

Nature Without Borders

The Comox Valley Land Trust Regional Conservation Strategy

Phase I – Final Report
Revised and Updated July 2008

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Foreword

Foreword from the Comox Valley Land Trust Board of Directors

Nature has no borders; it does not recognize political or philosophical boundaries and it is essential for the health of human and non-human communities alike. To view nature in this way represents not a “special interest” approach but a modern advance in civil society. We are realizing that the current loss of ecosystems and biodiversity cannot continue, yet pressures to develop land for human use is placing huge demands on what remains.

An analysis of the provincial Sensitive Ecosystem Inventory for the Comox Valley shows that forty-two percent (approximately 2,700 hectares) of the area’s rare and threatened sensitive ecosystem lands in the Comox Valley were either lost, fragmented or reduced between 1991 and 2002. Ninety-seven percent (approximately 9,300 hectares) of highly valuable human-modified ecosystems (second growth forests and seasonally flooded agricultural fields) have been fragmented and reduced in this same time period (see Map 2 link below for further details and Appendix 10:)

http://www.cvlandtrust.org/rcs-maps/sei_disturbance_may2108_8.pdf

Only thirteen percent (approximately 23,500 hectares) of Comox Valley land is protected; and over ninety percent of that land is within Strathcona Provincial Park (see Map 3 link below for further details:)

http://www.cvlandtrust.org/rcs-maps/protected_areas_custom.pdf

Without a regional consensus to address these issues, the continued loss of biodiversity will eventually undermine nature’s ability to provide essential environmental services. Clean air and water, healthy soils, local food production and food security, and natural resource industries are at stake.

Economic, social and environmental sustainability for *all* Valley residents is uncertain, without the vision and courage of many partners working together with an understanding of the importance of maintaining the natural processes and biological diversity of this extraordinary region. With this understanding, potential land use decisions will be measured first and foremost by the extent to which they will conserve and restore nature.

This vision should include recreational opportunities so that community members can actively witness and experience our natural and cultural heritage. Advanced citizenship realizes our place in nature and our position in time; it includes an understanding of where we came from and where we are headed.





Foreword

Due to the impacts which ongoing population growth is having on the beauty and resilience of this landscape, regional conservation planning has been identified generally in this report as the single most important task that we as a community, must undertake. The approach the Comox Valley Land Trust has taken, in prioritizing areas for protection, provides a framework for future science based planning. The report encourages conservation partners within all jurisdictions to coordinate their approach to planning by adopting a universal set of approaches, values and terminology.

The very fabric that sustains us as a species is at risk. We are encouraging planning that ensures a quality of life for our great, great grandchildren and beyond.





Acknowledgements

Acknowledgements

Phase 1 of the Comox Valley Land Trust's Regional Conservation Strategy was overseen by CV Land Trust Board members and volunteers. Lynda Fyfe, served as the primary grant writer, coordinated the project and served as researcher and map and database technician for the project. The Comox Valley Land Trust Board would like to acknowledge Lynda's commitment, dedication and careful attention to detail, which have produced a technically sound, well-documented and insightful vision for conservation. Members of the original Steering Committee contributed to background research and project design ideas. Board members Pam Munroe, Jack Minard, Shirley Ward, and Vivian Dean dedicated a great number of hours and vast amounts of energy to ensuring the project went ahead. The process was greatly assisted by an informal affiliation of volunteer advisors from local, provincial, and federal government agencies, biological and wildlife consultants, members of the Comox Valley Naturalists and local streamkeeper groups.

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Acknowledgements

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Thank you to the members of the Comox Valley Conservation Strategy Working Group, formed in the summer of 2007. This dedicated group has reviewed and revised the recommendations section of this report. The original report has subsequently been re-published to include their valuable input.





Executive Summary

Executive Summary

The geography of the Comox Valley is characterized by an incredible richness and diversity of habitats. The Comox glacier and mountain alpine areas feed a multitude of watercourses large and small, which cut through forest, woodland and rich farmland areas to the intertidal zones of the ocean shore. This rich and diverse landscape has supported the equally rich cultural heritage of the K'omoks First Nations and the Valley's more recent human residents. With careful management and conservation this landscape may continue to provide the resources necessary for human and non-human survival for many generations to come.

The Regional Conservation Strategy project has developed an initial framework for conservation planning throughout the Comox Valley bioregion. The impacts of land development, population growth, industry and other human uses pose a serious threat to the richness and diversity of the Comox Valley. In order to be successful in conservation planning, this region must be regarded as an interconnected system, joined by water, plants, wildlife and culture.

The Regional Conservation Strategy framework presented in this report was developed, in part, to assist the many stakeholders – conservancies and other non-government agencies, local and senior levels of government, and individuals – to take on the challenging task of conservation planning and implementation. Many of the inter-jurisdictional issues that arise from and between stakeholders in conservation planning are addressed, such as: identification of priority areas for conservation, clarification of conservation terms; establishing common methods and criteria for determining priority areas; and regionally consistent mechanisms for protecting environmentally sensitive areas.

This report identifies a network of areas that the Comox Valley Land Trust (CV Land Trust) considers to be most critical to the long-term health of the community, wildlife and plant habitat, and biodiversity. This was achieved by compilation of available conservation inventories, plans and reports; and assessment of this information in light of current knowledge about remaining sensitive ecosystems, wildlife habitat and migration, and physical landscape changes. We incorporated feedback and advice from local government planners, provincial and federal environment staff, local stewardship and naturalist organizations, and biological and wildlife consultants.

The report defines conservation priorities in two categories: (a) ecological areas and (b) recreation areas.





Executive Summary

A) Priority Ecological Areas

The report:

- Outlines the common goals, objectives, guiding principles and landscape criteria used as a basis for planning and identifying priority ecological areas.
- Provides a map that shows where the priority ecological areas are situated on the landscape.
- Provides maps showing other ecological features including Comox Valley Biogeoclimatic Zones and Sensitive Ecosystems.
- Describes the CV Land Trust's methods and definitions used for identifying ecological areas: riparian areas, critical watersheds, sensitive ecosystems, and upland wildlife corridors.
- Identifies gaps in conservation information and technical challenges in conserving ecological areas.

B) Priority Recreation Areas

The report:

- Outlines the common goals, objectives, guiding principles and landscape level criteria used as a basis for planning and identifying priority recreation areas.
- Identifies priority recreation areas for conservation and provides a map that shows where they are situated on the landscape.
- Describes the CV Land Trust's methods and definitions used for identifying these areas.
- Identifies technical challenges in recreational greenways planning.

The report also introduces the technical tools that the CV Land Trust has developed, including:

- a comprehensive library of digital map layers, depicting many aspects of Comox Valley conservation and land use information; and
- a searchable Conservation Database containing conservation reports and land use plans (including Official Community Plans) and detailed information about the areas identified as conservation priorities, within these reports and plans.

The report puts forward a set of recommendations to help guide stakeholders in implementing regional conservation planning and to support the CV Land Trust's conservation objectives for ecological and recreation areas. The recommendations fit under four headings:

- Conservation and Growth Management Planning





Executive Summary

- Recreational Greenways Planning and Implementation
- Recovering Costs and Creating Incentives
- Regulation and Enforcement

Stakeholders are encouraged to review these recommendations and work together for their implementation.

Key recommendations include:

- Commit to regional conservation planning with all local governments participating, using the CV Land Trust's priority ecological areas as a framework.
- Honour existing ecological and recreational greenways studies.
- Ensure that the survival needs of species and ecosystems is backed up by strong and regionally consistent environmental regulations, enforcement mechanisms, and public information programs.
- Partner with and employ the assistance of local environmental NGOs to achieve conservation goals.

The CV Land Trust invites all agency and local government stakeholders and anyone supporting the conservation goals of this report to participate in the implementation of the Regional Conservation Strategy. Success in conserving critical priority ecological and recreation areas can only be achieved through commitment, leadership and collaboration. To this end, the next task is to the formation of a Working Group, consisting of stakeholder agencies and citizens who will identify ways and take actions to meet regional conservation goals.







Contents

1.0	Introduction	3
Part A: Priority Ecological Areas		5
2.0	Basis For Conservation Planning in Priority Ecological Areas	5
2.1	Goal	5
2.2	Objectives	5
3.0	Basis For Identifying Priority Ecological Areas	5
3.1	Guiding Principles	5
3.2	Landscape Level Criteria	6
4.0	Identified Gaps in Conservation Information	7
4.1	CV Land Trust Resources and Expertise	7
4.2	K'omoks First Nation Knowledge and Expertise	7
4.3	Sensitive Ecosystems Inventory	7
4.4	Watercourses Inventory	8
4.5	Biogeoclimatic Zone and Subzone Mapping	8
4.6	Wildlife Information	9
5.0	Technical Challenges in Conserving Ecological Areas	10
5.1	Ecological Greenways Definitions	10
5.2	Mapping Systems	10
6.0	Methods for Identifying Priority Ecological Areas	10
6.1	Literature Review and Data Compilation	10
6.2	Database Development	11
6.3	Map Analysis and Assessment of Sensitive Ecosystems	11
6.4	Assessment of Upland Wildlife Corridors	13
6.5	Wildlife Advisory Input	13
7.0	Selected Priority Ecological Areas	14
7.1	Riparian Areas	14
7.2	Critical Watersheds	14
7.3	Sensitive Ecosystems	14
7.4	Upland Wildlife Corridors	14
Part B: Priority Recreation Areas		15
8.0	Basis for Conservation Planning in Recreation Areas	15
8.1	Goals	15
8.2	Objectives	15
9.0	Basis for Identifying Priority Recreation Areas	15
9.1	Guiding Principles	15
9.2	Landscape Level Criteria	15
10.0	Technical Challenges in Recreation Greenways Planning	16
10.1	Recreation Greenways Definitions	16
10.2	Recreation Greenways Inventory And Mapping	16





11.0	Methods for Identifying Priority Recreation Areas	17
11.1	Literature Review and Data Compilation	17
11.2	Map Assessment	17
11.3	CV Land Trust Board Input	17
12.0	Selected Priority Recreation Areas	18
Part C: Recommendations To Local Governments		18
13.0	Recommended Policy, Regulation and Action	18
13.1	Ecosystems and Species Protection	
	Conservation and Growth Management	19
13.2	Ecosystem and Species Protection	
	Recovering Costs and Creating Incentives	20
13.3	Ecosystem and Species Protection	
	Regulation and Enforcement	20
13.4	Recreational Greenway Trails	
	Planning and Implementation	21
13.5	Recreational Greenway Trails	
	Recovering Costs and Creating Incentives	22
13.6	Recreational Greenway Trails	
	Regulation and Enforcement	22
14.0	Conclusion	23
15.0	Future Work	24
16.0	Appendices	25
16.1	Upland Wildlife Corridors	25
16.2	Priority Recreation Areas – Greenway Trails	29
16.3	Informal Wildlife Advisory	31
16.4	Conservation Database – Bibliographic Entries	32
16.5	Property Assessment Criteria	33
16.6	Sample Greenway Definitions	37
16.7	Comprehensive List of Data Files	41
16.8	Technical Briefing for the RCS Working Group	45
16.9	Proposal for a Single Mapping Agency	46
16.10	Methods Used to Derive Sensitive Ecosystem Inventory	
	Statistics for the Comox Valley	47
17.0	Maps	48
17.1	Regional Conservation Strategy Project Area	
17.2	Comox Valley Disappearing Sensitive Ecosystems	
17.3	Comox Valley Protected Lands	
17.4	CV Land Trust Priority Ecological Areas for Conservation	
17.5	CV Land Trust Priority Recreation Areas for Conservation	
17.6	Comox Valley Biogeoclimatic Zones and Sensitive Ecosystems	
18.0	End Notes	48





Introduction

The CV Land Trust, as a member organization of the Land Trust Alliance of British Columbia, will continue to work with partners using conservation covenants, stewardship and land acquisition within our priority areas.

