Conservation Letters

R. Schuster, E.A. Law, A.D. Rodewald, T.G. Martin, K.A. Wilson, M. Watts, H.P. Possingham & P. Arcese. Tax-shifting and incentives for biodiversity conservation on private lands.

Supplementary Information: Appendix A

This supplementary material first provides the analysis scenario settings, followed by the Coastal Douglas-fir and Associated Ecosystems Conservation Partnership '2015 Conservation Strategy' for background and rationale.

The following is a summary of the parameters and settings used for the conservation prioritization scenarios run for this project. A further description of the parameters can be found in Appendix B of this manuscript. Additional custom designed scenarios can be run at the Marxan Tool Portal, hosted by the Peter Arcese Lab at UBC, with the help of the Marxan tutorial provided there.

Universal Parameters
Cost: Assessed Value ($)
Protected Areas: locked in
Connectivity/Boundary Length Modifier: 0 = not used

Property exclusions
Road density: max. 3 km/km^2
Parcel size: min. 2 ha
Agriculture density: max. 0.5 km/km^2

Protection Targets (variable 17 or 30%)
Old forest birds
Wetland birds
Beta diversity
Garry Oak Plant Species
TEM element occurrences

Standing Carbon

CDFCP

Coastal Douglas-fir
& Associated Ecosystems
Conservation Partnership

Conservation Strategy
2015

Acknowledgements

Introduction

Purpose of the Conservation Strategy

This Conservation Strategy sets a 30-year vision and goals for the Coastal Douglas-fir Conservation Partnership (CDFCP); with objectives and actions identified for the next five years (2015–2020). The intent is to review and update this strategy at least every five years.

Coastal Douglas-fir and Associated Ecosystems Conservation Partnership (CDFCP) Boundary

The CDFCP boundary includes the Coastal Douglas-fir moist maritime (CDFmm) and Coastal Western Hemlock very dry maritime (CWHxm1) biogeoclimatic variants. Portions of other CWH variants are also included, as shown in the legend below.

Legend
- CDFCP Boundary
- CDFmm
- CWHxm1
- CWHxm2
- CWHdm
- CWHmm2
- CWHvm2
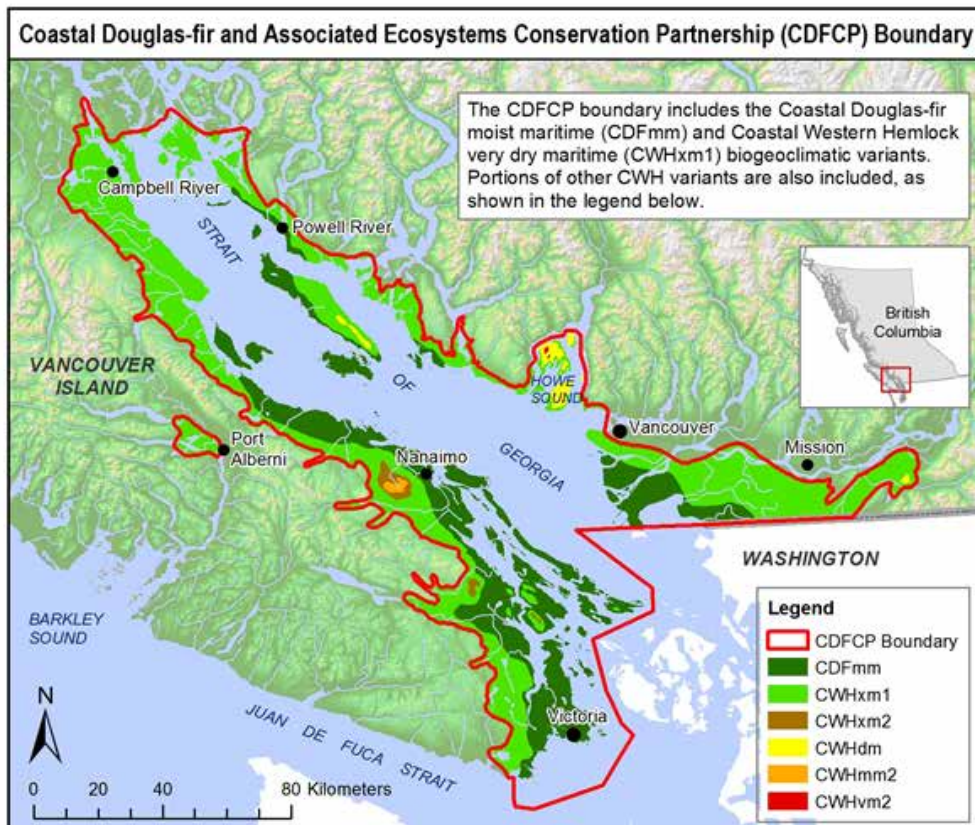
Coastal Douglas-fir and Associated Ecosystems

The Coastal Douglas-fir biogeoclimatic zone (CDF zone) is the smallest and most at-risk zone in British Columbia (B.C.). As home to the highest number of species and ecosystems at risk in B.C., many of which are ranked globally as imperiled or critically imperiled, it is of great conservation concern. The global range of the CDF lies almost entirely within B.C., underscoring both its global uniqueness and B.C.'s responsibility for its conservation. Of all the zones in the province, the CDF has been most altered by human activities. Less than 1% of the CDF remains in old growth forests and 49% of the land base has been permanently converted by human activities. The trend of deforestation and urbanization continues and has resulted in a natural area that is highly fragmented with continuing threats to remaining natural systems. Approximately 9% of the CDF zone is currently protected in conservation areas. The extent of disturbance, combined with the low level of protection, places the ecological integrity of the CDF zone at high risk.

As shown on the map, the area of concern to the CDFCP includes some parts of the Coastal Western Hemlock very dry maritime zone (CWHxm1 and CWHxm2), as these ecosystems share similar attributes and threats.

Threats to the integrity of the Coastal Douglas-fir and associated ecosystems (CDFAE) include:

- **Land conversion.** The CDF zone is 80% privately owned, in part due to the historic Esquimalt and Nanaimo (E & N) railway land grant. About 10% is provincially owned and the remaining 10% is owned by other levels of government. Much of the private land has been converted to urban and rural development, transportation and utility corridors, and agricultural use. Forty-nine percent (49%) of the land base in the CDF has been converted to human uses.

- **Ecosystem degradation.** Less than 1% of the CDF zone currently remains as old growth forest (over 250 years in age), and forests over 100 years in age now occupy only 4% of their former extent. Deforestation in a land base that was once predominantly forested has consequences for the small patch ecosystems, specialized habitats and at-risk species that were previously buffered and supported by the ecological processes of the surrounding forests. Remaining forests are predominantly younger, less diverse and bisected by roads. These changes affect hydrological patterns and the ability to filter and store water; destabilizes forest soils and reduces capacity to regenerate soils; alters the resistance to the invasion of alien species; alters prey-predator relationships; alters carbon and nutrient cycles, including the release of carbon to the atmosphere; and removes specialized habitat features for wildlife foraging, shelter and breeding.

- **Loss of natural processes.** Wildfires and deliberate burning by First Nations played an important role in shaping CDF ecosystems. Fires create openings in the canopy, kill off other less fire-resistant species, and help to establish and maintain the large, thick-barked Douglas-fir, Maple and Garry Oaks as the dominant trees in the area. Today and for the past 100 years, forest fires have been suppressed.

- **Species disturbance.** Human influence has artificially changed the balance of species, with resulting impacts on ecosystems. An example is the reduction in cougar and wolf populations, which has led to the hyper-abundance of deer populations and in turn reduction of native plants on which deer like to feed.

- **Invasive species** have increasingly intruded into all ecosystem types, displacing native plants and animals, altering ecosystem function and dynamics, and removing food sources for wildlife.

- **Climate change.** Changing climates are increasingly placing stress on native ecosystems and species through changes in seasonal temperatures, reduced snowpacks, winter rains instead of snowfalls, rain on snow events, and water availability, as well as introducing new pests and diseases.

- **Environmental Contaminants.** Environmental contaminants, including fertilizers, pesticides, household and industrial chemicals, sediment from human land disturbance, and human and animal wastes affects the function of ecosystems in the CDFAE. Some of these contaminants are from point sources, such as industry, but many come from non-point sources such as road infrastructure, housing developments, agriculture, and forestry.

A Mosaic of Protection and Stewardship

Coastal Douglas-fir and associated ecosystems (CDFAE) are found across the landscape. Large areas are set aside for ecosystem protection, forestry and agriculture, while small patches of natural habitat exist in community parks and backyards. The mosaic of protection and stewardship recognizes that this place is home to a diversity of native plants and animals, as well as home to many people. Some areas will be protected and set aside with a primary purpose of supporting ecological integrity; the primary use of other areas may be for economic, recreational or other uses. Stewardship of the CDFAE lands must balance these sometimes competing, sometimes complementary, roles.

This mosaic includes lands under government and private ownership and management, ranging in size from small to large parcels. Examples include:

- Protected areas (e.g., federal, provincial, regional and municipal parks, wildlife management areas, and non-government organization (NGO) owned nature reserves)
- Private lands managed for ecosystem values, including lands with conservation covenants
- Working landscapes (including forestry and agriculture)
- Connectivity corridors, including riparian areas
- Drinking water watersheds
- Community parks and recreation areas
- First Nations lands
- Private woodlots
- Urban forests
- Private backyards
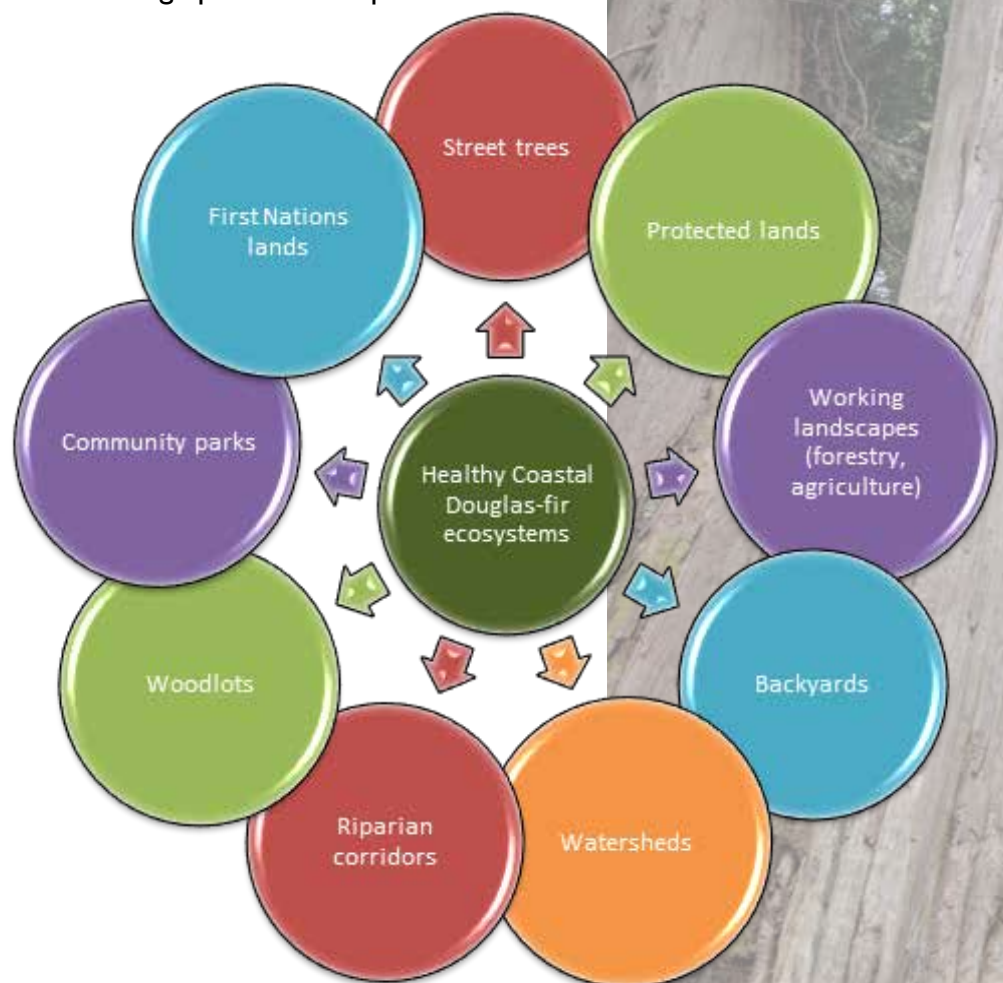
The Coastal Douglas-fir Conservation Partnership and its Mission

The Coastal Douglas-fir Conservation Partnership (CDFCP) is a collaboration of agencies, organizations and land managers who are interested in promoting and protecting healthy CDFAE into the future. Land trusts, governments (federal, provincial, regional, municipal, and First Nations), environmental stewardship groups, resource industry professionals, private landowners and academic institutions are encouraged to become CDFCP Participants or Supporters.

As set out in its terms of reference, the CDFCP is led by a Steering Committee and supported by a series of Working Groups focused on different aspects of the CDFCP goals. The CDFCP provides a forum for collaboration, communication and action to effectively protect and steward Coastal Douglas-fir and associated ecosystems. Its mission is:

> *To promote the conservation and stewardship of the Coastal Douglas-fir and associated ecosystems in south-western British Columbia through sound science, shared information, supportive policies, and community education.*

Vision for Coastal Douglas-fir and Associated Ecosystems

By 2045:

> *Coastal Douglas-fir and associated ecosystems have ecological integrity and resilience to change. A system of core protected areas are actively managed to provide habitat for native species and places to learn about the importance of healthy ecosystems. Working landscapes are actively managed to enhance their ecosystem values, while also supporting jobs and economic development opportunities. The public and land managers understand that Coastal Douglas-fir and associated ecosystems are special places that merit support and investment.*
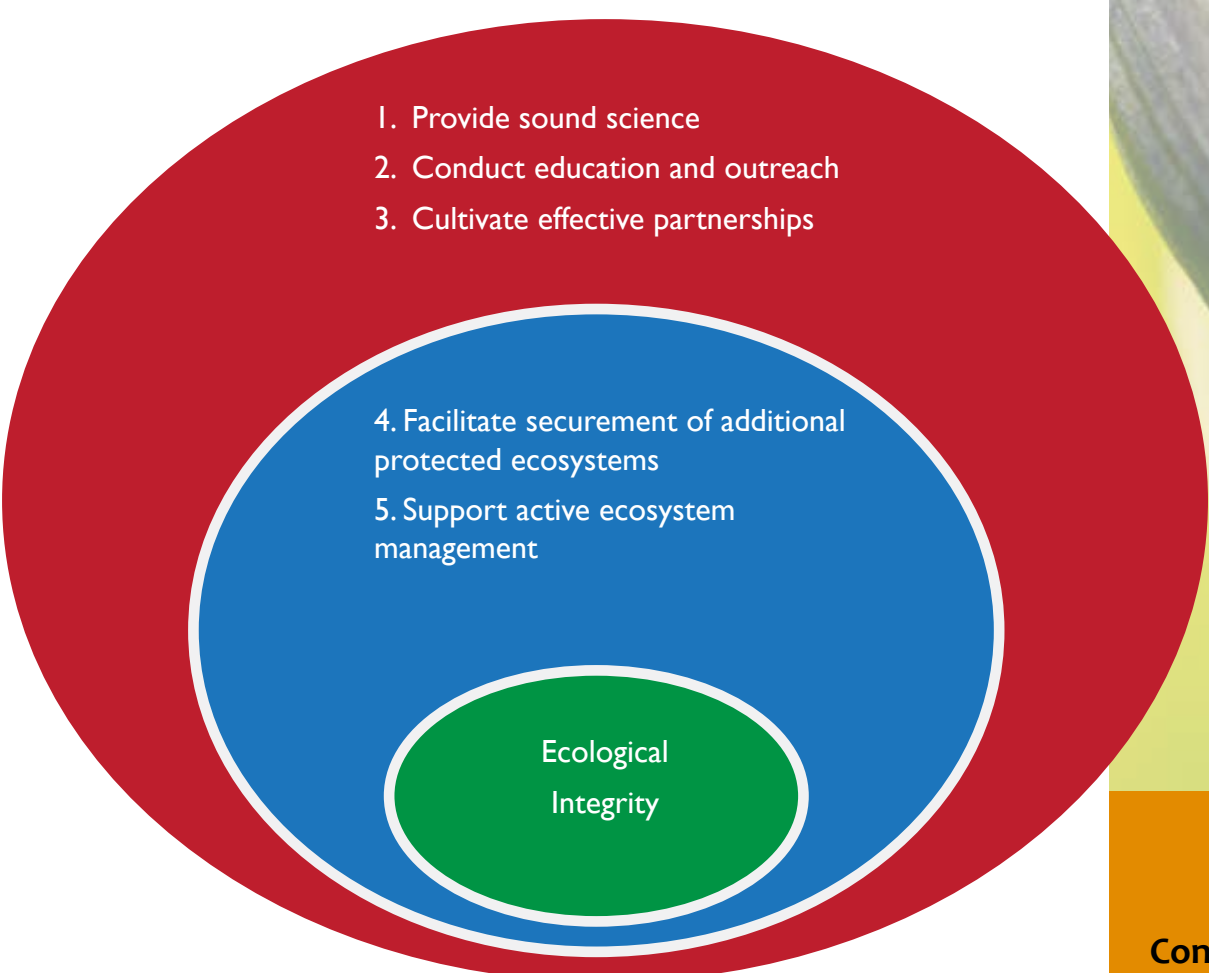
Goals and Objectives for the CDFCP

Goals

The five goals express the ways in which CDFCP is working towards the vision of ecological integrity for Coastal Douglas-fir and associated ecosystems. The first three are core business of the CDFCP, the other two are activities supported by the Partnership.

1. *Provide sound science*

2. *Conduct education and outreach*

3. *Cultivate effective partnerships*

4. *Facilitate securement of additional protected ecosystems*

5. *Support active ecosystem management*

1. Provide sound science
2. Conduct education and outreach
3. Cultivate effective partnerships

4. Facilitate securement of additional protected ecosystems
5. Support active ecosystem management

Ecological Integrity

Short-term Objectives and Actions

The goals reflect long-term aims. The objectives are specific outcomes for the next five years (2015-2020); supporting actions to achieve those objectives are also indicated. Objectives and actions are dependent on the availability of resources; the list below reflects the desired list of actions for the coming years, should resources (staff and funds) become available. For a list of objectives and actions which are "core" activities that are part of the ongoing CDFCP effort, please see Appendix A.

Summary of objectives and actions for 2015–2020:

1. **Provide sound science to support land securement and stewardship**
    1.1. Provide tools for prioritization of areas for securement and stewardship within the CDF Zone
    1.2. Assist local governments, conservation groups and First Nations to identify priority areas for securement and stewardship in their jurisdiction
    1.3. Provide information on emerging CDFAE threats
    1.4. Report annually on conservation outcomes

2. **Conduct education and outreach**
    2.1. Develop and implement a communications and outreach strategy
    2.2. Share success stories

3. **Cultivate effective partnerships**
    3.1. Create and fund a coordinator position
    3.2. Create and Support Working Groups
    3.3. Encourage First Nations representation in the Partnership
    3.4. Support the work of CDFCP Signatories
    3.5. Collaborate with other groups working on ecosystem conservation

4. **Facilitate securement of protected ecosystems**
    4.1. Provide advice on land securement
    4.2. Identify options and contacts for funding land securement and stewardship
    4.3. Promote and support land securement partnerships

5. **Support active ecosystem management**
    5.1. Work with local governments to develop plans, policies and bylaws and incentives that enhance CDF values
    5.2. Identify and promote opportunities for CDFAE stewardship
    5.3. Identify pilot (case study) lands and land managers where focused management activities would benefit CDFAE on working landscapes
    5.4. Work with the resource, developers and real estate sectors to enhance CDF stewardship

1. PROVIDE SOUND SCIENCE TO SUPPORT LAND SECUREMENT AND STEWARDSHIP

Effective and reliable science, combined with local knowledge, supports decisions that are made using the best available information.

1.1. Provide tools for prioritization of areas for securement and stewardship within the CDF Zone

Actions:

- Working with UBC and other information providers, use the Marxan tool and analysis to develop landscape-level maps that identify potential conservation priorities.

- Refine the landscape-level mapping by improving data collection quality and input tools.

- Use the Marxan tool and other information to identify high-value conservation areas for discussion with partners.

- Use the Marxan tool and other analysis to identify CDFAE values within existing protected areas and determine the amount and spatial distribution of 'additional' protected areas required to create a resilient system.

