Developing an Environmentally Sensitive Area Strategy for the Cowichan Region

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Disclaimer

The information and recommendations contained within this document were approached from a biological and ecological perspective. This report is meant to provide biological and ecological insight (a technical, science-based framework) regarding the development of an ESA strategy for the Cowichan Region. It is meant to initiate discussion regarding what the ESA strategy might look like, and will require extensive public and stakeholder consultation to build a foundation for successful implementation.

Acknowledgments

We would like to acknowledge that this study of environmentally sensitive areas (ESAs) falls within the traditional territories of Cowichan Tribes, Ditidaht First Nation, Halalt First Nation, Lake Cowichan First Nation, Lyackson First Nation, Malahat First Nation, Penelakut Tribe, and Stz'uminus First Nation.

We would like to thank the Cowichan Valley Regional District (CVRD) for the opportunity and funding to present a summary and analysis of existing (mapped) Environmentally Sensitive Areas in the Cowichan Region, and to contribute to the development of a regional ESA Strategy. In Part 1 of this project, "*An Inventory of ESAs within the Cowichan Region*", GIS data integration was completed by Ian Wright, and the detailed ESA mapping updates were conducted by Harry Williams. In this component of the project (Part 2), contributions to the report were by Tania Tripp, Harry Williams, Ian Wright and Laurie Kremsater of Madrone. In addition, the CVRD's Chloe Boyle provided land-use policy background research for the development of an ESA Strategy (Boyle 2017).

The Madrone team greatly appreciates the feedback provided by Kate Miller and Jeff Moore of CVRD Environmental Services, as well as other members of the Steering Committee: Kyle Young (Municipality of North Cowichan), Felicity Adams (Town of Ladysmith), Ken Epps (Island Timberlands), Keith Lawrence, Hamid Hatami, and Mike Tippett (CVRD). We also appreciate the information provided by Tim Ennis regarding the Comox Valley Land Trust's Land Protection Program.

Glossary of Key Terms and Acronyms

Biogeoclimatic system (BEC): Provincial ecosystem classification system used in forestry and natural sciences**.**

Conservation Partnership (CP): A Program developed and applied in Comox Valley Natural Areas Network in combination with their Land Protection Program.

Development Approval Information Area (DAIA): Local governments may, in an OCP, specify circumstances or designate areas in which development approval information may be required. The OCP must describe the special conditions or objectives that justify the specification or designation. The local government must then adopt a separate bylaw to establish procedures and policies on the process for requiring such information and the substance of the information required. It is important that this bylaw clearly establish the types of information that may be required for each type of development approval.

"Development approval information" is defined in the Local Government Act as information on the anticipated impact of the proposed activity or development on the community, including such matters as transportation, infrastructure, schools, parks, community services and the natural environment. Development approval information may be required from an applicant for a zoning bylaw amendment, a DP, or a temporary commercial or industrial use permit.

These provisions give local government the ability to require, at the applicant's expense, impact assessment studies relating to the proposed activity or development. For ***environmentally sensitive areas***, designation of an area as both a DP area and a development approval information area for the protection of the natural environment would allow the local government to require environmental impact assessment studies covering a broad range of concerns. These studies could then be used by the council or board to determine appropriate conditions for any DP issued in that area.[1]

Environmental Development Permit Area (EDPA): A tool available to local governments in British Columbia to protect the riparian and terrestrial natural environments. "EDPAs currently function by identifying the natural environment, its ecosystems and biodiversity, and regulating development within these areas. It is at the discretion of the local governments to identify the areas, define what constitutes "development", and place restrictions on such development" (*EDPAs: In Practice and in Caselaw*[2] March 2016).

Environmentally Sensitive Area (ESA): An area that contains sensitive or rare ecosystems, or other environmentally sensitive values. Often used as a synonym for Sensitive Ecosystems (see below).

Fragmentation: Barriers to animal and plant movement across the landscape; may be highways, populated areas, transmission lines, or natural areas such as large lakes.

Land Protection Program (LPP): Program developed and applied in Comox Valley Natural Areas Network

[1] http://www.bcwatersheds.org/wiki/index.php?title=Development_Permit_and_Development_Information_Areas
[2] http://www.elc.uvic.ca/wordpress/wp-content/uploads/2016/04/2016_01_02_EDPA_FINAL_March31_2016.pdf

Official Community Plan (OCP): A local government bylaw that provides objectives and policies to guide decisions on planning and land use management within the area covered by the plan.

Riparian areas: Rivers and streams, and associated river bank and streamside vegetation.

Sensitive Ecosystem (SE): an ecosystem in the landscape that is at-risk or ecologically fragile.

Sensitive Ecosystem Inventory (SEI): the standardized method by which sensitive ecosystems are mapped and described. The scale of mapping can be variable, ranging from 1:1 000 to 1:20 000. SEI mapping coverage in the CVRD is only available in some areas.

Species at Risk Act (SARA): Federal species at risk legislation.

Terrestrial Ecosystem Mapping (TEM): TEM refers to the mapping of ecosystems in BC following a provincially approved methodology. A typical TEM project will map all ecosystems in a given area - of which sensitive ecosystems are a subset. TEM is usually done to a map scale of 1:15 000. TEM mapping coverage in the CVRD is incomplete.

Vegetation Resource Inventory (VRI): Forestry based inventory that has data on forest stands including tree age, species and height. VRI coverage in the CVRD is pending in some areas, and incomplete in others.

Executive Summary

This report provides recommendations for developing an Environmentally Sensitive Areas (ESA) Strategy for the Cowichan Valley Regional District (CVRD), and a process for setting targets for ESAs in the region. In addition to the recommended structure of an ESA Strategy, we have highlighted legal, regulatory and policy-based tools that the CVRD can pursue to improve the protection of ESAs. We also describe ways to assess the condition of a given ESA to help prioritize conservation and restoration guidelines.

The development of an ESA Strategy for the Cowichan Region should be viewed as a long-term, incremental process. Public outreach, education and stakeholder engagement will be central to the effectiveness of the Strategy. During the early stages of implementation, the focus should be on refining the ESA inventory in priority areas, and completing an analysis of ESA representation, condition, connectivity and changes over time. Results of these studies should be quickly and clearly communicated to both the public and stakeholders. Following that (or concurrently), empowering local stewardship groups to monitor and restore ESAs, and providing incentives to landowners for the voluntary protection of ESAs should be a priority. Under this scenario, the development and implementation of new regulations and management tools will be better informed and supported. Our primary recommendations for the development of an ESA Strategy are summarized below:

Data Collection and Analysis

- Identify and map ESAs
    a. Combine all known ESA map sources as an inventory of existing ESA data for the region (completed by Madrone as Part 1 of this project)
    b. Update as appropriate with additional and new data; actively seek to fill data gaps
    c. Complete detailed ESA mapping (update for disturbance, refine to create as many one ESA label “pure” polygons as possible)
    d. Create standard easy-to-use maps for ESAs that can be provided to CVRD departments, developers, and the public
- Analyze existing ESAs and trends
    a. Assess ESA representation
    b. Assess ESA condition
    c. Assess ESA connectivity
    d. Track disturbances and ESA losses over time
    e. Identify priority ESAs based on stakeholder input and values
    f. Identify priority areas for conservation
    g. Identify priority areas for restoration
    h. Create an ESA network using a riparian network as the main building block of connectivity

ESA Scope

Engage all stakeholders in the development of a regional strategy for maintaining ESA sites and values. By including the entire region, the CVRD and its partners will be working towards cross-jurisdictional collaboration for the long-term benefit of ESAs and the health of our communities.

ESA Target Setting

In addition to a region-wide assessment of ESA representation and condition, we recommend using major watersheds as primary management units for ESA analysis and target setting as a coarse filter. Using watersheds as ESA planning units has the following advantages:

- They provide natural "contained" areas from valley bottom to height of land.
- Larger watersheds can be subdivided into 2 – 3 smaller sub-basins if appropriate, and conversely, smaller, unconnected watersheds on the landscape can be grouped with larger adjacent watersheds; and
- The CVRD Board has endorsed the development of watershed management plans; therefore, using watersheds as ESA management units will compliment that approach.

In addition to examining ESA health indices at the regional and watershed scales, we recommend the use of BEC units and jurisdictions as secondary scales for ESA analysis and developing targets. All three provide important insight into representation of ESAs within the Cowichan Region.

ESA Prioritization

Targets for ESAs should go beyond percent representation to account for the ecological integrity or condition of individual ESAs (fine scale filter).

- A method for evaluating ecological integrity enables a standardized approach to assess and identify degraded ESAs that could be improved through restoration or rehabilitation measures.
- An ESA standardized ranking matrix could also be used as a guide for land acquisitions and covenant areas.

Assigning priorities (rankings) to particularly high value ESAs is appropriate at all scales of assessment.

Support and Provide Incentives for ESA Monitoring, Conservation and Restoration

- Explore opportunities for partnerships with citizen-science stewardship groups for monitoring and restoring ESAs
- Explore the use of online tools for the public to aid in tracking invasive species, species at risk, and habitat mapping
- Explore site-level incentive options such as riparian tax exemptions, conservation covenants, and the provision of density bonuses

Regulatory and Policy Updates

- Conduct a gap analysis to identify divergences between Electoral Area OCPs (process initiated by Boyle, draft 2017)
- Include ESA language and policy directions explicitly in all future new policy and amendments
    a. Establish growth boundaries for all Electoral Areas
    b. Establish Development Approval Information Areas for all Electoral Areas
    c. Establish new EDPAs to include all ESAs
- Develop guidelines for site-level development within and adjacent to ESAs
    a. With guidance from a Technical Advisory Committee
    b. Incorporating public and stakeholder feedback
    c. Ensuring guidelines are clear and achievable, and that the permitting process is efficient

Land Acquisitions, Taxes and Staffing

- Develop criteria for land acquisition priorities
- Explore potential for establishing Development Cost Charges or Property Taxes for a Conservation Fund
- Explore potential for Regional Environmental Planning coordinator position to work between planning, parks, environmental services, municipalities, First Nations, and other regional districts

Communication and Stakeholder Engagement

The level of effort (time, resources, and funding) applied to the process of creating an inclusive strategy for the region will reflect the willingness for investment in the success of the CVRD ESA Strategy.

- Communicate results of the ongoing ESA data collection and analysis with stakeholders and the public through outreach and education initiatives
- Seek public and stakeholder feedback on the development of an ESA Strategy
- Continue Steering Committee meetings, as needed, to complete a draft ESA Strategy
- Establish a Technical Advisory Committee for the development of targets (determining thresholds and benchmarks)
- Compare ESA analytical results to targets and communicate areas of strength and weakness in the ESA network in a “state of ESAs” or “ESA report cards” document

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1 Introduction

There is growing awareness and concern for the overall status of environmentally sensitive areas (ESAs) in the Cowichan Valley Regional District (CVRD) and throughout British Columbia. ESAs are typically considered to be productive habitats important to biological diversity that are at risk of disappearing. Examples of ESAs familiar to many are wetlands, old forest and Garry oak woodlands. Some ESAs are also designated as ecosystems at-risk, or ecologically fragile (RISC 2006). Ecosystems at-risk are those that support rare or unusual ecological communities as designated by the B.C. Conservation Data Centre (BC CDC)[3]. With population growth and expanding land-use development, pressures upon these ecosystems increases, leading to progressive losses of ESAs that could significantly impact the biological diversity and ecological health of the area; especially where pressures are particularly focused along the Eastern portion of the region.

To address these concerns, the CVRD is in the process of completing an inventory of ESAs and developing a strategy for ESA management and conservation. As part of this process, Madrone Environmental Services Ltd. (Madrone) was awarded a contract to inventory ESAs in the CVRD using existing data, update ESA mapping in a priority area using recent aerial imagery, propose options for the development of an ESA network, and provide recommendations for the development of an ESA strategy.

By mapping and maintaining an inventory of ESAs, the CVRD can track changes in ESAs over time, and implement effective strategies for ESA conservation. The results of the preliminary inventory of ESAs in the CVRD are provided in Part 1 of this project: “An Inventory of Environmentally Sensitive Areas (ESAs) within the Cowichan Region” (A Foundation Component to an ESA Strategy) (Madrone, draft April 2018).

Following the inventory of ESAs, recommendations for the structure of an ESA strategy were developed, with the intention that this information will be incorporated into future planning and decision making.

Objectives established for this project that are contained in this report are as follows:

i. Provide recommendations for the structure of an ESA Strategy for the Cowichan Region, based on a thorough review of successful ESA strategies / conservation strategies from other jurisdictions (primarily other local governments in BC);

ii. Develop a process for setting targets for ESAs within the region;

[3] BC Conservation Data Centre and BC Species and Ecosystems Explorer

iii. Host steering committee workshops to guide decisions regarding the structure, scope and targets of the ESA Strategy; and

iv. Provide recommendations for legal, regulatory or policy-based tools for protecting ESAs.

1.1 Project Area

The project area is located between the Capitol Regional District (CRD), Alberni-Clayoquot Regional District (ACRD) and the Regional District of Nanaimo (RDN), on the south portion of Vancouver Island, British Columbia. It encompasses approximately 355,147 hectares (land and freshwater) extending from the east to west coast of Vancouver Island.

The CVRD is represented by ten biogeoclimatic ecosystem classification (BEC[4]) units (zones, subzones, and variants) that range from the dry Coastal Douglas-fir (CDF) moist maritime (mm) (CDFmm) subzone on the east coast to the Coastal Western Hemlock (CWH) very wet hypermaritime subzone variant (vh1) on the southwest coast.

Within the Cowichan Region there are 12 major watersheds and 7 coastal benchland units. The benchlands are coastal areas that do not contribute flows to the major river systems. For maps and further details on the BEC units and watersheds of the CVRD, refer to "An Inventory of Environmentally Sensitive Areas (ESAs) within the Cowichan Region" (Madrone, draft April 2018).

1.1.1 Jurisdictions and Communities

In addition to a wide variety of biogeoclimatic units, watersheds, and benchlands, the Cowichan Region has a number of jurisdictions, and diverse mix of communities, land ownership, and land use. There are a total of nine electoral areas in the CVRD, as well as four municipalities, and multiple First Nations and bands. A map of local government jurisdictional boundaries is provided in Figure 1.

