Model Bylaws for the Protection of Garry Oak & Associated Ecosystems

A Guide for Local Governments, a Reference for First Nations

Garryoak ecosystems recovery team

March 2014
www.goert.ca

Project Manager

Holly Clermont

Sample Bylaw Wording

Deborah Curran

Contact

All correspondence with respect to *Model Bylaws for Garry Oak and Associated Ecosystems* should be directed to:

Garry Oak Ecosystems Recovery Team
841 Ralph Street
Victoria, British Columbia
V8X 3E1 Canada
Email: info@goert.ca
Phone: 250-383-3427

Citation

Garry Oak Ecosystems Recovery Team. 2014. *Model Bylaws for the Protection of Garry Oak and Associated Ecosystems*. Victoria, B.C. 187 pages. (Version 1.0)

Disclaimer

The model bylaw provisions are for information only. They demonstrate a range of approaches that can be tailored to each local government's specific ecosystem conditions, administrative capacity, and political willingness to protect at-risk ecosystems and species. Please consult qualified legal counsel to adapt bylaws to your specific circumstances.

Relationship to the Green Bylaws Toolkit

Model Bylaws includes sample bylaw provisions and supporting information adapted from local government bylaws in use across British Columbia (B.C.) and some other Canadian jurisdictions. Originating in the *Green Bylaws Toolkit* (Wetland Stewardship Partnership 2007), available at www.greenbylawstoolkit.org, they have been adapted (with permission) specifically for the protection of Garry Oak and associated ecosystems. The bylaw approaches of various local governments have been strengthened to offer more fulsome protection for terrestrial species.

Species at Risk

The intent of these bylaws is to have the term "species at risk" (SAR) defined broadly to include more than those species that are listed under the federal *Species at Risk Act* (SARA, S.C. 2002, c.29) as Threatened, Endangered or Extirpated. For the purposes of these bylaws, SAR also includes Red and Blue-listed species as defined by the B.C. Conservation Data Centre, threatened and endangered species under the B.C. *Wildlife Act*, and other at-risk species.

Organization of this Document

Chapters 1 and 2 provide the rationale for protecting Garry Oak and associated ecosystems, and can be used to outline and strengthen justification sections in various bylaws. Chapter 3 provides an overview of jurisdiction and authority. Chapter 4 outlines a planning hierarchy - a series of principles to guide all efforts to protect of Garry Oak and associated ecosystems. Chapters 5 through 16 address specific bylaws and important processes that influence land use, such as subdivision and regional biodiversity conservation strategies. These chapters are partitioned into sections; an introductory section is followed by Triggers, Content, Sample Bylaw Wording, Challenges and Opportunities, and in some cases, Additional Resources. Chapter 17 addresses Other Modes of Protection, such as the Ecological Gifts Program. Chapter 18 is a comprehensive Resource Guide providing essential information for selecting, commissioning and using ecosystem mapping, site surveys and inventories, and SAR surveys and mapping.

Acknowledgements

Model Bylaws for the Protection of Garry Oak and Associated Ecosystems (hereinafter *Model Bylaws*) arose from a 2007 project generously supported by the Real Estate Foundation of B.C., Parks Canada, B.C. Ministry of Environment and the Habitat Stewardship Program. Garry Oak Ecosystems Recovery Team (GOERT) worked with City of Colwood and City of Langford senior planners during their Official Community Plan review process. Our Conservation Planning and Site Protection (CPSP) Recovery Implementation Group (RIG) identified priority sites within the municipalities based on their ecological values and level of threat, and these were then surveyed and mapped by SAR consultants and GOERT staff. A detailed report was prepared, suggesting best practices and policies to strengthen the protection of Garry Oak and associated ecosystems and species at risk. Deborah Curran, LL.M., provided legal advice and developed model bylaw provisions. Curran specializes in providing legal advice to local governments and community organizations in the areas of smart growth land development and urban sustainability.

Since that time, excerpts from the provisions have been provided to the City of Courtenay, Town of Comox, and District of Central Saanich.

Model Bylaws builds upon the original provisions and incorporates the knowledge and experience of numerous practitioners to provide an updated practical guide for all local governments within the range of Garry Oak and associated ecosystems. Holly Clermont, Project Manager, worked with Deborah Curran and other GOERT staff (Shyanne Smith, Carolyn Masson, Chris Junck, Kathryn Martell and Todd Kohler), CPSP RIG members and other reviewers to develop what we hope is a comprehensive and useful resource for local governments and First Nations.

