREMP document and other information:
http://www.comoxvalleyrd.ca/search_results.asp?id=3948&fragment=0&SearchType=&terms=CREMP

⁶² Comox Valley IBAs recognized by BirdLife International, a partnership of conservation organizations in over 100 countries worldwide

⁶³ Comox Valley Regional District, 2010
http://www.comoxvalleyrd.ca/uploadedFiles/Regional_Strategies/Sustainability/CVS_sustainabilityStrategy_Feb%2018_Final%20Draft2.pdf

⁶⁴ Ibid.

⁶⁵ Reference Living Watersmart: <http://livingwatersmart.ca/>

5. Protect and conserve drinking water resources through demand side conservation measures such as water metering, education and regulation.
6. Promote best practices for green boating⁶⁶ to encourage non-polluting water craft use that is not detrimental to wildlife, habitat and vegetation.

6.9 Develop and Maintain A Regional Recreational Trail Network

| IX. Develop and Maintain A Regional Recreational Trail Network - Actions |
|---|
| Local Government |
| 1. Consult with the K'omoks First Nation on all matters of land use and recreational trail planning. Demonstrate respect for legal rights, historic and cultural use of the land, waters and estuaries and traditional ecological knowledge. |
| 2. Partner with other levels of government and local agencies to support the development of an estuary interpretive centre adjacent to the Courtenay (K'omoks) River Estuary. |
| 3. Adopt regionally consistent definitions and policies for recreation greenways that distinguish them from ecological greenways and designate them as areas of public recreation and travel using non-motorized means (with exception for motorized wheel chairs and scooters used by persons with mobility impairment). |
| 4. Encourage low impact economic, recreational, educational and cultural activities in estuaries, foreshore and Important Bird Areas. ⁶⁷ |
| 5. Set up a structure for Comox Valley recreational greenway trail planning that ensures meaningful consultation and decision-making. For example, planning could be structured in a similar way to the Comox Valley Cycling Task Force, or involve recreation and conservation groups in a similar manner as the Comox Valley Accessibility Committee. ⁶⁸ |

⁶⁶ Guide to Green Boating, Georgia Strait Alliance, Revised Edition 2010 Georgia Strait Alliance <http://www.georgiastrait.org/files/share/PDF/GUIDE-2010.pdf>

⁶⁷ Activities such as birding, kayaking and hiking, cultural and art events could be augmented with small locally owned restaurants and kiosks highlighting local foods.

⁶⁸ Two common consultation methods that the CV Accessibility Committee uses are: (1) having draft plans submitted to the whole Committee for comments and/or suggestions; and (2) having a representative of the Committee attend meetings of the planning group, either as a member or intermittently, to consult on specific issues.

| |
|--|
| 6. Partner with and employ the assistance of local NGOs: identify and develop funding and partnership opportunities and undertake stewardship and maintenance activities on recreational greenway trails. |
| 7. Ensure design standards for recreational trails incorporate protection of riparian and other sensitive ecosystem areas, working lands, estuary foreshore and cultural heritage sites: <ul style="list-style-type: none">• adequate buffers designed to minimize impacts;• designated access points to minimize encroachment;• pervious, environmentally benign trail surfacing materials (for wheel chair access use mainly hard, smooth pervious materials and compacted gravel only for short distances leading to points of interest from the main trail);• appropriate trail surfacing such as boardwalk - if rerouting a trail to avoid a sensitive wetland or riparian area is not an option;• methods to discourage motorized vehicle use (except motorized wheel chairs and scooters used by persons with mobility impairment).• signage guidelines to: inform trail users to respect farm fences and not interfere with agricultural production; explain pet leash policies; identify allowed trail uses (motorized vehicles prohibited); and to discourage litter, dumping and disturbance of vegetation;• use of wildlife-friendly fencing when fencing is required. |
| 8. Require developer contribution of land when development is proposed in an area identified as a recreational greenway trail in local government plans and previously approved studies. |
| 9. Establish bylaws backed by enforcement and strong fines for pet leash violations within priority ecological areas or adjacent to working lands. |

7 Opportunities and Challenges for Conservation

Conservation decisions and actions are influenced by many factors, including: the level of environmental information available, the context of land tenure and ownership, and the level of agreement and cooperation between partners. In each of these areas, existing challenges can be overcome. The opportunities are likely to increase when a regional conservation vision is shared.

7.1 Gaps in Environmental Information

Environmental information is a crucial part of regional conservation planning. The Community Partnership encourages local governments to share information and *ground-truth* conservation areas, to fill any gaps in local environmental information. As the RGS states: “Loss of natural areas and renewable resource productivity (fisheries, forestry and agriculture and aquaculture) is often the result of a lack of data and understanding of the local landscape and its *formative systems*...Obtaining more detailed and complete information on ecosystem location and function will facilitate improved growth management decisions for ecosystem protection”.⁶⁹

7.1.1 Sensitive Ecosystems

An expansion and update of the sensitive ecosystems inventory is needed. The provincial Sensitive Ecosystems Inventory, discussed in Section 1.1 above, was conducted within the Nanaimo Area Lowland ecosection. This ecosection does not include the upper elevations of the CVCS project area (see Map 3) which are instead contained within the Leeward Island Mountain ecosection. Furthermore, within the Nanaimo Area Lowland, ecosystems smaller than 0.5 hectares were not captured by the provincial SEI, and some areas that are now recognized as unique and rare were omitted because they were too impacted by human activity to meet SEI criteria at the time.⁷⁰

⁶⁹ Comox Valley Regional District (adopted March 29, 2011). *Comox Valley Regional Growth Strategy Bylaw No. 120, 2010*, pp 33.

⁷⁰ Ward, P. et. al. (1998).

Sensitive ecosystems information can be collected by qualified individuals using standardized methods, and submitted to the provincial Conservation Data Centre. Partnership efforts between the different levels of government are needed to ensure that this process continues and that sensitive ecosystem information is expanded and maintained.

During the 2011 Town of Comox OCP update, the Town's own consultant proposed that the Town undertake more detailed mapping of terrestrial ecosystems as a basis for the planning

process.⁷¹ In the Comox area, rare Garry Oak associated ecosystems and a rare Coastal Sand Dune Ecosystem had not been accounted for by the SEI, and would have been overlooked during the OCP process without the knowledge and coordinated efforts of environmental NGOs. Garry Oak and associated ecosystems are endangered in Canada and the Coastal Sand Dune Ecosystem (located at Point Holmes) is one of only two such wind-formed dune ecosystems found on the south coast of BC.⁷²



Amanita mushroom

Photo by Kerry Dawson

7.1.2 Watercourses

Approximately fifty percent of small streams within low elevation watersheds in the Comox Valley have not yet been mapped. This is a serious challenge to sustainable land use planning because when a development application is made; the Riparian Areas Assessment (RAA) process under the Riparian Areas Regulation (RAR) is only triggered if a watercourse is already identified on an existing map. The streamside protection mechanisms available through this regulation are not applied otherwise. During the 2011 Town of Comox OCP update, the deficiency in stream and wetland mapping was

⁷¹ Town of Comox (April 2010) *Background and Policy Alternatives Report*. Prepared by The Arlington Group Planning and Architecture and partners. Pp.42

⁷² Clague, John, J., David Tupper and Sarah Webb. *Early Holocene Dune Fields on the South Coast of British Columbia*. (Unpublished paper). Department of Earth Sciences Simon Fraser University.

identified by the Town's consultant as a barrier to sustainable community planning.⁷³

Existing watercourse information for the region can be found on the CVRD's Sensitive Habitat Atlas which was developed in 1995, in partnership with Project Watershed Society, the BC Ministry of Environment and Fisheries and Oceans Canada. The Sensitive Habitat Atlas (available at the CVRD office and viewable online as a layer on the CVRD's *Imap* program) was the first of its kind for the Comox Valley and represented real progress toward better mapping of environmentally sensitive features and improved information sharing. Until 2005, it was updated regularly with standardized data collected from Project Watershed Society.



Wetlands - filter and store water

Photo by Kerry Dawson

Currently, the CVRD updates SHA watercourse information on an annual basis using the data collected during Riparian Areas Assessments.⁷⁴ This provides the CVRD with improved map accuracy for those segments of watercourses which were assessed under the RAR; however it does not expand the overall watercourse inventory.

7.1.3 Aquifer and Water Use

Information and mapping is needed to describe the locations, sizes, carrying capacities and vulnerabilities of aquifers within the CVCS project area – both as the basis for informed land use planning and decision-making, and to reduce the possibility of groundwater contamination.

An *Aquifer Classification Project Report* prepared for the region in 2000 highlighted these data deficiencies and recommended that the CVRD put time and energy into further information

⁷³ Town of Comox (March 1, 2010) *Town of Comox OCP Update – Environmental Background Report*. Prepared by Diamond Head Consulting Limited.

⁷⁴ Personal conversation with H. Follis (CVRD), June 9, 2011.

gathering to determine: (1) aquifer recharge areas and recharge rates; (2) direction of ground and surface water flows in areas of contamination concern; and (3) vulnerability of areas deemed as sensitive or under high development pressures.⁷⁵ The Regional Water Supply Strategy identifies local government participation in groundwater and aquifer risk assessment and protection as key actions to meet the goal of safe drinking water.⁷⁶

In order to track usage of groundwater in the region, a comprehensive record of water wells is also needed. The provincial government information is incomplete; it is not mandatory to submit well information to the province, and a 1993 study found that the province likely has only 40 percent of active well records.⁷⁷

7.1.4 Transitional Ecosystems

Map 2 shows the Biogeoclimatic Zones identified for the Comox Valley: Coastal Western Hemlock, Coastal Douglas Fir, Mountain Hemlock and Coastal Mountain Alpine. The majority of the lowland section of the CVCS project area falls within Coastal Western Hemlock zone, with Coastal Douglas Fir zone existing around Deep Bay and outside the project area on Denman and Hornby Islands.

Detailed inventory is necessary to identify and describe the unique ecosystems and plant communities that exist in the Comox Valley; which is an area of dynamic transition between the Coastal Western Hemlock and Coastal Douglas Fir zones. Unique pockets of Coastal Douglas fir-dominated forest and Garry Oak and associated plant communities exist in the Comox Valley north of Deep Bay. These ecosystems are some of the rarest in Canada. Coastal Douglas fir ecosystems are considered Globally Imperiled, with one percent of their old

⁷⁵ Humphrey, Gordon, J. (2000) *Regional District of Comox-Strathcona Aquifer Classification Project Report*, Regional District of Comox-Strathcona.