This study of environmentally sensitive areas falls within the traditional territories of:

- Cowichan Tribes
- Ditidaht First Nation
- Halalt First Nation
- Lake Cowichan First Nation
- Lyackson First Nation
- Malahat First Nation

[4] https://www.for.gov.bc.ca/hre/becweb/

- Penelakut Tribe
- Stz'uminus First Nation

Land ownership and use:

- First Nations
    - Reserve lands
    - Traditional territories and use areas
- Public
    - Provincial forestry lands
    - Local, Provincial and Federal Parks
- Private
    - Residential, commercial, industrial, agriculture, forestry

Local government jurisdictions and their communities include:

- Cowichan Valley Regional District
    - Area A – Mill Bay / Malahat
    - Area B – Shawnigan Lake
    - Area C – Cobble Hill
    - Area D – Cowichan Bay
    - Area E – Cowichan Station / Sahtlam / Glenora
    - Area F – Cowichan Lake South / Skutz Falls, Caycuse, Honeymoon Bay, Mesachie Lake, Nitinat
    - Area G – Saltair / Gulf Islands (Thetis and Valdez Islands)
    - Area H – North Oyster / Diamond
    - Area I – Youbou / Meade Creek
- Municipality of North Cowichan
    - Chemainus, Crofton, Maple Bay and Westholme
- Town of Lake Cowichan
- City of Duncan
- Town of Ladysmith

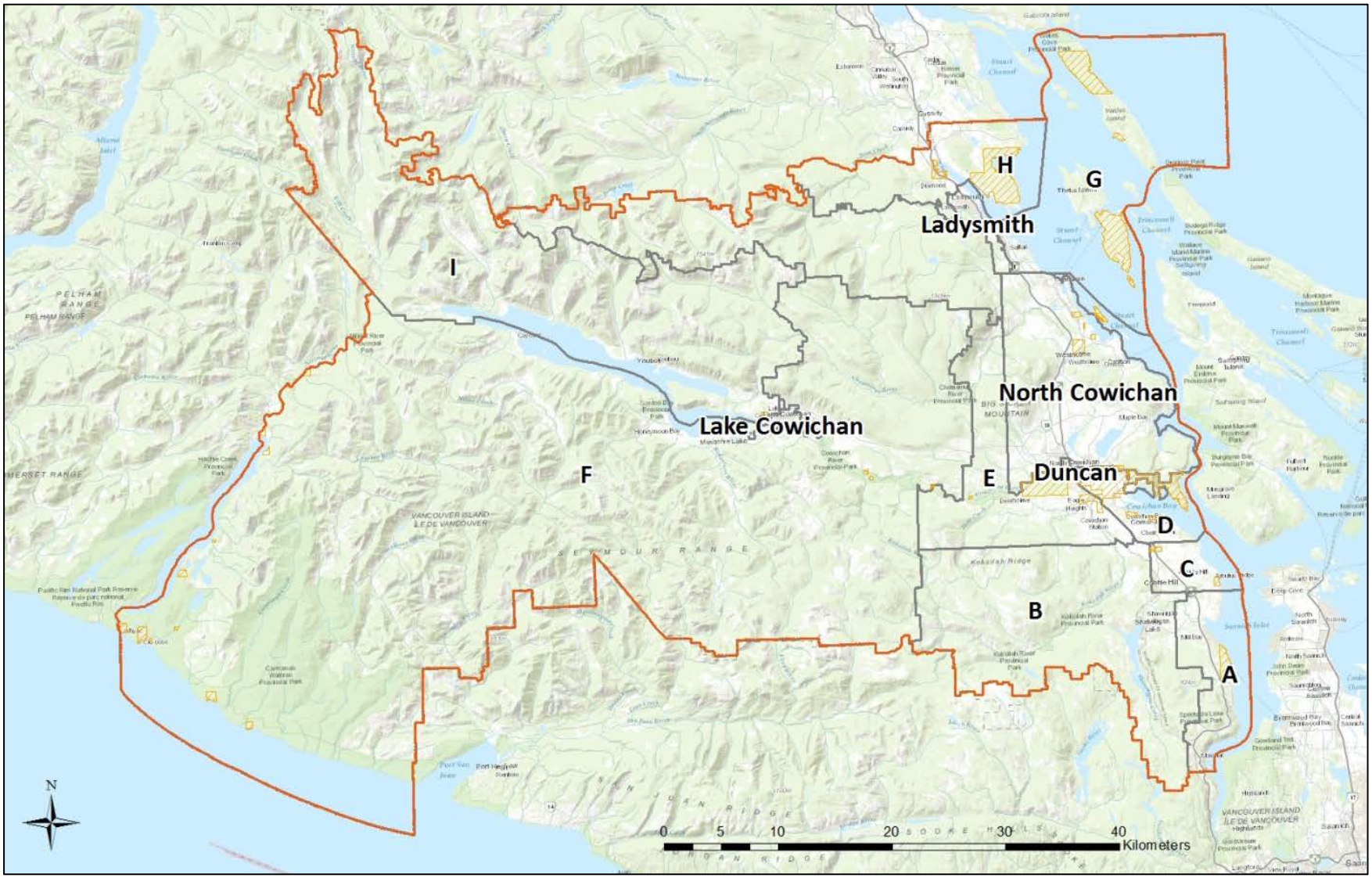

Figure 1. Local Government Jurisdictions in the CVRD

1.2 Rationale for an ESA Strategy

The primary rationale for an ESA Strategy for the Cowichan Region is to protect ESAs within the region. If we don't have this type of planning tool in place throughout the region, these natural assets will continue to be lost or damaged. In order to plan for development near these sensitive features, we need to know where they are located on the landscape.

As Part 1 of this project, a map has been created and provided to the CVRD that inventories and combines all of the known ESA/SEI map products for the region; specifically to identify ecologically significant lands and ecosystems. Incorporating ESA mapping in Land Use Planning creates a science-based rationale for policy development. It can also be used to prioritize acquisitions (parks or protected areas). In addition, it provides information that the CVRD needs to adapt and mitigate the future impacts of development and climate change (growth planning).

Within the context of existing CVRD objectives, an ESA Strategy:

- Would help in implementing stated conservation guidelines to maintain healthy natural environments and to anchor a vibrant green economy.
    - Could inform the concept of "green infrastructure" values and increased recognition of ecosystem services (water quality, stormwater management, waste cycling).
- Would provide an integral tool in creating core protected or managed areas via buffers, corridors and green linkages between CVRD parks, resource lands, agricultural lands, urban parks, green spaces, and private lands.

Relevant CVRD planning documents and initiatives include, but are not limited to:

- *Regional Parks Strategic Plan*
- Official Community Plans (OCPs)
- *Cowichan 2050: A regional integrated planning strategy* (in process)
- *Watershed Planning* (in process)
- *Cowichan Region State of the Environment (2010 with updates in 2014 and 2015)*

An ESA Strategy will also help to ensure that the CVRD is prepared to meet federal and provincial legislation, including:

Federal: *Species at Risk Act, Fisheries Act, Environmental Protection Act, Migratory Bird Convention Act*, Climate Change Policy, etc.

Provincial (BC): *Water Sustainability Act, Riparian Areas Regulation, Biodiversity targets of the Forests and Range Practices Act, Wildlife Act*, the potential for a BC Species at Risk Act, etc.

"A strategy that directs development away from ESAs and encourages restoration of damaged areas will ensure communities benefit from free ecosystem services that healthy ecosystems provide. Benefits that accrue to the environment, local government, landowners and citizens' quality of life from ecosystem services are summarized in the following table" (Table 1 adapted from the Comox Valley Land Trust *EDPA Framework*, January 2017).

Table 1. A highlight of some of the many ecosystem services provided by healthy ecosystems[5]

Environment	Local Government	Land Owners	Quality of Life
• Wildlife & plant habitat • Healthy watersheds • Water quality • Fish & aquatic habitat • Pollination • Biodiversity • Intact ecological processes • Climate change resilience	• Improved water quality • Natural rainwater (storm water) management • Reduced infrastructure maintenance and costs	• Increased property values • Reduced risk of flooding • Reduced infrastructure costs & lower property taxes	• Clean water • Improved air quality • Reduced demands on health care system • Access to green space, outdoor recreation, active living, nature education

[5] https://www.cvlandtrust.ca/wp-content/uploads/2018/01/EDPA-Framework-2017.pdf

2 Review of ESA Strategies from Other Jurisdictions

In order to inform our recommendations for developing an ESA strategy in the CVRD, we reviewed ESA strategies and conservation initiatives from other local governments in BC, as well as areas outside BC and Canada. During the first Steering Committee meeting, Madrone presented results of this review. Projects outside of BC (such as the Oak Ridges Moraine Conservation Area in Ontario) were generally informative, but since they were less applicable to the CVRD context the following discussion is limited to BC examples.

As part of our review process, a matrix was developed to track the differences and similarities between strategies. Strategies were assessed for their relevance to the CVRD, and compared based on the following criteria:

- level of overall applicability to the CVRD
- level of complexity (such as multiple jurisdictions and land tenure)
- ongoing incorporation of additional data to improve the base mapping
- similar mixed – rural setting
- depth of data analysis using NatureServe or equivalent
- level of public outreach, involvement, and information availability

There are numerous resources to help guide the structure of the CVRD ESA Strategy. A summary of the reviewed ESA strategies that were most applicable to the CVRD context is provided in Table 2. Following Table 2, each of these strategies is described further, with the focus on aspects we found of greatest interest and applicability to the CVRD.

Table 2. Summary of Selected ESA Strategies Reviewed from Other Jurisdictions in BC of Highest Relevance to the CVRD Context

Jurisdiction	Program Name	Applicability to CVRD	ESA Mapping Building Blocks	Ongoing Map Updates / Monitoring	Analysis of Ecological Condition / Connectivity, and/or Conservation Priority	Public Outreach and Stakeholder Engagement	Comments	Weblink (URL Tested and Active as of April 2018)
Comox Valley Regional District	**Natural Areas Network; Conservation Areas**	Example of ESA project at regional district level; uses similar building blocks and objectives; similar level of complexity with multiple jurisdictions and land tenure	SEI inventories, connectivity, biodiversity corridors, aquatic and upland habitat corridors, riparian areas, estuaries, species at risk, FN traditional knowledge, parks, greenways	Yes	Yes Biodiversity priority area analysis	Nature without Borders document; high level of public involvement, and partnerships with many local groups	Focus on conservation, restoration, improving connectivity, trail networks; incorporates other federal Species at Risk information as well as provincial listed rare species and ecosystems.	http://www.cvlandtrust.ca/
Regional District of Okanagan - Similkameen	**Biodiversity Conservation Strategy**	Example of ESA project at regional district level, uses similar building blocks; slightly lower level of complexity than Comox ESA	SEI, TEM, VRI, BEC, Freshwater Atlas, TRIM, Forest Tenure cutblock, DEM, Species occurrences, build on existing park and protected areas network	Yes	Yes	Keeping Nature in our Future 98 pgs, 2012; promotes better public understanding of biodiversity	Used to manage ecological values on crown lands, maintain diversity of ecosystems, considers regional context, to connect habitat areas, link natural areas.	http://www.rdos.bc.ca/departments/development-services/planning/strategic-projects/biodiversity-conservation-strategy/
Metro Vancouver	**Sensitive Ecosystems Inventory (SEI)**	Example of SEI in high population urban area; includes modified ecosystems such as flooded fields and young forests; includes riparian areas and rivers	Terrestrial Ecosystem Mapping (TEM), Regional Parks network, Provincial Parks, Riparian areas.	Yes	Yes	SEI Technical Report 2014, web presence is used for a variety of local initiatives	TEM was used to generate SEI values; Image interpretation done where no TEM was available; mapping done at 1:5,000 - 20,000; 20% of polygons field verified; "quality" of SEI polygons determined via condition, landscape context (fragmentation) and size	www.metrovancouver.org/services/regional-planning/conserving-connecting/sensitive-ecosystems/
City of Nanaimo	**ESA Network**	Uses SEI as base mapping; good public outreach, and well-integrated into different City departments	SEI mapping, supported with local biological assessments in areas of interest when required	No	Limited	Website, interpretive signage, tours	ESA is used extensively, but is not used in a dynamic way with analysis and updates.	https://www.nanaimo.ca/recreation-parks/parks-trails/natural-areas/environmentally-sensitive-areas

Jurisdiction	Program Name	Applicability to CVRD	ESA Mapping Building Blocks	Ongoing Map Updates / Monitoring	Analysis of Ecological Condition / Connectivity, and/or Conservation Priority	Public Outreach and Stakeholder Engagement	Comments	Weblink (URL Tested and Active as of April 2018)
City of Surrey	**Biodiversity Strategy; Green Infrastructure Network; Urban Conservation;**	Example of ESA mapping that informs Development Permit Areas	Parks, riparian corridors, natural areas, wetlands, marine foreshore, old fields, agricultural land, forest (all ages), connecting corridors, species at risk, shrub/herb/grass dominated habitat	Yes	Yes	Biodiversity Conservation Strategy 2014, 130 pgs, information available on the City website	Encouraging backyard biodiversity, engineered habitat features, restoration of disturbed habitat, enhancement of forests, create "Hubs" and connecting corridors	http://www.surrey.ca/city-services/11565.aspx
Islands Trust	**Regional Conservation Plan; Network of Protected Areas**	Similar ecology to parts of the CVRD (CDFmm BEC zone); working with FN is high priority; use covenants frequently as conservation tool	Identifies areas of interest for conservation; Core conservation areas, marine ecosystems; SEI, at-risk ecosystems, connectivity and buffers, and marine foreshore.	Yes	Yes Marxan analysis done on Salt Spring Island	Website that allows an interactive tour of marine habitats	Minimize fragmentation; use existing TEM (2004); goals include ecosystem representation, protection of large natural areas, and listed species (species at risk Federally and Provincially).	http://www.islandstrustfund.bc.ca/media/84636/draft-rcp.pdf
City of Richmond	**City of Richmond ESA Management Strategy** **&** **Richmond's Ecological Network Management Strategy**	Cross-jurisdictional collaboration; wide range of land use and ownership included in the network; ESA monitoring via periodic map updates	• Metro Vancouver SEI • Mapping of natural and semi-natural vegetation through aerial photo classification (polygons ≥0.25ha) • Marine shoreline buffer (30m), regardless of land use, vegetation or naturalness. • Riparian areas (15m and 5m setbacks) • Parks and greenways (opportunities for City-led restoration and enhancement focusing on green infrastructure)	Yes	Yes "Naturalness" classification Connectivity assessed via landscape impedance model and Circuitscape analysis	Outreach and education initiatives at 15 community events; online survey for public feedback – participants provided with reports, maps and photos as background info.	Comprehensive; strong stakeholder and public engagement; inter-departmental coordination; cross-jurisdictional collaboration; division of land base into strategy areas; focus on integration with existing initiatives; very different land cover and use from CVRD (mostly urban and agricultural – only 9% forested)	https://www.richmond.ca/__shared/assets/esamgmtstratbtr33976.pdf and https://www.richmond.ca/__shared/assets/Ecological_Network_Management_Strategy42545.pdf
District of Saanich	**Environmental Development Permit Area (EDPA)**	Similar ecosystems (CDFmm) and development pressure; cautionary example as the EDPA was repealed 5 years into implementation	• SEI • Conservation Data Centre (red and blue listed) • Wildlife Trees • Isolated Wetlands & Streams • Saanich Marine Inventory	Yes	No	Independent outreach and review effort in response to considerable stakeholder and public opposition	Streams and riparian areas not included in EDPA (pre-existing Streamside DPA)	http://www.saanich.ca/EN/main/community/sustainable-saanich/environmental-planning/environmental-development-permit-area.html

2.1 Comox Natural Areas Network

Based on our review of ESA programs and strategies in place from other jurisdictions, we found the *Natural Areas Network* (Fyfe, 2013) undertaken in the Comox Valley to be most applicable to the CVRD in terms of the mapping, program design, and highly effective outreach. Existing Sensitive Ecosystem Inventory (SEI) is the base mapping for two on-going programs: the Comox Valley Conservation Partnership (CVCP) and the Land Protection Program (LPP). The two programs bring together local groups and citizens to address issues of environmental concern through local government advocacy, outreach and education, and are administered through the Comox Valley Land Trust (CVLT).

Of direct applicability to a multi-jurisdictional approach, in 2008 the CVCP developed *Nature Without Borders* (NWOB) in response to the need to develop a strategy to address loss of sensitive ecosystems in the Comox Valley. The result has been that NWOB is currently adopted by all 4 local jurisdictions in the Comox Valley, and components of it have been integrated into OCPs, zoning bylaws and other local government regulations and policies. For example the village of Cumberland has designated Environmental Development Permit Areas (EDPA) for every SEI polygon in the Village.