- Create realistic scenarios for 'core' protection, taking into account spatial distribution and connectivity.

- Use the Marxan tool and other analysis to identify working landscapes and other lands with high CDF values.

- Develop and keep current a list of priority parcels for securement, and develop information on those parcels to support acquisition.

- Develop a methodology for ranking and ground truthing an individual conservation opportunity.

1.2. Assist local governments, conservation groups and First Nations to identify priority areas for securement and stewardship in their jurisdiction

Actions:

- Working with UBC and other groups, use the Marxan tool and other analysis to develop jurisdictional maps throughout the CDF area that identify areas with high conservation values, taking local priorities into account.

- Share existing data and knowledge through information forums and data sharing sites such as iMap, while respecting data privacy as required.

- Develop ways and means to facilitate timely and efficient access to a collective database.

- Engage local groups in the prioritization process so that they understand and support the selection process.

- Encourage jurisdictions to incorporate the results of regional mapping into their plans and policies.

- Provide training on the use and interpretation of the outcomes of this mapping and prioritization.

1.3. Provide information on emerging CDFAE threats

Actions:

- Gather information on the anticipated impacts from climate change, land conversion, invasive species and other emerging threats.
- Provide information on emerging threats to CDFCP partners and others through webinars, presentations and existing online resources.

1.4. Report annually on conservation outcomes

Actions:

- Establish parameters to be tracked (indicators).
- Monitor, evaluate and report annually on progress for these conservation indicators.

2. CONDUCT EDUCATION AND OUTREACH

Increasing public understanding of the importance of healthy Coastal Douglas-fir and associated ecosystems to humans and other species is necessary to create the political and financial support for programs that promote ecological integrity.

2.1. Develop and implement a communications and outreach strategy

Actions:

Through the Outreach and Education Working Group (OEWG):

- Develop a communications and outreach strategy.
  - Identify target audiences (e.g., senior and local governments, First Nations, the resource sector, and private landowners), and learn about their interests, perspectives and information needs.
  - Identify the most effective communications media for each of these audiences (e.g., e-newsletters, in-person meetings, social and regular media).
  - Develop key messages to be conveyed.
  - Identify existing materials (e.g., GOERT manuals, land trust strategies), and identify gaps in readily available information.
  - Identify organizations (partners and others) who can help to raise awareness of CDFAE.
  - Identify regions where there are no local groups to assist; consider options for filling this outreach gap.
- Provide informative educational materials in a variety of formats.
  - Provide links to existing online materials from the CDFCP website (and maintain links to ensure they remain current).
  - Where appropriate information does not already exist, create materials aimed at meeting the needs of specific groups.
  - Create engaging and clear information on CDFAE values for the general public.

- Post new materials on the CDFAE website in "print-ready" format and make them available through CDFCP partners.
- Distribute information widely.
  - Maintain an informative online presence, ensuring that content is updated regularly.
  - Ensure the coordinator role includes regular communications through email, social media and other methods.
  - Encourage CDFCP partners to share CDFCP news via their own websites, social media and other outreach.
- Host webinars, workshops and/or other information exchanges among existing and potential CDFCP partners
  - Identify target audiences and key topics for specific events.
  - Host at least one webinar (or in-person meetings) per year on different aspects of CDFAE protection and stewardship; encourage partners to co-host other events.
  - Consider events, contests and other activities that reach other audiences, such as youth.

2.2.   Share success stories

Actions:

- Use proactive communications methods (not just website listings) to share success stories, such as:
  - Successful land securement deals, especially those using new and innovative approaches, Target audiences for these include developers/builders, agricultural land owners/managers.
  - Best practices to enhance CDFAE values (and reduce negative impacts), including restoration techniques.

3. Cultivate effective partnerships

Create an effective and growing partnership in support of Coastal Douglas-fir and associated ecosystems.

3.1.   Create and fund a coordinator position

Actions:

- Hire the coordinator. Refine the existing job description, gather funding to support this position for at least the first two years, and advertise for/hire the coordinator.
  - Seek funding for ongoing support for this position.
  - Annually, prepare a budget and workplan that identifies appropriate CDFCP banker(s) and core funding and project funding.
  - Identify potential funders for proposed projects; write grant proposals.
  - Prepare a simple annual update that provides information on achievements, funds expended, in-kind contributions from partners and others, identification of ways members can help, etc.

3.2.   Create and Support Working Groups

Actions:

- Confirm Working Group membership, create a Terms of Reference for each group and identify official communications channels

- Where the working group role is filled by a parallel partnership (e.g., the Local Government Species At Risk Local Government Working Group), consider how this will meet the needs of the CDFCP and how best to achieve shared goals.

- Task each Working Group to provide a list of their priorities annually.

- Ensure the membership and efforts of the Working Groups are shared among all partners and supporters.

3.3.   Encourage First Nations representation in the Partnership

Actions:

- Invite First Nations to CDFCP webinars and meetings to provide them with an opportunity to learn about the partnership.

- Meet in person with First Nations to:

    - Seek to understand the value of the CDFCP to First Nations

    - Share ideas on benefits of CDFAE conservation and overlap with traditional ecological knowledge, perhaps through joint mapping

    - Invite the inclusion of First Nations knowledge in the post-processing analysis.

- Invite First Nations representation on the Steering Committee.

3.4.   Support the work of CDFCP Signatories

Actions:

- Develop an internal communications strategy for regular communications amongst partners.

- Identify the 'point person(s)' for information flow (internally and externally).

- Identify specific needs of the partners; help partners to further their CDFAE goals.

- Share the information (spreadsheet) identifying programs and gaps in ecosystem protection.

- Facilitate a peer-to-peer format for exchange of information, capacity building and access to funding.

3.5.   Collaborate with other groups working on ecosystem conservation

- Identify potential new partners and encourage their participation in the CDFCP.

- Identify gaps in partner membership (e.g., in geographical regions as well as areas of expertise)

- Share information with similar organizations and partnerships (e.g., South Coast Conservation Partnership) on an ongoing basis.

- Coordinate with region-wide groups (e.g., GOERT) regarding shared interests

- Promote members of CDFCP as mentors for smaller organizations and community groups.

- Contact community organizations working on complementary objectives (e.g., Shawnigan Watershed study and Cedar Watershed Study) and identify opportunities for collaboration.

Coastal Douglas-fir & Associated Ecosystems Conservation Partnership

4. Facilitate securement of protected ecosystems

Establishing and expanding a system of core protected areas that are specifically managed to protect ecosystem integrity will support the long-term resilience of CDFAE. These protected areas will include publicly-owned lands (e.g., parks and watershed lands), lands owned by conservation organizations, and private lands under conservation covenant or similar legal status.

4.1. Provide advice on land securement

Actions:

Through the Securement Working Group:

- Gather information on the options for land securement including conservation covenants, land donations, eco-gifts, land acquisition, Crown Land securement, leveraging land acquisition, land trades, and other voluntary conservation options.
- Provide advice as needed to support the efforts of government agencies and land trusts to plan for securement and to secure specific CDFAE lands for conservation.
- Provide letters of support for securement efforts that support the ecological integrity of CDFAE.

## 4.2. Identify options and contacts for funding land securement and stewardship

Actions:

- Identify and provide information on financial and other incentives for CDFAE securement and stewardship, e.g., potential carbon offset benefits.
- Provide examples of creative approaches to land securement, such as leveraging, land trades, or acquiring lands for trade.
- Identify contacts for fundraising (funders, fundraising expertise).
- Work with Provincial and regional organizations (e.g., the Land Trust Alliance of BC) to strategically promote funding for land conservation with government, funding agencies, financial advisors, and estate planners.
- Help to develop and advocate for new innovative funding opportunities, as well as encouraging increased funding levels for existing programs.

4.3. Promote and support land securement partnerships

Actions:

- Create venues for conversation about land securement options.
- Clarify roles various partners can play.
- Provide skills mapping for securement partners.
- Look at multi-purpose acquisitions that broaden the scope of conservation constituents, such as farming-conservation, mining-conservation and/or development-conservation.
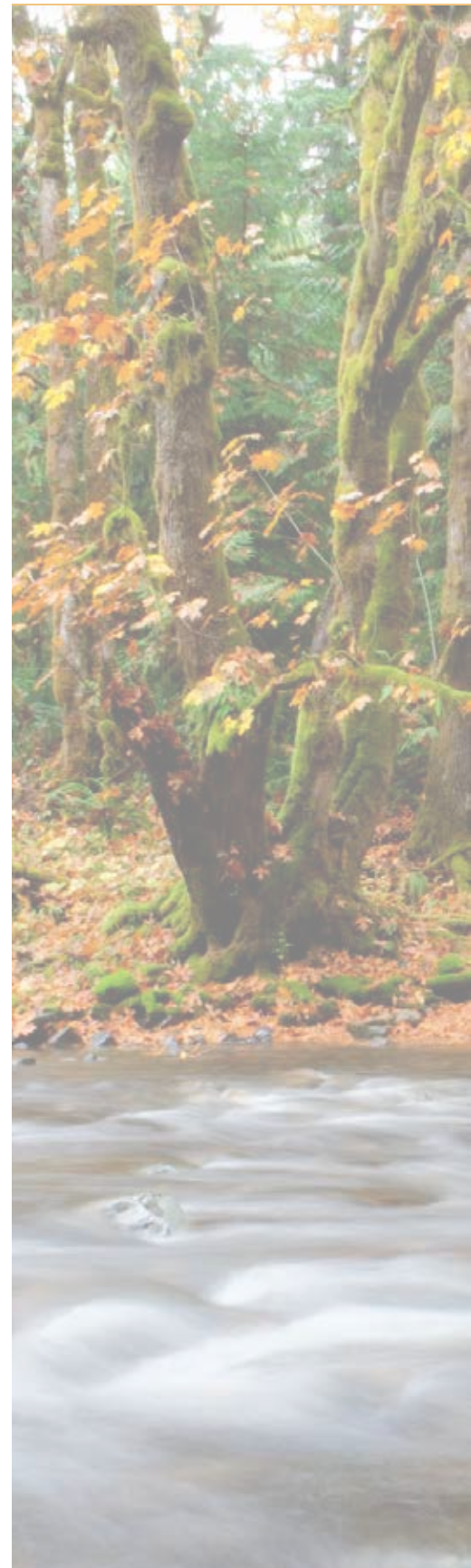
5. Support active ecosystem management

Without active management (stewardship), even protected areas may lose ecosystem integrity. By 2045, it is hoped that protection and stewardship of CDFAE will be an integral component of the plans, policies and management activities of all governmental, private and non-governmental land managers.