1.0 Introduction

The Comox Valley Land Trust (CV Land Trust) has developed an initial framework for regional conservation planning during Phase 1 of our Regional Conservation Strategy (RCS) project. This two-year process has resulted in: (1) identification of a network of conservation priority areas for the CV Land Trust; (2) criteria to guide the organization's conservation decision-making; (3) a better understanding of the actions, policies, partnerships and tools that will assist in implementing regional conservation measures; and (4) the technical tools necessary for the creation of a conservation atlas for the Comox Valley.

The results of Phase 1 were developed after compilation and review of past conservation inventories, plans and reports. This background literature has been assessed in light of the most current information about remaining sensitive ecosystems¹, wildlife habitat and migration, physical landscape changes and changes to policy. We incorporated information and advice from an informal advisory of local government planners, provincial and federal environment staff, local stewardship and naturalist organizations, and biological and wildlife consultants.

The RCS project was designed using information available from regional conservation planning processes taking place in other parts of BC and North America. The conservation priorities, recommendations and tools delivered in Phase 1 constitute the preliminary stage of regional conservation planning for the Comox Valley and are another step towards conservation initiatives that protect intact and representative ecosystems, diversity of species, and long-term human health and welfare. The RCS project builds on the momentum towards these goals, which have been identified by the larger community.

The CV Land Trust, as a member organization of the Land Trust Alliance of British Columbia, will continue to work with partners using conservation covenants, stewardship, and land acquisition, to conserve identified priority areas within two categories: (1) ecologically important areas, and (2) recreation areas. These selected areas – described below – were chosen by the CV Land Trust for their importance to the long-term health of human and non-human communities.

The work of conservancies constitutes only one part of the range of actions that are needed; local and provincial government agencies hold the power to implement broad-scale environmental policies to protect natural attributes such as riparian areas and other remaining sensitive ecosystems. Therefore, this report is divided into three parts: Part 'A' outlines the CV Land Trust's priority ecological areas, Part 'B' outlines our priority recreation areas and Part 'C' outlines the CV Land Trust's recommendations to local governments.





Introduction





Part A Priority Ecological Areas

Part A: Priority Ecological Areas

2.0 Basis For Conservation Planning In Priority Ecological Areas

2.1 Goal

Conserve sensitive ecosystems, plant and wildlife habitat (i.e. reservoirs, refuges and corridors)² so that the widest range of plant and animal species will be able to survive and adapt to changes in land use and climate conditions.

2.2 Objectives

- (1) Work with government agencies, stewardship groups, conservancies and the public to improve our conservation knowledge and address gaps in information
- (2) Establish long term partnerships responsible for protection of priority areas and for developing and maintaining conservation tools
- (3) Increase regionally based planning and conservation initiatives

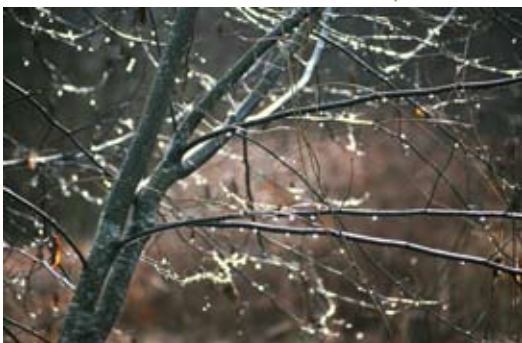
3.0 Basis For Identifying Priority Ecological Areas

3.1 Guiding Principles

Build on existing conservation information and knowledge – including three well-accepted principles of conservation biology:³

- i. Large habitat areas are better than small areas
- ii. Habitat areas closer together are better than areas far apart
- iii. Areas with low fragmentation are better than areas with high fragmentation

*Red alder - forested swamp.
Credit: Brent Reid*





Part A Priority Ecological Areas

3.2 Landscape Level Criteria

3.2.a Riparian Areas

Riparian ecosystems occur on floodplains adjacent to lakes, streams and rivers, where high soil moisture and light conditions support distinct soil and plant communities.⁴

The CV Land Trust includes in this definition riparian areas associated with any aquatic ecosystem (including wetlands) whether permanent or ephemeral and regardless of fish presence or connectivity to overland flow. Riparian areas are highly productive ecosystems that are necessary for most animal species at some part of their life cycle. To identify riparian areas, the CV Land Trust used the existing watercourse inventory from the June 2004 *Comox-Strathcona Sensitive Habitat Atlas 3rd Edition*; the rivers, lakes and wetlands inventory from the former Ministry of Sustainable Resource Management's 2004 *BC Watershed Atlas – Comox Watershed Group – Stream Network Layer*; and the wetlands mapped and inventoried by Project Watershed Society. Riparian areas are natural wildlife corridors and may also be referred to as 'aquatic habitat greenways.'⁵



Coastal Douglas fir ecosystem – Masters' Greenway and Wildlife Corridor. Credit: Brent Reid



Healthy riparian zone – lower Millard Creek. Credit: Brent Reid

3.2.b Sensitive Ecosystems

The CV Land Trust uses the provincial Conservation Data Centre's (CDC) definition of sensitive ecosystems and includes in the definition CDC "other ecosystems" (Seasonally Flooded Agricultural Fields and Older Second Growth Forests) which are human modified ecosystems that have significant biodiversity and wildlife values.⁶ These provincially inventoried ecosystems along with Project Watershed Society inventoried sensitive ecosystems are displayed in the June 2004 *Comox-Strathcona Sensitive Habitat Atlas 3rd Edition*. Since the SEI only captured one Garry oak associated area in the Comox Valley, this conservation project includes the Garry oak ecosystems that have been mapped at a preliminary level by Nick Page of Raincoast Applied Ecology (RAE) and by the Ministry of Environment (MOE).



The Red-legged frog – a species at risk that depends on both ephemeral wetlands and upland forests to survive. Credit: Kayt Chambers

3.2.c Upland Wildlife Corridors

The CV Land Trust definition for upland wildlife corridors includes habitat refuges and reservoirs and existing or potential connections between them. These areas provide safe migration routes both for larger mammals and smaller less mobile species, while protecting sensitive upland ecosystems including wetlands,





Part A Priority Ecological Areas

woodlands and forests. The primary function of these areas is to protect biodiversity so that plant and wildlife species and their diverse ecosystems are ensured survival, allowing for natural succession to take place. Upland wildlife corridors may also be referred to as ‘upland habitat greenways.’⁷

4.0 Identified Gaps In Conservation Information

Our ability to identify priority ecological areas was limited by the availability of complete science based information for ecosystems and wildlife within the project area shown on Map 1. There is further work to be undertaken if we are to achieve regional conservation that protects and maximizes connections between representative and intact sensitive ecosystems within the biogeoclimatic zones of the Comox Valley. Complete and detailed baseline inventories for the project area would greatly increase the effectiveness of conservation planning and implementation. For example, the Islands Trust Fund has completed air photo identification of all natural and modified ecosystems in the Islands Trust Area. This has allowed them to develop a conservation plan which aims to strategically protect the range of natural ecosystems represented in each local trust area/ island municipality.⁸ The CV Land Trust encourages partnership actions by government agencies, conservancy and stewardship groups and private interests, to address these information gaps in order to improve the scope and effectiveness of regional conservation planning.

4.1 CV Land Trust Resources and Expertise

Selection of ecological priority areas in Phase 1 was based on assessment of conservation map layers and data, and on the advice of local wildlife and biological consultants (listed in Appendix 3). The CV Land Trust did not have the resources or expertise available to ground survey all of these areas, nor to conduct detailed studies of wildlife habitat and migration within our identified upland wildlife corridors.

4.2 K’omoks First Nation Knowledge and Expertise

Participation by K’omoks First Nations is necessary so that conservation plans reflect First Nations unique and irreplaceable knowledge, perspective and expertise. The results of Phase 1 will be submitted to the Band for feedback, as they have requested.

4.3 Sensitive Ecosystems Inventory

Our priority assessment for Phase 1 was concentrated in the lower elevation portion of the project area known as the Nanaimo Area Lowland





Part A Priority Ecological Areas

(NAL) ecosection. Within the NAL, a Sensitive Ecosystems Inventory (SEI) was completed by the Canadian Wildlife Service and the Ministry of Environment in 1994 (using air photos from 1991-1993). The SEI was re-done in 2004 (using air photos from 2002) to show areas that had been disturbed in the intervening years.⁹ (Map 2 link below and Appendix 10 of this report describe results of the SEI reassessment for the Comox Valley.)

http://www.cvlandtrust.org/rcs-maps/sei_disturbance_may2108_8.pdf

In the upper elevation ecosection (the Leeward Island Mountains or LIM), there is no accessible sensitive ecosystem information. The LIM is the location of the largest community watershed in the Comox Valley. This area is largely privately owned forest land that is being logged intensively. A Sensitive Ecosystems Inventory in the LIM would allow conservation partners to assess conservation priorities in this area, would allow tracking of sensitive ecosystem disturbance, and would greatly assist regional conservation efforts.



*Garry Oak along Vanier Drive
Credit: Lynda Fyfe*

A further information gap is inherent in the provincial SEI itself, which was conducted primarily by air photo analysis, and shows only those ecosystems that are greater than half a hectare in size. Wetted forests, ephemeral wetlands, the riparian areas of small streams, and Garry oak and associated ecosystems are examples of highly important areas that were largely missed by the SEI. A Ministry of Environment inventory, done separately from the SEI, shows estimated historic and present day locations of Garry oak ecosystems in the Comox Valley; however, the present day information is incomplete (showing only the one site at Point Holmes).

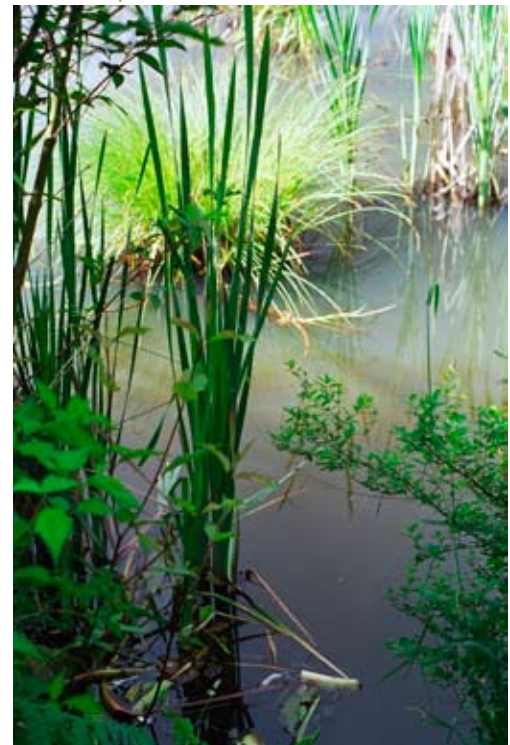
Detailed ground-truthing and mapping of smaller ecosystems, done by groups like Project Watershed Society, has added to the provincial inventory; however, much more work is needed. Ground-truthing is critical for verifying sensitive ecosystems and identifying additional areas, but the costs can be prohibitive for local non-profit groups.

4.4 Watercourses Inventory

Approximately fifty percent of small streams within low elevation watersheds in the Comox Valley have not yet been mapped.¹⁰

4.5 Biogeoclimatic Zone and Subzone Mapping

Within the project area, two Biogeoclimatic Zones: 1) Coastal Douglas Fir, and 2) Coastal Western Hemlock are determined to be highly valuable due to the rarity of species and plant communities within them.