2.1.1 Land Protection Program

CVLT's Land Protection Program has taken this work further assessing every SEI polygon in the Comox Valley and screening them against a variety of science-based conservation planning methodologies to develop a list of the top-30 sites for conservation in the Valley (T. Ennis pers. comm.). The associated database identifies 100 parcels of private land that comprise the 30 sites, and include attributes such as ownership, parcel size, % of the parcel that is significant, zoning etc. The database was used to complete a Viability Analysis based on NatureServe methodologies[6] and a Threats Analysis based on the International Union for the Conservation of Nature methodologies (IUCN)[7].

Further refinement was completed by way of an Opportunities Analysis, whereby each parcel was categorized by the most likely form of conservation applicable in each case (e.g., covenant, land acquisition, regulatory protection, etc.). The Opportunities Analysis was completed in collaboration with local government planning staff. As a result of the LPP, CVLT is now engaged in four conservation projects that seek to protect some of these high-value sites, and expects to protect 133 ha as a goal in 2018.

[6] http://www.natureserve.org/conservation-tools/ecological-integrity-assessment
[7] https://www.iucn.org/

2.1.2 Outreach and Education

Associated with the work of CVLT is a communications and outreach program. This is run by a Communications Coordinator and includes a website (www.cvlandtrust.ca), social media (e.g., Facebook), quarterly eNewsletters, and a regular presence in the local press through media releases. CVLT produces targeted, technical outreach materials for local government staff such as a recent publication on how to develop strong EDPA regulations. Through the CVCP member groups brochures and other watershed-specific outreach materials have been produced. The CVLT team regularly delivers public presentations at events, appears as delegations to Council on specific issues, and speaks at AGMs and to service clubs. Recently a large symposium was held focusing on the concept of eco-asset valuation (i.e., natural capital), attracting attendees from across the province and from all sectors.

2.2 Regional District of Okanagan – Similkameen (RDOS)

Another ESA/SEI strategy that stood out to us as "successful" is the one developed by the Regional District of Okanagan – Similkameen (RDOS). Starting in 2004, ecosystem and SEI mapping have been completed for the majority of its area. This mapping has been used to flag areas that should remain untouched (such as riparian areas and wetlands). This mapping has also been used to inform the "*Keeping Nature in Our Future: A Biodiversity Conservation Strategy for the South Okanagan – Similkameen*" which in 2013 was accepted by the Planning and Development (P&D) Committee of the Regional District Board as a guiding document for RDOS and became an amendment to their Official Community Plans (OCP).

Biodiversity analysis has been done on the mapping to identify biodiversity "hot spots" (areas of ecological importance on the landscape). Areas classified as having high or very high ratings have become focal sites for conservation. Land Management analysis has also been done to identify, for example, the amount of protected areas, parks, and high or very high value biodiversity areas. Habitat connectivity analysis has also been undertaken to identify barriers and pinch points to wildlife passage.

Keeping Nature in Our Future is the fulfillment of the Regional Growth Strategy's goal for biodiversity conservation planning and has, since 2013, been the basis for a comprehensive review of the environmental objectives, policies and development permit area guidelines contained within the Okanagan Electoral Area Official Community Plan (OCP) and Zoning Bylaws. Other planning and regulatory tools described in "*Keeping Nature in Our Future*" have been used for environmental protection, and to designate land for conservation, parks, and recreation that will help to conserve biodiversity.

In urban areas bylaws and incentives have been used to protect riparian areas, wetlands, and to regulate tree removal. Local governments can also protect biodiversity through:

- securing ecologically significant areas through land acquisition (including partnering with NGOs);
- establishing local levy-based conservation funds;
- accepting donations of land and funds; and
- establishing rights-of-way and covenants; and stewardship of protected areas within their boundaries.

2.2.1 Outreach and Education

The South Okanagan – Similkameen Conservation Program has a well-designed, visually appealing website that is easy to use. It describes *Keeping Nature in Our Future* (A Biodiversity Conservation Strategy), and uses a visually pleasing logo with clear messaging to "brand" the program. An information package and map has been prepared for the 14 municipalities and rural areas in the Regional District Okanagan Similkameen. A series of "Primers" provide details about the location of sensitive ecosystems and recommendations for conservation and restoration of natural areas. Their wording and messaging is clear and informative. They list the areas with the greatest proportion of very high and high relative biodiversity.

The home page[8] provides a link to Biodiversity Maps and Resources, and another link to resources for Planners and Professionals. All relevant documentation is easily found and available to download. A series of maps are provided that illustrate various themes, and include: Conservation Ranking, Valley Relative Biodiversity, Land Management, High Biodiversity Areas, and Habitat Connectivity. Shapefiles are also available to download directly from the website.

Education is a key component of their strategy, the Regional District Okanagan Similkameen supports a series of Environmental Education Programs conducted in partnership with the local schools.

2.3 Metro Vancouver Sensitive Ecosystem Inventory

Metro Vancouver SEI mapping was done in 2010-2012, and covers the Greater Vancouver Regional District. The SEI was done to provincial standards, but also included "modified ecosystems" – those having ecological and biodiversity value, such as seasonally flooded agricultural fields and young forests. The mapped area covers 367,000 ha, including rivers, lakes and intertidal zones (Meidinger *et al.* 2012). Quality analysis was done to determine SEI polygon condition (disturbance factors), landscape context (degree of fragmentation), and size (larger sites more likely to have a full suite of natural functions than small sites) (Meidinger *et al.*

[8] https://soscp.org/biodiversity/technical-files/

2012). Finalizing a 5-year update to the original mapping is currently being done (J. Clark Regional Planner, pers. comm.).

The objectives of the SEI mapping were to provide a tool for planning and implementing new projects within Metro Vancouver and member municipalities, agencies, and institutions; and to complement other SEIs in adjacent areas such as Howe Sound and the Sunshine Coast. The mapping is used for conservation, ecological restoration, environmental site assessments, and landscaping. Information from the SEI map has also been used by the Regional Parks staff to inform protected area acquisition and management. It also provides information for developing municipal environmental initiatives such as development plans and permits, tree planting, development plans and permits, stream set-backs, invasive plant bylaws, and urban forestry.

2.3.1 Outreach and Education

Staff from the Regional Planning Department promote the SEI at meetings and events as well as distribute brochures when appropriate (J. Clark Regional Planner pers. comm.). The SEI mapping and reports are available on the Metro Vancouver webpage (www.metrovancouver.org), and is compatible with desktops and tablets; a web viewer is also available, but just with the original data set (until the 5-year update is complete). The public can provide feedback on the mapping via an email address.

2.4 City of Surrey Biodiversity Strategy using Green Infrastructure Networks (GIN)

The City of Surrey completed a Biodiversity Conservation Strategy as part of the City's recognition that biodiversity is a key foundation of a healthy community, and that preserving nature provides many benefits. These benefits include: clean air and water, reduced infrastructure, and aesthetic and recreational values. To achieve this, the City embarked on a Green Infrastructure Network (GIN), which now serves as a tool to inform the following general objectives:

- Identify and quantify biodiversity and habitat resources
- Manage urban ecosystems and habitat
- Set conservation targets and acquire lands for conservation
- Locate areas for parkland dedication and ecological restoration
- Enact bylaws (such as tree protection, soil conservation, and floodplain management)
- Conservation easements
- Inform the City's Official Community Plan (OCP) and Sustainability Charter
- Incorporate Sensitive Ecosystem Development Permit Areas.

2.4.1 Green Infrastructure

The City of Surrey's "green infrastructure" refers to a network of natural areas that perform ecological functions and provide benefits to both people and wildlife (Diamond Head 2014[9]). Green infrastructure also refers to engineered systems that mimic natural processes (rain gardens or built wetlands for stormwater management). However these projects are usually done within a park, larger properties, or smaller jurisdictions. Green Infrastructure Networks can help local communities manage natural and urban environments to achieve the following ecological and social objectives:

- Permit natural ecosystem functions to work as intended and reducing reliance on traditional infrastructure (e.g., to manage stormwater) and reducing long-term capital burdens.
- Provide opportunities to meet community health and recreation objectives: park and trail infrastructure can be integrated into the green infrastructure planning to support community health initiatives, outdoor recreation and active transportation.
- Enhance overall ecological integrity of natural ecosystems by identifying key forest habitat, and facilitating greater connectivity between core natural areas.

2.5 City of Richmond ESA Management Strategy[10]

The City of Richmond had an *Environmentally Sensitive Area Management Strategy* drafted in 2012 as part of their 2014 OCP update. The 2012 ESA Strategy served as a guiding document to update the ESA DPA guidelines for the OCP update. Three ecosystem service categories were identified as values the Strategy intends to manage: (1) biodiversity and wildlife habitat, (2) water storage and filtration, and (3) recreation and the enjoyment of nature. ESAs were mapped as part of the Strategy development, and were assigned a "naturalness" ranking. The mapped ESAs formed an Ecological Network which the City intends to support for the provision of the ecological services noted above. The network is described as including the full range of land uses and ownership within the City. Goals for the management of the network included the following:

1. Preserve a connected network of natural and semi-natural areas
2. Reconnect people with nature
3. Maintain and enhance the value of ecosystems and ecosystem services
4. Strategically connect and restore the ecological value of key parks and public lands

[9] *Diamond Head (2014). Surrey Biodiversity Strategy.* http://www.diamondheadconsulting.com/surrey-biodiversity-project
[10] https://www.richmond.ca/shared/assets/esamgmtstratbtr33976.pdf

5. Integrate the management of the Ecological Network with other City responsibilities and with other jurisdictions' responsibilities

Richmond's ESA Strategy also identified the following management principles:

1. Research – Rigorous and transparent science
2. Protect and Strengthen – Promote ESA protection over the long-term
3. Reduce Administrative Redundancy – Leave ESA regulation to other jurisdictions as appropriate
4. Effective Communication – Between City departments and Richmond's citizens
5. Cost Effectiveness – Should not create an undue financial burden
6. Cost Sharing – By all appropriate parties
7. Partnerships – All levels of government and stakeholders need to work together

Richmond's ESA Strategy recognizes the need for periodic map updates to monitor ESAs in order to evaluate the success of the program. It includes plans to develop a report card based on indicators of environmental health, as well as public access and recreational values. Indicators of environmental health include fish habitat quality, water quality, fish and wildlife use, and extent of wetlands and forest cover.

Also of note as part of the "big ideas" section of the Strategy is the possibility of creating habitat compensation standards for cases where ESA loss cannot be completely avoided during development. The Strategy suggests a minimum 2:1 area replacement criteria and that compensation plans should be developed by a Qualified Environmental Professional (QEP). Building upon the compensation recommendation, the Strategy also identifies the possibility that the City could create a habitat bank, in which ESAs would be restored or newly created to offset potential future impacts to ESAs. Refer to Part 4 of Richmond's ESA Strategy for the policies and development permit area guidelines.

2.5.1 Richmond's Ecological Network Management Strategy

Subsequent to the creation of their ESA Strategy, the City of Richmond Council adopted an Ecological Network (EN) Management Strategy in September of 2015[11]. The EN Strategy was developed on the basis that, "effective management of ecological systems must occur at the city-wide scale." Richmond's EN Strategy aims to compliment and inform planning to protect and enhance the City's ecologically sensitive areas, by integrating with existing initiatives and policies, and without creating a series of new regulations and policies. In this way, the EN Strategy is conveyed as opportunistically building upon existing processes and projects in the City for the preservation, enhancement and connectivity of ESAs. The vision statement of

[11] https://www.richmond.ca/sustainability/stewardship/ecology/about.htm

Richmond's Ecological Network Management Strategy is as follows:

"The Ecological Network is the long-term ecological blueprint for the collaborative management and enhancement of the natural and built environments throughout the city, within neighbourhoods, and across land-uses and development types in order to achieve ecologically connected, livable and healthy places in which residents thrive."

Goals identified in the EN Strategy include managing and building upon ecological assets and green infrastructure, improving connectivity across the landscape, and engaging the public and stakeholders through stewardship and collaboration. During the development of the EN Strategy, residents' feedback was sought through consultation and engagement to ensure the resulting Strategy was pragmatic. Community engagement initiatives were also used as a platform for education and outreach about the EN. The City hosted an Ecological Network booth at 15 community events over five months, including educational activities for children and youth, and an online survey gathered feedback from the public over a three month period. Survey participants were provided with reports, maps and photos related to the EN as background information.

About 23% of the City of Richmond's total area is within the EN[12], and the mapped EN was used to create an Environmental Development Permit Area (DPA). DPA guidelines pertain to vegetation, tree retention, rainwater collection, stormwater management and green infrastructure. Ten strategy areas were established based on vegetation type, land use, stewardship and development opportunities, and area-specific plans were created for each strategy area.

Connectivity of ESAs was assessed as part of the EN development, by employing two analytical techniques:

- Corridor analysis using a landscape impedance model
- Landscape permeability using Circuitscape analysis

A valuable component of the EN Strategy is that it addresses the complex jurisdictional environment of the Fraser River and West Dike foreshore areas, and identifies roles and responsibilities for:

- The City of Richmond
- Provincial Government
- Federal Government
- Port Metro Vancouver

[12] While the Richmond ESA Strategy provides a useful example, the land area, land use context and ecological context is of course very different from the CVRD. For instance, only 9% of Richmond is forested.

- Metro Vancouver
- Vancouver International Airport
- First Nations
- Farmers
- Private Landowners
- Land Stewards

Other related bylaws in the City of Richmond include the Tree Protection Bylaw, the Pesticide Use Control Bylaw, the Pollution Prevention and Clean-Up Bylaw, Watercourse Protection and Crossing Bylaw, and the Green Roof Bylaw. Also of relevance is the City's draft Integrated Rainwater Resource Management Strategy, which addresses efficient use of energy, drinking water, nutrients in sewage, and rainwater collection.

In the report to Council[13] at the time the EN Strategy was adopted, the financial impact of adopting the Strategy was stated as imposing no cost at that time. Outreach and engagement activities were planned to be addressed through existing staff time, and activities that would result in additional costs were to be submitted for Council consideration as part of future budgets.

2.6 City of Nanaimo

The City of Nanaimo undertook ESA mapping in 2004 that covers the greater Nanaimo area (Madrone 2004). Most of the polygons are discrete, but there is riparian connectivity between some polygons. While no significant new additions have been made to the ESA mapping, it is broadly used both within the various departments of the City of Nanaimo (Parks, Planning, and Engineering) as well as by the public. It has been used to flag areas for new Parks, to put covenants on sensitive areas, for re-zoning applications, and set-backs from development (Rob Lawrance, Env. Planner, pers. comm.).

2.6.1 Outreach and Education

The City has also engaged in public outreach through interpretive signs, tours, and the City of Nanaimo website (www.nanaimo.ca) – which highlights the ecosystem services that ESAs provide and the importance of biodiversity. In summary, the ESA mapping is used extensively, and enjoys public support, but there doesn't appear to be a larger overarching conservation program where map analysis and methodologies are used to either add more information to the existing mapping, or to prioritize areas for protection.

[13] https://www.richmond.ca/agendafiles/Open_GP_9-21-2015.pdf#%5B%7B%22num%22%3A76%2C%22gen%22%3A0%7D%2C%7B%22name%22%3A%22FitH%22%7D%2C795%5D

2.7 Islands Trust Regional Conservation Plan 2018- 2027

The Islands Trust Regional Conservation Plan has the following objectives:

- Identify and investigate natural areas that are a priority for conservation
- Collaborate on shared conservation goals with First Nations
- Secure and manage Trust Fund lands and conservation covenants to maximize ecological integrity

The Trust area has both SEI and TEM coverage that are used as building blocks to achieve their objectives. In addition to this data, they also have data on species and ecosystems at risk (both under the Federal *Species at Risk Act* and the provincial *Wildlife Act*), and nearshore ecosystems (such as eelgrass habitat).