5.1. Work with local governments to develop plans, policies and bylaws and incentives that enhance CDF values

Actions:

Through the Local Government Working Group:

* Find examples of practices (e.g., policies, incentives) from B.C. and elsewhere that could be used to enhance CDFAE values; share these with local governments.
* Develop and promote model policies and bylaws.

5.2. Identify and promote opportunities for CDFAE stewardship

Actions:

* Identify incentives (financial and other) for CDFAE stewardship on working landscapes.
* Meet with representatives from the forestry, agriculture and mining sectors to discuss benefits and barriers to CDFAE stewardship.
* Facilitate a peer-to-peer format for exchange of information and capacity building.
* Create a recognition strategy to appreciate good stewardship.

5.3. Identify pilot (case study) lands and land managers where focused management activities would benefit CDFAE on working landscapes

Actions:

* Collaborate with land managers to identify priority lands for active management. – e.g., agriculture, forestry, real estate.
* Initiate pilot projects for stewardship projects that benefit land managers and enhance CDFAE values on working lands.
* Share the lessons from these pilot projects with the CDFCP and others.

**Coastal Douglas-fir &
Associated Ecosystems
Conservation Partnership**

5.4. *Work with the resource, developers and real estate sectors to enhance CDF stewardship*

Actions:

Through the Resource Sector Working Group, work with the resource sector (including forestry companies, woodlot owners, farmers and mining operators, and real estate sector) to:

- Identify aspects of CDFAE stewardship that enhance operations on working landscapes, and aspects that may create challenges.

- Increase awareness of the impacts of resource extraction activities on CDFAE.

- Explore and promote economic opportunities that are consistent with the CDFAE conservation objectives.

- Seek ways to increase the compatibility of resource activity outcomes with CDFAE conservation objectives.

- Work with the resource sector to integrate CDF values into strategic and operational plans.

Appendix A: Core Priorities

These activities form part of the CDFCP core work, and can be completed through the Steering Committee members and other partners.

1. Provide sound science to support land securement and stewardship

Effective and reliable science, combined with local knowledge, supports decisions that are made using the best available information.

1.1. Provide tools for prioritization of areas for securement and stewardship within the CDF Zone

- Working with UBC and other information providers, use the Marxan tool and analysis to develop landscape-level maps that identify potential conservation priorities.
- Use the Marxan tool and other information to identify high-value conservation areas for discussion with partners.
- Use the Marxan tool and other analysis to identify working landscapes and other lands with high CDF values.
- Develop a methodology for ranking an individual conservation opportunity.

1.2. Assist local governments, conservation groups and First Nations to identify priority areas for securement and stewardship in their jurisdiction

- Require additional resources to complete, and is dependent on funding availability.

1.3. Provide information on emerging CDFAE threats

- Requires additional resources to complete, and is dependent on funding availability.

1.4. Report annually on conservation outcomes

- Requires additional resources to complete, and is dependent on funding availability.

2. Conduct education and outreach

Increasing public understanding of the importance of healthy Coastal Douglas-fir and associated ecosystems to humans and other species is necessary to create the political and financial support for programs that promote ecological integrity.

2.1. Develop and implement a communications and outreach strategy

- Requires additional resources to complete, and is dependent on funding availability.

2.2. Share success stories

- Requires additional resources to complete, and is dependent on funding availability.

3. Cultivate effective partnerships

3.1. Create and fund a coordinator position

- Hire the coordinator. Refine the existing job description, gather funding to support this position for at least the first two years, and advertise for/hire the coordinator.
- Seek funding for ongoing support for this position.
- Prepare a simple annual update that provides information on achievements, funds expended, in-kind contributions from partners and others, identification of ways members can help, etc.

- Other actions require additional resources to complete, and is dependent on funding availability.

3.2. Create and Support Working Groups

- Requires additional resources to complete, and is dependent on funding availability.

3.3. Encourage First Nations representation in the Partnership

- Invite First Nations representation on the Steering Committee.

- Other actions require additional resources to complete, and is dependent on funding availability.

3.4. Support the work of CDFCP Signatories

- Identify the 'point person(s)' for information flow (internally and externally).

- Share the information (spreadsheet) identifying programs and gaps in ecosystem protection.

- Other actions require additional resources to complete, and is dependent on funding availability.

3.5. Collaborate with other groups working on ecosystem conservation

- Identify potential new partners and encourage their participation in the CDFCP.

- Identify gaps in partner membership (e.g., in geographical regions as well as areas of expertise)

- Share information with similar organizations and partnerships (e.g., South Coast Conservation Partnership) on an ongoing basis.

- Other actions require additional resources to complete, and is dependent on funding availability.

4. Facilitate securement of protected ecosystems

Establishing and expanding a system of core protected areas that are specifically managed to protect ecosystem integrity will support the long-term resilience of CDFAE. These protected areas will include publicly-owned lands (e.g., parks and watershed lands), lands owned by conservation organizations, and private lands under conservation covenant or similar legal status.

4.1. Provide advice on land securement

Through the Securement Working Group:

- Provide advice as needed to support the efforts of government agencies and land trusts to plan for securement and to secure specific CDFAE lands for conservation.

- Provide letters of support for securement efforts that support the ecological integrity of CDFAE.

4.2. Identify options and contacts for funding land securement and stewardship

- Work with Provincial and regional organizations (e.g., the Land Trust Alliance of BC) to strategically promote funding for land conservation with government, funding agencies, financial advisors, and estate planners.

- Other actions require additional resources to complete, and is dependent on funding availability.

5. *Support active ecosystem management*

Without active management (stewardship), even protected areas may lose ecosystem integrity. By 2045, it is hoped that protection and stewardship of CDFAE will be an integral component of the plans, policies and management activities of all governmental, private and non-governmental land managers.

5.1. Work with local governments to develop plans, policies and bylaws and incentives that enhance CDF values

Through the Local Government Working Group:

- Find examples of practices (e.g., policies, incentives) from B.C. and elsewhere that could be used to enhance CDFAE values; share these with local governments.

- Other actions require additional resources to complete, and is dependent on funding availability.

**5.2. Identify and promote opportunities for CDFAE stewardship**

- Requires additional resources to complete, and is dependent on funding availability.

5.3. Identify pilot (case study) lands and land managers where focused management activities would benefit CDFAE on working landscapes

- Requires additional resources to complete, and is dependent on funding availability.

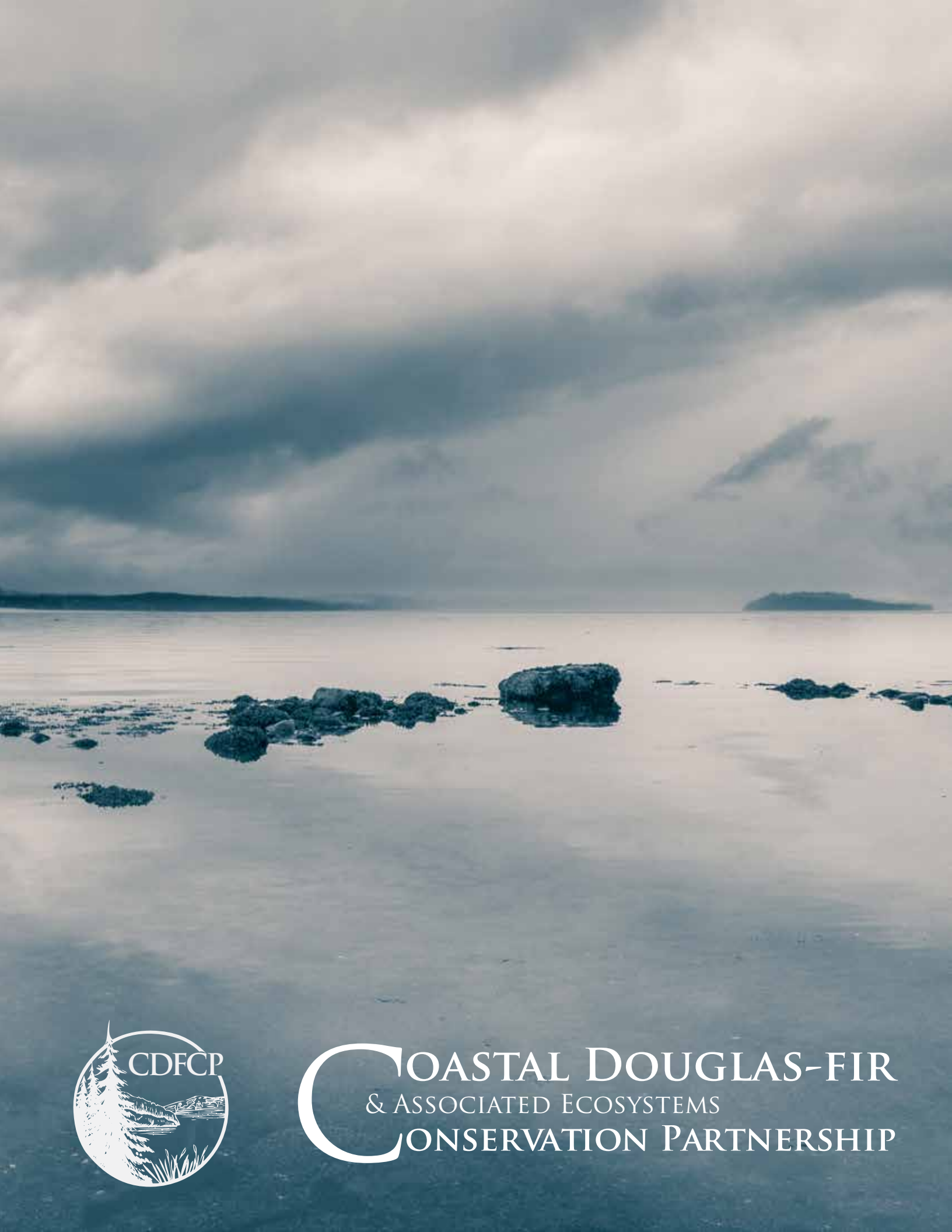**5.4. Work with the resource, developers and real estate sectors to enhance CDF stewardship**