*Cumberland Wetland
Credit: Nichole Narbonne*





Part A Priority Ecological Areas



*Coho fry from Millard Creek.
Credit: Warren Fleenor
Coho spend from three months to as
much as four years feeding in streams
before they migrate to the sea.*



*Perseverance Creek
Credit: Lynda Fyfe*

It is very important that representative and intact pockets of these ecosystems are protected. According to provincial Biogeoclimatic Zone mapping (see Map 6), the majority of the RCS project area consists of Coastal Western Hemlock Zone, with a small area of Coastal Douglas Fir in the Deep Bay area (to the south of the Chef Creek watershed).¹¹ The map does not show areas of ecosystem transition within the lowland Comox Valley; in effect it misses Coastal Douglas Fir ecosystems that exist north of Deep Bay.

Likely locations of remnant Douglas fir ecosystems can be found by querying the SEI layer in ArcView 3.2A to display areas where Douglas fir are the dominant tree species. This tool can also be used as a means of identifying potential Garry oak locations; since Garry oak are an associated understory species of the Comox Valley's Coastal Douglas Fir Moist Maritime Subzone.¹²

4.6 Wildlife Information

Wildlife information for the Comox Valley is very limited. The data used in Phase 1 was gathered from the Rare Element Occurrences records held by the provincial Conservation Data Centre,¹³ wildlife habitat mapping that took place before the Inland Island Highway (Highway 19) was constructed, and a collection of studies by contracted biologists. There are no comprehensive studies of important wildlife corridors - including habitat reservoirs and refuges for both large mammals and less mobile species such as amphibians - available at the time of this report. Working for the Regional District of Comox-Strathcona in 1997, BioAyer Consultants identified 'Biodiversity Corridors' that were intended to provide "connectivity between large blocks of habitat" and "connections to the hinterland."¹⁴ The work of BioAyer provided the first regional concept plan for upland wildlife corridors; however, these Corridors have not been formally studied to determine species use, existing or potential barriers to connectivity, and requirements for conservation and restoration.

Additionally, no formal studies or assessments documenting the impacts to wildlife from Highway 19 are available at the time of this report.¹⁵ The relative effectiveness of wildlife passage infrastructure is not known to be monitored, with the exception of information on wildlife collisions collected through the Wildlife Accident Reporting System (WARS).¹⁶





Part A Priority Ecological Areas

5.0 Technical Challenges In Conserving Ecological Areas

5.1 Ecological Greenways Definitions

Greenways in the Comox Valley are in need of clear and consistent definition. Except within the Comox-Strathcona Regional District, greenways have not been clearly or consistently defined in terms of their intended purpose and use (e.g. for wildlife and biodiversity versus human recreation, or for motorized versus non-motorized use).

The Comox-Strathcona Regional District (CSRD) has developed a system for defining greenways that specifies two types of Ecological Greenways outside of the Agricultural Land Reserve: (1) Aquatic Habitat Greenways and (2) Upland Habitat Greenways. Refer to Appendix 6 to view the definitions and language developed by the CSRD Electoral Area 'B', which could serve as a regional template, distinguishing ecological greenways from recreational greenways.

5.2 Mapping Systems

The CV Land Trust compiled regional greenways information from the three municipal governments and from the CSRD. The information existed in various formats including *ArcView* shape files, *AutoCad* files and paper maps. The accuracy of the resulting compilation is affected by variations in the original format of that information and this in turn presents challenges for sharing information for regional planning purposes. Efforts to conserve ecological greenways and other ecologically sensitive areas would be assisted by the use of a common mapping system (tools, methods and protocols) amongst the local governments.

6.0 Methods For Identifying Priority Ecological Areas

6.1 Literature Review and Data Compilation

Existing conservation and planning information – in digital and hard copy formats – was gathered over the February 2005 to February 2007 period. The digital layers collected by the CV Land Trust include aquifers, heron and eagle nest tree sites, sensitive ecosystems inventories, Garry oak inventories, and rare species occurrence information. Digital layers showing land status information include a comprehensive Crown lands layer, Agricultural Land Reserve, existing and proposed parks and greenways





Part A Priority Ecological Areas



Skunk cabbage – a wetland species that signals the arrival of spring.
Credit: Lynda Fyfe

in the region, and a layer showing all lands in our region that are held in conservation covenant or owned in fee simple by a conservancy. See Appendix 7 for a comprehensive list of RCS data files.

Hard copy conservation literature collected and reviewed in Phase 1 includes: Official Community Plans; parks and greenways studies; reports by provincial agencies, conservancies and consultants; and submissions by the Comox Valley Naturalists and other local stewardship organizations. Appendix 4 provides a bibliography.

6.2 Database Development

A Conservation Database was built to house bibliographic information from the conservation literature (including creator(s), contributor(s), date and brief abstract). Most of the literature sources were selected because they list specific sites in the RCS project area that have been recommended for environmental protection in the past. Each of these sites (which the CV Land Trust have termed ‘Community Conservation Features’) is recorded in the Database along with information about the special environmental attributes, historical information and conservation recommendations that were noted in the literature sources. These Community Conservation Features have been mapped using *ArcView 3.2A*.

6.3 Map Analysis and Assessment of Sensitive Ecosystems

Sensitive ecosystem data layers were collected from the Conservation Data Centre, Project Watershed Society, the BC Ministry of Environment and Nick Page of Raincoast Applied Ecology. By definition, all sensitive ecosystems are rare and threatened and thus important for the protection of species and biodiversity; however, certain ecosystems are deemed to be more valuable based on measures of rarity. To reflect this, *ArcView 3.2A* was used to identify two ecosystem groups.

6.3a Group 1 Sensitive Ecosystems

Group 1 includes Douglas fir dominant Older Forest, Wetlands, and Riparian areas identified by the CDC and Project Watershed Society (PWS); and Garry oak ecosystems identified by CDC (one area identified), RAE and MOE records. Group 1 will be given higher value when it comes to CV Land Trust decision-making on properties within priority areas (see Appendix 5 for Property Assessment Criteria).

Rationale: Less than one percent of Vancouver Island’s original mature and old growth Douglas fir forests remain. Within the Douglas fir biogeoclimatic zone are thirty-seven plant communities that the British Columbia Conservation Data Centre identifies as Red or Blue listed.¹⁷ Only five percent of Canada’s Garry oak ecosystems remain intact, and as a result over seventy species of highly rare plants and animals that rely on these





Part A Priority Ecological Areas

ecosystems are critically at risk.¹⁸ Wetlands and Riparian ecosystems were selected for Group 1 because of their high ecological productivity and because they provide key habitat for most animal species during some part of their lifecycle.

ArcView 3.2A Methods: In the Sensitive Ecosystem Inventory 2004 layer, the attribute 'Mod_type' was queried to exclude ecosystems deleted since 1991 due to disturbance, fragmentation or remnant association. The 'Ecosystem1' attribute was queried to select Older Forests and the 'Dominants' attribute was used to query Douglas fir dominant Older Forests from this set. The 'Dominants' attribute was queried to find the one area (Woodland ecosystem) where Garry oak are amongst the dominant species. The 'Ecosystem1' attribute was queried again to add all Wetland and Riparian ecosystems to the set. A thirty metre buffer was applied to these ecosystems in *ArcView 3.2A*.



*Old Growth forest scene.
Credit: Brent Reid*

6.3b Group 2 Sensitive Ecosystems

Group 2 ecosystems include: Older Forests in which the dominant species is other than Douglas fir; Terrestrial Herbaceous, Sparsely Vegetated, Woodland and Coastal Bluff ecosystems in which the dominant species is other than Garry oak; and Older Second Growth Forests and Seasonally Flooded Agricultural Fields.

Rationale: Older Forests are biologically rich and distinct from younger, second growth forests in both age and structure. They are remnants of forest that existed much more extensively throughout the Comox Valley about 150 years ago.¹⁹ Terrestrial Herbaceous, Sparsely Vegetated, Woodland and Coastal Bluff ecosystems are all recognized as unique and fragile by the CDC. The CDC does not consider Older Second Growth Forests and Seasonally Flooded Agricultural Fields to be "sensitive" ecosystems; however they do consider them noteworthy for their biodiversity and wildlife values.²⁰ The Comox Valley Land Trust values these areas for their contribution to community and ecosystem health and because they are often associated with working forests and farms.

ArcView 3.2A Methods: In the Sensitive Ecosystem Inventory 2004 layer, the attribute 'Mod_type' was queried to exclude ecosystems deleted due to disturbance, fragmentation or remnant association. The 'Ecosystem1' attribute was queried to select Older Forests and the 'Dominants' attribute was queried to select from that set ecosystems in which Douglas fir are not amongst the dominant species. It should be noted that all Older Forests with blank 'Dominants' fields were included in this selection. The





Part A Priority Ecological Areas

'Dominants' attribute was then queried to capture all ecosystems where Garry oak is not amongst the dominant species. Wetlands and Riparian areas were deselected for this set by querying the 'Ecosystem1' attribute. A thirty metre buffer was applied to this set of Group 2 ecosystems.

6.4 Assessment of Upland Wildlife Corridors

The 'Biodiversity Corridors' from BioAyer Consultants' 1997 *The Comox Valley Greenways Plan Report* 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's assessment and in some cases new corridors were added.

6.4a Map Layers Representing Environmental Conditions

- Sensitive Ecosystems – described in Section 3.2.b above
- Community Conservation Features – upland areas identified by a high number of conservation plans and reports as recorded in the Conservation Database²¹
- 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*

6.4b 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)

6.5 Wildlife Advisory Input

We enlisted an advisory of local biological and wildlife experts (Appendix 4), who contributed their knowledge of migration and refuge areas for both large and small animals. Information collected from Wildlife Advisors included any known impassable wildlife barriers (such as road and property fencing). One example of infrastructure that has likely created significant challenges for wildlife migration since 1997 is Highway 19. For large





Part A Priority Ecological Areas

mammals, protected passage to either side of the Highway has been limited to riparian passages under bridges, some road overpasses and underpasses, and one specially designed wildlife arch north of Hamm Road.²²

7.0 Selected Priority Ecological Areas

The CV Land Trust's selected priority areas are described below and in Appendix 1. When available, field assessments by Qualified Environmental Professionals will provide more detailed information about these areas.

7.1 Riparian Areas

The CV Land Trust will focus conservation efforts within a minimum of thirty metres from the top-of-bank (or top of ravine) of any watercourse or water body. Riparian areas of both permanent and ephemeral bodies of water are priorities regardless of fish presence and regardless of a watercourse's connectivity to overland flow.

7.2 Critical Watersheds

The Browns and Tsable River Watersheds are identified as high priorities because they contribute to the Western Canada Wilderness Committee's proposed Vancouver Island Conservation Vision.²³ Protection of the Browns and Tsable River watersheds would create a link for animals between the eastern and western coasts of Vancouver Island through Strathcona Provincial Park.

7.3 Sensitive Ecosystems

The CV Land Trust will focus conservation efforts on Group 1 and 2 sensitive ecosystems including land within a minimum of thirty metres of these ecosystems. See Section 6.3 for an explanation of the process for identifying these ecosystems. Note that for conservation decision-making at the property level, SEI data collection protocols will be used to verify preliminary information.²⁴

7.4 Upland Wildlife Corridors

The areas that the CV Land Trust selected as priority Upland Wildlife Corridors are described in Appendix 1 and are represented on Map 4. All Upland Wildlife Corridors have been given buffers of 500 metres on the map, except for the approximately 100 metre wide BC Hydro Corridor. The CV Land Trust will focus conservation efforts within these buffered areas.



*Red Columbine – a native flower that grows in sensitive ecosystems. It attracts hummingbirds as pollinators.
Credit: Nichole Narbonne*



*Rufous hummingbird.
Credit: Father Charles Brant*





Part B: **Priority Recreation Areas**

8.0 Basis For Conservation Planning In Recreation Areas

8.1 Goals

To increase opportunities for recreation and non-motorized travel in the Comox Valley by helping to implement a regional recreational trails system that increases human connections to nature and natural settings, while protecting sensitive ecosystems and cultural heritage sites and respecting working landscapes.