Using this data the Islands Trust has done a number of analyses including:

- Conservation planning and developing targets
- Land status analysis (total area of parks, covenant areas, ecological reserves)
- Forest structural stage (such as mature and old forest)
- Disturbance mapping (including type of disturbance)
- Biodiversity priorities (sensitive ecosystems, marine shorelines, ecosystems at risk)
- Threats to ecosystems (fragmentation, developments, resource use)

2.7.1 Outreach and Education

For public outreach, the Islands Trust has developed interactive mapping for their website (www.islandstrustfund.bc.ca). Viewers can take virtual tours of terrestrial ecosystems and nearshore ecosystems such as eelgrass habitat. They have prepared a document providing details of the Regional Conservation Plan which is also available on their website.

2.8 District of Saanich Environmental Development Permit Area

In the above examples, we have focused on programs and strategies that we viewed as successful. However, it would be short-sighted of us if we did not also mention the recent "failure" of the District of Saanich EDPA. We recommend that CVRD staff and the Committee Members read the independent review of the EDPA in Saanich (Diamond Head 2017). It may also be worthwhile for CVRD staff to meet with Saanich staff to learn from their experience, and identify potential pitfalls to avoid in the development of an ESA Strategy in the CVRD. The following is a brief synopsis of the history of the District of Saanich EDPA.

The District of Saanich enacted an Environmental Development Permit Area (EDPA) in March of 2012[14]. In 2015, the District conducted a six-month public check-in process to assess public perception of the EDPA three years into its implementation. Concerns were expressed during that process, particularly surrounding impacts to property rights and property values. To address those concerns, the District retained a third-party consultant to review options to revise the EDPA Bylaw based on public input.

The authors of the EDPA review noted that there were different and opposing opinions about the EDPA Bylaw, and there was a general need for clarity in:

- What the EDPA protects;
- How it regulates development;
- What activities constitute development;
- Whether mapped EDPA boundaries represent a complete restriction on future development;
- What level of flexibility there is in negotiating development design with staff, and how this negotiation process is structured.

Overall, the authors pointed to the confusion around the above aspects of the EDPA, and that this was accompanied by a lack of trust between the District and the public in implementing the EDPA. They also point out that although similar EDPAs have been implemented in other local government jurisdictions "without incident," the EDPA Bylaw in Saanich "faced significant public opposition."

In response to this opposition, the Saanich Council rescinded the EDPA in a 5-4 vote in November of 2017[15]. The repeal of the EDPA in Saanich after five years of implementation highlights the importance of up-front public and stakeholder engagement, consultation and support prior to rolling out an EDPA, as well as the need for clear communication. Requirements of an EDPA need to be clear and concise, and the permitting process should be efficient. Also, the Saanich example suggests that the implementation of an EDPA as part of an ESA Strategy should be preceded by: outreach and education, supporting voluntary stewardship, providing incentives for ESA protection and restoration, continuing to refine the mapping of ESAs in priority areas, monitoring changes in the distribution and condition ESAs over time, and communicating the findings of those efforts to the public and stakeholders.

[14] See Diamond Head (2017) and http://www.saanich.ca/EN/main/community/sustainable-saanich/environmental-planning/environmental-development-permit-area.html

[15] http://www.timescolonist.com/news/local/saanich-scraps-environmental-development-bylaw-it-simply-isn-t-workable-1.23087186

3 Overview of Land Use Policy Background for an ESA Strategy

The following section is adapted from a detailed review conducted by Chloe Boyle (CVRD) "Land-use Policy Background for an Environmentally Sensitive Areas Strategy in the Cowichan Valley Regional District" (Draft, November 2, 2017). The review document was provided to Madrone for consideration in our recommendations on the development of an ESA Strategy. Specific regulatory and policy-based recommendations provided by Boyle (Draft, 2017) are included in Table 5, Section 5. A summary of the analysis of existing CVRD policies related to ESAs, completed by Boyle (Draft, 2017), is provided here to compliment the background research on existing and implemented strategies provided in the previous section.

3.1 Analysis of Policy Strengths, Weaknesses, Opportunities and Threats

3.1.1 Strengths

Strengths are the policy directions within CVRD that are already working towards conserving and restoring ESAs. These strengths include, but are not limited to the following:

Mapping and Strategic Planning Strengths

- Numerous ecosystem and ESA/SEI map products completed within the CVRD, and now brought together as a deliverable of Part 1 of this project
- Broad awareness and understanding within CVRD of the importance of conserving ESAs
- Environmental Services is currently completing a Watershed Atlas

Funding and Land Acquisition Strengths

- North Cowichan, Ladysmith, and Duncan collect Development Cost Charges (DCCs) that can be used for park acquisition and maintenance

Official Community Plan and Environmental Development Permit Area Strengths

- Language is included in the OCPs about conservation of ESAs
- Electoral Areas A, B, C, D, I and Municipality of North Cowichan have defined Village / Urban Containment Boundaries; Electoral Areas E, F, & G include language about establishing Village Containment Boundaries
- Town of Ladysmith, City of Duncan, and Town of Lake Cowichan are small enough to not require containment boundaries
- All Electoral Areas and municipalities have EDPA established; The RAR requirements are included in all EDPA either through separately established EDPA, as part of watercourse protection EDPA, or blanket EDPA guidelines
- Ocean shorelines have EDPA, either attached to zoning, separate map, site specific conditions, or guidelines within blanket EDPA
- Certain EDPA and/or Comprehensive Development (CD) zoning have provisions for location and amount of vegetation cover retained

Zoning Bylaw Strengths

- Watercourse setbacks are mostly consistent throughout the CVRD, with 30m setbacks from Cowichan, Koksilah, and Chemainus, and 15m from any other watercourse or water body; (Ladysmith and Town of Lake Cowichan vary slightly)
- Comprehensive Development Zones generally include provisions for cluster development or density bonuses with land transfer, dedication, or covenant for environmental protection
- Electoral Areas A, B, & C rezoning to rural community residential based on minimum and base designated as parkland; Electoral Areas D, E, F, & I have discretionary policies regarding rezoning including land dedication; North Cowichan and Lake Cowichan have discretionary rezoning policies; Ladysmith has explicit separate rezoning community amenity contribution policy

Regulatory Strengths

- CVRD has a Development Approval Information Area Bylaw which is in effect in Electoral Areas A, B, & C; Municipality of North Cowichan, Town of Ladysmith, and City of Duncan are also designated Development Approval Information Areas
- CVRD has a Soil Removal Deposition Bylaw in progress, and Municipality of North Cowichan has a similar Bylaw in effect
- CVRD has a Land-clearing Management Regulation Bylaw preventing burning of debris

3.1.2 Weaknesses

Weaknesses are the gaps identified in policy directions that are barriers to ESA conservation and restoration.

Funding and Land Acquisition Weaknesses

- CVRD does not collect DCC or have a Conservation Tax in place to collect funds for regional park acquisition and maintenance
- Town of Lake Cowichan cannot use DCCs for park acquisition
- No checklist for determining park acquisition priorities

Official Community Plan and EDPA Weaknesses

- OCP language is interpreted in a non-flexible way, and different OCPs focus on different elements of ESA (e.g., wetlands vs. nest trees) instead of principles of conserving and restoring ESAs
- Electoral Areas E, F, G, & H have no defined growth containment boundaries in their OCPs
- Limited language in the OCPs about linking habitat patches through corridors, and focusing on larger better quality habitat patches for conservation and restoration
- Rezoning community amenity contributions provisions in OCP do not use language of linkages and connectivity

- EDPA design varies between electoral area and municipality; some EDPA are attached to specific maps in the OCP, some are attached to zoning, some are blanket, some are according to site-specific conditions
- EDPA language related to ESA is discretionary: *may* require security, *may* require QEP report, *may* require engineering report, development outside area *if possible* etc.; *supports* vs. *will only support if* (See: Soto, 2015 on language)

Other Regulatory Weaknesses

- CVRD Electoral Areas D, E, F, G, H, & I, and the Town of Ladysmith do not have Development Approval Information Area Bylaws in effect
- Currently no method of ticketing exists for Developers who alter the land without a development permit
- Town of Ladysmith, City of Duncan, and Town of Lake Cowichan do not have a soil removal or deposition bylaw in effect; the CVRD bylaw is not yet in effect
- CVRD does not have a Tree Protection Bylaw for ESAs, no method of ticketing for removal of vegetation without a permit
- CVRD does not have Floodplain Designation / Management Bylaw
- No provisions in Property Maintenance / Premises / Neighbor Bylaws about native species, and limited language about noxious weeds and nuisance plants

Zoning Bylaw Weaknesses

- No provisions for landscaping with native vegetation species for buffers and screens in subdivision bylaws
- Electoral Areas do not have requirements or provisions in zoning bylaw for landscaping with native plants
- Comprehensive Development zones rarely include language about connectivity and linkages between protected areas through clustered development and density bonuses, do not include language around ecological integrity of areas to be preserved and protected – up to the discretion of planners
- No separate formal CVRD policy for determining costs/benefits of rezoning community amenity contributions, varies within each OCP; Electoral Area G & H do not mention any rezoning policy

3.1.3 Opportunities

Opportunities are the policy directions that CVRD can take to address the weaknesses and threats in developing an ESA Strategy. The opportunities are based on the "Best Practices" identified through reviewing other literature, and building on the identified strengths within CVRD. Examples of opportunities include:

- Working collaboratively with other jurisdictions and stakeholders
- Trying to twin development with conservation

- Land Trusts could protect and manage lands in the CVRD (easing financial burden on CVRD). Land trusts could be compensated by lower taxes on protected lands.
- Create position for Regional Environmental Planning coordinator who would interact with other departments in CVRD as well as with First Nations, municipalities, other jurisdictions.

3.1.4 Threats

Threats are the external factors that create barriers for CVRD in ESA conservation and restoration.

Mapping and Strategic Planning

- Do not have access to all land-use information in the Regional District
- Sensitive Ecosystem Inventory (SEI) information outdated
- Planners generally are not trained in terrestrial ecology, have limited background and understanding of ecological dynamics
- Limited capacities of non-governmental organizations, First Nations, and other municipalities in the area
- Competing priorities at local government level
- Multiple jurisdictions within the region means CVRD has varying authority in electoral areas and municipalities, does not have the authority to require that municipalities and electoral areas harmonize EDPA formats and zoning bylaws
- CVRD does not have regulatory authority for use on forested or ALR agricultural lands
- CVRD does not have subdivision servicing powers in electoral areas (Ministry of Transportation and Infrastructure)

Funding and Land Acquisition

- Existing Park Land owned by CVRD is in the form of fragmented community parks
- Regional Districts have limited flexibility in funding services as compared to municipalities in terms of their ability to respond to concerns, support initiatives
- Parkland funds must be used for parkland acquisition, not upgrading current parks or other purposes (See: Soto, 2015)

Official Community Plans and EDPAs

- Professional reliance model: Setbacks from watercourses can be reduced through QEP reports
- Planners cannot challenge QEPs – court case (Yanke v. Salmon Arm)
- Cannot ticket for Environmental Development Permit Area infractions
- Province has limited capacity to enforce RAR infractions
- Federal government has limited capacity to enforce Fisheries Act infractions, Species at Risk Act Infractions
- QEPs do not submit maps and reports in GIS format – information is lost

- QEPs may not go back and see if development respected their recommendations (requires oversight by government – lack of funding and ability to enforce)
- Conservation covenants can fail if they are not being monitored

4 Recommendations - Structure of an ESA Strategy

Recommendations for the structure of an ESA Strategy for the Cowichan Region are based on the thorough review of ESA strategies from other jurisdictions, and a detailed review of related land-use policy by Boyle (draft 2017). We start with our recommendation on scope, followed by approaches to setting ESA targets.

4.1 Scope of the ESA Strategy

Sensitive ecosystem distribution is not driven by political or planning boundaries. Sensitive ecosystem representation analysis across the entire extent of ecosystem types, rather than within the administrative boundaries of a political unit is the most ecologically meaningful approach (Huggard 2004). From an ecological, science-based perspective, we believe that a region-wide scope is the best approach for the CVRD ESA Strategy. A region-wide scope would include all jurisdictions and land uses within the Cowichan Region. We recognize there are cross-jurisdictional challenges in developing a region-wide ESA strategy, along with limitations of where and how the CVRD can influence ecosystem management. Acknowledging the existing challenges, we believe that engaging all of the region's stakeholders in the development of an ESA strategy that covers the entire region will be the most effective approach in the long term for maintaining ESA sites and values.

In the following table, options are provided that reflect different levels of inclusion. Only Option C would be considered to capture a region-wide approach. The three options provided are not mutually exclusive. It is entirely possible to have Option A take place as the initial building block (foundation) for achieving completion of Options B and C. The level of effort (time, resources, and funding) applied to any of these options will reflect the willingness for investment in the success of the ESA Strategy.

4.1.1 Land Ownership

Most of the land in the CVRD is privately owned, either by citizens or private forestry companies. Because an ESA region-wide strategy would necessarily cover areas of private property, engaging with private property owners is essential. At present, through zoning and various regulations the CVRD does have some influence on land use on private land. On residential, commercial and industrial private lands (excluding forestry and agriculture), the ESA network within the CVRD could be used actively in regional planning, as a Development Permit Area, or to guide land acquisition.

Private forest land within the CVRD should be treated as other private land; however, keeping in mind that forestry activities on these lands are regulated by the *Private Managed Forest Land Act* and associated regulations, and are not influenced by local government bylaws. Engaging with private forestry companies is recommended to identify common goals with respect to ESAs, without management obligations. ESA mapping using imagery could be carried out on private forestry land as it is done on other private lands in the CVRD or elsewhere. If places of particular concern or interest are located on private forest land, dialogue could be initiated to seek mutually-beneficial outcomes.

For ESA management on Crown Land, it would be necessary to engage with the provincial government as well as the forest tenure holders.

Table 3. Options for Scope of ESA Strategy for the CVRD (adapted from Boyle 2017)

	Option A: CVRD Only (Electoral Areas)	**Option B: CVRD + Local Governments + Stewardship groups**	**Option C: CVRD + Local Governments + Stewardship Groups + Senior Governments (+ Other Regional Districts)**
Area	Electoral Areas Only, within CVRD control	Electoral Areas, Municipalities, First Nations Reserve Lands	Entire Region including First Nations Reserve Lands, Private Managed Forest Lands (PMFL), Agricultural Land Reserve (ALR)
Tools	Electoral Area OCPs and zoning bylaws, Park management	Additional Local government tools within each municipality, education and outreach,	Additional Provincial and Federal regulatory tools
Process	Internal education and development of technical documents	Additional External consultation, education, and outreach with local governments, First Nations, stewardship groups	Additional external consultation and facilitated meetings with senior government
Level of Effort	High	High	High
Funding	Internal	Additional possible grant funding or funding from partners	Additional possible senior government funding
Deliverables	Guidelines and maps for internal EDPA, technical documents for developers, OCP bylaw template	Additional educational outreach material for stewardship groups, joint guidelines developed with input from local government + First Nations	CVRD participation in and influence of regulatory reform?
Area	Only on CVRD land, won't have regional connectivity	Regional connectivity in most habituated lands; but still not entire region	Entire Region
Community Input	None or Public consultation in electoral areas to identify important ESA	Public consultation in electoral areas, FN, and municipalities to identify ESA	Public consultation in electoral areas, FN, and municipalities to identify ESA. Additional consultation with Province, Feds, and/or private corporations/industries
Pros	Would be lower cost, implemented in a shorter time-frame, potentially implemented even while being created	Including FN and North Cowichan lands means more connectivity, increase in stakeholder trust, potential for more funding	Provincial and Federal support ideal for ESA strategy across entire region, other regional district support to connect ESA strategy across regional borders
Cons	Only on CVRD lands means less effective ESA network, might lose stakeholder trust by developing internal strategy,	Likely to have a longer time frame for completion, and higher consultation cost because of inclusive approach	Likely the longest time frame for completion (depending on how that is measured), higher cost associated with inclusive approach

4.2 Role for CVRD and Partners

In relation to the member municipalities and private agricultural and forestry lands, the CVRD can have an integral role in support of ESA conservation as a provider of information (i.e., ESA inventory mapping and monitoring) and as a facilitator for cross-jurisdictional collaboration.