⁷⁶ Comox Valley Regional District (April 2011). *Comox Valley Regional Water Supply Strategy*. Prepared by Wedler Engineering LLP, Courtenay, BC.

⁷⁷ Comox Valley Environmental Council, (1993). *Water - Lifestream of the Comox Valley; Community Options for Water and Watershed Stewardship*.

forest remaining;⁷⁸ less than 5% of Garry Oak and associated ecosystems remain intact.⁷⁹

7.1.5 Wildlife

In the face of continuing habitat loss due to growth and development, it is urgent that the critical habitats of species at risk and their life requisite needs are identified and protected. Critical habitat information must be gathered proactively by local governments during OCP and local area plan updates. Development must be directed away from identified critical habitat areas and migration corridors, in order to avoid the loss or extirpation of important native wildlife species.⁸⁰



Bald eagle

Photo by Kerry Dawson

7.2 Land Tenure

Many of the priority conservation areas identified by the CVCS are privately owned lands. This situation presents both a challenge and an opportunity, as it demands that conservation partners maintain respectful relationships, identify common interests, and use creative approaches that benefit landowners. The opportunity is to create a unifying vision for conservation in our community, whereby private landowners understand and experience the benefits of participating in the conservation network.

⁷⁸ Forest Practices Board (June 2010). *Conservation of Imperiled Coastal Douglas-fir Ecosystem*. FPB/IRC/168

⁷⁹ Garry Oak Ecosystems Recovery Team. *What remains of Garry Oak ecosystems?* http://www.goert.ca/about/what_remains.php. Hit: September, 25 2012.

⁸⁰ As recommended in: Town of Comox (March 1, 2010) *Town of Comox OCP Update – Environmental Background Report*.

7.3 Leadership and Cooperation

The establishment of a regional approach to conservation planning in the Comox Valley will require more than just access to the most up-to-date environmental information, data and mapping on sensitive ecosystems, wildlife and water resources. It will require leadership and political will, and creative approaches to work with private landowners, First Nations and non-profit organizations.

7.3.1 Data Collection and Mapping

The Valley's local governments are urged to undertake rigorous environmental inventory and regularly update environmental mapping. This must be a required part of planning updates, development approval processes, OCPs, rezoning and other permitting processes.

Regional mapping and inventory standards and methods must be established for efficient collecting and sharing of this environmental information. This will allow local governments to display regional environmental information on their OCP maps and facilitate planning decisions that respect and maintain larger landscape processes. The RGS policy advises local governments to “use a sensitive environmental atlas as a common method of collecting and displaying conservation and environmental information” and to work “with private landowners, environmental organizations and upper level governments...to encourage and assist in the sharing of mapping and ground-truthing”.⁸¹

⁸¹ Comox Valley Regional District (adopted March 29, 2011). *Comox Valley Regional Growth Strategy Bylaw No. 120, 2010*, pp. 35

7.3.2 Traditional Ecological Knowledge

First Nation peoples are the original stewards of the Comox Valley. European colonists began settling the Valley in 1862. During this time a devastating small pox epidemic ravaged the tribal peoples of Vancouver Island. By 1863, whole Native communities had disappeared, along with an unfathomable wealth of human knowledge, skills and traditions related to the land.⁸²

Native peoples have lived in the Valley for thousands of years, harvesting from nature without compromising the sustainability of its systems and resources. This traditional ecological knowledge (TEK) and its application within the current context, represents a major gap in

understanding. Recently, a community group working to preserve the Courtenay Estuary has based its approach on the TEK principle of “Keeping it Living.” Further efforts to incorporate TEK into conservation and land use planning are needed. The Community Partnership welcomes opportunities to build relationships and work together in respect for the land and people of the K’omoks First Nation.



The Courtenay Estuary

Photo by Kerry Dawson

7.3.3 Consistent Terms and Definitions

Different greenways terms and definitions amongst the Valley's four local governments result in incompatible treatments for greenways across jurisdictional boundaries. This uncoordinated approach can create confusion for land owners and the public, frustration for recreational greenway users and dangerous situations for wildlife. The RGS urges local governments to adopt regionally consistent terminology

⁸² Mackie, Richard, S. (1995) *The Wilderness Profound: Victorian Life on the Gulf of Georgia*. Victoria, BC: Sono Nis Press.

The biophysical environment is not merely an external consideration to be tacked on to our social planning exercises, but rather it is the foundation upon which all levels of decision-making and action must occur. Economic and social activities are all framed within the bounds of natural systems.⁸⁶

as the basis for consistent policies and actions toward a regional network of areas for recreation and biodiversity protection.⁸³ All local governments committed to this in June and July 2008.

The Community Partnership endorses terms for ecological and recreation greenways that are explicit about the character and intended functions of these different features (refer to glossary in Appendix 2).⁸⁴ Similar terms were adopted by the CVRD in their 2011 parks and greenways strategic plan.⁸⁵ Communications between the Valley's regional and municipal governments are necessary to develop common agreements on these terms and their planning applications.

7.3.4 Regional Administrative Structure

Regional conservation planning requires innovative and cooperative administrative structures that respect the dynamic interconnections between ecosystems, and between the environment and the community. A regional administrative structure to address conservation planning should be established and driven by the same three guiding principles that drive the CVCS: precaution, connectivity and conservation of ecological services.

Regional conservation planning is most effective when based on a reputable and transparent environmental management system (EMS). Implementing organizations need to demonstrate that environmental impacts are being measured and that environmental management is continually improving. An example is the ISO 14001 standard for environmental management, developed by the International Organization for Standardization.⁸⁷ - The ISO 14001 is a cyclical process involving five steps:

⁸³ Ibid.

⁸⁴ International conservation scientists use the terms 'biodiversity corridor' and 'ecological greenway' synonymously. If defined and managed for conservation purposes, ecological greenways can play a critical role in maintaining all levels of biodiversity.

⁸⁵ Comox Valley Regional District (January 2011). *A Natural Selection: Rural Comox Valley Parks and Greenways Strategic Plan (2011-2030)*, pp 43.

⁸⁶ Brandes, Oliver. Thinking like a watershed: ecological governance, concepts, trends and applications. Powerpoint presentation at the Workshop for Collaborative Watershed Governance November 19-20, 2008. <http://www.livingrivers.ca/cwg.html>

⁸⁷ ISO (International Organization for Standardization). *ISO 1400 Environmental Management*. <http://www.iso.org/iso/home/standards/management-standards/iso14000.htm>. Hit: Oct. 4, 2012.

- (1) “Policy: establish and commit to a written policy that sets overall direction and vision.
- (2) Plan: identify current environmental impacts and applicable legal requirements. Establish objectives, goals and targets for reducing impacts. Develop plans and timelines for achieving objectives and targets, including indicators for measuring progress.
- (3) Do: Begin implementation. This may require organizational, procedural, and human resources adjustments, to better align with policies and objectives. EMS training of managers and employees may be required, as will set up of appropriate document control and communication procedures.
- (4) Check: establish techniques for auditing the management system, for measuring progress toward the objectives and targets, and for reporting on progress. [Requiring indicators to be publicly reported can be a powerful incentive.]
- (5) Act: Establish procedures for making regular, ongoing improvements, plans and operations, as well as the management system itself, to remedy any problems and to promote continual improvement.”⁸⁸

An EMS should be analyzed on a regular basis by an independent auditor in order to certify whether the organization(s) are conforming to the defined procedures.

⁸⁸ Source: Ross & Associates 2002; Wood 2002-2003 in Brandes, O.M., Ferguson, K., M’Gonigle, M. and Sandborn, C. (May 2005). *At a Watershed: Ecological Governance and Sustainable Water Management in Canada* pp.67

8 Maps

8.1 Map 1: CVCS Project Area



http://www.cvconservationstrategy.org/wp-content/maps/CV_Context_CVCS_Area_2012_2x3_4_screen.pdf

8.2 Map 2: Comox Valley Biogeoclimatic Zones and Sensitive Ecosystems



http://www.cvconservationstrategy.org/wp-content/maps/CV_Biogeoclimatic_2012_2x3_4_screen.pdf

8.3 Map 3: Comox Valley's Disappearing Sensitive Ecosystems



http://www.cvconservationstrategy.org/wp-content/maps/CV_SEI_Disturbance_2012_2x3_4_screen.pdf

8.4 Map 4: Comox Valley Protected Areas



http://www.cvconservationstrategy.org/wp-content/maps/CV_Protected_Areas_2012_2x3_4_screen.pdf

8.5 Map 5: CVCS Priority Ecological Areas for Conservation: Lands



http://www.cvconservationstrategy.org/wp-content/maps/CV_Eco_Priority_Areas_2012_2x3_4_screen.pdf

8.6 Map 6: CVCS Priority Ecological Areas for Conservation: Water Resources



http://www.cvconservationstrategy.org/wp-content/maps/CV_Water_Resources_2012_2x3_4_screen.pdf

8.7 Map 7: CVCS Priority Recreation Greenway Trails for Conservation



http://www.cvconservationstrategy.org/wp-content/maps/CV_Priority_Recreation_2012_2x3_4_screen.pdf

9 Appendices

- 9.1 *Methods Used to Derive SEI Data for the CVCS Project Area*
- 9.2 *Glossary of Terms*
- 9.3 *Assessment and Description of Upland Habitat Corridors*
- 9.4 *Description of Recreational Greenway Trails*
- 9.5 *Conservation Database Bibliographic Entries*
- 9.6 *Property Assessment Criteria*
- 9.7 *NWB First Edition Recommendations to Local Government*
- 9.8 *Species at Risk*

9.1 Methods Used to Derive Sensitive Ecosystem Inventory (SEI) Statistics for the Comox Valley

Prepared: May 18, 2008
(Revised September 2012)

1. The *2004 Sensitive Ecosystem Inventory of Vancouver Island and the Gulf Islands* digital file was clipped to the Comox Valley Conservation Strategy project area boundary using *ArcView 3.2a* GIS mapping software.
2. The attribute file (.dbf) for the *2004 Sensitive Ecosystem Inventory of Vancouver Island and Gulf Islands* digital information was copied and opened as a separate *Excel* document.
3. Codes describing primary ecosystems (see two letter codes defined below) were missing from the 'Ecosystem1' (2004) column for some of the polygons. These gaps in ecosystem information for 2004 represent polygons that were identified in 1997 and then classified as deleted during the 2002-03 reassessments. To allow for sorting, the ecosystem code information from the 'Eco1_1997' column was copied and pasted into gaps in the 'Ecosystem1' column.
4. Once all of the ecosystem code information was populated for all of the polygons in the 'Ecosystem1' column, the column could be sorted by code into the nine types: CB= Coastal Bluff, HT=Herbaceous Terrestrial, OF=Older Forest, RI=Riparian, SV=Sparsely Vegetated, WD=Woodland and WN=Wetland, FS=Seasonally Flooded Agricultural Fields and SG=Older Second Growth Forest.
5. The ecosystem types were grouped together and then sorted according to the 'Mod_Type' (type of modification made to the SEI polygon as determined during the 2002-03 assessment)*
6. For each ecosystem type, the area (in hectares) was tallied according to the level of modification.