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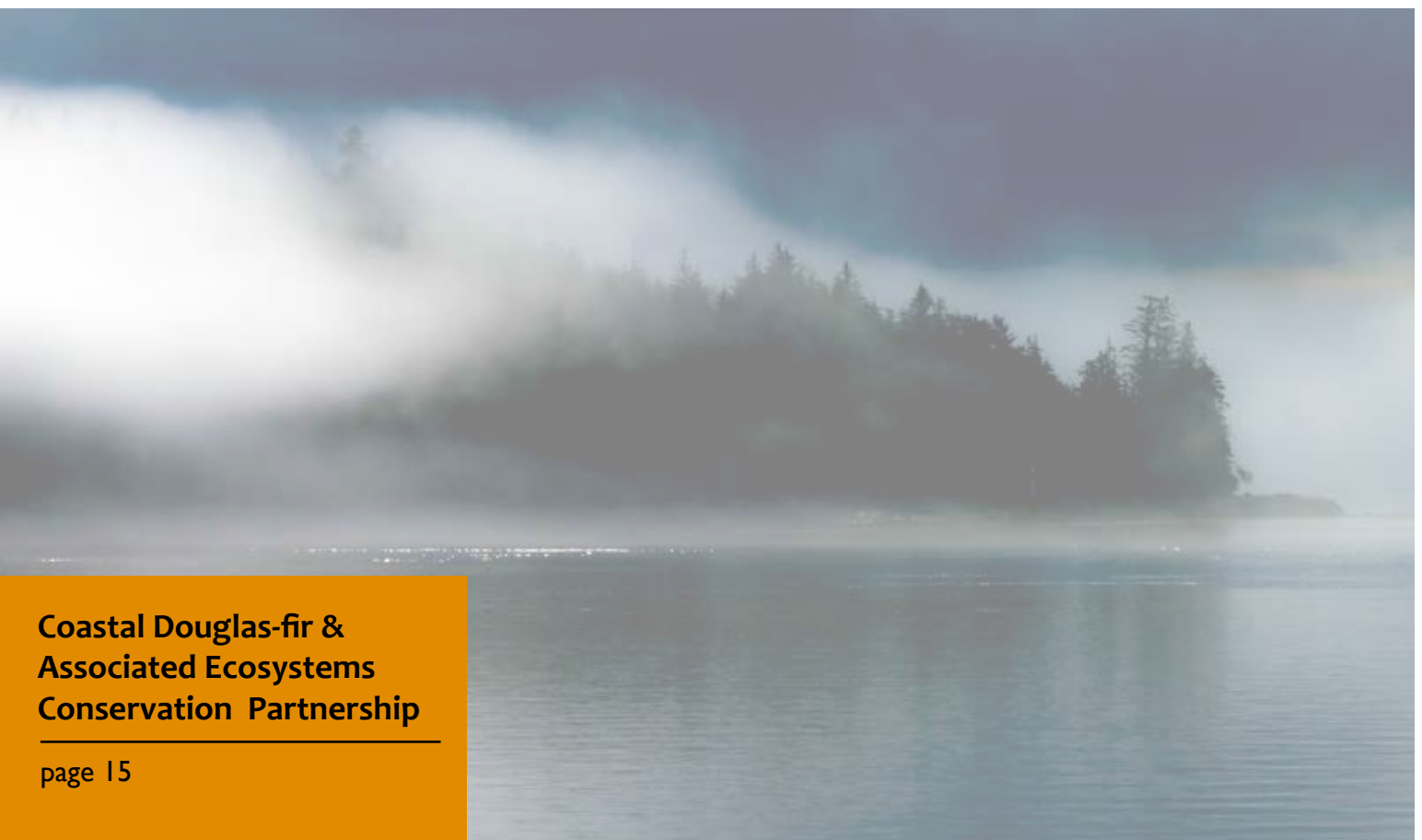
**Coastal Douglas-fir &
Associated Ecosystems
Conservation Partnership**

2015 Conservation Strategy: Study Area and Local Government Scenarios

Prepared for the Coastal Douglas-fir and Associated Ecosystems Conservation Partnership
June 2015

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Acknowledgements

The Coastal Douglas-fir and Associated Ecosystems Conservation Partnership (CDFCP) gratefully acknowledges the support of the Real Estate Foundation of British Columbia (REFBC) in creating the following local government scenarios.

The CDFCP also acknowledges the Capital Regional District, the Cowichan Valley Regional District and Islands Trust for their participation in the project. Finally, the guidance from Dr. Peter Arcese at the University of British Columbia and mapping support from Richard Schuster has been invaluable in creating and inspiring some of the ideas behind these scenarios.

Background

In the spring of 2014, the Coastal Douglas-fir and Associated Ecosystems Conservation Partnership (CDFCP) received funding through the Real Estate Foundation of British Columbia (REFBC) to create a CDFCP Conservation Strategy. Part of the funding was used to develop a basin wide landscape analysis and case studies for up to three (3) local governments in the CDFCP region. A facilitated workshop was held on February 11, 2015 with four (4) interested local governments: Capital Regional District (CRD), Cowichan Valley Regional District (CVRD), Regional District of Nanaimo (RDN) and Islands Trust. The CRD, CVRD and Islands Trust indicated a willingness to continue working with the CDFCP to develop scenarios that could be used as examples of the application of the CDFCP Conservation Strategy in a local government framework. The timeline of the REFBC project did not allow for any of these local governments to fully integrate the outcomes into their own planning documents or bylaws, but the CDFCP hopes to continue to work with these partners and others towards that end.

The CDFCP Steering Committee hopes that the local government scenarios will be helpful to other agencies and local governments working in the CDFCP region. The scenarios should be read in conjunction with the CDFCP Conservation Strategy (2015).

Analysis Tools and Methods

Each of the local government scenarios in this document was developed using Marxan, a computer application that runs an algorithm[1] on a set of data layers and presents a 'solution'. The 'solution' is a table of land parcels that can then be used to create map displays and summarized information that is helpful to the user. The Marxan scenarios were run using a web interface created for the CDFCP area by

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[1] An algorithm is a process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer.

Richard Schuster, PhD, and hosted through the Dr. Peter Arcese Lab at the University of British Columbia (available at: http://arcese.forestry.ubc.ca/marxan-tool/).

Within each area of interest, Marxan parameters were set according to the local government in collaboration with the CDFCP Steering Committee. To keep this document as concise as possible, the parameters used for each scenario are in Appendix A and the *Marxan Tutorial for the CDFCP Study Area* is attached as Appendix B. In each scenario further analysis was done on the results of the Marxan output (i.e. the data was 'post-processed'). A full technical description of the methodology is available in Appendix A. A general description of the post-processing is below each scenario.

While parameters have been selected for each scenario, these are only samples of what might be done with the Marxan tool and additional post-processing. Each user is responsible for choosing the parameters and post-processing methods that meet their needs. It is the hope that the CDFCP will be able to provide guidance for other agencies wishing to use the Marxan tool into the future.

Study Area

The study area is the area within the CDFCP region (Map below) where Terrestrial Ecosystem Mapping (TEM) was readily available. It includes the Coastal Douglas-fir (CDF) biogeoclimatic zone, except for areas on the Lower Mainland, and the portions of the Coastal Western Hemlock zone found with the Islands Trust Area. It is important to note that for the CRD and CVRD, the analysis only includes those parts of each regional district that fall within the CDF zone.
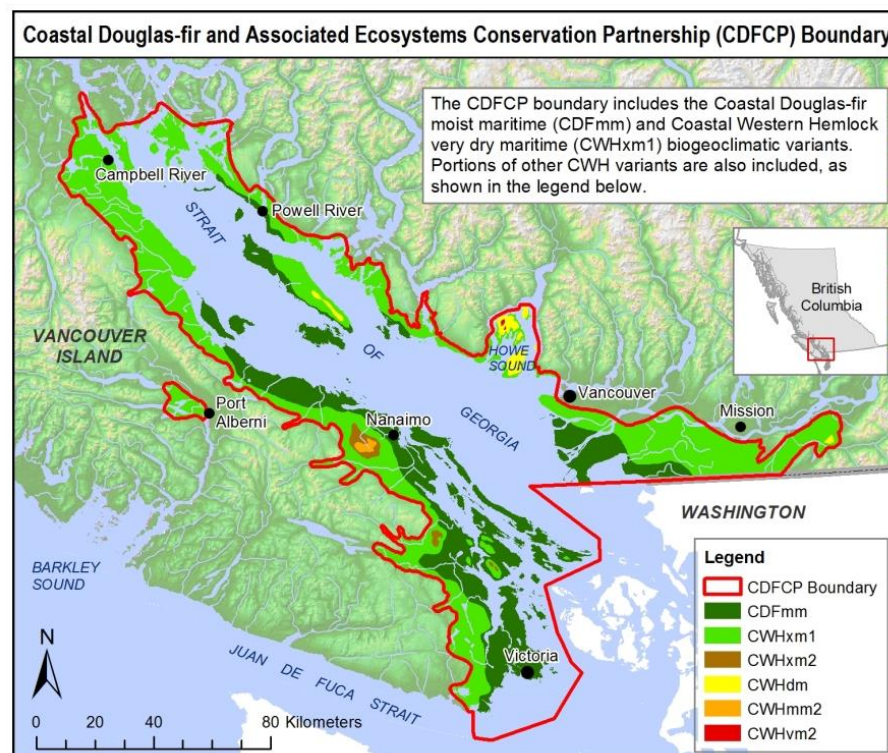
Case Study Limitations

Like all modelling exercises, the results of the case studies in this report have some limitations. Local governments and other agencies wishing to use the Marxan web interface provided by the Peter Arcese lab at UBC are advised to consult the CDFCP before undertaking analyses to ensure that they are aware of the impacts of using the provided parameters. Generally, limitations in this study include:

Data Quality: The protection targets for each case study were obtained using Terrestrial Ecosystem Mapping (TEM) data, bird count data and Garry oak plant species data. Errors in these data sources will impact the results of the analyses. Additionally, when Marxan is run, it uses an algorithm to capture as much of the protection targets as possible for the least amount of cost. For the purposes of the case studies in this report, BC Assessment land value data was used to determine land cost. Variations in market value at time of sale are not taken into account.

Tool Set Up vs. Post-processing: In the Islands Trust and Capital Regional District scenarios a separate server was set up to run the Marxan analysis within the local government area. For the watershed level analyses provided to the Cowichan Valley Regional District (CVRD), a server was set up for the CVRD and then the results were clipped to the watershed boundaries. The reason for this difference is that the CDFCP did not have the resources to create separate servers for the watershed Marxan runs.