While much of the region is outside the CVRD's direct control, the CVRD can:

(1) inventory and monitor ESAs across the region;

(2) share this information with First Nations and other member municipalities; and

(3) engage stakeholders in dialogue to foster a shared understanding of the state of ESAs in the region, and to seek common ground regarding their management.

The opportunity exists for the CVRD to have a direct influence on ESA management region-wide, over the long term. The foundation of this approach is in the collection, analysis, and sharing of ESA information with all stakeholders – ideally providing the most up-to-date and high resolution data available. This will enable management decisions to be based on the best available information, whether or not those decisions are made directly by the CVRD.

By including the entire region in the mapping of ESAs and developing an ESA strategy, the CVRD and its partners will be working towards cross-jurisdictional collaboration for the long-term benefit of ESAs. In the short-term, an important part of the strategy could include the implementation of management measures (e.g., ESA DPAs) within the CVRD's direct sphere of influence (particular electoral areas and zoning designations).

- Sharing the results of CVRD's ESA mapping and monitoring will provide the municipalities with additional information that may be valuable for their internal planning initiatives.
- Municipalities may also have more detailed ESA data that they may be willing to share with the CVRD.
- First Nations engagement is considered essential for the development of a region-wide ESA strategy.
- Dialogue with other jurisdictions could be made with regard to connecting areas, and adding additional areas to the ESA network.
- All communities within the various jurisdictions should be made aware of the ESA strategy initiative, and encouraged to provide input via community meetings or other forums (proactive, transparent engagement).

Requests could be made for ESA data from the other jurisdictions. The data obtained could be displayed on the ESA maps, with no implicit management responsibility or action required on the part of that jurisdiction. However those jurisdictions could choose to use the ESA information as part of their own planning processes, or agree to allow data from their jurisdiction to be used in a regional planning process.

4.3 Setting ESA Targets

The questions of "how much is enough" is central to many issues in conservation biology and key to setting targets for protection and management of ESAs. The process of establishing targets has been discussed in a number of reports including:

1) Environment Canada (How Much Is Enough?[16]) (Environment Canada 2013)
2) The Great Bear Rainforest reserve design process followed targets based on rates of natural disturbance to determine appropriate amounts of protected old forest (Price *et al.* 2009, CIT 2004)
3) NatureServe (http://www.natureserve.org) has developed a detailed methodology for assessing the value of occurrences of ecosystems. This process can indicate where the most important areas are, and can help set target areas for some ecosystem representation

This section discusses the process of establishing targets, without actually quantifying those targets. Factors to consider when determining targets may include:

- Land tenure
- Location on the landscape
- Presence or absence of ecosystem mapping
- Other data, such as VRI, stream and wetland mapping
- Biogeoclimatic zones
- Stakeholder involvement
- Funding to do the analysis
- Rationale (wildlife, rare ecosystems, ecosystem representation, conservation of biodiversity)

[16] https://www.ec.gc.ca/nature/default.asp?lang=En&n=E33B007C-1

Once ESAs have been identified on the landscape (by mapping, for example) questions remain with regard to:

- Where ESAs are already protected (e.g., parks, wildlife habitat areas, wetland and riparian zones)
- Where on the landscape protection of the ESAs is most important and feasible
- How many ESAs, or portions of can be protected
- How ESAs not under official protection can be managed to maintain ecological characteristics
- Where to add new ESA areas and by what mechanism

The area/scale to which targets apply is of key importance. The smaller the unit (such as the smaller CVRD electoral districts and towns, or watershed sub-drainages), the more difficult it is to create a cohesive strategy or protected area network. Although larger areas reduce the likelihood of fragmentation, they also require more specific attention to ensure suitable geographic distribution of protected ESAs. Protection is meant to capture representation of suitable geographic extent, size, shape and connectedness. The broadest scale for the CVRD ESA Strategy is the entire region.

4.3.1 Setting ESA Targets by Watershed

Watersheds provide an ecologically meaningful science-based scale to evaluate the spatial distribution of ESAs (a coarse filter). We recommend using the major watersheds as the primary management units for ESA analysis and target setting (Figure 2). This approach enables areas of relative scarcity to be identified, which can then be used to prioritize conservation, recruitment, and restoration efforts. Using watersheds as ESA planning units has the following advantages:

- Ecosystem distribution is largely determined by the terrain and hydrological characteristics of the watersheds they occur in (as well as climate, discussed in the following section);
    - The major watersheds in the Cowichan region are of a sufficient size to contain considerable topographical and biological diversity;
- Larger watersheds can be subdivided into 2 – 3 smaller sub-basins if appropriate, and conversely, smaller, unconnected watersheds on the landscape can be grouped with larger adjacent watersheds; and
- The CVRD board has endorsed the development of watershed management plans; therefore, using watersheds as ESA management units will compliment that approach.

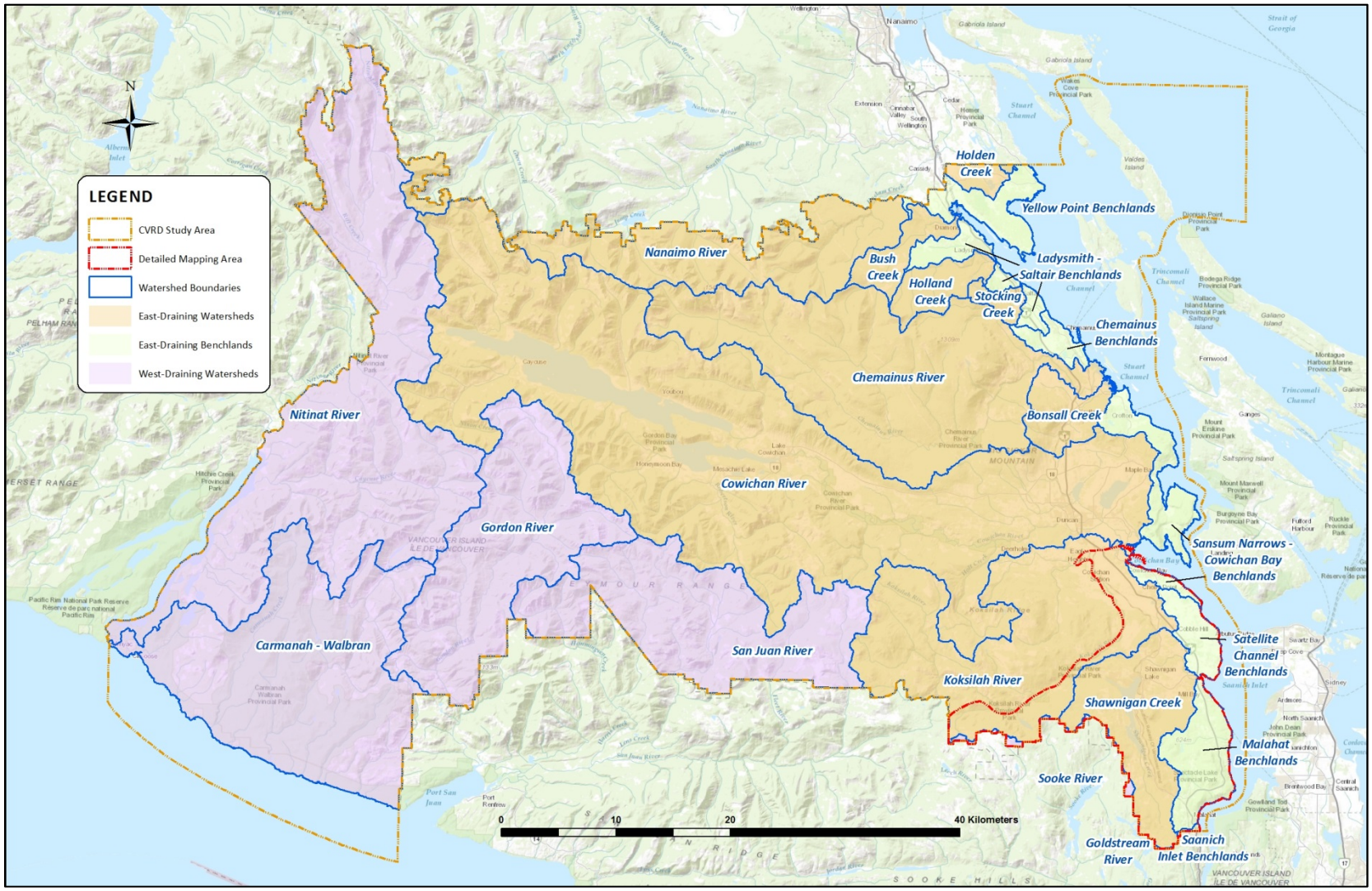

Figure 2. CVRD Watersheds and Coastal Benchlands

Example: Wild Salmon Policy Watershed-Scale Habitat Pressure Indicators

As part of the development of watershed management plans, the CVRD could consider the use of indicators and benchmarks for watershed and ecological health. An example we have chosen to highlight are a series of pressure indicators developed for Strategy 2 of the *Wild Salmon Policy*, created to support the standardized assessment of salmon habitat status at the watershed scale (Nelitz *et al.*, 2007[17]; Stalberg *et al.*, 2009[18]; Porter *et al.*, 2013[19]). Benchmarks for each of the indicators were established by an expert working group, to denote whether the indicator for a given watershed represents a low, moderate or high risk of salmon habitat impairment. A selection of these indicators and associated benchmarks is provided in Table 4.

Table 4. Pressure indicators developed for watershed-scale habitat status assessments for salmon (adapted from Porter et al. 2013)

Habitat Pressure Indicator	Units	Benchmarks		
		Low Risk	Moderate Risk	High Risk
Road development	km/km^2	< 0.4	≥ 0.4 to < 1.2	≥ 1.2
Forest disturbance	%	< 9.5	≥ 9.5 to < 20	≥ 20
Total land cover alteration	%	< 11	≥ 11 to < 22	≥ 22
Urban development	%	< 0.78	≥ 0.78 to < 3.1	≥ 3.1
Agricultural / rural development	%	< 1.8	≥ 1.8 to < 5	≥ 5
Riparian disturbance	%	< 5	≥ 5 to < 23	≥ 23

While the above indicators and benchmarks may not be directly applicable to setting targets for ESA conservation in the CVRD, the process through which they were created forms a model approach. This process led by Fisheries and Oceans Canada (DFO) is described in three steps by Nelitz *et al.* (2007):

Step 1: Indicator Compilation and Ranking

- Compile a list of indicators used by volunteer groups, DFO, and other government agencies in the U.S. and Canada.
- Rank the preliminary indicators based on how frequently they have been used or cited by other groups, and on their scientific linkage to key habitat attributes.

Step 2: Indicator Practical Assessment

- Assess each indicator based on data source, data availability, relative cost, spatial extent / resolution, temporal extent / frequency, and scientific relevance.

[17] Refining habitat indicators for Strategy 2 of the Wild Salmon Policy: Practical assessment of indicators
[18] Canada's Policy for Conservation of Wild Pacific Salmon: Stream, Lake, and Estuarine Habitat Indicators
[19] Southern Chinook Conservation Units: Habitat Indicators Report Cards

- Short-list the most feasible indicators for implementation.

Step 3: Indicator Metrics and Benchmarks

- Identify metrics for measuring each indicator.
- Develop benchmarks as thresholds for relative risk to habitat (as shown in Table 5 above).

The indicators developed by the DFO have since been used in habitat status assessments for many BC watersheds. They have been applied to produce habitat status report cards for watersheds representing cumulative habitat impacts (risk rating), based on a composite risk scoring roll-up of five key habitat pressure indicators (see Porter *et al.* 2013). A similar approach could be applied CVRD ESAs to produce ESA status report cards for priority watersheds. Deficiencies identified through such an assessment could then inform target setting for conservation and restoration.

This process was completed by the DFO's Habitat Working Group – a group of managers and scientists. A similar process could be followed by a Technical Advisory Committee established by the CVRD for the purpose of setting targets for ESAs. An inclusive approach for consideration of establishing targets for ESA types within watersheds could be to initiate the process for one or two pilot areas. The Shawnigan Creek Watershed and Malahat Benchlands are logical choices due to the recently completed, detailed ESA inventory update that covered both of these areas. They are also viewed as high priority areas for managing the natural environment. This approach would allow participation and input by the public and stakeholders at an early stage in the process. When people participate early in a given process, ownership and "buy-in" is more likely to be fostered.

4.3.2 Other Scales of Analysis and Target Setting

Although we recommend the use of watersheds as ESA management units for analysis, network design and target setting at a broad scale (coarse filter), we also examined two other frameworks considered applicable: Biogeoclimatic units and Jurisdictions. There is a role for each within the overarching watershed management unit; with all three providing important insight into representation of ESAs within the Cowichan Region. Each of these constructs is discussed below.

Biogeoclimatic Units

Biogeoclimatic (BEC) units (zones, subzones, and variants), as surrogates for local climate, represent ecological regions that vary in plant composition. Therefore, BEC units are logical to use as management units at a regional level. Representation of similar ecosystems within a single BEC unit allows comparison of equivalent ESA types for analysis of representation. Although generalized attributes are used in the classification of ESAs, a patch of old forest within the Coastal Douglas Fir zone (CDF) is more similar to other CDF old forest than to old forest in the higher elevation Mountain Hemlock BEC zone. We recommend the use of BEC units as a secondary scale for ESA analysis and target-setting with watersheds as the primary unit.

Jurisdictions

The CVRD covers a large area with a variety of jurisdictions (electoral areas, member municipalities, First Nations), land ownership (private and public) and uses (forestry, agriculture, residential, commercial and industrial, parks and conservation). Due to the importance of establishing Development Permit Areas (DPAs) based on the ESA network, using electoral areas and municipalities is also an appropriate scale of analysis and management. Analysis of ecological representation and fragmentation / connectivity can ensure that each jurisdiction has a healthy representation of ESAs at a "local" scale. Most residents of the Cowichan Region will likely be more inclined to engage with and to the ESA Strategy at this scale. This scale of analysis may be of particular interest to the municipalities that are managing smaller land bases (i.e., Duncan, Ladysmith and Lake Cowichan).

4.3.3 Prioritization of ESAs

Targets for ESAs should go beyond percent (%) representation to account for the ecological integrity or condition of individual ESAs (fine scale filter). Assigning priorities (rankings) to particularly high value ESAs is also appropriate at all scales of assessment. A method for evaluating ecological integrity has been developed by NatureServe that is applied by the BC Conservation Data Centre (BC CDC). It enables a standardized approach to assess and identify degraded ESAs that could be improved through restoration or rehabilitation measures. The NatureServe method[20] assesses 'viability' (or ecological integrity) through three factors:

- Landscape context
- Size
- Condition

[20] http://www.natureserve.org/conservation-tools/ecological-integrity-assessment

The weighting of these factors depends upon the ecosystem (i.e., which ones are most or least important, and what are the key factors influencing the ecosystem). Changes in the context can greatly influence the ecosystem. For small patch or linear ecosystems, landscape context is considered most important. Size is determined in a specific manner – aggregating polygons that are connected or are separated by less that certain distances (less in modified vs. natural environments).