8.2 Objectives

To work with government agencies, stewardship groups, conservancies, and the public to implement conservation measures, trail inventories, and land stewardship initiatives on and adjacent to priority recreation corridors.

9.0 Basis For Identifying Priority Recreation Areas

9.1 Guiding Principles

- (1) Build on recreational greenways plans and priorities as identified by the larger community
- (2) Protect sensitive ecosystems, working landscapes, and cultural heritage values

9.2 Landscape Level Criteria

CV Land Trust's priority recreational areas are trails (or sections of trail) that facilitate low-impact recreation and non-motorized vehicles (which may include electric wheelchairs and scooters). They are surfaced with pervious surfacing materials that are environmentally benign and are located outside of ecologically sensitive areas. Where the trails run adjacent to an ecologically sensitive area, working landscape or a sensitive cultural heritage site, every effort is made to buffer and protect the adjacent land values.





Part B Priority Recreation Areas

10.0 Technical Challenges In Recreational Greenway Planning

10.1 Recreation Greenways Definitions

As discussed in Section 5.1 above, greenways in the Comox Valley are in need of clear and consistent definition. These definitions would distinguish recreational greenways from ecological greenways, as well as distinguishing trails from other types of recreational access routes such as sidewalks or roads.

The CSRD Electoral Area 'B' greenways definitions could serve as a regional template, by defining and describing three types of recreation greenways: (1) Greenway Trails; (2) Greenway Roads; and, (3) Greenway Sites (refer to Appendix 6 for more information).

10.2 Recreation Greenways Inventory and Mapping

The CV Land Trust compiled regional greenways information from the three municipal governments and the CSRD. Although local governments have made good progress in identifying and mapping recreation greenways within their jurisdictional boundaries, the differences in methods of recording this information presents challenges for sharing and compiling it for regional planning purposes.

Regional recreation greenways planning would be assisted by a consistent mapping system (tools, methods and protocols) amongst the local governments. Such a system could incorporate useful attribute information like type of trail surfacing, as surface plays a large part in determining a trail's character and usage by the various user groups. As part of its greenways strategy, the City of Courtenay is currently undergoing inventory of its existing greenways, to collect information such as trail usage, surfacing and connectivity.²⁵



*Valley View Greenway.
Credit: Brian Walwork*





Part B Priority Recreation Areas



CV Land Trust trail stewardship – volunteers replant native species along the One Spot Railway Trail. Credit: Diana Caldwell

11.0 Methods For Identifying Priority Recreation Areas

11.1 Literature Review and Data Compilation

Digital files and hard copy map information for all existing and proposed parks and greenways in the region was compiled by the CV Land Trust in *ArcView* 3.2A. In some cases, greenways information existed in *ArcView* digital format, while some digital files had to be converted from *Autocad* (.dwg) files and many greenways plans needed to be transcribed (digitized) from hard copy maps and reports. These existing and proposed greenways were recorded in the Conservation Database in association with the source literature (Official Community Plans, Electoral Area Plans and greenways reports). For each greenway, information and recommendations from the source reports was recorded.

11.2 Map Assessment of Recreation Areas

Selection of priority recreation areas in Phase 1 was based on assessment of map layers displaying:

- existing and proposed parks and greenways for the Comox Valley; and,
- Community Conservation Features – recreation greenways identified by the plans and reports recorded in the Conservation Database.²⁶

11.3 CV Land Trust Board Input

The following were also considered by the CV Land Trust Board in choosing priority recreation areas:

- current involvement of the CV Land Trust in conservation and stewardship activities along or adjacent to trails;
- trail character (as defined by surface materials and user groups) based on existing information and the knowledge of the CV Land Trust Board; and,
- historical values based on the knowledge of the CV Land Trust Board.





Part C Recommendations to Local Government

12.0 Selected Priority Recreation Areas

The CV Land Trust's chosen priority recreation areas are listed below:

- (1) One Spot Heritage Railway Trail;
- (2) Wellington Colliery Railway Trail;
- (3) Comox Lake to Comox Trail;
- (4) Brooklyn Creek Trail; and,
- (5) future areas that connect to these trail networks.

As resources are available, on-the-ground inventories to gather physical information about these recreational trails will assist the CV Land Trust to identify specific conservation and stewardship opportunities. See Appendix 2 for descriptions of these trails and Map 5 for locations.

Part C: Recommendations to Local Governments

13.0 Recommended Policy, Regulation and Action

The CV Land Trust commends the local governments for their progress in the identification and dedication of parks, greenways and areas of environmental value. In addition, the local governments' visions for continued protection of Agricultural Land Reserve and Crown lands correspond with the CV Land Trust's mission: *"the Comox Valley Land Trust works to maintain the land heritage of the Comox Valley as a living trust, through long-term planning, co-operation and conservation."*

We encourage all local governments to commit to regional conservation planning, using the CV Land Trust's priority ecological areas as a framework along with other community resources and stewardship tools. Effective conservation involves local governments and community partners working together.



*Morrison Creek Lamprey – a species found in Morrison Creek and nowhere else in the world.
Credit: Jim Palmer*





Part C Recommendations to Local Government

What is 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.

Read more about Regional Conservation Planning in the November 2007 *Green Bylaws Toolkit*.²⁷

Local government agencies have the ability to implement visionary and effective environmental policies and bylaws to protect natural attributes such as riparian areas and remaining sensitive ecosystems. Publications such as the November 2007 *Green Bylaws Toolkit* and 1997 (revised June 1999) *Stewardship Bylaws: A Guide for Local Government*²⁸ provide excellent resources such as: economic, social and environmental reasons for protecting sensitive ecosystems; examples of comprehensive environmental regulations from local governments in BC; sample bylaw wording; and case study reports on the outcome of specific regulatory tools.²⁹ In the Comox Valley – with three municipal, one regional and one tribal government – the creation of a region-wide network of natural and recreation areas that protects wildlife and biodiversity, water and air quality, and human health is a particularly worthwhile challenge. The CV Land Trust regards its role as being complementary and supportive to the efforts of governmental and non-governmental agencies in meeting this challenge. We therefore make the following recommendations to local governments for: (1) Ecosystems and Species Protection and (2) Recreational Greenway Trails.

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 principle³⁰ 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 (see Appendix 6).³¹
- e) **Support the establishment of, and utilize a Valley wide mapping agency** (see description in Appendix 9). 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





Part C Recommendations to Local Government

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 transfers³² and bonuses; tax exemption programs;³³ 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;³⁴ low-impact development;³⁵ and water balance models.³⁶
- 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.³⁷



Walking the bridge over Perseverance Creek. Credit: Kayt Chambers

What is a Sensitive Ecosystem?

A sensitive ecosystem is an ecosystem that is rare, fragile and relatively unmodified.

In BC there are seven of these ecosystems defined by Environment Canada and the BC Ministry of Environment.

They are called: Riparian, Wetland, Old Forest, Terrestrial Herbaceous, Sparsely Vegetated, Woodland and Coastal Bluff.

Source for definition above.³⁸





Part C Recommendations to Local Government

What is Proper Functioning Condition?

A riparian-wetland area or watercourse is considered to be in Proper Functioning Condition when adequate vegetation, landform or large woody debris is present to:

- dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality;
- filter sediment, capture bedload, and aid floodplain development;
- improve flood-water retention and ground-water recharge;
- develop root masses that stabilize watercourse banks against cutting action;
- develop diverse ponding and channel characteristics to provide habitat and the water depth, duration and temperature necessary for fish production, waterfowl breeding and other uses;
- support greater biodiversity.

Source for definition above.⁴⁰

- 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.⁴¹
- 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*).





Part C Recommendations to Local Government

- 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.





Conclusion

14.0 Conclusion

By gathering and building upon the work of many other agencies, the RCS project has made significant progress towards a regional conservation plan for the Comox Valley. Phase 1 of the RCS project has produced: (1) a map

and description of a network of ecological and recreation priority areas; (2) clear decision-making criteria for the CV Land Trust for properties within these priority areas; (3) a better understanding of the actions, policies, partnerships and tools needed to achieve regional conservation measures – including a working list of recommended policies, actions and regulations for local governments; and (4) the tools necessary for the creation of a conservation atlas for the Comox Valley – including a library of conservation and land use map layers, and a searchable Conservation Database.



*Reflection on Portuguese Creek.
Credit: Brent Reid.*

As mentioned in Section 2, there are several areas where more information and resources are needed in order to undertake effective conservation planning in this region. Information gaps include: streams and watercourse inventory and mapping; detailed on-the-ground inventory and verification of sensitive ecosystems within the urbanizing Nanaimo Area Lowland ecosection; identification and mapping of rare Coastal Douglas Fir Moist Maritime Subzone and Garry oak and associated ecosystems; and, studies of wildlife habitat and migration areas. Contribution by the K'omoks First Nation is needed as an essential component of regional conservation planning, and access to information about sensitive ecosystems within the Leeward Island Mountains is needed in order to embark on a comprehensive plan that aims to protect intact and representative areas of all of the Valley's sensitive ecosystem types.



*Alpine flowers in Strathcona Park.
Credit: Krista Kaptein.*

Technical challenges that have been identified could be met by the adoption of clear and consistent regional definitions

for greenways; common usage of mapping tools; and common protocols for collecting information on sensitive ecosystems and ecological and recreational greenways.

The CV Land Trust chose to define a project area that extends from the ocean to the height of land in the Beaufort and Vancouver Island mountain ranges, in the hope that conservation partners would recognize the importance of maintaining interconnectivity throughout this area; for water, wildlife and ecosystem survival and human health and enjoyment. It was also intended to bring attention to interconnectivity on a larger scale by tying into initiatives such as the Western Canada Wilderness Committee's





Future Work

Vancouver Island Conservation Vision and *The Willamette Valley-Puget Trough-Georgia Basin Ecoregional Assessment* conducted by The Nature Conservancy in the United States and the Nature Conservancy of Canada in 2004. On the human and institutional level, interconnectivity will be facilitated by the sharing of conservation and land use information, use of a common mapping system, sharing of technical expertise, and development of common definitions, policies and regulations.



Forest floor with Western Trillium. Credit: Brent Reid

15.0 Future Work

The CV Land Trust will invite other community stakeholders to work in partnership as part of a Comox Valley Conservation Strategy Working Group in 2007. The CV Land Trust's goal for this Working Group is to achieve protection of priority ecological and recreation areas in the Comox Valley by promoting regional conservation planning. The Working Group would:

- identify ways and take action to improve regional conservation planning
- review, prioritize and strategize RCS report recommendations
- assist in development of effective conservation tools

One recommendation for the development of conservation tools is to create an online atlas format to display the information in our map layers and Conservation Database. In this format updated information forms in the Conservation Database will connect to the Community Conservation Features map layers; thereby providing information on specific areas of concern to anyone with access to the Internet. Appendix 8 describes some of the details necessary for the Working Group to begin exploring the possible uses of the technical tools developed in Phase 1.

Efforts by the CV Land Trust to conduct on-the-ground verification of priority areas will continue as resources are available.





Appendices

16.0 Appendices

16.1 Upland Wildlife Corridors

Fourteen Upland Wildlife Corridors were selected. Descriptions are provided below, along with a list of the Community Conservation Features (points and polygons) that correspond (or overlap) with these Corridors.⁴² Listed in brackets after the Feature(s) name is the number of bibliographic records that refer to that Feature in the Database. With the exception of the BC Hydro Corridor, all Corridors are shown on Map 4 with a 500 metre buffer.