Scale: The data used for the Marxan analysis is meant to function at a regional scale. As the data gets applied at smaller and smaller scales, larger uncertainties will appear in the results. All results should be reviewed by individuals with a good knowledge of the area of interest before being used.

Full Study Area Scenario

Background

The CDFCP study area covers 258,668 ha and is approximately 80% privately held lands. The CDFCP Conservation Strategy recognizes the need to include a variety of techniques to address conservation of biodiversity on private lands. Some techniques may include land securement, but other land uses, such as ecologically sensitive agriculture and forestry as well as land development that considers wild spaces are important to maintain biodiversity. To begin to address land use planning in an area with a multitude of uses and a large privately held landbase, the CDFCP elected to begin to analyze the landscape based on both biodiversity value and type of land use.
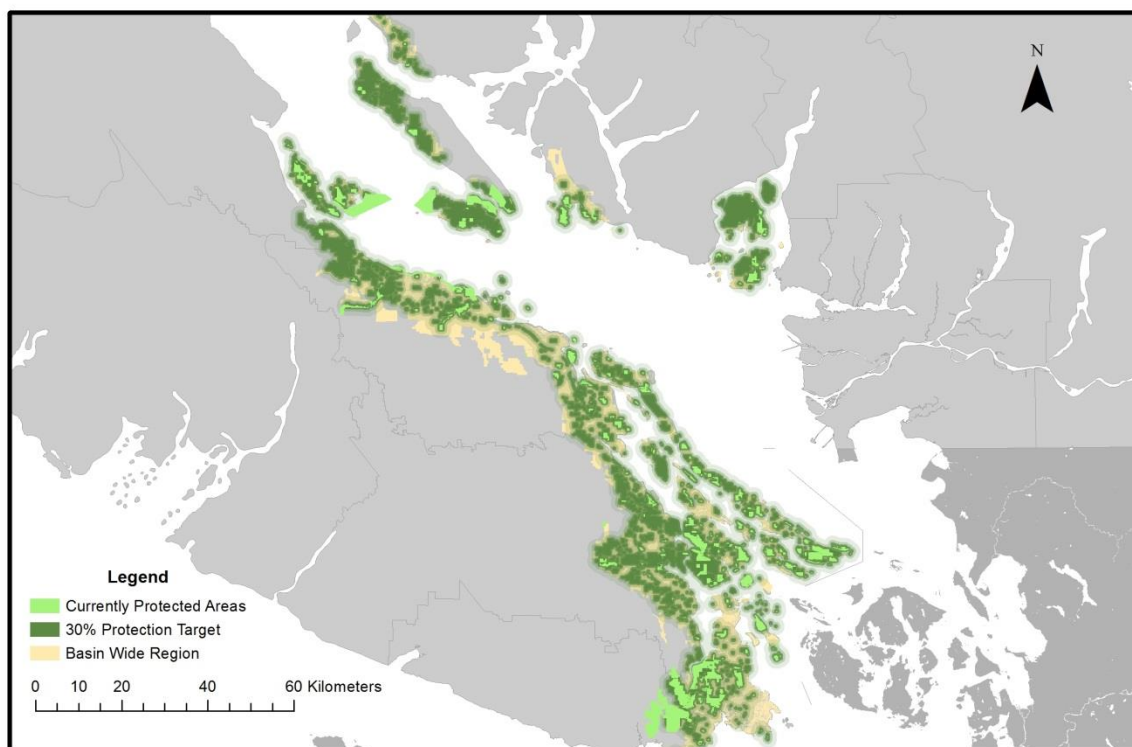
Mapping Analysis

Marxan was used to select conservation focus areas and these focus areas were subjected to post-processing to analyze current land uses using property classes provided by the BC Assessment Authority. The selection targets for Marxan were set at 17%, 30% and 50% as noted in Appendix A. A vast amount of data was provided and is available to the CDFCP and its members; however, to present data in a meaningful and succinct manner, results have been displayed as a number of properties selected for each land use category.

Results

Areas selected as high priority according to 30% protection targets are displayed in Map 2 below. Priority areas included the most northern extent of the CDF Zone in the Regional District of Nanaimo (near Bowser and Combs) and large areas on Texada, Denman, Hornby and Lasqueti Islands. The mid-portions of the CDF around the more urban area of the City of Nanaimo did not contain large priority areas using 30% targets; however, the 50% target analysis did show larger areas of interest in areas near Ladysmith. In the southern regions the areas on Vancouver Island and Salt Spring Island straddling the Sansum Narrows were selected frequently by the Marxan 30% analysis. Also, the saddle of land between the Saanich and Sooke inlets was prominent in the 30% target analysis as were large parts of Galiano and Saturna Islands. Because the parks areas were 'locked in' for the analysis, Marxan built reserve systems using the parks as confirmed protected habitat areas.

CDFCP Basin Areas of Interest

Legend
- Currently Protected Areas
- 30% Protection Target
- Basin Wide Region

0 10 20 40 60 Kilometers

Produced for the Coastal Douglas-fir Conservation Partnership, June 2015

In addition to mapping protection targets at 17%, 30% and 50%, several analyses were performed overlapping the Marxan outputs with land type data from the BC Assessment office. The number of properties, total area, average property size and BC Assessment value obtained using the 17%, 30% and 50% targets is shown below in table 1. Of note is that the number of properties increases dramatically at the 50% target while the average property size decreases.

Table 1. Number of properties, land area and BC Assessment Value obtained using protection targets of 17%, 30% and 50% within the CDFCP study area.

Protection Targets	Number of Properties Selected	Area selected (ha)	Average Property Size (ha)	Total BC Assessment Value ($)
17%	408	18,274	45	157,098,118
30%	1,483	54,526	37	1,057,656,858
50%	9,002	114,218	13	9,855,203,908

The data was also analysed by property assessment class to indicate the type of land use occurring on selected parcels. Because BC Assessment can have several land classes per parcel, to analyse the data assumptions were made to classify properties by one predominant type. These assumptions are provided in Appendix A. In general, where properties had a Private Managed Forest land class or a Farm

Status land class these uses took precedence. In each scenario, residential land classes were predominant; however, these were significantly increased at the 50% protection target where 6,518 or 72% of the properties were classed as residential (Figure X).
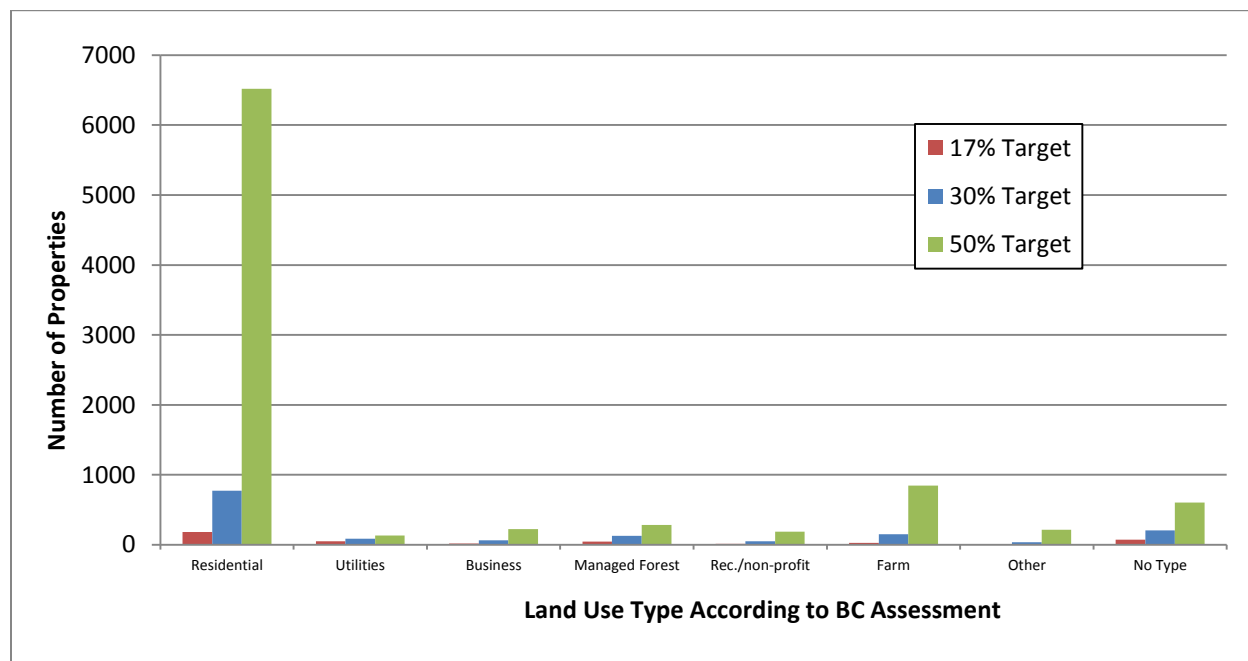
By area, the percent of land in Managed Forest, Farm and Residential use remained reasonably steady with Managed Forest uses between 10% and 13% of the land base, Residential land at between 44% and 50% and active Farm land at approximately 4% to 11% of the land base (Figure X).
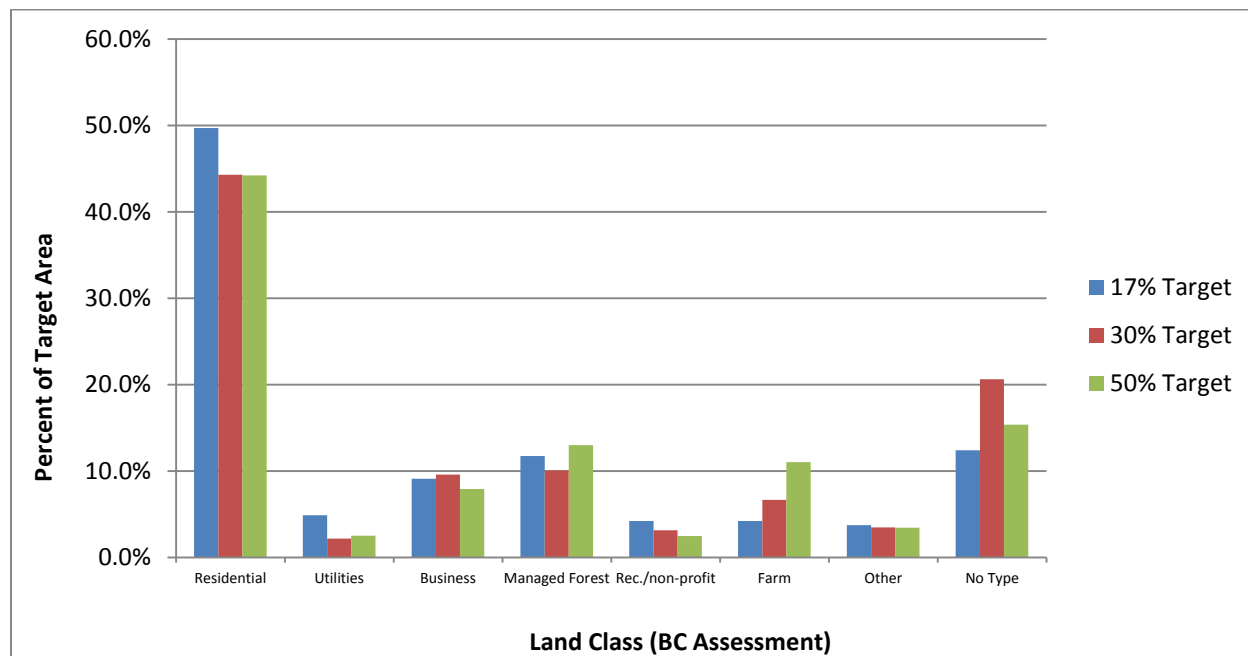
Next Steps