* Some polygons had been assigned a combination of two or more modification types (e.g. RFI=Reduced, Fragmented and Reinterpreted). To simplify the information, the modification types were 'lumped' as follows:

- Polygons classified as [DD=deleted due to disturbance, DF=deleted due to fragmentation and DR=deleted due to remnant assessment] were all grouped together as 'Deleted'

- Polygons classified as [F=Fragmented] alone or in combination with another modification types (except DF) were grouped together as 'Fragmented'
- Polygons classified as [R=Reduced or RI=Reduced and Reinterpreted] were grouped together as 'Reduced'
- Polygons classified as [A=Addition**, N=No Change, or I=Reinterpretation] were grouped together as 'Intact'

** The polygons classified as 'Addition' in the 2003 assessment are polygons that were added to the 1997 inventory after the fact but they are regarded as an oversight from the first assessment (pers. comm. Jan Kirkby, Environment Canada's Canadian Wildlife Service, February 2008). Ecosystem codes and area information for 'Additions' are present in both the 2004 and 1997 attribute columns and for this reason these polygons could be included in the calculation of statistics.

9.2 Glossary of Terms

(Revised December 2012)

Aquifer: an underground stratum of permeable rock, sand or gravel that holds and readily transmits large quantities of water. Aquifers lying close to the ground surface are often the source of wetlands and springs at that location.

Aquatic Habitat Corridors: biodiversity corridors designated to protect watercourses, and the wetlands and fisheries sensitive zones surrounding them.⁸⁹

Biodiversity: short for biological diversity, biodiversity refers to the diverse collection of living things on earth and the natural processes that link and maintain them. Biodiversity is the variety of species, ecosystems and genes, and the complex ecological processes of which they are a part.

Biodiversity corridors (see also ecological greenways): the land and water pathways that link core parks and protected areas. They incorporate intact and restored ecosystems, as well as areas under human use, such as forestry and agriculture. These habitat connections are critical to maintaining health and biodiversity in plant and animal populations. They provide fish, birds and other species with the opportunity to move across the landscape, to find food, birthing and rearing spaces, and protection from predators. They include areas of public and private ownership. The two types of biodiversity corridors are: **Aquatic Habitat Corridors** and **Upland Habitat Corridors**.

Biodiversity network: a network of lands considered necessary to support biodiversity; a long-term vision for contiguous natural space throughout the urban/rural interface. A biodiversity network can be achieved through designation of planning areas for conservation, including: core areas, buffer areas, biodiversity corridors and sustainable use areas.

Biosphere: the part of the earth's surface in which life can exist.

Collaborative watershed governance: the process of reaching shared outcomes and resolving differences among community, private sector and governmental interests in a fashion consistent with maintaining the physical and biological resilience of watersheds. The approach recognizes that the diverse activities of humans on land and water need to be planned and managed to preserve essential ecosystem functions and the ecological goods and services that watersheds provide.⁹⁰

⁸⁹ Definition for Aquatic Habitat Greenways derived from the *Comox-Strathcona Regional District Bylaw No. 2152 (1999) Electoral Area Plan and Greenways Plan for Area 'B'*. Aquatic Habitat Greenways located within the Agricultural Land Reserve are defined as 'Working Landscape Fisheries Sensitive Zones.'

⁹⁰ Wilkes, Brian for the Collaborative Watershed Governance Initiative (revised September 22, 2009) *Toward a New Framework for Collaborative Watershed Governance in BC*.

Connectivity: the degree to which a landscape facilitates or impedes movement of organisms amongst resource patches.⁹¹

Ecological diversity: (see Biodiversity)

Ecological governance: a form of governance that regards the environment as embedded in all levels of decision-making and action – from the personal to the global. It treats the environment not as an add-on or after-thought, but as all-encompassing and all pervasive.⁹²

Ecological Greenways (see also biodiversity corridors): ecological greenways are the land and water pathways that link core parks and protected areas. They incorporate intact and restored ecosystems, as well as areas under human use, such as forestry and agriculture. These habitat connections are critical to maintaining health and biodiversity in plant and animal populations. They provide fish, birds and other species with the ability to move across the landscape, to find food, birthing and rearing spaces, and protection from predators. They include areas of public and private ownership. The two types of ecological greenways are: **Aquatic Habitat Corridors** and **Upland Habitat Corridors**.

Ecology: the study of the interrelationships and interactions between organisms and their environment.

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 of living things, including humans. 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 forest or grassland ecosystem.

Ecosystem functions: the physical, chemical and biological processes that keep an ecosystem operating. Examples include infiltration of surface water, evapotranspiration and nutrient cycling.

Ecosystem goods and services: the benefits people derive from ecosystems (e.g. goods such as food, wood and other raw materials; service such as pollination of crops, water purification and erosion prevention).⁹³

⁹¹Tischendorf, L. and Fahrig L. *On the usage and measurement of landscape connectivity*. Pages 7-19 in: OIKOS Volume 90, Issue 1 (July 2000). <http://onlinelibrary.wiley.com/doi/10.1034/j.1600-0706.2000.900102.x/abstract>.

⁹² POLIS Project on Ecological Governance. <http://www.polisproject.org/ecologicalgovernance>

⁹³ World Health Organization, *Ecosystem goods and services for health*. WHO 2012. Accessed: May 9, 2012. <http://www.who.int/globalchange/ecosystems/en/>

Estuary: a semi-enclosed coastal body of water, which has a free connection with the open sea, and within which, seawater is measurably diluted with freshwater draining off the land.⁹⁴

Formative systems: processes that shape the landscape and drive landscape functions; they produce the forms and features of a landscape and set the basic character of an area or region.

Groundwater: all the precipitation that percolates into the ground; this includes soil water and water stored in aquifers

Ground-truth: in the earth sciences, the facts that are confirmed in an actual field check that is done at a location, specifically the determination of facts by examining the ground for patterns revealed by remote sensing or aerial photography.

Habitat: the area or natural environment where an organism or biological population lives, grows and interacts.

Habitat refuge: a small patch of habitat that provides food, shelter and/or other needs for wildlife. Habitat refuges may include human-modified ecosystems, and generally are not large enough to maintain the genetic diversity of a population.⁹⁵

Habitat reservoir: a large area of relatively natural habitat that has sufficient size and ecological integrity to support a range of native species, including species that need interior habitats and those that are less tolerant of human presence. The size of the habitat reservoir depends on the species being managed. Habitat reservoirs are often hotspots of biodiversity in or near disturbed urban and rural landscapes.⁹⁶

Hydrologic cycle: the planet's water system, described by the movement of water from the oceans to the atmosphere to the continents and back to the sea.⁹⁷

Indicator: a quantitative measure that provides information about the state of the environment or human health.⁹⁸

Natural systems: a set of interacting and interdependent entities forming an integrated whole. Properties of systems include: structure, behavior, interconnectivity and function, or

⁹⁴ Pritchard, D. W. (1967) *What is an estuary: physical viewpoint*. Pages 3–5 in: G. H. Lauf (ed.) *Estuaries*, A.A.A.S. Publ. No. 83, Washington, D.C.

⁹⁵ BC Ministry of Environment (March 2006). *Develop with Care: Environmental Guidelines for Urban and Rural Development in British Columbia*. Accessed: December 17, 2012
http://www.env.gov.bc.ca/wld/documents/bmp/devwithcare2006/develop_with_care_intro.html.

⁹⁶ Ibid

⁹⁷ Marsh, William, M. (1993) *Landscape Planning: Environmental Applications* (Third Edition). Hoboken NJ, USA: John Wiley and Sons, Inc.

⁹⁸ Noss, Reed. F. (1990) *Indicators for Measuring Biodiversity: A Hierarchical Approach*. Pages 355-364 in: Conservation Biology Vol.4 No. 4 (Dec. 1990), published by the Society for Conservation Biology.

groups of functions. Natural systems (e.g. the solar system) are different from *designed* systems; which are designed by humans (e.g. transportation system).

Other Important Ecosystems (see also Sensitive Ecosystems): ecosystems that are not categorized as rare and/or fragile but are included in the Sensitive Ecosystems Inventory (SEI) due to their high biodiversity values and importance to wildlife. For the East Vancouver Island area these include: Seasonally Flooded Agricultural Fields and Older Second Growth Forests.

Precautionary Principle: where there are threats of serious or irreversible damage to the environment or human health, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent the environmental degradation from occurring.⁹⁹

Recreational Greenways: linear corridors that balance the recreational needs of people with the needs of other species. A key role of a recreational greenway network is to increase public access to green space. Both greenway trails and greenway roads are envisioned as having special facilities for people to walk and cycle and to facilitate those with mobility challenges.¹⁰⁰ Two types of Recreational Greenways are: **Recreational Greenway Trails** and **Greenway Roads**.

Recreational Greenway Trails: off-road recreational greenways that are designed for low impact use such as walking, cycling and nature viewing; they may be located adjacent to sensitive ecosystems and habitat areas. They are surfaced with pervious and environmentally benign materials and disallow motorized vehicles except wheel chairs and scooters used by persons with mobility impairment.

Regional Conservation Planning: Regional conservation planning identifies a network of critical natural areas and implements measures to protect and restore those areas. Results are regularly assessed to ensure that the conservation goals of ecosystem representation, landscape connectivity, groundwater protection, and habitat and species protection are being met. This approach considers long-term changes to climate and infrastructure. Regional conservation planning assists compatible, managed growth by identifying lands that are unsuitable for infrastructure and development; it is a critical first step in growth management planning.

Riparian area (also riparian zone): an area of set width surrounding streams, lakes and wetlands. The width of a riparian area is measured from the *top of bank* (see definition below).

⁹⁹ United Nations Environment Programme (UNEP). *Rio Declaration on Environment and Development*. (United Nations Environment Programme, <http://www.unep.org/Documents.multilingual/Default.asp?DocumentID=78&ArticleID=1163>) Accessed: May 2011.