The principles of the assessment can be applied to determine the quality of ESA polygons. Landscape context and condition are the most significant values – especially for the type of ESAs in the CVRD – and can be combined, with polygon size, into an overall 'quality' score for individual polygons using a standardized method. An overview of the criteria for assessing landscape context and condition is provided in Appendix B.

Appendix B also includes another well-structured example of how to assess ESAs to determine priorities. The example is by the Comox Valley Conservation Society from their "*Nature Without Borders*" document. Having a similar conservation matrix for decision-making would be beneficial to the CVRD ESA Strategy and network design.

4.3.4 Initial ESA Targets

Initiate target setting at the broadest scale first (coarse to fine filter): the region, followed by watershed, BEC units, Jurisdictions, and site level (individual ESAs). At the broadest scale, start the target setting process for ESA types that are already protected under existing legislative frameworks (e.g., wetlands and riparian areas). Water (stream networks and lakes) form the core of the proposed ESA networks provided in Part 1 (ESA Inventory document). Water is also an essential resource for humans, wildlife, and ecosystems.

Shoreline units (sparsely vegetated and herbaceous) could also be an ESA type to focus on to complete a target setting exercise.

5 Legal, Regulatory and Policy-Based Tools

A comprehensive resource for BC local governments interested in preserving ESAs is the *Green Bylaws Toolkit for Conserving Sensitive Ecosystems and Green Infrastructure* (Curran and Company, 2016). Tools and approaches to ESA protection are described in detail in the toolkit, some highlighted elements of which are provided below in Table 5.

Table 5. Recommended Tools and Approaches for Preserving ESAs

Tools to Protect ESAs	Recommended Approaches
Regional Growth Strategy	• Establish urban containment boundaries with a commitment that a specified percentage of growth (such as 90%) will occur within those boundaries over the life of the strategy (25 years)
Official Community Plans (local area / neighbourhood / integrated watershed management plans)	• Delineate (map) ESAs • Designate land uses and densities to concentrate development outside ESAs • Describe how the CVRD will protect ESAs from development • Establish amenity bonus and density policies
Development Permit Area Guidelines	• Establish DPA requirements for development proposed in ESAs (as identified in the OCP) • Establish an ESA DP review process, including an impact assessment process • Create guidelines for best management practices (based on BMPs from the Ministry of Environment)
Zoning Bylaw	• Maintain large parcels outside the urban containment boundary. • Encourage mixed-use, nodal development within the urban containment boundary • Establish setbacks for ESAs • Set density bonuses for certain zones • Set maximum impervious surface coverage for each zone • Standardize and regulate screening or landscaping to preserve, protect, restore and enhance ESAs • Allow clustering of development outside of ESAs in specific zones
Bylaws (comprehensive or topic-based)	• Establish regulations in the areas of tree protection, soil removal and deposit, and water quality (municipalities can also establish regulations around pesticide use and invasive species).
Stormwater Policy and Design Manual	• Adopt a stormwater management policy and design manual that aims to infiltrate rainwater at the source, as part of the Subdivision and Development Services Bylaw

Note: The recommendations provided in the above table are from Section 4.6.7 of the Green Bylaws Toolkit (Curran and Company 2016)

In addition to the tools identified above, conservation covenants could provide a means of protecting ESAs. Landowners could be provided with a tax incentive to accept a conservation covenant pertaining to ESAs identified on their property. Note that this comes with monitoring requirements to ensure that covenants are honoured. This process has been widely used by the Islands Trust, the Cowichan Land Trust, and other NGOs.

A list of toolkits, research papers, and strategies from other regions were identified and reviewed by Boyle (draft 2017) to determine "Best Practices" policies in Environmentally Sensitive Areas Strategies that apply to the Cowichan Valley Regional District. A list of resources that exist in BC that could be considered by the CVRD in the ESA Strategy design components (building blocks) is provided in Appendix C.

5.1 Funding and Land Acquisition

CVRD has the potential through existing legislation to collect DCC and Conservation Taxes through new service bylaws, which can be modeled on existing bylaws by other regional governments. For example the Regional District South Okanagan – Similkameen Conservation Fund/Program, and the CRD Park Acquisition Fund.

- Create Conservation Fund: earmarked dedicated source of funding for purpose of undertaking environmental conservation projects
    - A conservation Fund can be established through service bylaw as an extra property tax and/or through establishing Development Cost Charges from development and/or charging user fees for entrance and use of public spaces (or a combination of all three!)
    - A fund can support acquisition of land, management and maintenance of areas, education and outreach, and liability in case of injury or damage to ecosystem
- Consider creating natural assets accounting (NAA) for ESA providing valuable functions
- Ensure efficient process for conservation when opportunities arise
    - List of key resource people: financial planners, estate planners, notaries

5.2 Site-Scale Conservation Tools

- Property Evaluation Tool: Matrix for conservation decision-making at the site or property level.
    - Tool can be used to determine ratings for conservation importance, urgency for protection
    - Matrix for land securement viability
    - Numerical system for land acquisition prioritization: Ecological value and threat based
- Use tax incentives to encourage stewardship on private lands

  - Ecological Gifts: Against Income Taxes (like in Switzerland)
  - Property tax rebates: Property tax exemption in riparian areas incentive for those with large properties
- Develop an ESA or Biodiversity checklist to assist/require developers to achieve environmental targets
- Education and information to landowners about third party certification programs that encourage stewardship of private lands (e.g., Habitat Acquisition Trust and land stewardship program and associated signage)

5.3 Communications, Outreach, Education and Engagement

Educational material can be created to highlight the various important ecological attributes of each type of ESA and outline how landowners can maintain or improve ecological conditions.

- Collaborate with environmental not-for-profits and stewardship organizations
  - Community stewardship organizations can monitor and collect ecological data
  - Stewardship organizations can engage volunteers in ecological restoration
  - Stewardship organizations can take on education and awareness building
- Reach-out and establish relationships with forestry companies, agricultural producers, large developers
- Develop educational program for local schools
- Maintain an up-to-date website that highlights the initiative and provides primers on the numerous topics related to the natural environment and our associated natural assets in the CVRD.
- Provide “stand-alone” information hand-out sheets on ESA/SEI classes to educate and assist in a landowner being able to identify these features on their property. An example of a quick reference to ESA of the CVRD is provided as Appendix A.

5.3.1 Certification and Program Branding

An aspect of an ESA Strategy that can often lend to its success is its branding. As well, it is worth considering partnering with an existing “brand” or certification, or creating one unique to the Cowichan Region. The logo could be designed by one of our many talented local artists with a Cowichan natural areas theme.

One of the main concepts behind implementation of an environmental certification programs is to improve image and generate a competitive advantage. “The ecolabels associated with environmental certification inform consumers that the product in question has been verified by a third party auditor as originating from an environmentally well managed company. This approach allows consumers to steer their purchasing behaviour in a more environmentally

sound direction[21]". FairTrade certified coffee brands are a good example of a successful environmental certification/branding, and the Forest Stewardship Council's FSC certification[22] is widely recognized and adopted in forest management and forest product manufacturing.

There is also the ethical motivator for environmental certification. "The current high levels of consumption and economic growth often leads to the degradation of land and pollution of the natural environment. The aim of the move towards sustainable development is to ensure the availability of natural resources for future generations.[21]"

Below is a collage of "green" certification logos from a quick search on the internet.

One example of an existing program of relevance to the CVRD ESA Strategy is the "Green Infrastructure" partnership. This term is applied to green communities. "*Since the built and natural environments are connected, design with nature to protect watershed function. The Green Communities Initiative provides a policy, regulatory and program framework for enabling local governments to create more compact, more sustainable and greener communities. Lead by example. Showcase innovation. Celebrate successes*." (http://waterbucket.ca/gi/)

[21] https://en.wikipedia.org/wiki/Environmental_certification

[22] What is FSC Certification? https://ic.fsc.org/en/what-is-fsc-certification

6 Implementation

Curran and Company (2016) outline implementation priorities for local governments developing strategies to conserve ESAs. These priorities can be viewed as general steps towards the development and implementation of an ESA Strategy and are presented in Table 6. Together, these priorities also outline an overall structure of a local government ESA Strategy.

> *"No local government will have the resources, technical know-how, and political support to implement all of the regulatory approaches suggested in this Toolkit. Implementation is an incremental process. The following priorities for implementation assume a long-term view of the possibilities."* (Curran and Company, 2016 – page 48)

Table 6. Recommended Implementation Priorities for the CVRD ESA Strategy

Implementation Priorities	Tasks
1. Identify ESAs[23] (Mapping)	• The CVRD must know approximately where the ESAs are before establishing setbacks, DPAs and regulations. • ESA mapping is an essential prerequisite to effectively apply legal, regulatory and policy tools to protect ESAs. • Accurate ESA mapping will provide the CVRD with an understanding of ESA values on particular lots within a broader regional context.
2. Develop Policies and Zoning to Contain Urban Areas	• Direct new development within existing serviced areas, and limit the expansion of municipal infrastructure in order to save money and reduce development pressure on ESAs.
3. Create Compact Communities[24]	• Amend zoning and OCPs to encourage mixed-use and higher density development within existing developed areas. • Promote the clustering of development around town and village nodes.
4. Protect and Restore ESAs	• Include policies in OCPs and zoning regulations to preserve ESAs on large lots. • Create Development Permit Areas for the protection of ESAs o Prevent development on ESAs o Prevent degradation and fragmentation of ESAs and promote connectivity o Assess the impacts of development and implement mitigation measures
5. Create Incentives for Low-Impact or Restorative Development	• Offer property tax exemption for ESAs secured with conservation covenants on land titles. • Allow density bonuses (higher density development) outside of ESAs in exchange for the dedication of existing ESAs as park. • Similarly, offer density bonuses in exchange for the restoration or enhancement of ESAs prior to their dedication.
6. Manage Stormwater to Protect Aquatic ESAs	• Adopt best practices for stormwater management to reduce runoff, erosion and sedimentation.

Note: The implementation priorities provided in the above table are adapted from Section 4.7 of the Green Bylaws Toolkit (Curran and Company, 2016)

[23] Refer to Appendix F – The Importance of Mapping in the Green Bylaws Toolkit (Curran and Company, 2016)
[24] Refer to Part 3 of the Smart Bylaws Guide (Curran, 2003) for more on strategies for creating compact communities

Ideally an ESA can eventually be treated as a Development Permit or Special Management Planning area, or equivalent. However, while waiting for updates to OCPs, the ESA mapping and future network design could be launched to build recognition as a planning tool. It could also be referred to by planners to determine what is on the landscape in an area of interest. ESA mapping could be integrated into the OCPs for different electoral districts as desired, and are in fact already included in many of the regions OCPs.

Another approach is to treat the ESAs as Special Management Planning (SMP) areas. They could also be combined with other DP areas where feasible. Depending on the attributes of given ESA polygon applicable checks and balances may already be in place (but not directly identified as ESA related). For example:

- Riparian areas, Lakeshore
- Marine Foreshore
- Parks, Institutional
- Ecological reserve
- Agricultural
- Habitat Protection Areas
- Aquifer protection areas
- Floodplains and other Natural Hazard Lands

6.1 ESA Map

The ESA map should be viewed as a dynamic product that will require updates over time. ESA map products that are user friendly should be provided to CVRD departments, developers, and the public. They could be made available on the CVRD website. Other initiatives could include:

- Update the ESA map layer as new ecological information becomes available, and create guidelines for collecting further ecological information. This could include additional mapping, field verification of existing mapping, and field work done in specific areas.

7 Summary of ESA Strategy Recommendations

This report provides recommendations for developing an Environmentally Sensitive Areas (ESA) Strategy for the Cowichan Valley Regional District (CVRD), and a process for setting targets for ESAs in the region. In addition to the recommended structure of an ESA Strategy, we have highlighted legal, regulatory and policy-based tools that the CVRD can pursue to improve the protection of ESAs. We also describe ways to assess the condition of a given ESA to help prioritize conservation and restoration guidelines.

The development of an ESA Strategy for the Cowichan Region should be viewed as a long-term, incremental process. Public outreach, education and stakeholder engagement will be central to the effectiveness of the Strategy. During the early stages of implementation, the focus should be on refining the ESA inventory in priority areas, and completing an analysis of ESA representation, condition, connectivity and changes over time. Results of these studies should be quickly and clearly communicated to both the public and stakeholders. Following that (or concurrently), empowering local stewardship groups to monitor and restore ESAs, and providing incentives to landowners for the voluntary protection of ESAs should be a priority. Under this scenario, the development and implementation of new regulations and management tools will be better informed and supported.

Our primary recommendations for the development of an ESA Strategy are summarized below:

Data Collection and Analysis

- Identify and map ESAs
  a. Combine all known ESA map sources as an inventory of existing ESA data for the region (completed by Madrone as Part 1 of this project)
  b. Update as appropriate with additional and new data; actively seek to fill data gaps
  c. Complete detailed ESA mapping (update for disturbance, refine to create as many one ESA label “pure” polygons as possible)
  d. Create standard easy-to-use maps for ESAs that can be provided to CVRD departments, developers, and the public
- Analyze existing ESAs and trends
  a. Assess ESA representation
  b. Assess ESA condition
  c. Assess ESA connectivity
  d. Track disturbances and ESA losses over time
  e. Identify priority ESAs based on stakeholder input and values
  f. Identify priority areas for conservation
  g. Identify priority areas for restoration
  h. Create an ESA network using a riparian network as the main building block of connectivity

ESA Scope

Engage all stakeholders in the development of a regional strategy for maintaining ESA sites and values. By including the entire region, the CVRD and its partners will be working towards cross-jurisdictional collaboration for the long-term benefit of ESAs and the health of our communities.

ESA Target Setting

In addition to a region-wide assessment of ESA representation and condition, we recommend using major watersheds as primary management units for ESA analysis and target setting as a coarse filter. Using watersheds as ESA planning units has the following advantages:

- They provide natural "contained" areas from valley bottom to height of land.
- Larger watersheds can be subdivided into 2 – 3 smaller sub-basins if appropriate, and conversely, smaller, unconnected watersheds on the landscape can be grouped with larger adjacent watersheds; and
- The CVRD Board has endorsed the development of watershed management plans; therefore, using watersheds as ESA management units will compliment that approach.

In addition to examining ESA health indices at the regional and watershed scales, we recommend the use of BEC units and jurisdictions as secondary scales for ESA analysis and developing targets. All three provide important insight into representation of ESAs within the Cowichan Region.

ESA Prioritization

Targets for ESAs should go beyond percent representation to account for the ecological integrity or condition of individual ESAs (fine scale filter).

- A method for evaluating ecological integrity enables a standardized approach to assess and identify degraded ESAs that could be improved through restoration or rehabilitation measures.
- An ESA standardized ranking matrix could also be used as a guide for land acquisitions and covenant areas.

Assigning priorities (rankings) to particularly high value ESAs is appropriate at all scales of assessment.