As described in Section 6.4, the CV Land Trust's process for identifying Upland Wildlife Corridors began by assessing BioAyer Consultant's 1997 Biodiversity Corridors. Although the locations of these 1997 corridors were modified during our assessment, some of the original names and descriptions from BioAyer's conception have been used in this report.

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

1. **Lazo-Oyster:** extends from Goose Spit along Balmoral Bluffs to Lazo Marsh, and along the peninsula to Oyster River.⁴³ In the southern section it includes the CV Land Trust's Buchanan Covenant.

Community Conservation Features: Courtenay River-Comox Harbour-Estuary (6), Northeast Wood 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





Appendices

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).⁴⁴

3. **BC Hydro:** this utility corridor was noted for its importance to wildlife by BioAyer Consultants in 1997. Its approximately 100 metre width 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.⁴⁵

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 Inventory⁴⁶ (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.⁴⁷

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 surrounding at least 17 small wetlands.⁴⁸ 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).⁴⁹

‘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.⁵⁰

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).





Appendices

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 Minto Road highway underpass because although this is a paved road culvert and is not well suited for used by wildlife 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.⁵¹

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 Corridor).⁵²

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.⁵³

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.





Appendices

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 Tye and Spike Roads. Then it crosses the Old Island Highway near Surgenor Road and links to SEI Old Growth Forest ecosystem in the Williams Beach area.⁵⁴

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.⁵⁵

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 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 crossing are needed in order to make any statement about their viability.

12. **Western Toad Tunnels:** Each year hundreds of thousands of provincially Yellow listed⁵⁶ 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.⁵⁷ This corridor would protect critical Western Toad habitat on either side of the highway.⁵⁸

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 is a bottomless arch with no road which is the only non-riparian passage along the Inland Highway built specifically for wildlife. Its use by wildlife is supported by observation of tracks.⁵⁹





Appendices

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

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.⁶⁰

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

16.2 Priority Recreation Areas – Greenway Trails

Three Recreation Greenway Trails were selected. Descriptions are provided below and the trails are displayed on Map 5.

Below each description is a list of the linear features recorded as ‘greenway’ in the Conservation Database that: (I) correspond or are located adjacent to priority Trails; and (II), intersect priority Trails and therefore may provide subsequent connections. Linear corridors specified as ‘greenways roads’ were not included, however some of these ‘greenways’ may include road sections. Corridors specified as ‘ecological greenways’ are included, but are listed in italics to indicate the need for protection of these areas. The number of bibliographic records that refer to each Community Conservation Feature is listed in brackets after the Feature’s name.

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 Regional District plans to build a suspension bridge.⁶¹ This bridge will open up possibilities to link sections of the grade that stretch into Electoral Area ‘C’.





Appendices

(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.⁶²

(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 Trail⁶³

The CV Land Trust is a partner in this initiative due to the covenant that we hold on the Masters Greenway and Wildlife Corridor. We will continue to work 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





Appendices

(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.⁶⁴ 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.⁶⁵

(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).

16.3 Informal Wildlife Advisory

NAME	ASSOCIATION
Michele Jones	RP Biologist, Mimulus Biological Consultants
Ken Bond	Gaia Consulting
Dan Bernard	DL Consulting
Sean Wong	RP Biologist, Senior Environmental Biologist, BC Ministry of Transportation and Highways
Chris Pielou	PhD, BSc., Retired
Julie Micksch	BSc. Environmental Technologist, Redtail Environmental Services
Warren Fleenor	RP Biologist, Fleenor and Associates Environmental
Kim Brunt	RP Biologist, Wildlife Biologist, BC Ministry of Environment





Appendices

16.4 Conservation Database – Bibliographic Entries

TITLE	CREATORS	PRODUCTION DATE
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	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 BC Project No.428	Chislett Lattey Manson Architecture and Engineering	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	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. 2152 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 Saratogy/ Miracle Beach Local Area Plan	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
The Town of Comox Parks and Recreation Plan	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	1995





Appendices

16.4 Conservation Database – Bibliographic Entries continued

TITLE	CREATORS	PRODUCTION DATE
Village of Cumberland Official Community Plan, 2004	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.	August, 1997
Wildlife Habitat Mapping Vancouver Island Highway Mud Bay to Cumberland Road	Donald A. Blood and Associates Ltd.	February, 1997
Willamette Valley-Puget Trough-Georgia Basin Ecoregional Assessment	The Nature Conservancy	March, 2004

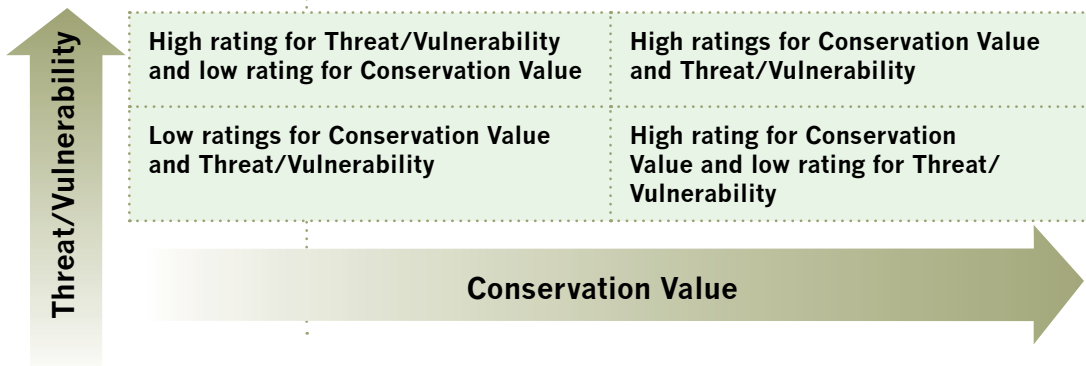
16.5 Property Assessment Criteria

CVLT Criteria and Measures to Evaluate Projects – Property Level

The table below is to be used to rate and compare two or more properties within the CV Land Trust’s identified priority ecological conservation areas (30 metre riparian buffer, 30 metre sensitive ecosystem buffer, upland wildlife corridor or critical watershed). The table below is to be used to generate ‘total measures’ for three categories: Conservation Value, Threat/Vulnerability and Suitability/Feasibility. The Conservation Value and the Threat/Vulnerability measures should be compared in a matrix style comparison (see below) while the Suitability/Feasibility measure is designed for application to the overall result.

Note that properties within the Nanaimo Area Lowland (NAL) ecosection are likely to receive a higher rating in the Conservation Value category than properties within the Leeward Island Mountain (LIM) ecosection, until access to conservation information within the LIM improves.

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





Appendices

CRITERIA	DESCRIPTION	MEASURES
1. Conservation Value	Is the land within an area identified as a high priority by the CV Land Trust (30 metre riparian buffer, 30 metre sensitive ecosystem buffer, upland wildlife corridor or critical watershed). ⁶⁶ If yes continue with assessment.	
a. Sensitive Ecosystem	Is the land or a portion of the land identified as one of the following: Use SEI inventory protocol to confirm. ⁶⁷ *See below for list of acronyms.	3=Group 1 Ecosystems: Douglas fir dominant Older Forest, Wetlands, and Riparian areas identified by the CDC and PWS; and Garry oak ecosystems from CDC (one Woodland area), RAE and MOE records. 2=Group 2 Ecosystems: Older Forests in which the dominant species is other than Douglas fir; Terrestrial Herbaceous, Sparsely Vegetated, Woodland and Coastal Bluff ecosystems in which the dominant species is other than Garry oak; and Older Second Growth Forests and Seasonally Flooded Agricultural Fields (CDC). 1=Anecdotal evidence suggesting sensitive ecosystem on site – more information needed to confirm 0=No
	What proportion (%) of the land is identified as sensitive ecosystem in 1a. above?	Graded scale based on area: 100%=10, 90%=9 etc
b. Sensitive Habitat – watercourses	Does the land include watercourse as identified in the Sensitive Habitat Atlas or determined through field survey (stream, lake, wetland or vernal pool)	Yes=5 No=0
c. Community Conservation Feature	Is the land identified as a Community Conservation Feature (listed in an OCP, EAP or LAP; community stewardship group report, or senior conservancy report)? ⁶⁸	3=Yes, mentioned in 3 or more reports 2=Mentioned in 2 reports 1=Mentioned in 1 report 0=No, not mentioned
d. 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 on information source is from a conservancy, stewardship or watershed group Assign (3 points if one of the above apply)
	Total measure: Conservation & Community Value (max. 18) =	





Appendices

CRITERIA	DESCRIPTION	MEASURES
2. Threat/ Vulnerability		
a. Development	Is the land considered for development (commercial or industrial, residential, mineral, oil, gas or gravel extraction)?	3=within the next 2 years 2=within the next 5 years 1=within the next 10 years 0=no development considered in the foreseeable future.
b. Fragmentation	If the land or a portion of the land contains a CDC identified SE, has it been fragmented and if so, by how much? Use SEI inventory protocol to assess (the SEI layer can be queried for preliminary assessment). ⁶⁹	5=Unfragmented 3=<6% 1=6 – 25%
c. Climate Change	Is the land likely to face serious damage/ destruction due to climate change (i.e. coastline areas) or other factor.	5=No (good likelihood for adaptation to changes) 0=Yes
d. Invasive Species	How vulnerable is the land and ecology to encroachment by invasive species.	4=Extremely resilient or no threats anticipated 3=Low vulnerability or low level of infestation 2=Moderately vulnerable or moderate infestation 0=Highly vulnerable or highly infested
	Total measure: Threat/Vulnerability (max. 18) =	





Appendices

CRITERIA	DESCRIPTION	MEASURES
3. Suitability & Feasibility*		*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. *Feasibility: initial cost/opportunity assessment
a. Adjacency to conserved land	How close is it to land already protected (as park, wildlife/ecological reserve or by a conservancy), while allowing for wildlife migration (no impassable wildlife barriers)	5=Abuts protected land 4=Within 30 metres 3=Within 100 metres 2= Within 500 metres 1=Within 1 km
b. 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
c. Partnership interest	Is there sufficient partnership and community interest?	3=Several partners, highly interested 2=Several partners, moderate interest 1=Partners not available but level of Land Trust membership and community interest considered sufficient to undertake conservation measures. 0=Partnership/community interest not considered sufficient to undertake conservation
d. General Management Difficulty	Time commitment, accessibility, other management issues.	5= Considered manageable given current resources. 0= Considered unmanageable given resources.
e. Money/ Resources available	Is there a good potential to secure the necessary money/ resources for future conservation and management?	3 = excellent potential 2 = moderate potential 1 = some potential 0 = no potential
	Total measure: Suitability & Feasibility (max. 19) =	

*CDC = Conservation Data Centre, MOE= BC Ministry of Environment, PWS= Project Watershed Society, RAE = Raincoast Applied Ecology
SEI= Sensitive Ecosystem Inventory, SE=Sensitive Ecosystem





Appendices

16.6 Sample Greenway Definitions

*For original text see CSRD Bylaw No. 2152 Electoral Area Plan and Greenways Plan for Area 'B'.

**CV Land Trust suggested changes and additions are in [brackets] below.

Ecological Greenways:

Ecological Greenways are environmentally sensitive areas and habitat patches [(refuges and reservoirs)] connected together by a network of [natural and vegetated areas]. These connections provide fish, birds and other species with corridors to move through to find food, birth and rearing spaces, and protection from predators. Ecological greenways help to maintain health and biodiversity in fish and wildlife populations. They may be either public or private ownership. They normally have no public access.

Ecological Greenways apply to two main areas: (1) Aquatic Habitats (watercourses, wetlands, [vernal pools], springs, back channels or floodplains) and (2) Upland Habitats (wooded areas, veteran trees and native thickets).