¹⁰⁰ Definition derived from the *Comox-Strathcona Regional District Bylaw No. 2152 (1999) Electoral Area Plan and Greenways Plan for Area 'B'*. The CRD defined Aquatic Habitat Greenways within the Agricultural Land Reserve as 'Working Landscape Fisheries Sensitive Zones,' for policy purposes.

Riparian ecosystem: a distinct ecological system surrounding streams and wetlands and delineated by site-specific vegetation, soil and elevation features. Riparian ecosystems support high levels of biodiversity, protect adjacent aquatic areas and stabilize stream banks. They are critical refuges and natural aquatic corridors for wildlife.

Sensitive ecosystems: rare and/or fragile ecosystems and other ecosystems of high biodiversity that have been identified during a Sensitive Ecosystems Inventory. For the East Vancouver Island SEI these sensitive ecosystems include the following: Coastal Bluff, Sparsely Vegetated, Terrestrial Herbaceous, Wetland, Riparian, Woodland, Older Forest, Seasonally Flooded Agricultural Fields and Older Second Growth Forests.

Sensitive Ecosystems Inventory (SEI): an inventory that systematically identifies and maps rare and fragile ecosystems in a given area. The purpose of the provincial SEI is to identify remnants of rare and fragile terrestrial ecosystems and to encourage land-use decisions that will ensure the continued integrity of these ecosystems. The initial projects were a joint federal/provincial initiative of Environment Canada (Canadian Wildlife Service), the BC Ministries of Sustainable Resource Management and Water, Land and Air Protection, and the Habitat Conservation Trust Fund. SEI projects have also been initiated and/or received support and funding from ENGOS, regional districts and local governments.

Sustainability: a state that is achieved when social and economic systems can be maintained indefinitely with no reduction in ecosystem functioning and the ability of the natural environment to renew itself.¹⁰¹ It refers to an economic/social system in which the essential products and systems of nature are used no more quickly than they can be renewed and that wastes are discharged no more quickly than they can be absorbed and recycled by the environment.¹⁰²

Top of bank: the point closest to the natural boundary (or high water mark) of a watercourse where a break in slope occurs such that the grade beyond the break is flatter than 3:1 (horizontal: vertical) for a minimum of 15 metres measured perpendicularly from the watercourse. Small slopes beyond the initial break in slope that are steeper than 3:1 but are less than 1 metre in height can be included in the determination of the 15 metre distance from the top of bank. Where banks are not well defined (e.g., in the case of lakes, wetlands, or ponds), the top of the bank is equivalent to the natural boundary or seasonal high water mark.

¹⁰¹ Comox Valley Regional District (January 2011). *A Natural Selection: Rural Comox Valley Parks and Greenways Strategic Plan 2011-2030* (Final draft).

¹⁰² Rees, W. and Wackernagel, M. (1994). *Ecological Footprints and appropriated carrying capacity: measuring the natural capital requirements of the human economy*. In: Investing in Natural Capital: The Ecological Economics Approach to Sustainability. Island Press, Washington.

Upland Habitat Corridors: biodiversity corridors that provide connectivity between terrestrial ecosystems. Upland Habitat Corridors are mapped to recognize the existing or potential connections between habitat refuges and reservoirs including core protected areas such as nature parks and conservation lands.¹⁰³

Watershed: (also called drainage basin): an area of land that contributes runoff to a specific delivery point, such as the mouth of a river. Large watersheds may be composed of many smaller sub-basins, each contributing runoff to various streams and rivers that ultimately combine at a common delivery point.

Wetlands: unique ecosystems that have a high water table and often remain saturated year round – even when they appear dry at the surface. Wetlands exist along the edges of lake and watercourses, in catchments and estuaries, and serve as the link between aquatic and upland habitats.¹⁰⁴ Wetlands perform an array of important ecosystem services: they provide habitat for a large diversity of plants and animals, many of which are rare or endangered; they filter sediments, excess nutrients and pollutants from water; they control erosion and flooding by absorbing and slowing water flows; and they are important freshwater resources that are often connected to aquifers.

¹⁰³ Definition derived from *Comox-Strathcona Regional District Bylaw No. 2152 (1999) Electoral Area Plan and Greenways Plan for Area 'B'*. The CSRD separately defined Upland Habitat Greenways within the Agricultural Land Reserve for policy purposes.

¹⁰⁴ Southam, T. and Curran, E.A. (eds) (1996) *The Wetlandkeepers Handbook: a practical guide to wetland care*. BC Wildlife Federation, Surrey BC and Environment Canada, Delta, BC.

9.3 Assessment of Upland Habitat Corridors

Prepared: May 2008

Revised: September 2012

The Biodiversity Corridors from the 1997 BioAyer Consultants' Report, *The Comox Valley Greenways Plan* were digitized from hard copy map into ArcView 3.2A and were then assessed by overlaying a set of map layers (listed below) depicting current environmental and physical conditions. Most of the BioAyer Biodiversity Corridors were modified by the CV Land Trust and in some cases new corridors were added.

Map Layers Representing Environmental Conditions:

- Sensitive Ecosystems Inventory
- Community Conservation Features – upland areas identified by a high number of conservation plans and reports as recorded in the Conservation Database
- Rare Element Occurrence records – from the Conservation Data Centre
- Blue heron and Bald eagle nest tree locations – from the Wildlife Tree Stewardship Program Inventory 2007
- Aquifers that are highly or moderately vulnerable to contamination from surface sources according to the August 2000 *Regional District of Comox-Strathcona Aquifer Classification Project Report*

Map Layers Representing Physical Conditions:

- Locations of protected lands which provide some level of wildlife refuge (covenants, conservation land holdings, parks and reserves)
- Development areas represented by municipal and Local Area Plan boundaries
- Locations of recently proposed large developments (Trilogy, Raven Ridge, Kensington and Sage Hills)

Descriptions of Upland Habitat Corridors

Fourteen Upland Habitat Corridors were selected. Descriptions are provided below, along with a list of the Community Conservation Features¹⁰⁵ (points and polygons) that correspond (or overlap) with these Corridors. Listed in brackets after the Feature(s) name is the number of bibliographic records that refer to that Feature in the Database. All Corridors are shown on Map 5 with a 500 metre buffer.

Northwest/ Southeast Corridors - these three corridors serve wildlife movement through the project area in an approximately northwest to southeast direction.

¹⁰⁵ Community Conservation Features are areas recorded in the CV Land Trust's Conservation Database. They are areas recommended for some level of protection by reports and plans created by government agencies, conservancies and local environmental non-profit groups.

1. **Lazo-Oyster:** extends from Goose Spit along Balmoral Bluffs to Lazo Marsh, and along the Comox peninsula to Oyster River. In the southern section it includes the CV Land Trust's Buchanan Covenant.¹⁰⁶

Community Conservation Features: Courtenay River-Comox Harbour-Estuary (6), Northeast Woods Comox (3), Lazo Marsh (1), Greenways Concept - Area B (1), Knight Road Community Park (2), Little River Watershed (1), Block 72 (1), Seal Bay Park, Wetlands and Crown Land (3), Black Creek Watershed (1), Black Creek North Estuary (5), Miracle Beach Provincial Park (1), Oyster River Watershed (2) and Williams Beach Road Marsh (1).

2. **Deep Bay-Oyster:** runs along the west side of the Inland Island Highway from the Deep Bay area to the north of Courtenay at Dove Creek, where it crosses under the highway allowing access to the network of sensitive ecosystems in the upper Tsolum River. The corridor crosses back over to the west side of the highway at Black Creek.

Community Conservation Features: Tsable River Watershed (1), Langley Lake (1), CPA Environmental Resource Area – Cumberland OCP (1), Maple Lake (5), Puntledge River Watershed (1), Nymph Falls (1), Nymph Falls Regional Park (1), Browns River Watershed (1), Tsolum River Watershed (1), BC Hydro corridor (2), Upper Tsolum River Lot A, Block 29, Plan 23392 (2), Upper Tsolum River Area – flats (1), Black Creek Watershed (1), Northy Lake (3), Oyster River Watershed (2), Mud Bay Creek – Highway Site N (1), Morrison Creek Headwaters – Highway Site 2 (1), Wetland – Highway Site 13 (1), Creek and Wetland – Highway Site 14 (1), Japanese Slough – Highway Site 15 (1), Wetland – Highway Site 16 (1), Dove Creek – Highway Site 17 (1), Wetlands – Highway Sites 18, 19 and 20 (3), Headquarters Creek – Highway Site 21, Pup Creek and Beaver Ponds – Highway Site 22 (1), Wetland/Tsolum Trib – Highway Site 23 (1), Wetland South of Tsolum River – Highway Site 24 (1), Tsolum River – Highway Site 25 (1), Tsolum Tributary – Highway Site 26 (1), Marsh North of Tsolum River – Highway Site 27 (1), Wetland North of Tsolum River – Highway Site 28 (1), Millar Creek Wetland - Highway Site 29 (1), Millar Creek - Highway Site 30 (1), Wetland – Highway Site 31 (1), Black Creek – Highway Site 35 (1).¹⁰⁷

3. **BC Hydro:** this utility corridor, which runs southeast/northwest through the project area, was noted for its importance to wildlife by BioAyer Consultants in 1997. It should be retained and managed in a way that facilitates continued wildlife passage. There is evidence to support use of this corridor by large mammals.¹⁰⁸

¹⁰⁶ BioAyer Consultants for the Regional District of Comox-Strathcona, October 31st, 1997, *The Comox Valley Greenways Plan Report*.

¹⁰⁷ Highway sites are identified in Donald A. Blood and Associates Ltd., August, 1997, *Wildlife Habitat Mapping Inland Island Highway Cumberland Road to Campbell River* and February, 1997, *Wildlife Habitat Mapping Vancouver Island Highway Mud Bay to Cumberland Road*.

¹⁰⁸ Personal Communication: Ken Bond (Gaia Consulting).

Community Conservation Features: Rosewall Park (1), Rosewall Creek and surroundings (1), Comox Terrestrial Macrosite (1), Tsable River (2), Tsable River Watershed (1), Trent River/Roy Creek Land Inventory¹⁰⁹ (1), Minto Area (1), CPA Environmental Resource Area – Cumberland OCP (1), Puntledge River Watershed (1), Upper Puntledge River Land Inventory (1), Puntledge River Fossil Beds (1), Browns River Watershed (1), Tsolum River Watershed (1), Upper Tsolum River Area – flats (1), Black Creek Watershed (1) and Oyster River Watershed (2).