Support and Provide Incentives for ESA Monitoring, Conservation and Restoration

- Explore opportunities for partnerships with citizen-science stewardship groups for monitoring and restoring ESAs
- Explore the use of online tools for the public to aid in tracking invasive species, species at risk, and habitat mapping
- Explore site-level incentive options such as riparian tax exemptions, conservation

covenants, and the provision of density bonuses

Regulatory and Policy Updates

- Conduct a gap analysis to identify divergences between Electoral Area OCPs (process initiated by Boyle, draft 2017)
- Include ESA language and policy directions explicitly in all future new policy and amendments
    d. Establish growth boundaries for all Electoral Areas
    e. Establish Development Approval Information Areas for all Electoral Areas
    f. Establish new EDPAs to include all ESAs
- Develop guidelines for site-level development within and adjacent to ESAs
    a. With guidance from a Technical Advisory Committee
    b. Incorporating public and stakeholder feedback
    c. Ensuring guidelines are clear and achievable, and that the permitting process is efficient

Land Acquisitions, Taxes and Staffing

- Develop criteria for land acquisition priorities
- Explore potential for establishing Development Cost Charges or Property Taxes for a Conservation Fund
- Explore potential for Regional Environmental Planning coordinator position to work between planning, parks, environmental services, municipalities, First Nations, and other regional districts

Communication and Stakeholder Engagement

The level of effort (time, resources, and funding) applied to the process of creating an inclusive strategy for the region will reflect the willingness for investment in the success of the CVRD ESA Strategy.

- Communicate results of the ongoing ESA data collection and analysis with stakeholders and the public through outreach and education initiatives
- Seek public and stakeholder feedback on the development of an ESA Strategy
- Continue Steering Committee meetings, as needed, to complete a draft ESA Strategy
- Establish a Technical Advisory Committee for the development of targets (determining thresholds and benchmarks)
- Compare ESA analytical results to targets and communicate areas of strength and weakness in the ESA network in a “state of ESAs” or “ESA report cards” document

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Appendix A: Quick Reference to the CVRD ESAs

QUICK REFERENCE INFO SHEET

Cowichan Valley Regional District (CVRD)
Environmentally Sensitive Areas

Environmentally Sensitive Areas - Ecosystem Classes

Environmentally Sensitive Areas (ESAs), also referred to as sensitive ecosystems, are often the remnants of the natural ecosystems that once occupied a much larger area and are now increasingly important as human activities change the landscape. They are rare, ecologically fragile, or ecologically important ecosystems within the CVRD.

FW: Freshwater

Freshwater lakes and ponds; lack floating vegetation that would indicate a shallow wetland water class. Lake Cowichan is the largest lake in the CVRD, covering over 6,000 hectares.

HB: Herbaceous

Non-forested ecosystems, with shallow soils, often with bedrock outcroppings, coarse textured soils, or natural disturbances, dominated by grasses and herbs.

IT: Intertidal

Ecosystems at marine and terrestrial interface; influenced by tidal cycles with little freshwater influence.

MF: Mature Forest

Forests that are 80 – 250 years in age, 5 hectares or larger; not as structurally complex as Old Forests. Occur as coniferous, mixed, or broadleaved stands.

OF: Old Forest

Forests older than 250 years in age, generally conifer dominated with complex vertical structure. Common tree species include Western redcedar, Western hemlock, Amabilis fir, and Douglas-fir.

RI: Riparian

Ecosystems associated with freshwater along rivers, streams, and creeks. Includes high-bench, mid-bench, and low-bench floodplains. Includes all natural & semi-natural structural stages.

QUICK REFERENCE (DRAFT)

Cowichan Valley Regional District (CVRD) Environmentally Sensitive Areas

SV: Sparsely Vegetated	Ecosystems with roughly 5% to 10% vascular vegetation; often contains mosses, liverworts, and lichens (such as alpine). Uncommon in CVRD.
WD: Woodland	Open canopy forests on dry sites, mostly south facing slopes or rocky knolls and bedrock; can be conifer dominated or include arbutus or broadleaved hardwoods (e.g. Garry oak).
BW: Broadleaved Woodland	Open canopy forests on dry sites, mostly south facing slopes of rocky knolls and bedrock; dominated by broadleaved trees such as Garry oak.
WN: Wetland	Ecosystems that are saturated by water seasonally or year-round; includes fens, marshes, and swamps.
Not Sensitive	Developed and paved areas (e.g., industrial parks, business areas, highways, and transportation infrastructure)

Appendix B: Evaluation of Condition/Quality of ESA Polygons – Draft for Consideration

Landscape Context

Land use/cover in a larger area around a polygon determines the ecological processes that influence the function of the ecosystem. Natural or semi-natural vegetation functions most 'naturally'. Modified vegetation can impact on the migration of species or seeds dispersal, and can impact on processes such as water flow. Significantly modified vegetation is more likely to have a greater impact than slightly modified vegetation. Highly built-up areas have the greatest impact, as they are generally low in vegetation cover and have greatly modified the water movement through the system (e.g., percolation, subsurface flow, flooding regime).

The criteria for the assessment of landscape context are shown in Table B-1. The area to be assessed around a polygon is 4 km^2, but the assessment area may need to vary to best reflect jurisdictions.

We are evaluating the potential for automating the assessment of landscape context by utilizing the land cover and land use mapping for CVRD. The following two-step assessment is proposed for testing.

Step 1: determine a **'natural index'** for 4 km^2 area around polygon by combining vegetation cover and land use. Determine vegetation cover (%) in each class of 'vegetation/land use' and then multiply by the 'adjustment factor' to determine the 'natural index'.

Landscape context – natural index adjustment factor by land cover and land use

Vegetation / Land use	Adjustment factor
Tree or shrub cover / parkland, watershed	100%
Tree cover / agriculture	75%
Shrub cover / agriculture	40%
Herb cover / parkland, agriculture	20%
Tree or shrub cover / playing fields	30%
Herb cover / playing fields	5%
Tree or shrub cover / urban, industrial	10%
Herb cover / urban, industrial	5%
Water (fresh or marine)	100%

Step 2:

a. Convert value to a class; or,
b. Prorate the highest context value, i.e., 5, by the Natural Index.

For example, if a polygon was 60% tree cover in a natural park and 40% herb cover in playing fields and agriculture, then the Natural Index would be (60*100%) + (40*20%) = 68%. If converted to a class using the following table, the landscape context value would be 'B'. If the highest context value of 5 is prorated by the Natural Index, the context value would be 5*68% = 3.4.

Landscape context – final score based on natural index

% range	Number range	Final score (numerical)	Final score (letter)
80-100	4.1 - 5	5	A
60-80	3.1 - 4	4	B
40-60	2.1 - 3	3	C
20-40	1.1 - 2	2	D
0-20	0 - 1	1	E

ESA Condition

Aggressive invasive species can completely alter the species composition of a native community and severely impact on condition. Where these can be identified, for example reed canarygrass invasion, the condition class should reflect the altered species composition. For complex polygons, condition needs to be assessed for each component of the polygon and then compiled for the polygon as a whole using a weighted average.

Factors influencing the condition of the ecosystem are outlined in Table B-2. Factors that can be observed on the remote imagery and are likely to impact on the species composition and values associated with the sensitive ecosystem class were selected. For example, although the proportion of exotic species and cover of invasive species is an important component of condition, it is difficult to impossible to assess these site conditions with available imagery. However, the likelihood of exotic or invasive species can be inferred with a reasonable level of confidence by the type of vegetation or land cover adjacent to the polygon (i.e., proportion of unnatural edge) and, the degree of disturbance within and adjacent to the polygon (up to 15 m). The resulting assessment also uses the edge criteria shown in Table B-3. The most likely disturbance codes are in Table B-4.

ESA Size

Size criteria are provided for consideration in Table B-5. For SEI mapping where other map sources are used (e.g., TEM), the size value can be determined from the amalgamation of polygons into the SEI class/subclass. This value can then be assigned to the individual TEM or FREMP polygons for determining individual polygon quality.

Combining Scores

Table B-6 provides the weighting to be applied to combine the three scores into one. For display of quality, the following table converts the resulting value into a class.

Ecological integrity class (landscape context, condition and size scores combined)

Combined value	Quality class
> 4.2 – 5.0	5
> 3.4 – 4.2	4
> 2.6 – 3.4	3
> 1.8 – 2.6	2
1.0 – 1.8	1

(Adapted from NatureServe and Metro Vancouver SEI Strategy)

Table B-1: Landscape context factors influencing ratings for sensitive ecosystems (adapted from Metro Vancouver SEI Strategy)

SEI Class	A	B	C	D	E
Forest: Old, Mature, Woodland Wetland Herbaceous	• >90% natural/semi • little recent harvesting in watershed • no barriers • good connectivity	• 65-90% natural/semi • some recent harvesting in watershed • few barriers • mod good connectivity	• 40-65% natural/semi • moderate recent harvesting in watershed • some barriers • moderate connectivity	• 20-40% natural/semi • significant recent harvesting in watershed • some barriers • poor connectivity	• <20% natural/semi • considerable recent harvesting in watershed • many barriers • very poor connectivity
Riparian	• >90% natural/semi • little recent harvesting in watershed • no barriers • good connectivity • natural hydrology OK at landscape	• 65-90% natural/semi • some recent harvesting in watershed • few barriers • mod good connectivity • natural hydrology mostly OK at landscape; some development impacting flooding, and erosion/deposition	• 40-65% natural/semi • moderate recent harvesting in watershed • some barriers • moderate connectivity • natural hydrology significantly altered at landscape; development impacting flooding, and erosion/deposition	• 20-40% natural/semi • significant recent harvesting in watershed • some barriers • poor connectivity • natural hydrology significantly altered at landscape; development impacting flooding, and erosion/deposition	• <20% natural/semi • considerable recent harvesting in watershed • many barriers • very poor connectivity • natural hydrology not working at landscape; development impact is no natural flooding, and erosion/deposition pattern
Alpine Karst Sparsely vegetated	• >90% natural/semi • no barriers • good connectivity	• 65-90% natural/semi • few barriers • mod good connectivity	• 40-65% natural/semi • some barriers • moderate connectivity	• 20-40% natural/semi • some barriers • poor connectivity	• <20% natural/semi • many barriers • very poor connectivity

SEI Class	A	B	C	D	E
Estuarine	• >90% natural/semi • little recent harvesting in watershed • no barriers • good connectivity • natural hydrology OK at landscape	• 65-90% natural/semi • some recent harvesting in watershed • few barriers • mod good connectivity • natural hydrology mostly OK at landscape; some development impacting tidal flow, flooding, and erosion/deposition	• 40-65% natural/semi • moderate recent harvesting in watershed • some barriers • moderate connectivity • natural hydrology significantly altered at landscape; development impacting tidal flow, flooding, and erosion/deposition	• 20-40% natural/semi • significant recent harvesting in watershed • some barriers • poor connectivity • natural hydrology significantly altered at landscape; development impacting tidal flow, flooding, and erosion/deposition	• <20% natural/semi • considerable recent harvesting in watershed • many barriers • very poor connectivity • natural hydrology not working at landscape; development impact is no natural flooding, and erosion/deposition pattern; significant impact on tidal flow
Intertidal / shallow subtidal	• >99% natural marine environ • no barriers to propagule movement	• 90-99% natural marine environ • few barriers to propagule movement	• 75-90% natural/semi marine environ • some barriers to propagule movement	• 50-75% natural/semi marine environ • some barriers to propagule movement	• <50% natural/semi marine environ • many barriers to propagule movement
Lakes / Ponds Reservoirs	• n/a	• n/a	• n/a	• n/a	• n/a
Seasonally-flooded fields	• n/a	• n/a	• n/a	• n/a	• n/a
Old field	• n/a	• n/a	• n/a	• n/a	• n/a

Table B-2: Condition factors influencing ratings for sensitive ecosystems

Notes:

- Refer to edge effects and disturbance codes – balance all factors (disturbance level and type, amount and type of edge)
- Use judgement when assessing 'unnatural edge', including the type, age and structure of modified vegetation
- Aggressive invasives can impact condition much more than expected using criteria in table

SEI Class	A	B	C	D	E
Old Forest	• **vo** or **co** subclass • no unnatural edge • no disturbance	• **vo** or **co** subclass and < 20% unnatural edge, or **mx** subclass and no unnatural edge • no disturbance	• **vo** or **co** subclass and < 50% unnatural edge, or **mx** subclass and <20% unnatural edge • some disturbance	• **any** subclass • <75% unnatural edge • moderate disturbance	• **any** subclass • > 75% unnatural edge • sign't disturbance
Mature Forest SEI	• **co** subclass • no unnatural edge • no disturbance	• **co** subclass and < 20% unnatural edge, or **mx** subclass and no unnatural edge • no disturbance	• **co** subclass and < 50% unnatural edge; or **mx** subclass and <20% unnatural edge • possibly some disturbance	• **any** subclass • <75% unnatural edge • moderate disturbance	• **any** subclass • > 75% unnatural edge • sign't disturbance
Woodland	• trees old • no unnatural edge • no disturbance	• trees mature and no unnatural edge; or trees old and < 20% unnatural edge • no or some disturbance	• trees old or mature and < 50% unnatural edge • some disturbance	• trees old or mature and < 75% unnatural edge • mod. disturbance	• trees old or mature and > 75% unnatural edge • sign't disturbance
Riparian	• no unnatural edge • no anthro disturbance evident • natural hydrology	• < 25% unnatural edge • possibly some anthro disturbance • possibly slightly altered drainage or water level control	• 25 – 50% unnatural edge • substantial anthro disturbance • substantial drainage or water level control	• 50 – 75% unnatural edge • substantial anthro disturbance • sign't drainage or water level control	• > 75% unnatural edge • sign't anthro disturbance • severely disrupted hydrology

SEI Class	A	B	C	D	E
Wetland – swamp (forested)	• old or mature forest • no unnatural edge • no disturbance	• old or mature forest • < 35% unnatural edge • no disturbance	• old or mature forest and > 35% unnatural edge; or young forest and < 20% unnatural edge • some disturbance	• old or mature forest and > 60% unnatural edge; or young forest and < 50% unnatural edge • moderate disturbance	• young forest and > 50% unnatural edge • sign't disturbance
Wetland – all others	• no unnatural edge • no anthro disturbance evident • natural hydrology	• < 25% unnatural edge • possibly some anthro disturbance • possibly slightly altered drainage or water diversion	• 25 – 50% unnatural edge • moderate anthro disturbance • substantial drainage or water diversion	• 50 – 75% unnatural edge • substantial anthro disturbance • substantial drainage or water diversion	• > 75% unnatural edge • sign't anthro disturbance • severely disrupted hydrology
Herbaceous	• no unnatural edge • no anthro disturbance evident	• < 25% unnatural edge • possibly some anthro disturbance	• 25 – 50% unnatural edge • moderate anthro disturbance	• 50 – 75% unnatural edge • substantial anthro disturbance	• > 75% unnatural edge • sign't anthro disturbance
Alpine	• no unnatural edge • no anthro disturbance evident	• < 25% unnatural edge • possibly some anthro disturbance	• 25 – 50% unnatural edge • moderate anthro disturbance	• 50 – 75% unnatural edge • substantial anthro disturbance	• > 75% unnatural edge • sign't anthro disturbance
Sparsely vegetated	• no unnatural edge • no anthro disturbance evident	• < 25% unnatural edge • possibly some anthro disturbance	• 25 – 50% unnatural edge • moderate anthro disturbance	• 50 – 75% unnatural edge • substantial anthro disturbance	• > 75% unnatural edge • sign't anthro disturbance
Karst	• no unnatural edge • no anthro disturbance evident	• < 25% unnatural edge • possibly some anthro disturbance	• 25 – 50% unnatural edge • moderate anthro disturbance	• 50 – 75% unnatural edge • substantial anthro disturbance	• > 75% unnatural edge • sign't anthro disturbance
Estuarine	• no unnatural edge • no anthro disturbance evident	• < 25% unnatural edge • possibly some anthro disturbance	• 25 – 50% unnatural edge • moderate anthro disturbance	• 50 – 75% unnatural edge • substantial anthro disturbance	• > 75% unnatural edge • sign't anthro disturbance