Based on the analysis done to date, the next steps for the CDFCP are to:

- Further refine the data analysed to try to better understand the 'other' and 'no type' BC Assessment classes;
- Some analysis for this project was also done for using the Agricultural Land Reserve as a filter, further work to look at those results is needed;
- Based on the land class breakdown, develop strategies that suit different land uses for application with local governments and landowners; and
- Communication of results to CDFCP partner agencies and local governments.

Local Government Scenarios

Three local governments participated in creating case studies for the CDFCP. The reason for creating these scenarios is to offer some examples of the types of analyses that can be performed by local governments. A comparison of the case studies is shown in Table 2 below and the detailed case studies follow beginning on page 11.

Table 2.

Capital Regional District	
Relevant Planning Documents	Regional Sustainability Strategy

Summary of Objectives	• To identify areas of high conservation value with an understanding of land tenure, acquisition cost and geospatial context in support of:
	  o Assessing conservation value of existing regional park lands.
	  o Completing or rectifying existing regional park boundaries within the CDF and identified in the strategic plan.
	  o Identifying other land parcels of high conservation value for other targeted conservation or stewardship initiatives by municipalities, NGOs or private interests.
	• To explore opportunities for "nature needs half" within the core CRD area (CDF Component) by:
	  o identifying and assessing green space networks including parks, resource lands or other land types.
	  o exploring network connectivity for a system of green space (ecological, social and economic)
	  o identifying data gaps or shortfalls limiting output from existing models

Cowichan Valley Regional District	
The CVRD in in the process of using this and other analysis/ information to build a Regional Conservation Strategy. The targets used have been for planning purposes and do not reflect mandated targets.	
Relevant Planning Documents	Regional Integrated Planning Strategy (Regional Sustainability Strategy 2015 in process) Regional Parks Strategic Plan 2012-2021 Regional Conservation Strategy Official community planning documents (various)

Summary of Objectives	• To identify areas of high conservation value
	• To analyze land tenure of high conservation value lands, to better understand landowner issues, effective communications strategies, potential regulatory mechanisms, acquisition cost and geospatial context in support of:
	  o Assessing conservation value of existing regional and sub-regional park lands.
	  o Locating other land parcels of high conservation value for other targeted conservation or stewardship initiatives by the region, municipalities, NGOs or private interests.
	  o Identifying and assessing green space networks including parks, resource lands or other land types.
	  o Exploring network connectivity for a system of green space (ecological, social and economic)

	o Finding data gaps or shortfalls which limit output from existing models o Integrating conservation issues into regional planning frameworks and strategies • To serve as a pilot to inform green infrastructure, land use planning, stewardship program development and parkland acquisition within the CDF portion of the CVRD Integrated Planning Strategy Area. • To assess the development of preliminary conservation targets for the developed portions of the CVRD.
Islands Trust Fund	
Relevant Planning Documents	Regional Conservation Plan Official community planning documents (various, subject to interest from local trust committees)
Summary of Objectives	To explore areas that are a high priority conservation as defined using 30% protections targets and applying filters weighting lands as follows: • Focus on residential properties • Focus on resource lands • Focus on residential properties, favouring lands that were subdividable • Focus on residential properties, favouring lands that were not subdividable • Focus on resource lands (agricultural & forestry), favouring lands that were subdividable • Focus on resource lands (agricultural & forestry), favouring lands that were not subdividable Within each of these analyses First Nations and Crown lands were either excluded or included. Residential and Resource lands were identified through zoning rather than through BC Assessment data.

These case studies demonstrate that the Marxan tool created by the University of British Columbia can be applied at a variety of scales with a variety of intended results. To provide a context for each local government scenario, Table 3 shows the overlap of each scenario with the CDFCP study area case study. Note that a positive number indicates that the local government area is a greater priority for the CDFCP region than the 30% target applied at the local level suggests.

Table 3.

	Amount of area selected in 30% CDFCP basin-wide analysis (ha)	Amount of area selected in 30% local government scenario (ha)	Difference (ha)
CRD	8,124	13,094	- 4,970
CVRD			
Koksilah Watershed	6,605	7,280	-675
Yellow Point Watershed	875	903	-28
Islands Trust			
Lasqueti Island	4,980	1,954	3,026
Salt Spring Island	6,938	5,629	1,309

Capital Regional District (CRD) Local Government Scenario

Relevant Planning Document:
Regional Sustainability Strategy

Background:
The Capital Regional District Growth Management Planning Area is composed of 13 municipalities and the Juan de Fuca Electoral Area. The region encompasses almost 200,000 hectares of land and is characterized by two major biogeoclimatic zones. The Coastal Douglas-fir zone describes most of the land east of a line from Beecher Bay to the Saanich Inlet. The western part of the region is predominately within the Coastal Western Hemlock biogeoclimatic zone with pockets of the Mountain Hemlock zone at higher elevations. The Capital Regional District is responsible for many services including regional planning and the management and operation of the regional parks system.

Under the proposed Regional Sustainability Strategy, the "nature needs half" concept is proposed as a means to conserve the healthy natural environment needed to support human health and well-being, plant and animal health, and to anchor a vibrant regional "green" economy. The concept of core protected areas integrated with the rest of the landscape through natural area buffers and corridors and green linkages is fundamental to this approach. This "green infrastructure" can be composed of park lands, resource lands, agricultural lands urban parks and other green spaces. In addition to the role of protected areas management, land stewardship is critical across the landscape and in particular on private lands that can provide complimentary high conservation value.

The Marxan analysis generated by the CDFCP provides an objective approach to analysing large amounts of data across the landscape to identify important conservation values. These values are assigned to land parcels which can then be identified for targeted protection and/or stewardship initiatives. Program outputs will be useful to support and inform decision making but the analytical process is equally important moving forward as new information feeds into the model and parameters are adjusted to highlight different management foci. This active process highlights the value of a user interface through the UBC Server. These products and processes will be critical in designing and securing protected area networks and for working with landowners to identify and value important natural features on a range of land tenures.

Objective of Marxan Analysis:
- To identify areas of high conservation value with an understanding of land tenure, acquisition cost and geospatial context in support of:
    - Assessing conservation value of existing regional park lands.
    - Completing or rectifying existing regional park boundaries within the CDF and identified in the strategic plan.
    - Identifying other land parcels of high conservation value for other targeted conservation or stewardship initiatives by municipalities, NGOs or private interests.
- To explore opportunities for "nature needs half" within the core CRD area (CDF Component) by:
    - identifying and assessing green space networks including parks, resource lands or other land types.

- o   exploring network connectivity for a system of green space (ecological, social and economic)
- o   identifying data gaps or shortfalls limiting output from existing models

Results of Analysis:

Preliminary analysis has been done toward achieving some of the objectives above. Additional work will continue on increasing confidence in these data. However, CRD Parks has already been utilizing the Marxan output and the interactive Marxan Server created through the CDFCP for the purposes of designing and updating a park land acquisition strategy (in progress). In assessing the conservation value of existing regional park lands, the Marxan analysis was repeated with park lands locked into the solution and then with park lands available on the landscape for selection but not locked into the solution. By comparing these analyses we were hoping to determine the overall conservation value of existing regional park lands in the context of the larger landscape. Preliminary results indicate that our existing park lands in the CRD provide a combined conservation value achieving 23% of the 30% target. When parks are not locked into the solution, this combined conservation value drops to approximately 20% as more high value lands outside of parks are selected preferentially. Further work is required to better understand these results. This analysis and planned future work will assist us in completing existing regional park boundaries within the CDF and identified in the strategic plan. More broadly, the analysis outside of existing parks will help managers to identify other land parcels of high conservation value for other targeted conservation or stewardship initiatives by municipalities, NGOs or private interests.

To explore landscape conservation patterns and opportunities for "nature needs half" within the core CRD area (CDF Component) our analysis also investigated a 50% conservation target for key features both inside and outside of park lands. This investigation is ongoing and will help in identifying and assessing green space networks including parks, resource lands or other land types throughout the core CRD area to explore potential network connectivity and system planning for green space (ecological, social and economic).

Next Steps:

Both of the land selection models described above will be assessed to identify data gaps or shortfalls limiting output from existing models. These outputs are in support of decision making and will be complimentary to other techniques for assessing conservation values in the region. Over half of the CRD landscape is not considered within the CDF zone. However, these techniques for landscape evaluation can be applied across a larger landscape if the appropriate data are acquired. The lessons learned in this current initiative will be helpful in directing future landscape analyses and planning for the CRD.

Additional information on the landscape will augment any future analysis. There is potential to incorporate other spatial data to evaluate other factors like recreation and social needs, connectivity, complementary land uses etc. The support and collaborative sharing through the CDFCP in both technical expertise and integrated land management lead toward consistent and coordinated land use policies across the area of conservation interest. This is a good model to promote these approaches across a broader landscape toward accomplishing protection and land stewardship goals.