‘West Valley’ Corridor – intended to link blocks of public and private forest land on the Valley’s western edge.¹¹⁰

4. **Union Bay Forest:** this corridor runs along the eastern edge of the Union Bay Provincial Forest. The Forest has been fragmented by logging but it still contains a large area of mixed second growth which surrounds at least 17 small wetlands.¹¹¹ The corridor would connect with the BC Hydro corridor at the south end.

Community Conservation Features: Trent River Nature Park (2), District Lot 7 (1), BC Hydro corridor (2) and Comox Terrestrial Macrosite (1).¹¹²

‘East/West’ Corridors – these seven corridors run approximately east to west across the project area, facilitating wildlife movement from upper to lower elevation areas and across river valleys.

5. **Beauforts to East Coast:** A protected corridor through the Tsable River watershed.¹¹³

Community Conservation Features: Lunchtime Lake (3), Silver Snag and Kim Lakes (2), Tsable River Watershed (1), Tsable River (2), Tsable River Estuary (1), Base Flat (3) and Comox Terrestrial Macrosite (1), Tsable River Highway Site 1 (1).

6. **Millard Estuary to Comox Lake:** from Millard/Piercy Creek estuary through to the proposed Trilogy Development, under the highway at Minto Road and from Maple Lake, along the west side of the Inland Highway to the Cumberland Community Forest covenant lands and Comox Lake. The corridor includes the paved Minto Road highway underpass because it is the only underpass available to animals between the Trent and Puntledge Rivers other than the Lake Trail/Morrison Creek and Bevan Wetland underpasses.^{114, 115}

¹⁰⁹ Identified along with four other land inventory areas in BioAyer Consultants, January 1998, *Land Status and Stewardship Options for Comox Harbour Area and Surrounding Uplands Near Courtenay, Vancouver Island, BC*.

¹¹⁰ BioAyer Consultants, 1997.

¹¹¹ Ibid.; Axyx Environmental Consulting Ltd. For the Canadian Wildlife Service. Revised June 2005. *Redigitizing of Sensitive Ecosystems Inventoried Polygons to Exclude Disturbed Areas: Summary Report*.

¹¹² Identified in The Nature Conservancy (US) and the Nature Conservancy of Canada, 2004, *The Willamette Valley-Puget Trough-Georgia Basin Ecoregional Assessment*.

¹¹³ Western Canada Wilderness Committee (Summer 2005) *Wilderness Committee Victoria Chapter Educational Report* Vol. 24 No.5.

¹¹⁴ Personal Communication (circa 2007): Michele Jones.

Community Conservation Features: Puntledge River Watershed (1), Cumberland/Chinatown Marsh (3), CPA Environmental Resource Area – Cumberland OCP (1), Maple Lake (5), Courtenay River Estuary Land Inventory (1), Millard Creek Greenway/Nature Park (1), Millard Creek wildlife holding/conservation covenant (1), Comox Terrestrial Macrosite (1) and Eastern End of Maple Lake - Highway Site 1 (1).

7. **Comox Lake to Millard/Piercy Headwaters:** from Comox Lake and the Pigeon Lake area, through the headwaters of Morrison Creek under the highway at the Lake Trail/Morrison Creek underpass and through the agricultural lands along Marsden Road. Roosevelt elk migrating from the Comox Lake/Pigeon Lake area, are known to travel this route. Alternatively, there are signs that Black bear and Roosevelt elk travel west of the Inland Highway towards Maple Lake and then southeast towards Trent River (along the Deep Bay-Oyster Biodiversity Corridor).¹¹⁶

Community Conservation Features: Puntledge River Watershed (1), Comox Lake Wetland (3), CPA Environmental Resource Area – Cumberland OCP (1), Morrison Creek - Highway Site 3 (1) and Wetland - Highway Site 4 (1).

8. **Strathcona Park to Seal Bay:** connects Strathcona and Woods Mountain Parks to the Browns River Provincial Forest and from the Tsolum River to the Sandwich Forest covenant and Seal Bay Park.¹¹⁷

Community Conservation Features: Browns River Watershed (1), Tsolum River Watershed (1), Greenways Concept - Area B (1), Medicine Bowls (5), Seal Bay Park and Crown Land (2), Browns River Highway Site 11 (1), Wetland North of Browns River – Highway Site 12 (1), Wetland – Highway Site 13 (1)

9. **Tsolum to Kitty Coleman Watershed:** Conservation Data Centre (CDC) Riparian and Douglas fir dominated Second Growth forest ecosystems along the Tsolum River, across the Portuguese Creek watershed to CDC Riparian ecosystem in the Kitty Coleman watershed, through patches of Crown forest lands in the Macham/Headquarters Road area.

Community Conservation Features: Tsolum River Watershed (1), Whitaker Road Greenway (1), Greenways Concept - Area B (1), Waterfront – Miracle Beach to Kitty Coleman (1) and Area B Coastal Habitat (1).

10. **Tsolum to Williams Beach:** connects Provincial Woodlot with CDC Wetland and Second Growth Forest ecosystems along the Tsolum River. It connects to a complex of CDC Wetland and Second Growth ecosystem near the junction of Tyee and Spike Roads.

¹¹⁵ CIVITAS Urban Design and Planning Inc. & Clive Grout Architect Inc. (June 9, 2006) *Master Plan Cumberland Interchange Lands* (prepared for Trilogy Properties VI Corporation) <http://www.trilogyatcumberland.com/pdfs/master-plan.pdf>; BioAyers Consultants, 1997.

¹¹⁶ Personal Communications (circa 2007): Michele Jones.

¹¹⁷ BioAyer Consultants 1997, Western Canada Wilderness Committee, Summer 2005.

Then it crosses the Old Island Highway near Surgenor Road and links to SEI Old Growth Forest ecosystem in the Williams Beach area.¹¹⁸

Community Conservation Features: Tsolum River Watershed (1), Upper Tsolum River – flats (1), Old Headquarters Townsite (1), Black Creek Watershed (1) and Waterfront – Miracle Beach to Kitty Coleman (1).

11. **Tsolum to Miracle Beach:** originates in wetlands of the upper Tsolum River and Black Creek headwaters, crosses the old highway north of the Black Creek Store. It crosses a block of private forestry lands and connects with Miracle Beach Provincial Park.¹¹⁹

Community Conservation Features: Black Creek Watershed (1) and Miracle Beach Provincial Park (1).

Upland Highway Crossings – these three corridors were chosen with the intention of protecting upland wildlife crossings in the northern portion of the project area. Through discussions with wildlife advisors we determined that wildlife crossings in the southern portion of the project area generally correspond with the bridges of larger creeks and rivers. Studies on animal use of both riparian and upland crossings are needed in order to make any statement about the viability of these crossings.

12. **Western Toad Tunnels:** Each year hundreds of thousands of provincially yellow listed¹²⁰ Western Toads (*Bufo boreas*), migrate out of Keddy's Swamp east of the highway, through frog tunnels under the highway, and into the hills around Mount Washington.¹²¹ This corridor would protect critical Western Toad habitat on either side of the highway.

Community Conservation Features: Tsolum River Watershed (1), BC Hydro corridor (2), Black Creek Watershed (1) and Wetland – Highway Site 31 (1).

13. **Large Mammal Underpass:** This corridor would protect refuge areas on either side of this wildlife underpass approximately 2.5 kilometers north of the Hamm Road interchange. The underpass, a bottomless unpaved arch built specifically for wildlife, is the only non-riparian passage along the Inland Highway. Its use by wildlife is supported by observation of tracks.¹²²

Community Conservation Features: Tsolum River Watershed (1), BC Hydro corridor (2), Black Creek Watershed (1) and Wetland – Highway Site 32 (1).

¹¹⁸ Personal Communications (circa 2007): Ken Bond.

¹¹⁹ BioAyer Consultants, 1997.

¹²⁰ BC Ministry of Environment. BC Species and Ecosystems Explorer.

http://srmapps.gov.bc.ca/apps/eswp/search.do;jsessionid=37d612f19cb2415085ada327db482981.qR9Hml1KqNCNa30Kcymbt_aheM-xaQ-x8ObgSLbxyIbNzAckeS-AmObNfzaxmRnxqL-huKa30xok5Nq79Jn70IqR9Hml1KqMTBpRmImAaImQ4xaxySah0M8QvJpkixo6XHngbyknvrkLOlQzNp65In0

¹²¹ Personal Communications (circa 2007): Ken Bond, Dan Bernard (DL Consulting) and Sean Wong (BC Ministry of Transportation and Highways).

¹²² Personal Communications (circa 2007): Dan Bernard and Ken Bond.

14. **Large Mammal Overpass:** This corridor would protect refuge areas on either side of the Duncan Bay Main overpass. This overpass may be used even more extensively by wildlife than the Large Mammal Underpass.¹²³

Community Conservation Features: Tsolum River Watershed (1), BC Hydro corridor (2), Black Creek Watershed (1) and Oyster River Watershed (2).

¹²³ Personal Communications (circa 2007): Dan Bernard.

9.4 Descriptions of Priority Recreational Greenway Trails

Prepared: May 2008

The four selected Priority Recreational Greenway Trails are described below and displayed on Map 7.

The Priority Recreational Greenway Trails were chosen by analyzing maps of existing and proposed Comox Valley parks and greenways, and searching the Conservation Database for linear features identified for designation as ‘greenway’ or ‘ecological greenway.’ Below each Priority Recreational Greenway Trail description is a list of greenway features, determined by this analysis to: (I) correspond with or be located adjacent to the Priority Recreational Greenway Trail; or (II), intersect the Priority Recreational Greenway Trail and therefore provide possible subsequent connections. Features identified as ‘ecological greenway’ in the Conservation Database are shown in italics to indicate the need to carefully manage or avoid disturbing these areas. The numbers in brackets refer to the number of bibliographic records in the Conservation Database that contain reference to the ‘greenway’.

1. One Spot Heritage Railway Trail

The southern section of this railway grade diverges from the Wellington Colliery Line approximately 300 metres from the intersection of Gartley Road and the Old Island Highway (Highway 19A). South of Millard Road, the grade has been developed as a trail by the City of Courtenay (as the Courtenay Riverway Trail) to 6th Street. The CV Land Trust has been involved in the promotion and development of the section of this trail that runs north from Cessford Road, where it is soft surfaced and used mainly by walkers and equestrians. This northern section has been opened from a point approximately 200 metres along Condensory Road from the intersection of Cessford and Condensory Roads, all the way to the Tsolum River, where the CVRD plans to build a suspension bridge. This bridge will open up possibilities to link sections of the grade that stretch into Electoral Area ‘C’.

(I) Overlapping or adjacent linear ‘Greenway’ Features: One Spot Heritage Railway Trail (5).