SEI Class	A	B	C	D	E
Intertidal & shallow sub-tidal	• no unnatural edge • no anthro disturbance evident	• < 25% unnatural edge • possibly some anthro disturbance	• 25 – 50% unnatural edge • moderate anthro disturbance	• 50 – 75% unnatural edge • substantial anthro disturbance	• > 75% unnatural edge • sign't anthro disturbance
Lakes & Ponds Reservoirs, Seasonally flooded field	• n/a	• n/a	• n/a	• n/a	• n/a

Table B-3: Criteria for determining edge effects

SEI Class	Good to OK edge	Unnatural edge	Comment
Forest: Old, Mature	Natural or semi-natural vegetation	Anthropogenic vegetation or non-vegetated	Edge effect allows invasives, change in vegetation composition
Woodland	Natural or semi-natural vegetation	Anthropogenic vegetation or non-vegetated	Edge effect allows invasives, change in vegetation composition
Riparian	Natural or semi-natural vegetation; river & assoc features; lake or pond	Anthropogenic vegetation; non-vegetated; dike?	Riparian vegetation can vary; edge effect more significant on edge away from water; decreases with stature of vegetation
Wetland	Natural or semi-natural vegetation; lake or pond	Anthropogenic vegetation; non-vegetated.	Generally only a minimal impact of edge Only considers immediate landscape effects rather that broader landscape impacts on hydrology
Herbaceous	Natural or semi-natural vegetation	Anthropogenic vegetation or non-vegetated	Difficult to have a standard rule for distance of edge impact, but also unlikely to be able to observe on imagery
Sparsely vegetated	Natural or semi-natural vegetation; natural landform of subclass	Anthropogenic vegetation, urban, industrial, roads, etc.	Difficult to have a standard rule for distance of edge impact; but also unlikely to be able to observe on imagery
Estuarine	Natural or semi-natural vegetation; water body; natural estuarine landforms	Anthropogenic vegetation, urban, industrial, roads, etc.	Difficult to have a standard rule for distance of edge impact; but also unlikely to be able to observe on imagery
Intertidal / shallow subtidal	Natural or semi-natural vegetation; sea; natural intertidal landforms	Anthropogenic vegetation, urban, industrial, roads, etc.	Difficult to have a standard rule for distance of edge impact; but also unlikely to be able to observe on imagery
Lakes / Ponds Reservoirs	Natural or semi-natural vegetation; sea; natural intertidal landforms	Anthropogenic vegetation, urban, industrial, roads, etc.	Not applicable?
Alpine	Natural or semi-natural vegetation	Anthropogenic vegetation or non-vegetated	Difficult to have a standard rule for distance of edge impact, but also unlikely to be able to observe on imagery
Karst	Natural or semi-natural vegetation	Anthropogenic vegetation or non-vegetated	Difficult to have a standard rule for distance of edge impact, but also unlikely to be able to observe on imagery
Seasonally-flooded fields	?	?	Not applicable

Table B-4: Disturbance codes for Condition Assessment Most likely codes for use

(see *Field Manual for Describing Terrestrial Ecosystems* for additional codes).
Adjacent disturbance assessed within 15m of polygon.

Code	Description
	null
A	atmospheric related effects
Ae.sn	heavy snow
Aw	windthrow
B	biotic (plant and animal) effects
Bb	beaver tree cutting
Bv	aggressive vegetation
Hbad	buildings or structures (adjacent)
Hbw	buildings or structures (within)
Hmh	modified hydrology, e.g., dikes, man-modified lake/pond
Hmv	modified vegetation, e.g., agriculture, recreation fields (adjacent)
Hrad	roads (adjacent)
Hrw	roads (within)
Htad	trails (adjacent)
Htr	tree removal – recent
Htw	trails (within polygon)
Huad	utility right-of-way (adjacent)
Huw	utility right-of-way (within)
Ll	land clearing
Ls	selective logging
M	plant or site modification effects
Mc	herbicide (chemical) use
Mg	planted or seeded to grasses
Mh	planted or seeded to herbs
Ms	planted or seeded to shrubs
Mt	planted or seeded to trees
S	soil disturbances
Sa	cultivation (agriculture)
Se	excavation
Sr	road bed, abandoned
T	terrain related effects
Ta	avalanching
Tq	rock quarrying (incl. open pit mines)
Ts	terrain failures
W	water related effects
Wd	water table control (diking, damming)
We	water table depression
Wi	Inundation

Table B-5: Size factors influencing ratings for sensitive ecosystems

SEI Class	A	B	C	C	D
Old Forest	>40 ha	20 – 40 ha	10 – 20 ha	2 – 10 ha	<2 ha
Mature Forest SEI	>40 ha	20 – 40 ha	10 – 20 ha	2 – 10 ha	<2 ha
Woodland	>20 ha	10 – 20 ha	5 – 10 ha	2 – 5 ha	<2 ha
Riparian	>20 ha	10 – 20 ha	5 – 10 ha	2 – 5 ha	<2 ha
Wetland – swamp (forested)	>20 ha	10 – 20 ha	5 – 10 ha	1 – 5 ha	<1 ha
Wetland – all others	>20 ha	10 – 20 ha	5 – 10 ha	1 – 5 ha	<1 ha
Herbaceous	>20 ha	10 – 20 ha	5 – 10 ha	2 – 5 ha	<2 ha
Alpine	>20 ha	10 – 20 ha	5 – 10 ha	2 – 5 ha	<2 ha
Sparsely vegetated	>20 ha	10 – 20 ha	5 – 10 ha	1 – 5 ha	<1 ha
Karst	>10 ha	5 – 10 ha	2 – 5 ha	1 – 2 ha	<1 ha
Estuarine	>20 ha	10 – 20 ha	5 – 10 ha	1 – 5 ha	<1 ha
Intertidal & shallow sub-tidal	>20 ha	10 – 20 ha	5 – 10 ha	1 – 5 ha	<1 ha
Lakes & Ponds Reservoirs	n/a	n/a	n/a	n/a	n/a
Seasonally flooded agriculture fields	>20 ha	10 – 20 ha	5 – 10 ha	1 – 5 ha	<1 ha
Old field	>20 ha	10 – 20 ha	5 – 10 ha	1 – 5 ha	<1 ha

Table B-6: Weighting factors for combining quality attributes

SEI Class	SEI Subclass	Size	Condition	Landscape context
OF: Old Forest		20	45	35
OF	co: coniferous	20	45	35
OF	mx: mixed	20	45	35
OF	vo: very old	20	45	35
MF: Mature Forest		20	45	35
MF	co: coniferous	20	45	35
MF	mx: mixed	20	45	35
MF	bd: broadleaf	20	45	35
WD: Woodland		15	35	50
WD	co: coniferous	15	35	50
WD	mx: mixed	15	35	50
RI: Riparian		20	35	45
RI	ff: fringe	20	35	45
RI	fh: high bench floodplains	20	35	45
RI	fm: medium bench floodplains	20	35	45
RI	fl: low bench floodplains	20	35	45
RI	gu: gully	20	35	45
RI	ca: canyon	20	35	45
RI	ri: river	n/a	n/a	n/a
WN: Freshwater Wetland		20	35	45
WN	bg: bog	20	35	45
WN	fn: fen	20	35	45
WN	ms: marsh	20	35	45
WN	sp: swamp	20	35	45

SEI Class	SEI Subclass	Size	Condition	Landscape context
WN	sw: shallow water	20	35	45
WN	wm: wet meadow	20	35	45
HB: Herbaceous		15	35	50
HB	hb: herbaceous	15	35	50
HB	cs: coastal herbaceous	15	35	50
HB	vs: vegetated shoreline	15	35	50
HB	sh: shrub	15	35	50
SV: Sparsely Vegetated		15	35	50
SV	cl: cliff	15	35	50
SV	ro: rock outcrop	15	35	50
SV	ta: talus	15	35	50
SV	sd: sand dune	15	35	50
SV	sp: spit	15	35	50
ES: Estuarine		20	35	45
ES	sp: swamp	20	35	45
ES	md: meadow	20	35	45
ES	ms: marsh	20	35	45
ES	tf: tidal flat	20	35	45
IT: Intertidal & shallow sub-tidal		15	35	50
IT	mf	15	35	50
IT	bs	15	35	50
IT	el	15	35	50
FW: Lakes & Ponds (freshwater)		n/a	n/a	n/a
FW	la: lake	n/a	n/a	n/a
FW	pd: pond	n/a	n/a	n/a
AP: Alpine		15	35	50
AP	hb: herbaceous	15	35	50
AP	kr: krummholz	15	35	50
AP	pf: parkland forest	15	35	50
AP	sh: shrub	15	35	50
AP	av: avalanche tracks	15	35	50
KA: Karst		15	35	50

Conservation Priority Matrix – Appendix 9.6 (p. 74-78) of Nature Without Borders

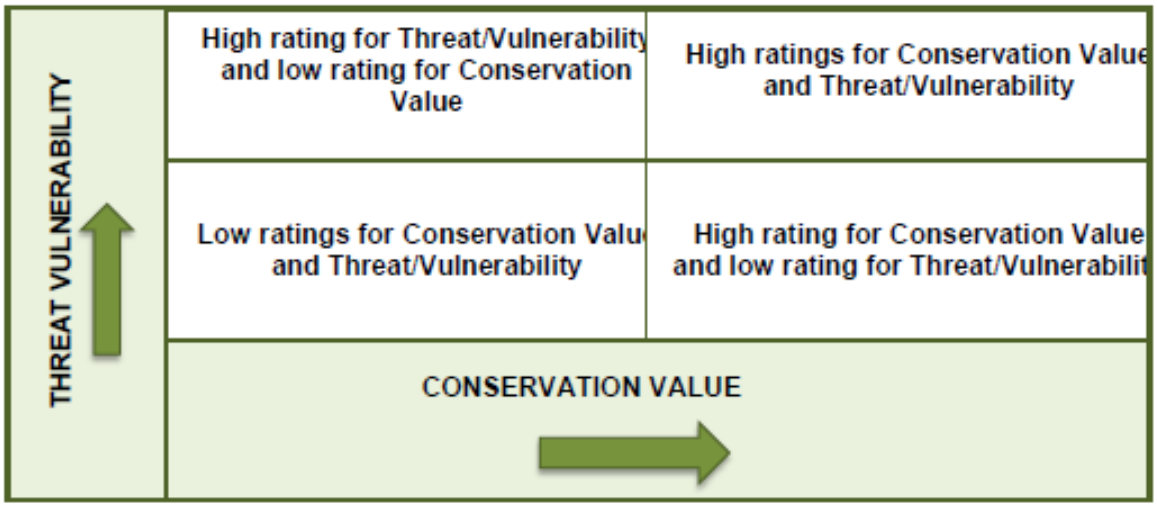
NATURE WITHOUT BORDERS – Second Edition

9.6 Criteria and Measures to Evaluate Projects at the Property Level

Prepared: May 2008
Revised: December 2012

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

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



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

[124] See NWB Second Edition report and maps for descriptions of these priority areas.
[125] See the *Sensitive Ecosystems Inventory East Coast Vancouver Island and Gulf Islands Information Change Form* accessible from the Ministry of Environment, EcoCat: The Ecological Reports Catalogue. http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=2124
. Last updated: March 19, 2007.
[126] Site series descriptions may be available in British Columbia Ministry of Forests (1994). Land Management Handbook Number 28. Green, R.N. and K. Klinka. *A Field Guide to Site Identification and Interpretation for the North Central Portion of the Northern Interior Forest Region.*

Criteria	Description	Measures
f. Connectivity - Adjacency to Forest Land	Is the land adjacent to forested land such that protecting the land would contribute to the contiguity of forest cover on the landscape?	5 = Yes 0 = No
g. Connectivity – Wildlife Barriers	Are there any permanent impassable barriers on or adjacent to the land that would prevent wildlife (travelling overland) from migrating to adjacent areas?	5 = No permanent impassable barriers exist on or adjacent to the land; there is a high level of connectivity with adjacent areas. 3 = Barriers exist on or adjacent to the land; however, overland connectivity can be restored and enhanced - by minimizing existing barriers - to create a moderate level of connectivity with adjacent areas. 1 = Permanent impassable barriers exist that preclude wildlife migration overland to adjacent areas.
h. Community Conservation Feature	Is the land identified as a Community Conservation Feature in the Community Conservation Features database?[127]	3 = Yes, mentioned in 3 or more reports 2 = Mentioned in 2 reports 1 = Mentioned in 1 report 0 = No, not mentioned
i. Community Conservation Feature-Reliability of Community Conservation Information	If yes to above, how reliable (are) the information source(s)?	▪ At least one information source has been verified by an RPBio or QEP ▪ At least one information source is based on an OCP, EAP, LAP public process ▪ At least one information source is from peer reviewed scientific literature ▪ At least one information source is from a conservancy, stewardship or watershed group Assign (3 points if one or more of the above apply)
	Total measure: Conservation & Community Value (max. 51) =	

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

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

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

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Criteria	Description	Measures
d. 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
e. General Management Difficulty	Time commitment, accessibility, invasive species issues, other management issues.	5 = Considered manageable given current resources. 0 = Considered unmanageable given resources.
f. 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. 24) =	

Appendix C: List of ESA Strategy Resources from BC for Consideration in Development of the CVRD ESA Strategy

1. Comox Valley Conservation Strategy – Nature Without Borders (2013) http://www.cvconservationstrategy.org/wp-content/uploads/2014/01/NWB_2ndED_web.pdf
2. Islands Trust Regional Conservation Plan 2011-2015 (2010) http://www.islandstrustfund.bc.ca/media/9359/regional_conservation_plan.pdf
3. Islands Trust Land Securement Strategy 2017-2027 (2017) http://www.islandstrustfund.bc.ca/media/84607/itf-2017-02-07-final-tfb-land-securement-strategy-2017.pdf
4. Islands Trust 2018 Strategy (Draft 2018)
5. Coastal Douglas Fir Conservation Partnership Conservation Strategy (2015) http://www.cdfcp.ca/attachments/CDFCP_CS_2015.pdf
6. South Okanagan-Similkameen Biodiversity Conservation Strategy – Keeping Nature in Our Future (2012) https://soconservationfund.ca/wp-content/uploads/2017/08/KNOIF-2013-web-1.pdf
7. Establishing a Regional Conservation Fund in British Columbia (2011) https://soconservationfund.ca/wp-content/uploads/2017/08/conservationfundguidewebversion13.pdf
8. Okanagan Region Biodiversity Conservation Strategy (2014) http://a100.gov.bc.ca/appsdata/acat/documents/r42389/BiodiversityStr_1409784064471_9783578053.pdf
9. Capital Regional District Land Acquisition Strategy 2015-2017 (2015) https://www.crd.bc.ca/docs/default-source/parks-pdf/land-acquisition-strategy-2015-2017.pdf?sfvrsn=8
10. The HAT Manual: Protecting Natural Areas in the Capital Region (2004) http://www.hat.bc.ca/attachments/016_HATManual.pdf
11. Green Bylaws Toolkit (2016) http://www.greenbylaws.ca/documents/GreenBylawsToolkit_2016.pdf
12. Environmental Development Permit Areas: In Practice and in Case Law (2016) http://www.elc.uvic.ca/wordpress/wp-content/uploads/2016/04/2016_01_02_EDPA_FINAL_March31_2016.pdf
13. Innovative Subdivision Design to Retain Valued Community and Environmental Assets (2015) http://bvcentre.ca/files/research_reports/InnovativeSubdivisionReport-Soto-2015-interactive.pdf
14. Gibsons Eco-Asset Strategy http://www.gibsons.ca/include/get.php?nodeid=1000
15. City of Surrey Biodiversity Conservation Strategy (2014) http://www.surrey.ca/files/Surrey_BCS_Report.pdf