Four classes of Ecological Greenways include:

1. Aquatic Habitat Greenways (Aquatic Habitats outside of the Agricultural Land Reserve (ALR))
2. Working Landscape Fisheries Sensitive Zones (Aquatic Habitats within the ALR)
3. Upland Habitat Greenways (Upland Habitats outside of the ALR)
4. Working Landscape Biodiversity Corridors (Upland Habitats within the ALR)

1. Aquatic Habitat Greenways:

- are designed to protect watercourses [and wetlands] and the fisheries sensitive zone [and plant and wildlife habitat] around them
- normally have no public access
- protection of these areas is required under the federal Fisheries Act and the provincial Fish Protection Act [Riparian Area Regulations].

Aquatic Habitat Greenways shall:

- a. protect the permanently or intermittently wetted area of the watercourse [or wetland, including ephemeral pools and borderline systems such as treed wetlands], and springs, back channels or floodplains that provide summer base flows, winter refuge, and sources of cool water;
- b. [protect the Proper Functioning Condition of riparian-wetland areas;]





Appendices

- c. conserve vegetation overhanging the watercourse, to maintain cooler water temperatures by providing shade, and to provide food sources for fish;
- d. maintain vegetated riparian zones for erosion control along banks and steep slopes, to filter pollutants from runoff approaching the stream, to modify rate of delivery of ground and surface drainage, and to provide large organic debris to the watercourse. This large organic debris is a critical component of fish habitat; and
- e. be implemented through a variety of measures, including their designation in [*Development Permit Areas*] – see CSRD Development Permit No. 1A (Aquatic ESAs).

2. Working Landscape Fisheries Sensitive Zones:

- in working landscapes (ALR), management of the fisheries sensitive area is under senior government jurisdiction (Canada Fisheries Act, Water Act, Fish Protection Act, Farm Practices Protection Act)
- in these areas the width of conserved aquatic habitat will vary based on fisheries values, adjacent land use and the applicable senior government guideline.

3. Upland Habitat Greenways:

- provide important habitat for eagles, herons, song birds as well as many mammals and other species
- protect sensitive upland ecosystems including [*high value, functioning ecosystems within the CDFmm⁷⁰ and CWHxm1⁷¹ site series*], Garry oak and aspen woodland, old growth (coniferous and deciduous), riparian, and herbaceous terrestrial]
- are mapped to recognize habitat patches [*(refuges and reservoirs)*] and the existing or potential connections for wildlife between them
- the map designation means that landowners will be encouraged to protect environmental resources in these areas
- Upland Habitat Greenways will usually be created as a companion to land uses

Naturescape approaches will be encouraged, such as:

- a. maintaining or re-naturalizing a network of vegetation [*that extends across*] land uses, for wildlife food/cover. This will often be on property edges, or on steep slopes for erosion control.
- b. conserving veteran and standing dead wildlife trees for food, perch and cavity nest sites, and maintaining wildlife cover on the ground.





Appendices

- c. in rural residential areas, voluntary placement of habitat enhancements such as nest boxes, bird feeders, and bird baths or other water supply.

Upland Habitat Greenways will be implemented through a variety of measures including their designation in [*Development Permit Areas*] – see CSRD Development Permit No. 1B (Upland Habitat Greenways), No. 3 (Eagle Nest Trees) and No. 4 (Heron Nest Sites) respectively.

4. Working Landscape Biodiversity Corridors:

- In working landscapes (ALR), management of upland habitat greenways or biodiversity corridors is entirely voluntary.
- In these areas the width of conserved habitat may vary based on adjacent land use
- Location of corridors may vary over time, e.g. as agriculture cycles rotate.
- Biodiversity corridors could follow, voluntarily, the guidelines for upland habitat greenways in [*Development Permit Areas*] – see CSRD Development Permit No. 1B (Upland Habitat Greenways).
- The provisions of the Fisheries Act apply to these areas.

Recreational Greenways:

Recreational Greenways balance the needs of people with the needs of other species. A key role of the greenway system 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].

Recreational Greenways apply to three main areas:

1. Greenway Trails
2. Greenway Roads and
3. Greenway Sites.

Descriptions for Greenway Trails and Roads are provided below.

1. **Greenway Trails:** shall be for walkers, cyclists, [*wheelchairs and electric scooters*] and in some cases for equestrians; noisy or high-speed motorized vehicles such as trail bikes or ATVs shall be prohibited on greenway trails.
 - a. Trails shall connect to the road system, where signage and barriers will be encouraged to restrict vehicular access.





Appendices

- b. Buffers along the trail shall be encouraged to provide separation between trail users and adjacent residents or farms. Where necessary, fences should be installed.
- c. Where a greenway trail parallels an ecological greenway or livestock area, barriers should be used as required to keep people out of sensitive habitat areas and away from livestock. Key trails are envisioned along the waterfront, [*adjacent to*] major ecological corridors where development is anticipated, and through and between major parks, and on unopened road rights-of-way. This system, along with greenway roads, will create a series of interconnected loops...
- d. A greenway trail along the waterfront may not be a constructed pathway. In some cases, it may be simply a shoreline, which is passable at all tides.

2. Greenway Roads: will provide access for walkers, cyclists and equestrians to the larger greenway trail system. This will be accomplished by special treatments on the road right-of-way. Greenway Roads are located in areas where a trail connection is not possible. Actual roadway cross sections will vary. In all cases, the objective will be to keep the overall width of roadway pavement to a minimum.

- a. On busier collector road, trails may be separated from the pavement, running near the property line behind the roadside ditch.
- b. On quiet local roads, a wide gravel or rough grass shoulder may be all that is required to accommodate trail uses.

Greenway roads shall be designated in coordination with the cycling network plan of the Region District.





Appendices

16.7 Comprehensive List of Data Files

This list is comprehensive as of January 2008. For an up-to-date list please contact The Mapping Centre: maps@projectwatershed.bc.ca

LAYER TYPE	DESCRIPTION	CUSTODIAN	PERMISSION (NAME, DATE, CONDITIONS)
Jurisdiction/ Boundaries			
Cadastral	Road and property lines for the Comox Valley region, 2005	CSRD	Limited Use Agreement signed August 26, 2005
Cadastral Text	Infrastructure names, 2005	CSRD	Limited Use Agreement signed August 26, 2005
Jurisdiction Boundaries	Jurisdiction boundary including CSRD areas ABC and all municipal, 2005	CSRD	Limited Use Agreement signed August 26, 2005
Jurisdiction Boundaries	Courtenay municipal boundary, 2005	CSRD	Limited Use Agreement signed August 26, 2005
Jurisdiction Boundaries	Comox municipal boundary, 2005	CSRD	Limited Use Agreement signed August 26, 2005
Jurisdiction Boundaries	Cumberland municipal boundary, 2005	CSRD	Limited Use Agreement signed August 26, 2005
Local Area Plan Boundaries	Local Area Plan boundaries within CSRD Electoral Area (date unknown)	CSRD	Limited Use Agreement signed August 26, 2005
Environmental Attributes			
Water resources	British Columbia Aquifers	MSRM	Ordered online/publicly available
Water resources	Coastline (for large scale)	CSRD	Received from PWS, December 2006
Water resources	Coastline (for small scale)	MSRM	Received from PWS, December 2006
Water resources	Rivers and lakes (1:50,000)	MSRM	Received from PWS, December 2006
Water resources	Rivers and lakes (1:20,000)	MSRM	Received from PWS, December 2006
Water resources	Watercourses – Sensitive Habitat Atlas, 2006	CSRD	Received from PWS, December 2006
Water resources	Watershed boundaries 1:20K TRIM Watershed Atlas (preliminary) data, 2001	MSRM	Received from PWS, December 2006
Water resources	Ocean (from south tip of Quadra Island to Qualicum Beach)	PWS	Received from PWS, December 2006
Sensitive Ecosystems	Conservation Data Centre Sensitive Ecosystem Inventory 2004	MOE – CDC	Jan Kirkby, Canadian Wildlife Service. 2005
Sensitive Ecosystems	Conservation Data Centre Sensitive Ecosystem Inventory 1997	MOE – CDC	Jan Kirkby, Canadian Wildlife Service. 2005
Sensitive Ecosystems	Project Watershed Sensitive Ecosystem Inventory (Wetlands) – from the Sensitive Habitat Atlas, August 31, 2004	CSRD	Limited Use Agreement signed August 26, 2005
Sensitive Ecosystems	Nanaimo Area Lowland Ecosystem boundary	MSRM	Ordered online/publicly available
Sensitive Ecosystems	BC Biogeoclimatic Zones	MSRM	Ordered online/publicly available





Appendices

LAYER TYPE	DESCRIPTION	CUSTODIAN	PERMISSION (NAME, DATE, CONDITIONS)
Rare Ecosystems	Garry Oak Ecosystem – present day and historic extent	HR GISolutions Inc.	Ted Lea, Ministry of Environment, 2006. Education and research
Rare Ecosystems	Garry Oak Ecosystem areas (preliminary layer), 2007.	Raincoast Applied Ecology	Nick Page, December 5, 2006. Not for distribution
Rare Ecosystems	Garry Oak individual trees (preliminary layer), 2007	Raincoast Applied Ecology	Nick Page, December 5, 2006. Not for distribution
Rare Ecosystems	Rare and Endangered Species Occurrences	MOE – CDC	Ordered online/publicly available
Rare Ecosystems	Heron and Eagle Nest Tree Locations	Federation of BC Naturalists	Federation of BC Naturalists. Data sharing agreement signed January 16, 2007
Land Ownership			
Public land	Crown land (compilation of provincial and federal and including municipal Return to Crown), 2006	CVLT	Original sources – see Campbell River and South Island Forest District tenure files
Public land	School properties – SD 71, 2005	CSR/D/ PWS	Limited Use Agreement signed August 26, 2005
First Nations	First Nations reserves, 2004	MOF – CR Forest District, 2004.	Extracted from Campbell River Forest District layer. Publicly available
First Nations	Hamatla Treaty Society negotiations area – as it corresponds to RCS project area, 2005	Hamatla Treaty Society	Legal council for the Hamatla Treaty Society (Rod Naknakin) December 2005
Land Designation & Use			
Park & Reserves	Parks (compilation of provincial, regional and municipal parks information from digital and hard copy sources) 2006	CVLT	Limited Use Agreement signed August 26, 2005 (CSR/D), others compiled from hard copy
Park & Reserves	Provincial Parks Wildlife & Eco Reserves, 2001	BC Parks Victoria	Ordered online/publicly available
Park & Reserves	CSR/D parks, 2005	CSR/D	Limited Use Agreement signed August 26, 2005
Park & Reserves	BC Covenant Lands including fee simple and conservation covenants (draft 2007). CV Land Trust covenants added Nov 2006.	The Nature Trust of BC	Received from The Nature Trust of BC November 29, 2005. Jason Northcott Conservation Specialist.
Existing “Greenways”	Courtenay OCP “Special Use Parks – Greenways” lines, 2006	CVLT	N/A
Existing “Greenways”	Courtenay OCP “Special Use Parks – Greenways” polygons, 2006	CVLT	N/A
Existing “Greenways”	Comox OCP Greenways Network, 2006	CVLT	N/A
Existing “Greenways”	Comox OCP Bikeways Network, 2006	CVLT	N/A