(II) Subsequent Connections: Piercy Road Trail (1), Browns River Trail (1), Headquarters Creek Trail (1), Merville/Headquarters Trail (1), Hamm Road Trail and Macaulay loops (1), Oyster River Trail (1), Inland Highway Greenway – North (1) and Area ‘C’ Greenway Trail (1).

2. Wellington Colliery Railway Trail

The Wellington Colliery railway starts in Union Bay at the ‘coal hills’ and from there it runs approximately parallel to Highway 19A until just south of Royston. Approximately 300 metres from the intersection of Gartley Road and Highway 19A the grade crosses the

Trent River and sweeps to the southwest, crosses the E&N line and winds its way along the Trent, to the south of Royston Road. The grade crosses the Inland Highway about 1,400 metres south of the Royston Road/Inland Highway overpass. The line meets Dunsmuir Avenue at Ulverston and runs along Dunsmuir for approximately 550 metres where it branches to the southwest and runs along the southern edge of the Village and through the Cumberland/Chinatown wetlands. It passes through Japanese Town Number One. The grade crosses Comox Lake Road at the Perseverance Creek bridge and continues toward the Number 4 Mine area.

- (I) Overlapping or adjacent linear 'Greenway' Features: Wellington-Colliery Rail Trail (1) and Old Collieries Rail ROW Greenway (1).
- (II) Subsequent Connections: Foreshore Greenway – Area A (1), One Spot Heritage Railway Trail (5), Esquimalt and Nanaimo ROW Greenway (2), Trent River Trail (1), Hydro ROW Greenway (1) and Inland Highway Greenway – South (1).

3. Comox Lake to Comox Trail

The CV Land Trust is a partner in this initiative due to the covenant held on the Masters Greenway and Wildlife Corridor. Work will continue with local governments and landowners to link together established sections of this trail and to conserve lands that will contribute to the trail while protecting riverbank and foreshore areas.

- (I) Overlapping or adjacent linear 'Greenway' Features: Puntledge River Trail – 2 sides (1), Puntledge and Browns River Greenway – northwest side of Puntledge (3), Puntledge River Trail – southeast side (1), Puntledge River Greenway (1), Courtenay Riverway (1), Valley View Greenway (1), Comox Valley Trail (2) and Comox Waterfront Ecologically Significant Corridor (1).
- (II) Subsequent Connections: Puntledge Triangle (1), Bevan/Maple Lake Trail Loop (1), Inland Highway Greenway – North (1), Browns River Trail (1), Rotary Riverside Trail (1), Morrison Creek Greenway (1), One Spot Heritage Railway Trail (5), Courtenay Riverway (1) and East Coast Trail Recreation Corridor (1).

4. Brooklyn Creek Trail

The CV Land Trust is interested in working with local governments, stewardship groups and private landowners along Brooklyn Creek to conserve and expand the existing trail, while respecting the sensitive Brooklyn Creek riparian corridor and adjacent land uses. At Guthrie Road the Brooklyn Creek Trail could become a road-side trail leading to connections proposed by both the City of Courtenay Official Community Plan and Area 'B' Electoral Area Plan. About 150 metres north along Anderton from the intersection of Anderton and Guthrie Roads, this trail would wind through the lands south of Hector/Atlas Road. Across Lerwick, the trail would connect with Lerwick Nature Park and the Hawk Greenway, which links to Hurford Hill Nature Park.

- (I) Overlapping or adjacent linear 'Greenway' Features: Brooklyn Creek Ecologically Significant Corridor (1), Lerwick Greenway (2), Hawk Greenway (1), Valley View Greenway (1) and Area 'B' Greenway Trail (1).

(II) Subsequent Connections: Lerwick Greenway (2), Hawk Greenway (1), Valley View Greenway (1), East Coast Trail Recreation Corridor (1), Comox Waterfront Ecologically Significant Corridor (1) and Comox Valley Trail (2).



Brooklyn Creek

Photo by Kerry Dawson

9.5 Conversion Database Bibliographic Entries



| Title | Creator(s) | Contributor(s) | Date of Production |
|---|---|----------------------------------|--------------------|
| 1999 Land Use Report - DL 7, Nelson District, Union Bay | McElhanney Consulting Services Ltd. | | October, 1999 |
| A Blueprint for Courtenay: Official Community Plan, Appendix 'A' to Bylaw No.2387 | The Corporation of the City of Courtenay | | February, 2005 |
| Comox Strathcona Natural History Society Newsletter, 1994 | Comox Valley Naturalists | Vi Chungranes et. al. | February, 1994 |
| Comox Valley Area Parks Plan | Planning Department Regional District Comox-Strathcona | | February, 1987 |
| Environmental Overview: Our Needs and Desires - Special Green Spaces and Some Threats to a Healthy Environment | Comox Valley Environmental Council | | October, 1991 |
| Greenways Study, Comox B.C. Project No.428 | Chislett Lattery Manson Architecture and | | September, 1993 |
| Identifying and Protecting Sensitive Shoreline Habitat and Adjacent Wetland Habitat on the East Coast of Vancouver Island, BC. Report of the Vancouver Island East Coast Shoreline and Adjacent Wetlands Workshop | Federation of British Columbia Naturalists | Comox Valley Naturalists | March, 1991 |
| Land Status and Stewardship Options for Comox Harbour Area and Surrounding Uplands Near Courtenay, Vancouver Island, BC | BioAyer Consultants | | January, 1998 |
| Proposed Habitat Landscape Model for the Comox Valley (Preliminary Draft) | Fry Kathleen | | September, 1993 |
| Rural Comox Valley Official Community Plan Bylaw, 1998, Amendment Bylaw No. 2 - Bylaw No. 2162 Electoral Area 'B' Electoral Area Plan and Greenways Plan | Regional District Comox Strathcona | | February, 2000 |
| Rural Comox Valley Official Community Plan Bylaw, 1998, Amendment Bylaw No 6 - Bylaw No.2194 Electoral Area 'A' Greenways Plan | Regional District Comox Strathcona | | January, 2000 |
| Rural Comox Valley Official Community Plan, 1998, Amendment Bylaw No.1 - Bylaw No.2100 Electoral Area 'C' Land Use Plan, Greenways Plan and Saratog/Miracle Beach | Regional District Comox Strathcona | | October, 1999 |
| Status of Proposed Protected Areas Feb. 2002 | Frank Hovenden | | February, 2002 |
| The Comox Valley Greenways Plan Report | BioAyer Consultants | | October, 1997 |
| The Courtenay River Estuary - Status of Environmental Knowledge to 1978, Special Estuary Series No. 8 | Sahlaa Morris, Leaney, A.J., Bell, L.M., and Thompson, J.M. | | March, 1979 |
| Town of Comox, Parks and Recreation Plan | The Town of Comox | | May, 1997 |
| Town of Comox, Official Community Plan, Bylaw 1471 | Town of Comox | | February, 2006 |
| Vancouver Island Land Use Plan - Goal II: Areas of Interest | Province of British Columbia | Comox Valley Naturalists | 1995 |
| Village of Cumberland Official Community Plan, 2004 | Contractor for the Village of Cumberland | | 2004 |
| Wilderness Committee Victoria Chapter, Educational Report Vol. 24, No. 5 | Western Canada Wilderness Committee - Victoria Chapter | | 2005 |
| Wildlife Habitat Mapping Inland Island Highway Cumberland Road to Campbell River | Donald A. Blood and Associates Ltd. | L. Knight and D. Blood | August, 1997 |
| Wildlife Habitat Mapping Inland Island Highway Mud Bay to Cumberland Road | Donald A. Blood and Associates Ltd. | L. Knight and D. Blood | February, 1997 |
| Williamette Valley-Puget Trough-Georgia Basin Ecoregional Assessment | The Nature Conservancy | The Nature Conservancy of Canada | March, 2004 |

9.6 Criteria and Measures to Evaluate Projects at the Property Level

Prepared: May 2008
Revised: December 2012

The table below has been developed to assist conservation partners and decision-makers in selecting lands for conservation at the local and site level. It is designed to generate 'total measures' for three categories: Conservation Value, Threat/Vulnerability and Suitability/Feasibility. The Conservation Value and the Threat/Vulnerability measures form a comparison matrix (see below). The Suitability/Feasibility assessment is intended for further consideration of areas identified as having high ratings for Conservation Value and Threat/Vulnerability

This decision making tool is a work in progress. Changes may be made by the CVCS Community Partnership to accommodate new information and/or to adjust the relative weight of the criteria.

| | | |
|--|--|---|
| THREAT VULNERABILITY  | High rating for Threat/Vulnerability and low rating for Conservation Value | High ratings for Conservation Value and Threat/Vulnerability |
| | Low ratings for Conservation Value and Threat/Vulnerability | High rating for Conservation Value and low rating for Threat/Vulnerability |
| | CONSERVATION VALUE  | |

| Criteria | Description | Measures |
|---|--|---|
| 1. CONSERVATION VALUE | Does the land correspond with any of the CVCS priority ecological areas: Sensitive Ecosystem and 30 metre buffer area, aquatic ecosystem, proposed biodiversity corridor (aquatic habitat corridor or upland habitat corridor)? ¹²⁴ | 5 = Yes (skip to 1.a) 0 = No (skip to 1.c) |
| a. Sensitive Ecosystem-Type | Is the land or a portion of the land identified as one of the following ecosystem types? Use SEI inventory protocol to assess. ¹²⁵ | 5 = Group 1 Ecosystems: Older Forest; Wetland or Riparian ecosystem; Garry oak associated ecosystem; Terrestrial Herbaceous, Sparsely Vegetated, Woodland or Coastal Bluff ecosystems. 4 = Group 2 Ecosystems: Older Second Growth Forests and Seasonally Flooded Agricultural Fields. 0 = No |
| b. Sensitive Ecosystem - Area | What size of area on the land is identified as Sensitive Ecosystem in 1a. above? | 5 = area \geq 5 ha 4 = area \geq 0.5 ha and \leq 5 ha 3 = \leq 0.5 ha |
| c. Rare or Threatened Ecological Community | Does the land contain an ecological community listed by the BC provincial Conservation Data Centre? Obtain qualified environmental professional report. ¹²⁶ | 10 = provincially Red listed 5 = provincially Blue listed 2 = provincially Yellow listed |
| d. Sensitive Habitat - Watercourse | Does the land include a watercourse as identified in the Sensitive Habitat Atlas or determined through field survey (stream, lake, wetland or vernal pool)? | 5 = Yes 0 = No |
| e. Connectivity -Proximity to Protected Land | How close is the land to a protected area (nature park, wildlife/ecological reserve or conservancy parcel)? | 5 = Abuts protected land 4 = <30 metres 3 = >30 and <100 metres 2 = >100 and <500 metres 1 = > 500 metres |

¹²⁴ See NWB Second Edition report and maps for descriptions of these priority areas.