Cowichan Valley Regional District

Relevant Planning documents:
- Regional Integrated Planning Strategy (Regional Sustainability Strategy 2015 in process)
- Regional Parks Strategic Plan 2012-2021
- Regional Conservation Strategy
- Official community planning documents (various OCP's)

Background:
The Cowichan Valley Regional District (CVRD)'s Regional Integrated Planning Strategy Area is composed of four (4) municipalities, nine (9) electoral areas and thirty-four (34) First Nations reserves. The region encompasses more than 3,473 square kilometers stretching from the Pacific Coast to the Strait of Georgia, and includes the southern Gulf Islands of Penelakut, Thetis and Valdes. The CVRD is made up of four municipalities – City of Duncan, Town of Lake Cowichan, District of North Cowichan and Town of Ladysmith – and nine electoral areas. The CVRD land base is part of the traditional territories of several First Nations, Including the Cowichan people, Chemainus, Penelakut, Lyackson, Halalt, Malahat, Pauquachin, Lake Cowichan and Ditidaht First Nations. Traditionally, these First Nations occupied overlapping, ecologically based territories that included the Salish Sea and the Fraser River. The landscape was a source of both spiritual and physical nourishment.

The CVRD contains a range of rare, sensitive and keystone ecosystems that have very high ecological and social values. It is characterized by wide diversity in all its major biogeoclimatic zones and includes some of the wettest areas in the province on its western coastal boundaries and some of the driest areas in the province in its more populated eastern zones. Most of the land along the developed eastern boundary is within the Coastal Douglas-fir (CDF) zone. This area contains the majority of the region's population and transportation corridors. The western part of the region is predominately within the Coastal Western Hemlock (CWH) biogeoclimatic zone, with pockets of the Mountain Hemlock (MH) and Coastal Mountain –heather Alpine (CMA) zones at higher elevations. Lake Cowichan, which straddles the central zone, provides a substantial modifying element to the region's ecological systems. The lake and the Cowichan River which contribute flow to the Cowichan estuary are a source of water in the xeric eastern area of the CVRD. The river's abundance is a key biological driver, adding phosphorus and nitrogen inputs to the adjacent ecological areas. The historic First Nations use of fire and active ecosystem management in the CDF has defined many of the remnant biologically rich communities still found in this area.

Under the currently developing Regional Integrated Planning Strategy, the development of a conservation strategy is proposed as a means to maintain a healthy natural environment needed to support human health and well-being, plant and animal health, and to anchor a vibrant regional "green" economy. This perspective embraces the concept of core protected or managed areas integrated with the rest of the landscape through natural area buffers, corridors and green linkages and, where necessary, ongoing anthropogenic management to maintain desired ecological structure and values. The plan will also include the wider concept of "green infrastructure" which has a multitude of values

including provision of ecosystem services (freshwater, air and waste cycling) as well as water management and social needs and at its optimum will add to the regions climate resilience in the face of climate and ecosystem altering futures. These critical areas can be composed of park lands, resource lands, agricultural lands, urban parks and other green spaces and includes as a necessity private lands. The role of protected areas management and private land stewardship is critical across the landscape, particularly on those lands that are complimentary to high conservation value as part of a system wide conservations strategy.

The Marxan analysis provides an objective approach to analysing large amounts of data to identify these important values across the landscape. The products/outputs will be useful to support and inform decision making, establishing regional targets, identifying the wide array of stakeholders and parties that should be involved in a long term functional and integrated conservation strategy to meet the regionals objectives which are yet to be fully established.

The analytical process behind the model is equally important as new information feeds into the model and parameters are changed to highlight different foci, it is unclear at this time what the opportunities and issues arising from refining input data may be. This will be a large component of ongoing model refinement over time. These products and processes will be critical in working with landowners to identify and value important natural features on different land tenures and to ensure that the products are refined as necessary.

Objective of Marxan Analysis:

The CVRD in in the process of using this and other analysis/ information to build a Regional Conservation Strategy. The targets used have been for planning purposes and do not reflect mandated targets.

- To identify areas of high conservation value
- To analyze land tenure of high conservation value lands, to better understand landowner issues, effective communications strategies, potential regulatory mechanisms, acquisition cost and geospatial context in support of:
  - Assessing conservation value of existing regional and sub-regional park lands.
  - Locating other land parcels of high conservation value for other targeted conservation or stewardship initiatives by the region, municipalities, NGOs or private interests.
  - Identifying and assessing green space networks including parks, resource lands or other land types.
  - Exploring network connectivity for a system of green space (ecological, social and economic)
  - Finding data gaps or shortfalls which limit output from existing models
  - Integrating conservation issues into regional planning frameworks and strategies
- To serve as a pilot to inform green infrastructure, land use planning, stewardship program development and parkland acquisition within the CDF portion of the CVRD Integrated Planning Strategy Area.
- To assess the development of preliminary conservation targets for the developed portions of the CVRD.

Results of Analysis:

As no wide or structured input into establishing regional targets has been undertaken preliminary numbers (targets) have been used. These targets are based on the lower end of the CRD and Island Trust targets under their Nature needs half strategy and analysis of 30% and 50% as they have a substantially different ecological, land tenure and political framework in which they are working. In addition given the large percentage of First Nations lands, well as agricultural and forestry lands over which the regional has little or no jurisdiction a lower preliminary target was established to assist with preliminary discussion with the range of stakeholders involved.

At this preliminary stage

- CVRD used 17% and 30% targets as test numbers based on the federal target of 17% and the adjacent local government partner's lower range target numbers of 30%.

Comparison between CDFCP scenario and Local Government Scenario:

- Similarities & differences
  - The CDFCP scenarios maximized the land for a number of variables which will likely ultimately skew the analysis, the depressed valuation of land in agricultural and forestry zones may artificially reduce the cost variables which underlie the modeled output and optimization
  - Large areas which are likely politically unfeasible are included in the optimization in both scenarios but can be more easily refined at the local level given the range of constraints. Local scenarios used a much smaller minimum size to reflect the likely range of opportunities for stewardship over land acquisition programs in support of the objectives. First Nations lands were also excluded from the local scenario as they are not under control or management of local governments.
- Does the analysis work at this scale?
  The Marxam analysis is appropriate a very high level strategically and spatially for preliminary discussion purposes at this time. Given the tool's methodology it is easily used as a mechanism for further target setting and landscape level discussions at the regional level without excluding participants further input.

Next Steps:

- Evaluate potential uses of this information and decide on potential variations that should be assessed.
- Evaluate other input variables that are or might be available to increase the value of the existing outputs.
- Field test and verify the outputs and their ability to meet a range of diversity scores and variables.
- Post Processing

- Overlay the information with other spatial data to determine sites that are important in multiple analyses (recreation and social needs, connectivity, complementary land uses, natural capital evaluations)
- Incorporate marxan approach toward development of a region-wide landscape analysis
- Provide information about CDFCP Marxan outputs to inform the Regional Integrated Planning Strategy
- Identify areas in which other adjunctive strategies are currently being developed (invasive species and species at risk strategies, acquisition strategies etc.)
- Provide support and/or data products to other interests in the CVRD toward accomplishing protection and land stewardship goals.

Islands Trust Area

Relevant Planning Document:
Regional Conservation Plan with possible application to local trust area Official Community Plans and Bylaws as determined by relevant local trust committees.

Background:

The Islands Trust Area is composed of over 13 major islands and over 650 smaller islands in the Salish Sea. The region is entirely within the Coastal Douglas-fir and Associated Ecosystems Conservation Partnership (CDFCP) area of interest and constitutes approximately 25% of the Coastal Douglas-fir biogeoclimatic zone. The Islands Trust Fund, which is the land conservancy legally associated with the local government (Islands Trust), undertakes conservation planning for the region and works to secure important conservation lands through acquisition and conservation covenants. Acquired properties are managed as nature reserves. The Islands Trust Fund currently manages 26 Nature Reserves and 70 conservation covenants constituting over 1,145 hectares.

As part of its conservation planning work, the Islands Trust Fund was interested in exploring high priority conservation lands according to land tenure. The theory behind the analysis is that the techniques and approaches for working with landowners with important natural features will vary according to the use of the land. Land tenure categories used for the analysis included: residential, resource (forestry and farms) and Crown. These categories were sourced from Islands Trust zoning layers and land tenure classes. As an added filter, subdivision potential was incorporated into the analysis to look at lands within the resource and residential classes that had high potential for development.

Objective of Marxan Analysis:

To explore areas that have a high conservation priority as defined using 30% protections targets and applying filters to focus the analysis as follows:

- Focus on residential properties
- Focus on resource lands
- Focus on residential properties, favouring lands that were sub-dividable
- Focus on residential properties, favouring lands that were not sub-dividable
- Focus on resource lands (agricultural & forestry), favouring lands that were sub-dividable
- Focus on resource lands (agricultural & forestry), favouring lands that were not sub-dividable

Within each of these analyses First Nations and Crown lands were either excluded or included. Residential and Resource lands were identified through zoning rather than through BC Assessment data.

Results of Analysis:

To accommodate the Islands Trust Fund analysis, servers were built for each of the Islands Trust area major islands. Zoning and land use were also built into the server for the Marxan analysis, rather than being added during post-processing. The scenario generated as an example for the Islands Trust Fund was for Salt Spring Island, although with the servers now set up, scenarios for other islands could be easily completed.

Generally the optimal results for the 30% protection targets were in the range of 5,029 – 5,410 ha for Salt Spring Island; however, the ranges for the number of properties affected varied by about 120 properties depending on the focus of the scenario (see Table 4 below). Generally a focus on resource properties seemed to lessen the number of properties affected in the analysis, suggesting that protection targets might be met more efficiently if it were possible to work with landowners of agricultural or forestry lands on Salt Spring Island. Note that this data is preliminary and requires further investigation to determine if the selected properties are appropriate for conservation.

Table 4. Number of Properties and Area (ha) selected by using a 30% protection target with a focus on residential or resource lands on Salt Spring Island within the Islands Trust area.

Type of Scenario	Salt Spring Island	
	Number of Properties	Area Selected (ha)
Preference to residential properties	486	5,029
Preference to resource properties	383	5,048
Preference to non-subdividable residential properties	377	4,702
Preference to subdividable residential properties	479	4,945
Preference to non-subdividable resource properties	361	4,736
Preference to subdividable resource properties	392	5,083

Next Steps:

- Evaluate potential uses of this information and decide on potential variations that should be assessed
- Overlay the information with available Islands Trust conservation priority mapping to determine sites that are important in multiple analyses
- Incorporate review of CDFCP Marxan information into the Regional Conservation Plan
- Provide information about CDFCP Marxan runs to Island Planners as they are preparing reviews of Official Community Plans and Land Use Bylaws.