Appendices

LAYER TYPE	DESCRIPTION	CUSTODIAN	PERMISSION (NAME, DATE, CONDITIONS)
Existing "Greenways"	Cumberland OCP Greenway, 2004	CSRD	Received in April 2005 from CSRD. Use is restricted to education and research.
Existing "Greenways"	CSRD greenways (from Parks Source Book), 2006	CSRD	Limited Use Agreement signed August 26, 2005
Existing "Greenways"	BC Hydro corridor land – dam to penstock, 2004	BC Hydro	Les Westerveld. November 2004. Education and research use only.
Proposed "Ecological Greenways"	Proposed Biodiversity Greenways Concept from <i>The Comox Valley Greenways Plan Report</i> , 1997.	CVLT	N/A
Proposed "Ecological Greenways"	Electoral Area 'A': Proposed Upland Habitat Greenway (E&N Ecological Greenway), 1998	CSRD	Limited Use Agreement signed August 26, 2005
Proposed "Ecological Greenways"	Electoral Area 'A' Proposed Aquatic Habitat Greenways, 1998	CSRD	Limited Use Agreement signed August 26, 2005
Proposed "Ecological Greenways"	Electoral Area 'B': Ecological Greenway, 1998	CSRD	Limited Use Agreement signed August 26, 2005
Proposed "Ecological Greenways"	Electoral Area 'B': Aquatic Habitat Greenway – Coastal Habitat Greenway, 1998	CSRD	Limited Use Agreement signed August 26, 2005
Proposed "Ecological Greenways"	Electoral Area 'B': Upland Habitat Greenway/Protected Area, 1998	CSRD	Limited Use Agreement signed August 26, 2005
Proposed "Ecological Greenways"	Electoral Area 'B': Upland Habitat Greenway – Development Permit Area No. 1B, 1998	CSRD	Limited Use Agreement signed August 26, 2005
Proposed "Ecological Greenways"	Electoral Area 'B': Working Landscape Fisheries Sensitive Area, 1998	CSRD	Limited Use Agreement signed August 26, 2005
Proposed "Ecological Greenways"	Electoral Area 'B': Greenways Concept lines, 1998	CSRD	Limited Use Agreement signed August 26, 2005
Proposed "Ecological Greenways"	Electoral Area 'C': Upland Habitat Greenway, 1998	CSRD	Limited Use Agreement signed August 26, 2005
Proposed "Ecological Greenways"	Electoral Area 'C': Working Landscape Biodiversity Corridor, 1998	CSRD	Limited Use Agreement signed August 26, 2005
Proposed Recreation Greenways	Proposed Recreation Greenways Concept from <i>The Comox Valley Greenways Plan Report</i> , 1997	CSRD	Cheri Ayers in 2005
Proposed Recreation Greenways	Electoral Area 'A' Recreational Greenways (pedestrian, pedestrian/bike and multi-use trails), 1998	CSRD	Limited Use Agreement signed August 26, 2005





Appendices

LAYER TYPE	DESCRIPTION	CUSTODIAN	PERMISSION (NAME, DATE, CONDITIONS)
Proposed Recreation Greenways	Electoral Area 'B' Greenways Roads and Trails, 1998	CSRD	Limited Use Agreement signed August 26, 2005
Proposed Recreation Greenways	Electoral Area 'C' Greenway Roads and Trails, 1998	CSRD	Limited Use Agreement signed August 26, 2005
Proposed Recreation Greenways	Electoral Area 'C' Cycling Network Plan, 1998	CSRD	Limited Use Agreement signed August 26, 2005
Existing Recreational Trails	Electoral Area 'B' existing trails (date unknown)	CSRD	Limited Use Agreement signed August 26, 2005
Working Lands	Agricultural Land Reserve, 2004	Agricultural Land Commission	Boyd Porteous, August 2004. Use restricted to education and research
Working Lands	Campbell River Forest District – tenure 2004	MOF – CR Forest District, 2004.	Available to the public. Received from Jennifer Naylor in email November 22, 2005
Working Lands	South Island Forest District lands, 2005	MOF- Resource Tenures & Engineering.	Received from the South Island Forest District in 2005. Freely viewable to the public.
Official Community Plans	Official Community Plan – Courtenay, 2005	City of Courtenay	City of Courtenay. Data sharing agreement signed October 5, 2005.
Official Community Plans	Official Community Plan – Comox, 2006	Town of Comox	Town of Comox. Data sharing agreement pending ArcView conversion.
Official Community Plans	Official Community Plan – CSRD, 1998	CSRD	Limited Use Agreement signed August 26, 2005.
Official Community Plans	Official Community Plan – Cumberland, 2004	CSRD	Limited Use Agreement signed August 26, 2005
Environmentally Sensitive DPA	Courtenay Environmentally Sensitive Development Permit Areas, 2006	CVLT	N/A
Environmentally Sensitive DPA	Comox Environmentally Sensitive Development Permit Areas, 2006	CVLT	N/A
Environmentally Sensitive DPA	CSRD Environmentally Sensitive Development Permit Areas	CVLT	N/A
Environmental CPA	Cumberland Environmental Comprehensive Planning Area, 2004	CVLT	N/A
Environmentally Sensitive DPA	Cumberland Environmentally Sensitive Development Permit Areas, 2004	CVLT	N/A
Community Conservation Features	From the Conservation Database 2007 – polygons	CVLT	N/A
Community Conservation Features	From the Conservation Database 2007 – lines	CVLT	N/A





Appendices

LAYER TYPE	DESCRIPTION	CUSTODIAN	PERMISSION (NAME, DATE, CONDITIONS)
CV Land Trust Conservation Layers			
Community Conservation Features	From the Conservation Database 2007 – points	CVLT	N/A
CVLT Priority Areas	Upland Ecological Corridors and Buffers, 2007	CVLT	Permissions obtained for source data layers
CVLT Priority Areas	Critical Watersheds – Vancouver Island Conservation Vision	CVLT	Permissions obtained for source data layers
CVLT Priority Areas	Group 1 Sensitive Ecosystems	CVLT	Permissions obtained for source data layers
CVLT Priority Areas	Group 2 Sensitive Ecosystems	CVLT	Permissions obtained for source data layers

16.8 Technical Briefing for the RCS Working Group

In Phase 1, three Community Conservation Feature map layers were created to house point, line and polygon features. Each Community Conservation Feature has a unique GIS identifier that links its unique shape in *ArcView 3.2A* to information from the Database. The Database can be linked to any of the three Community Conservation Feature map layers in *ArcView 3.2A*, (using SQL connect) making Database information such as environmental attributes, protection status, land uses, and recommendations accessible by clicking on any Feature on the map. In order to make this information most useful, the Database must first be set up to create reports with the following for each Feature:

- a list of reference titles with hyperlinks to the original documents;
- a summary of attributes and recommendations from the source literature; and
- updated information on land use and status.

Once the Database is set up to produce this information in easy to view forms, those forms can be linked to the mapped Features in an online application.

The Community Conservation Features layers created by the CV Land Trust and any other conservation data layers compiled by the CV Land Trust in Phase 1 will need to be updated on a yearly basis in order that they provide useful and reliable information. The custodians of other data layers collected for this project must be contacted yearly (or in some cases on a more regular basis) to request updates. Appendix 7 gives contacts details for data layer custodians.





Appendices

16.9 Proposal for a Single Mapping Agency

The Comox Valley Conservation Strategy Working Group identified a need for a single mapping agency upon review of the CV Land Trust's original *Nature without Borders* report. The single mapping agency is described as follows:

Rationale: A Valley-wide approach to conservation requires all governing jurisdictions to adapt a common method of collecting and displaying conservation habitats (i.e. through maps). Since the environment is subject to change over time, such maps require review and updating. To avoid duplication and confusion as to quality and currency of maps, a central collection and referral agency is required. Since 1993 this work has been undertaken, in large part, by the voluntary sector, namely by Project Watershed Society and to a lesser extent by the CV Land Trust based on both organizations' abilities to attract private foundation funding.

Purpose: To identify and adequately resource a single-source environmental mapping organization (such as a Project Watershed Society / CV Land Trust partnership) to:

- (A) Organize and maintain a public repository for Sensitive Habitat information maintaining both a Desktop GIS and Internet-based Sensitive Habitat & Inventory Mapping (SHIM) GIS;
- (B) Act as technical experts in the area of watershed and land inventories and GIS mapping and be responsible for day by day management of the repository;
- (C) Be responsive to requests for updates to the SHIM GIS and mapping inventory of important conservation features (following a common referral protocol);
- (D) Maintain an inventory of sophisticated mapping equipment and a supply of suitably trained technicians to do mapping work for both private and public groups requiring additional environmental mapping on a cost plus administrative fee basis;
- (E) Maintain membership in the Community Mapping Network as a way to share resources among other communities and to stay current with new advancements such as new "open source" mapping software (Mapguide, "Enterprise" edition) as well as sources of advancement that allow for interconnections with other information technologies and mapping networks and ubiquitous services such as "Google Earth";
- (F) Provide web-based training to Comox Valley residents, environmental groups, stream and wetland keepers and others who wish to develop their own mapping capability using web-based GIS tools;
- (G) Act as a resource to local governments and NGOs in the Comox Valley on environmental mapping issues.





Appendices

16.10 Methods Used to Derive Sensitive Ecosystem Inventory Statistics for the RCS Phase 1

Prepared May 18, 2008

1. The 2004 Sensitive Ecosystem Inventory of Vancouver Island and Gulf Islands digital file was clipped to the Regional 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 table.
3. To address gaps in ecosystem code information found within the table, information was re-appended for 2004 polygons which had been identified in 1997, and then classified as deleted (and therefore removed) during the 2002-03 reassessment. The ecosystem code information from the 'Eco1_1997' column was copied and then pasted into the 2004 table in the 'Ecosystem1' column where these gaps existed.
4. Once all of the ecosystem code information was populated for all of the polygons in the 'Ecosystem1' column, the column was 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 type of modification. Total area modified (by type) was then calculated for each ecosystem code.

* 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 following:

- 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'





Appendices

- Polygons classified as [A=Addition**, N=No Change, or I=Reinterpretation] were grouped together as 'Intact'

** The polygons classified as 'Addition' in the 2003 re-assessment are polygons which were added to the original inventory and 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.

17.0 Maps

The following maps are available on the CV Land Trust Website:

<http://www.cvlandtrust.org>

17.1 Regional Conservation Strategy Project Area

http://www.cvlandtrust.org/rcs-maps/overview_rcs_may30.pdf

17.2 Comox Valley Disappearing Sensitive Ecosystems

http://www.cvlandtrust.org/rcs-maps/sei_disturbance_may2108_8.pdf

17.3 Comox Valley Protected Lands

http://www.cvlandtrust.org/rcs-maps/protected_areas_custom.pdf

17.4 CV Land Trust Priority Ecological Areas for Conservation

http://www.cvlandtrust.org/rcs-maps/eco_priority_custom.pdf

17.5 CV Land Trust Priority Recreation Areas for Conservation

http://www.cvlandtrust.org/rcs-maps/priority_rec_custom.pdf

17.6 Comox Valley Biogeoclimatic Zones and Sensitive Ecosystems

http://www.cvlandtrust.org/rcs-maps/bio_geo_custom.pdf





Endnotes

18.0 Endnotes

- ¹ 'Sensitive ecosystems' are designated as rare and fragile by the BC Ministry of Environment Conservation Data Centre. For definition of 'ecosystem' refer to the glossary 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/devwithcare2006/DWC%202006%20Sec%206-1%20Glossary.pdf>.
- ² For definitions of 'habitat refuge', 'habitat reservoir' and 'wildlife corridor' refer to the glossary in *Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia*. BC Ministry of Environment. March 2006.
- ³ Diamond, J.M., 1975 and Forman. R.T.T. 1995 in *Willamette Valley-Puget Sound-Georgia Basin Ecoregional Assessment*. The Nature Conservancy, Nature Conservancy of Canada and Washington Department of Fish and Wildlife. March 2004.
- ⁴ *Sensitive Ecosystems Inventories: Riparian Ecosystems of Eastern Vancouver Island and the Gulf Islands*, BC Ministry of Environment, Ecosystems Branch. http://www.env.gov.bc.ca/sei/van_gulf/riparian.html. Hit March 28, 2007.
- ⁵ For example in 1998, *Bylaw No. 2152 Electoral Area 'B' Electoral Area Plan and Greenways Plan*, Regional District Comox Strathcona, pp.15.
- ⁶ Ward, Peggy et. al. 1998, *Sensitive Ecosystem Inventory: East Vancouver Island and Gulf Islands 1993-1997 - Volume 1: Methodology, Ecological Descriptions and Results*, Environment Canada Canadian Wildlife Service and British Columbia Ministry of Environment Lands and Parks, pp 10.
- ⁷ For example in 1998, *Bylaw No. 2152 Electoral Area 'B' Electoral Area Plan and Greenways Plan*, Regional District Comox Strathcona, pp.16.
- ⁸ Refer to the *Islands Trust Regional Conservation Plan 2005 – 2010*. Adopted by the Trust Fund Board August 26, 2005. <http://www.islandstrustfund.bc.ca/howtoprotectlands/rcp/itfrcfinal.pdf>
- ⁹ Ward, Peggy et. al. 1998; Axys Environmental Consulting Ltd. Revised June 2005. *Redigitizing of Sensitive Ecosystem Polygons to Exclude Disturbed Areas, Summary Report*. Canadian Wildlife Service.
- ¹⁰ Personal Communication: Don Chamberlain, March 10, 2007.
- ¹¹ *Biogeoclimatic Zones of British Columbia*. BC Ministry of Forests <http://www.for.gov.bc.ca/hfd/library/documents/treebook/biogeno/biogeno.htm>. Accessed: February 28, 2007.
- ¹² Described in Green, R.N. and Klinka. 1994. *A Field Guide for Site Identification and Interpretation for the Vancouver Forest Region*. BC Ministry of Forests. <http://www.for.gov.bc.ca/hfd/pubs/docs/lmh/Lmh28/Lmh28-02.pdf>, pp 46.
- ¹³ *Mapped Known Locations of Species and Ecological Communities at Risk and Big Trees*. BC Ministry of Environment, Conservation Data Centre Mapping Service. <http://maps.gov.bc.ca/imf50/imf.jsp?site=cdc>. Accessed: February 28, 2007.
- ¹⁴ BioAyer Consultants for the Regional District of Comox-Strathcona, October 31st, 1997, *The Comox Valley Greenways Plan Report*, pp 12.
- ¹⁵ Personal Communication: Sean Wong, Senior Environmental Biologist for BC Ministry of Transportation, March 21, 2007 and Kim Brunt, Wildlife Biologist for BC Ministry of Environment Fish and Wildlife Section, March 21, 2007.
- ¹⁶ Personal Communication: Kim Brunt, March 21, 2007.
- ¹⁷ For more information see *Endangered Species and Ecosystems Glossary*. BC Ministry of Environment, Ecosystems Branch. <http://www.env.gov.bc.ca/atrisk/glossary.html#r>. Accessed: March 28, 2007.
- ¹⁸ *Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia Section 5: Regional Information Packages – Vancouver Island Region*. BC Ministry of Environment. March 2006. <http://www.env.gov.bc.ca/wld/documents/bmp/>





Endnotes

- devwithcare2006/DWC%202006%20Sec%205-1%20VI%20Region.pdf, pp 5.1-9 and 5.1-11.
- ¹⁹ Ward, Peggy et. al. 1998, pp 42.
- ²⁰ Ibid, pp 45.
- ²¹ See Appendix 4 for list of Conservation Database bibliographic entries.
- ²² Personal Communication: Kim Brunt, March 21, 2007.
- ²³ Western Canada Wilderness Committee. *Wilderness Committee Victoria Chapter Educational Report* Vol. 24 No.5. Summer 2005.
- ²⁴ See the *Sensitive Ecosystems Inventory East Coast Vancouver Island and Gulf Islands Information Change Form* accessible from the BC Ministry of Environment, EcoCat: The Ecological Reports Catalogue. http://srmwww.gov.bc.ca/appsdata/acat/html/depoy/acat_p_report_2124.html. Last updated: March 19, 2007.
- ²⁵ Personal Communications: Randy Wiwchar, March 30, 2007.
- ²⁶ See Appendix 4 for list of Conservation Database bibliographic entries.
- ²⁷ *Green Bylaws Toolkit for Preserving Sensitive Ecosystems and Green Infrastructure*. November 2007. (Stewardship Series). Prepared by Environmental Law Clinic, University of Victoria Faculty of Law, and Deborah Curran and Company for the Wetland Stewardship Partnership, Ducks Unlimited Canada, Grasslands Conservation Council of British Columbia, Environment Canada, and the Province of British Columbia, pp.41-43.
- ²⁸ *Stewardship Bylaws: A Guide for Local Government*. Revised June 1999. (Stewardship Series) Co-published by the Province of British Columbia. (Canadian Cataloguing in Publication Data, 1996/1997). <http://www.dfo-mpo.gc.ca/Library/250188.pdf>.
- ²⁹ *Green Bylaws Toolkit*, 2007.
- ³⁰ The precautionary principle says that 'the environment should not be left to show harm before protective action is taken; scientific uncertainty should not be used as a justification to delay measures which protect the environment.' Andrew Jordon and T.O'Riordon, 'The Precautionary Principle in UK Environmental Policy Making', in Tim S. Gray, ed., *UK Environmental Policy in the 1990s* (London: MacMillan, 1995), pp.59.
- ³¹ Updates will be necessary to keep these definitions consistent with newly introduced provincial and federal environmental legislation and to reflect progressive environmental principles such as Proper Functioning Condition.
- ³² City of Vancouver. *Transfer of Density Policy and Procedures*. September 2002. <http://vancouver.ca/commsvcs/Guidelines/T001.pdf>.
- ³³ Islands Trust Fund. *Natural Area Protection Tax Exemption Program*. <http://www.islandstrustfund.bc.ca/naptep.cfm>.
- ³⁴ Soft Engineering is an engineering approach that begins with a loose plan of action and goal only. The actual finished work is accomplished not by hard and fast pre-design but letting the natural system and the understanding of the natural processes at work dictate the final outcome or design. Personal Communications: David Gooding, P.Eng Hydrologist, December 20, 2007.
- ³⁵ Low Impact Development is a new comprehensive land planning and engineering design approach with a goal of maintaining and enhancing the pre-development hydrologic regime of urban and developing watersheds. *Low Impact Development Centre*. http://www.lowimpactdevelopment.org/about_us.htm. Accessed: January 4, 2008.
- ³⁶ The Water Balance Model promotes a watershed-based approach that manages the natural environment and the built environment as integrated components of the same watershed. *Water Balance Model Canada*. <http://model.waterbalance.ca/sql/home/login.asp?sl=wbm>. Accessed: January 4, 2008.





Endnotes

- ³⁷ 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/devwithcare2006/DWC%202006%20Sec%204%20EnvResources.pdf>, pp 4-23 to 4-27.
- ³⁸ Ward, Peggy et. al. 1998. Pp 10.
- ³⁹ USDI Bureau of Land Management and USDA Forest Service. *A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas TR-1737-15 1998* and *A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lentic Areas TR-1737-16 1999*.
- ⁴⁰ Ibid.
- ⁴¹ 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.
- ⁴² 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.
- ⁴³ BioAyer Consultants, 1997.
- ⁴⁴ 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*.
- ⁴⁵ Personal Communication: Ken Bond (Gaia Consulting), Fall 2005.
- ⁴⁶ 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*.
- ⁴⁷ BioAyer Consultants, 1997.
- ⁴⁸ Ibid.; Axys Environmental Consulting Ltd. For the Canadian Wildlife Service. Revised June 2005. *Redigitizing of Sensitive Ecosystems Inventoried Polygons to Exclude Disturbed Areas: Summary Report*.
- ⁴⁹ Identified in The Nature Conservancy (US) and the Nature Conservancy of Canada, 2004, *The Willamette Valley-Puget Trough-Georgia Basin Ecoregional Assessment*.
- ⁵⁰ Western Canada Wilderness Committee, Summer 2005.
- ⁵¹ Personal Communication: Michele Jones (Mimulus Biological Consulting); CIVITAS Urban Design and Planning Inc. & Clive Grout Architext Inc, prepared for Trilogy Properties VI Corporation, *Master Plan Cumberland Interchange Lands*, June 9, 2006, <http://www.trilogyatcumberland.com/pdfs/master-plan.pdf>; BioAyer Consultants, 1997.
- ⁵² Personal Communications: Michele Jones, Fall 2006.
- ⁵³ BioAyer Consultants 1997; Western Canada Wilderness Committee, Summer 2005.
- ⁵⁴ Personal Communications: Ken Bond, Fall 2006.
- ⁵⁵ BioAyer Consultants, 1997.
- ⁵⁶ BC Ministry of Environment. *BC Species and Ecosystems Explorer*. <http://srmapps.gov.bc.ca/apps/eswp/search.do;jsessionid=37d612f19cb2415085ada327db482981>.





Endnotes

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0xok5Nq79Jn70IqR9Hml1KqMTBpRmlmAalmQ4xaxySah0M8QvJpkixo6XHngbyknvrkL
OIQzNp65InO__

- ⁵⁷ Personal Communications: Ken Bond, Dan Bernard (DL Consulting) and Sean Wong, Fall 2006.
- ⁵⁸ The BC Ministry of Transportation is interested in doing an upgrade on the toad fence in spring of 2007 (Personal Communications: Sean Wong).
- ⁵⁹ Personal Communications: Dan Bernard and Ken Bond, Fall 2006.
- ⁶⁰ Personal Communications: Dan Bernard, Fall 2006.
- ⁶¹ Personal Communications: Ray Booghardts, April 5, 2007.
- ⁶² Personal Communications: Gwyn Sproule, March 2007.
- ⁶³ Pieces of this trail have been established; however, plans for a contiguous Comox Waterfront to Comox Lake Trail have yet to be finalized.
- ⁶⁴ For detailed information on Brooklyn Creek including recommendations for restoration works, refer to Cousens B. and Lee C. (J.C. Lee and Associates Ltd. Biological Consultants), April 12 1999, *Preliminary Fisheries Resource, Habitat and Development Impact Assessment of Brooklyn Creek in Coomox-Courtenay, BC*, and Comox Valley Project Watershed Society, January 2000, *Brooklyn Creek Mapping and Inventory Project: Sensitive Habitat Inventory and Mapping (SHIM) Survey*, prepared by Bainbridge G. and Kuta C. http://www.projectwatershed.bc.ca/pw_web_docs/mapsandbrochures/SHIMCD/SHIMCompilation1998-2000/Appendix2/Brooklyn_Creek_Report.pdf.
- ⁶⁵ Comox Strathcona Regional District (1998). Bylaw No. 2152 *Electoral Area 'B' Electoral Area Plan and Greenways Plan*; and City of Courtenay Parks and Open Spaces Map Revised July 16, 2006.
- ⁶⁶ Refer to CV Land Trust's 2008 Regional Conservation Strategy Phase 1 report *Nature Without Borders*, for descriptions of these priority areas.
- ⁶⁷ See the *Sensitive Ecosystems Inventory East Coast Vancouver Island and Gulf Islands Information Change Form* accessible from the BC Ministry of Environment, EcoCat: The Ecological Reports Catalogue. http://srmwww.gov.bc.ca/appsdata/acat/html/deploy/acat_p_report_2124.html. Last updated: March 19, 2007.
- ⁶⁸ Refer to CV Land Trust's Regional Conservation Strategy Conservation Database (Microsoft Access Application).
- ⁶⁹ Query SEI layer (sevi_2004_rcs.shp) for 'Mod_type' and 'Dist_frag' in the attribute table.
- ⁷⁰ Described in Green, R.N. and Klinka, 1994.
- ⁷¹ Ibid.