¹²⁵ See the *Sensitive Ecosystems Inventory East Coast Vancouver Island and Gulf Islands Information Change Form* accessible from the Ministry of Environment, EcoCat: The Ecological Reports Catalogue.
<http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=2124>

. Last updated: March 19, 2007.

¹²⁶ Site series descriptions may be available in British Columbia Ministry of Forests (1994). Land Management Handbook Number 28. Green, R.N. and K. Klinka. *A Field Guide to Site Identification and Interpretation for the North Central Portion of the Northern Interior Forest Region*.

| Criteria | Description | Measures |
|---|--|---|
| f. Connectivity - Adjacency to Forest Land | Is the land adjacent to forested land such that protecting the land would contribute to the contiguity of forest cover on the landscape? | 5 = Yes 0 = No |
| g. Connectivity – Wildlife Barriers | Are there any permanent impassable barriers on or adjacent to the land that would prevent wildlife (travelling overland) from migrating to adjacent areas? | 5 = No permanent impassable barriers exist on or adjacent to the land; there is a high level of connectivity with adjacent areas. 3 = Barriers exist on or adjacent to the land; however, overland connectivity can be restored and enhanced - by minimizing existing barriers - to create a moderate level of connectivity with adjacent areas. 1 = Permanent impassable barriers exist that preclude wildlife migration overland to adjacent areas. |
| h. Community Conservation Feature | Is the land identified as a Community Conservation Feature in the Community Conservation Features database? ¹²⁷ | 3 = Yes, mentioned in 3 or more reports 2 = Mentioned in 2 reports 1 = Mentioned in 1 report 0 = No, not mentioned |
| i. Community Conservation Feature-Reliability of Community Conservation Information | If yes to above, how reliable (are) the information source(s)? | <ul style="list-style-type: none"> At least one information source has been verified by an RPBio or QEP At least one information source is based on an OCP, EAP, LAP public process At least one information source is from peer reviewed scientific literature At least one information source is from a conservancy, stewardship or watershed group Assign (3 points if one or more of the above apply) |
| | Total measure: Conservation & Community Value (max. 51) = | |

¹²⁷ See Comox Valley Conservation Strategy Bibliographic Database (Microsoft Access Application).

| Criteria | Description | Measures |
|--|--|--|
| 2. THREAT/ VULNERABILITY | | |
| a. Development | Is the land considered for development (commercial or industrial, residential, mineral, oil, gas or gravel extraction)? | 5 = within the next 2 years 3 = within the next 5 years 0 = no development considered in the foreseeable future. |
| b. Fragmentation | If the land or a portion of the land contains a Sensitive Ecosystem, is it intact or relatively unfragmented? Use SEI inventory protocol to assess (the SEI map layer can be queried for preliminary assessment). ¹²⁸ | 5 = unfragmented or <6% fragmented |
| | Total measure: Threat/Vulnerability (max. 10) = | |
| 3. SUITABILITY & FEASIBILITY* | | <p>*Suitability: the likelihood of conservation success based on factors that would impact the quality of the area and affect the cost for conservation over time.</p> <p>*Feasibility: initial cost/opportunity assessment</p> |
| a. Adjacency to conserved land | How close is the land to land already protected (as park, wildlife/ecological reserve or by a conservancy)? | 5 = Abuts protected land 4 = <30 metres 3 = >30 and <100 metres 2 = >100 and <500 metres 1 = >500 metres |
| b. Climate Change | Is the land likely to face serious damage/destruction due to climate change (i.e. coastline areas) or other factors? | 5 = No (good likelihood for adaptation to changes) 0 = Yes |
| c. Ownership/ zoning conflicts | Is there any ownership or zoning conflicts/controversy? | 3 = no ownership or zoning conflicts anticipated 2 = ownership or zoning conflicts are limited to issues that could be addressed in a good communication strategy 1 = Controversy or conflict anticipated, resources beyond standard communication strategy required 0 = Significant conflict anticipated |

¹²⁸ Query SEI layer (sevi_2004_rcs.shp) for 'Mod_type' and 'Dist_frag' in the attribute table.

| Criteria | Description | Measures |
|---|--|---|
| d. Partnership interest | Is there sufficient partnership and community interest? | <p>3 = Several partners, highly interested</p> <p>2 = Several partners, moderate interest</p> <p>1 = Partners not available but level of Land Trust membership and community interest considered sufficient to undertake conservation measures.</p> <p>0 = Partnership/community interest not considered sufficient to undertake conservation</p> |
| e. General Management Difficulty | Time commitment, accessibility, invasive species issues, other management issues. | <p>5 = Considered manageable given current resources.</p> <p>0 = Considered unmanageable given resources.</p> |
| f. Money/ Resources available | Is there a good potential to secure the necessary money/ resources for future conservation and management? | <p>3 = excellent potential</p> <p>2 = moderate potential</p> <p>1 = some potential</p> <p>0 = no potential</p> |
| | Total measure: Suitability & Feasibility (max. 24) = | |

9.7 NWB First Edition Recommendations to Local Government

Reprinted from Fyfe, L. (2008) *Nature without Borders: the Comox Valley Regional Conservation Strategy Phase 1 Final Report Revised and Updated July 2008*.

13.0 Recommended Policy, Regulation and Action

13.1 Ecosystems and Species Protection - Conservation and Growth Management

In order to effectively plan for conservation and to assist in growth management planning the following are recommended:

- a) **Improve regional conservation knowledge** by addressing gaps in science based information. Research priorities include: watercourse and sensitive ecosystems inventories and wildlife corridor studies.
- b) **Use the precautionary principle in regards to sensitive ecosystem protection.** Ensure that detailed inventory and mapping is undertaken, so that measures to protect and mitigate adverse effects on sensitive areas are put in place before development occurs.
- c) **Conservation planning requires ongoing consultation with First Nations** as there exists an unresolved land claim with the K'omoks Nation. Consult with respect for: legal rights; historic and cultural use of the land; and traditional knowledge of land and wildlife stewardship.
- d) **Adopt regionally consistent definitions for ecological greenways which clearly distinguish them from recreational greenways.** Refer to the wording developed by the Comox-Strathcona Regional District as a model.
- e) **Support the establishment of, and utilize a Valley wide mapping agency.** The agency would develop an efficient system for sharing of conservation information in digital format and would work towards conversion to a regionally consistent mapping system. This would facilitate the production of planning and educational maps that depict regional information such as sensitive ecosystems, watercourses and riparian areas, parks and greenways, and working landscapes (Agricultural Land Reserve and public forest lands).
- f) **Require allocation of land when development is proposed in an area that corresponds to an ecological greenway** as identified in any Official Community, Electoral Area, Local Area Plan or local government funded study.

13.2 Ecosystem and Species Protection - Recovering Costs and Creating Incentives

In order to address the costs of measures to protect ecosystem and species the following are recommended:

- a) **Develop methods and identify new opportunities to recover and reduce costs of conservation initiatives** using: greenways levies; development cost charges; density transfers and bonuses; tax exemption programs; and partnerships with local, federal, provincial and private programs.
- b) **Reduce the long term costs of development infrastructure by using methods such as:** soft engineering; low-impact development; and water balance models.

- c) **Partner with and employ the assistance of local environmental NGOs** to: identify and develop funding and partnership opportunities; contribute conservation data and mapping information; provide assessment tools; undertake stewardship and maintenance activities in ecological greenway areas; assess reports submitted to local governments by Qualified Environmental Professionals; and, contribute local knowledge.
- d) **Identify and develop alternative ways for protecting sensitive ecosystems on private lands**, such as incentives and public education programs.

13.3 Ecosystem and Species Protection - Regulation and Enforcement

To ensure that the survival needs of species and ecosystems are backed up by strong and regionally consistent environmental regulations, enforcement mechanisms, and public information programs the following are recommended:

- a) Protect all remaining sensitive ecosystems including minimum 30 metre buffer areas around them.
- b) Protect the Proper Functioning Condition (PFC) of riparian areas, wetlands and watercourses by ensuring that the principles and assessment methods defined in existing PFC documents³⁹ are used as a supplement to riparian assessment under the current legislation (Riparian Areas Regulation).
- c) Protect eagle and heron nest trees and the critical habitat surrounding those trees.
- d) Set clear goals for the development and enforcement of regulations that manage the ecological impacts of tree cutting, and land clearing and filling. For example, set the goal to reduce the spread of invasive non-native plant species, and then develop and enforce regulations that control the removal and transportation of fill and topsoil.
- e) Limit infrastructure and minimize human encroachment in protected areas. Anticipated benefits include a reduction in: local government liability conflicts; maintenance costs incurred by fragmentation, erosion, trampling and soil compaction; and, spread of invasive non-native plant and animal species caused by human interaction.

13.4 Recreational Greenway Trails – Planning and Implementation

Commit to regional recreational greenway trail planning. Develop and implement a regional plan based on the CV Land Trust's priority recreation greenways trails. Effective recreational greenway trail planning involves local governments and community partners working together.

- a) **Set up a structure for Comox Valley recreational greenway trail planning** that ensures meaningful consultation and decision-making. For example, planning could be structured in a similar way to the Comox Valley Cycling Task Force, or involve recreation and conservation groups in a similar manner as the Comox Valley Accessibility Committee.

- b) **Recreational trail planning requires ongoing consultation with First Nations** as there exists an unresolved land claim with the K'omoks Nation. Consult with respect for: legal rights; historic and cultural use of the land; and traditional knowledge of land and wildlife stewardship.
- c) **Adopt regionally consistent definitions for recreation greenways** that distinguish these greenways from ecological greenways and describe their intended use. Refer to the wording developed by the Comox-Strathcona Regional District as a model (see Appendix 6 in *Nature without Borders I*).
- d) **Develop an efficient system for sharing of greenways information in digital format** and work towards conversion to a regionally consistent mapping system.
- e) **Ensure that development honours the greenway trail recommendations and goals identified in local government plans and previous approved studies.** Require allocation of land when development is proposed in an area identified as a recreational greenway trail.

13.5 Recreational Greenway Trails - Recovering Costs and Creating Incentives

In order to address the costs of planning and implementing recreational greenways the following is recommended:

- a) **Partner with and employ the assistance of local NGOs:** identify and develop funding and partnership opportunities and undertake stewardship and maintenance activities on recreational greenway trails.

13.6 Recreational Greenway Trails - Regulation and Enforcement

To ensure that the development and use of recreational greenways is governed by regionally consistent regulations, bylaws and enforcement mechanisms, the following are recommended:

- a) Build and manage recreational trails with adequate buffers designed to minimize impacts to riparian and sensitive ecosystem areas, working lands and cultural heritage sites.
- b) Require that all pets be on leash when in proximity to an identified sensitive ecosystem area or working landscape.
- c) Designate all recreational greenway trails as low impact use only; discourage motorized vehicles, except motorized wheel chairs and scooters used by persons with mobility impairment.
- d) Ensure the use of pervious and environmentally benign trail surfacing materials. For wheel chair accessibility, use hard, smooth pervious surfacing materials for the major portion of the trail while using compacted gravel only for short distances leading to points of interest from the main trail.
- e) Ensure the assessment and selection of appropriate trail type in sensitive ecosystem areas (if rerouting the trail to avoid these areas is not an option). For example, install boardwalk to reduce impacts on wetland or riparian areas and ensure Proper Functioning Condition.

9.8 Species at Risk

List of Species at Risk in the Comox Valley (CDC)

(October 2011)

| English Name | Scientific Name | COSEWIC | SARA | BC List |
|---|--|-----------------|------------|---------|
| MAMMALS | | | | |
| American Water Shrew, brooksi subspecies | <i>Sorex palustris brooksi</i> | | | Red |
| Ermine, anguinae subspecies | <i>Mustela erminea anguinae</i> | | | Blue |
| Grey Whale | <i>Eschrichtius robustus</i> | Special Concern | Schedule 1 | Blue |
| Keen's Myotis | <i>Myotis keenii</i> | Data Deficient | Schedule 3 | Red |
| Roosevelt Elk | <i>Cervus canadensis roosevelti</i> | | | Blue |
| Steller Sea Lion | <i>Eumetopias jubatus</i> | Special Concern | Schedule 1 | Blue |
| Townsend's Big-eared Bat | <i>Corynorhinus townsendii</i> | | | Blue |
| Vancouver Island Marmot | <i>Marmota vancouverensis</i> | Endangered | Schedule 1 | Red |
| Wolverine, vancouverensis subspecies | <i>Gulo gulo vancouverensis</i> | Special Concern | | Red |
| BIRDS | | | | |
| Band-tailed Pigeon | <i>Patagioenas fasciata</i> | Special Concern | Schedule 1 | Blue |
| Barn Owl | <i>Tyto alba</i> | Threatened | Schedule 1 | Blue |
| Barn Swallow | <i>Hirundo rustica</i> | Threatened | | Blue |
| Brandt's Cormorant | <i>Phalacrocorax penicillatus</i> | | | Red |
| Brant | <i>Branta bernicla</i> | | | Blue |
| California Gull | <i>Larus californicus</i> | | | Blue |
| Caspian Tern | <i>Hydroprogne caspia</i> | Not at Risk | | Blue |
| Common Nighthawk | <i>Chordeiles minor</i> | Threatened | Schedule 1 | Yellow |
| Double-crested Cormorant | <i>Phalacrocorax auritus</i> | Not at Risk | | Blue |
| Great Blue Heron, fannini subspecies | <i>Ardea herodias fannini</i> | Special Concern | Schedule 1 | Blue |
| Green Heron | <i>Butorides virescens</i> | | | Blue |
| Long-tailed Duck | <i>Clangula hyemalis</i> | | | Blue |
| Marbled Murrelet | <i>Brachyramphus marmoratus</i> | Threatened | Schedule 1 | Blue |
| Northern Goshawk, laingi subspecies | <i>Accipiter gentilis laingi</i> | Threatened | Schedule 1 | Red |
| Northern Pygmy-Owl, swarthi subspecies | <i>Glaucidium gnoma swarthi</i> | | | Blue |
| Olive-sided Flycatcher | <i>Contopus cooperi</i> | Threatened | Schedule 1 | Blue |
| Peregrine Falcon, pealei subspecies | <i>Falco peregrinus pealei</i> | Special Concern | Schedule 1 | Blue |
| Purple Martin | <i>Progne subis</i> | | | Blue |
| Red-necked Phalarope | <i>Phalaropus lobatus</i> | Candidate | | Blue |
| Short-eared Owl | <i>Asio flammeus</i> | Special Concern | Schedule 3 | Blue |
| Sooty Grouse | <i>Dendragapus fuliginosus</i> | | | Blue |
| Surf Scoter | <i>Melanitta perspicillata</i> | | | Blue |
| Vesper Sparrow, affinis subspecies | <i>Poocetes gramineus affinis</i> | Endangered | Schedule 1 | Red |
| Western Grebe | <i>Aechmophorus occidentalis</i> | Candidate | | Red |
| Western Screech-Owl, kennicottii subspecies | <i>Megascops kennicottii kennicottii</i> | Special Concern | Schedule 1 | Blue |
| White-tailed Ptarmigan, saxatilis subspecies | <i>Lagopus leucura saxatilis</i> | | | Blue |
| REPTILES & AMPHIBIANS | | | | |
| Northern Red-legged Frog | <i>Rana aurora</i> | Special Concern | Schedule 1 | Blue |
| Wandering Salamander | <i>Aneides vagrans</i> | | | Blue |
| Western Painted Turtle - Pacific Coast Population | <i>Chrysemys picta pop. 1</i> | Endangered | Schedule 1 | |
| Western Toad | <i>naxyrus boreas</i> | Special Concern | Schedule 1 | Blue |
| FISH | | | | |
| Coho Salmon | <i>Oncorhynchus kisutch</i> | Endangered | | Yellow |
| Cutthroat Trout, clarkii subspecies | <i>Oncorhynchus clarkii clarkii</i> | | | Blue |

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| English Name | Scientific Name | COSEWIC | SARA | BC List |
|---|--|-----------------|------------|---------|
| Dolly Varden | Salvelinus malma | | | Blue |
| Western Brook Lamprey (Morrison Creek population) | Lampetra richardsoni pop. 1 | Endangered | Schedule 1 | Red |
| INVERTEBRATES | | | | |
| Autumn Meadowhawk | Sympetrum vicinum | | | Blue |
| Black Gloss | Zonitoides nitidus | | | Blue |
| Blue Dasher | Pachydiplax longipennis | | | Blue |
| Broadwhorl Tightcoil | Pristiloma johnsoni | | | Blue |
| Common Ringlet, insulana subspecies | Coenonympha tullia insulana | | | Red |
| Common Wood-nymph, incana subspecies | Cercyonis pegala incana | | | Red |
| Dun Skipper | Euphyes vestris | Threatened | Schedule 1 | Blue |
| Edith's Checkerspot, taylori subspecies | Euphydryas editha taylori | Endangered | Schedule 1 | Red |
| Evening Fieldslug | Deroceras hesperium | Data Deficient | | Red |
| Greenish Blue, insulanus subspecies | Plebejus saepiolus insulanus | Endangered | Schedule 1 | Red |
| Northern Abalone | Haliotis kamtschatkana | Threatened | Schedule 1 | Red |
| Olympia Oyster | Ostrea conchaphila | Special Concern | Schedule 1 | Blue |
| Pacific Sideband | Monadenia fidelis | | | Blue |
| Propertius Duskywing | Erynnis propertius | | | Blue |
| Rocky Mountain Parnassian, olympiannus subspecies | Parnassius smintheus olympiannus | | | Blue |
| Sand-verbena Moth | Copablepharon fuscum | Endangered | Schedule 1 | Red |
| Threaded Vertigo | Nearctula sp. 1 | Special Concern | | Red |
| Western Branded Skipper, oregonia subspecies | Hesperia colorado oregonia | Candidate | | Blue |
| Western Pine Elfin, sheltonensis subspecies | Callophrys eryphon sheltonensis | | | Blue |
| Western Thorn | Carychium occidentale | | | Blue |
| PLANTS | | | | |
| black knotweed | Polygonum paronychia | | | Blue |
| Carolina meadow-foxtail | Alopecurus carolinianus | | | Red |
| chaffweed | Anagallis minima | | | Blue |
| coast microseris | Microseris bigelovii | Endangered | Schedule 1 | Red |
| coastal wood fern | Dryopteris arguta | Special Concern | Schedule 1 | Blue |
| creeping wildrye | Leymus triticoides | | | Red |
| flowering quillwort | Lilaea scilloides | | | Blue |
| fragrant popcornflower | Plagiobothrys figuratus ssp. figuratus | Endangered | Schedule 1 | Red |
| Henderson's checker-mallow | Sidalcea hendersonii | | | Blue |
| Macoun's meadow-foam | Limnanthes macounii | Threatened | Schedule 1 | Red |
| Menzies' burnet | Sanguisorba menziesii | | | Blue |
| moss | Andreaea schofieldiana | | | Blue |
| moss | Ditrichum schimperi | | | Blue |
| moss | Homalothecium arenarium | | | Blue |
| moss | Platyhypnidium riparioides | | | Blue |
| Nuttall's quillwort | Isoetes nuttallii | | | Blue |
| Olney's bulrush | Schoenoplectus americanus | | | Red |
| Olympic mountain aster | Eucephalus paucicapitatus | | | Blue |
| Olympic onion | Allium crenulatum | | | Red |
| Oregon ash | Fraxinus latifolia | | | Red |
| pointed rush | Juncus oxymeris | | | Blue |

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| English Name | Scientific Name | COSEWIC | SARA | BC List |
|------------------------------|---|-----------------|------------|---------|
| poverty clover | Trifolium depauperatum var. depauperatum | | | Blue |
| purple sanicle | Sanicula bipinnatifida | Threatened | Schedule 1 | Red |
| Salish daisy | Erigeron salishii | | | Blue |
| sand-dwelling wallflower | Erysimum arenicola var. torulosum | | | Blue |
| slimleaf onion | Allium amplexans | | | Blue |
| snow bramble | Rubus nivalis | | | Blue |
| Tisch's saxifrage | Micranthes tischii | | | Red |
| Vancouver Island beggarticks | Bidens amplissima | Special Concern | Schedule 1 | Blue |
| | Euonymus occidentalis var. occidentalis | | | Red |
| western wahoo | Sericocarpus rigidus | Special Concern | Schedule 1 | Red |
| white-top aster | Viola praemorsa ssp. praemorsa | Endangered | Schedule 1 | Red |
| yellow montane violet | | | | |
| yellow sand-verbena | Abronia latifolia | | | Blue |