Many of the ideas and recommendations presented herein were adapted from the Conservation for Local Governments workshop hosted by the B.C. Ministry of Natural Resource Operations (now Ministry of Forests, Lands and Natural Resource Operations (MFLNRO)) on March 3, 2011 in Nanaimo (presentations by Marlene Caskey, Margaret Henigman, Jan Kirkby (Canadian Wildlife Service),

and Bill Huot (Ministry of Community, Sport and Cultural Development)); the Association of Professional Biologists Land Development Workshop (presentations by Mark Holland (formerly HB Lanarc), Jan Kirkby, Rob Lawrance (City of Nanaimo), Kathy Dunster (consultant), and Susan Blundell (Encon)) on May 4, 2011; and three GOERT Connectivity Conservation dialogue sessions held February 22-24, 2012 (presentations by Patrick Yarnell (Parks Canada), Ken Brock (Canadian Wildlife Service), Ken Cossey (Songhees First Nation), Matt Fairbarns (SAR botanist), Kari Nelson (Ministry of Environment (MoE)), Brenda Costanzo (MoE), Jenny Heron (MoE), Tracy Fleming (Cowichan Tribes), Luschiim Arvid Charlie (Cowichan Tribes), Drew Mildon (Woodward and Company) and dialogue from participants). We also appreciate Chris Midgley's (Regional District of Nanaimo) help with "Links to Sustainability", and the assistance of Carmen Cadrin (MoE) and Andy MacKinnon (MFLNRO) regarding "Classification of Garry Oak and Associated Ecosystems". Darren Copley and Adriane Pollard (District of Saanich), Rob Lawrance, and Bryn White South Okanagan-Similkameen Conservation Program (SOSCP)) provided text and photos for the " Spotlight" story pages.

We are especially grateful for the efforts of reviewers Jan Kirkby, Adriane Pollard, Alison Garnett (Cowichan Valley Regional District), Rob Lawrance and Ken Cossey. Although these reviewers provided many constructive comments and suggestions, they were not asked to endorse the document, nor did they see the final draft of the report before its release.

To ensure accuracy, any text in *Model Bylaws* that has been borrowed from web sites is provided with little modification from its original form, with links to the source text and related information. Other sources are cited at the end of the document.

TABLE OF CONTENTS

1.0 THE IMPORTANCE OF MODEL BYLAWS

Left: Building lot on Triangle Mountain;
Middle: Camas (Camassia sp.) and Sea Blush (Plectritis congesta)
Right: Camas bloom (Photos by Chris Junck)

This is a pivotal time in history, as an increasingly global community confronts the dual challenges of climate change and the widespread collapse of ecosystems.

> *"Humanity has fabricated the illusion that somehow we can get by without biodiversity or that it is somehow peripheral to our contemporary world: the truth is we need it more than ever on a planet of 6 billion [people], heading to over 9 billion by 2050," said...the executive director of the United Nations Environment Programme (UNEP). "Business as usual is no longer an option if we are to avoid irreversible damage to the life-support systems of our planet" (UN News Centre 2010).*

The overarching purpose of this document is to ease the process for local governments and First Nations to regulate the protection of some of the most imperiled ecosystems on Earth. Governments are often asked to balance environmental protection with other interests. Yet with more than 95% of Garry Oak and associated ecosystems in Canada already degraded or lost to other uses, a balance is no longer possible. When used collectively, *Model Bylaws* will help prevent the piecemeal loss and degradation of remnant Garry Oak and associated ecosystems and the Species at Risk (SAR) therein. Conserving this biodiversity will, in turn, increase our capacity for adaptive responses, and strengthen ecological, social, and economic resilience in a rapidly changing world (Cornell, Wetterstrand and Hermansson Török [editors] 2013).

2.0 A RATIONALE FOR PROTECTING GARRY OAK AND ASSOCIATED ECOSYSTEMS

2.1 Distinctive Diversity

Left: Deep soil woodland/parkland;
Middle: Shallow soil woodland/Coastal Bluff;
Right: Maritime Meadow associated ecosystem (Photo by Leah Ramsey)

Majestic oaks, dazzling displays of wildflowers, mossy outcrops - Garry Oak and associated ecosystems delight and soothe the human spirit. Beyond their aesthetic values, these ecosystems are home to more plant species than any other terrestrial ecosystem in coastal British Columbia. Some 1600 species, including 700 plant species, more than 100 species of birds, 7 amphibians, 7 reptiles, 33 mammals, and at least 800 invertebrates are found here. Many of these species occur nowhere else in Canada.

After visiting several Garry Oak and associated ecosystems, you may marvel at how different they appear from site to site. Garry Oak woodlands may be found as open parkland with Garry Oak *(Quercus garryana)* trees, a sparse shrub layer and a diverse herb layer. They may also present a nearly closed canopy over a patchy mix of shrub thickets and meadow openings, with or without Arbutus *(Arbutus menziesii)* and Douglas-fir *(Pseutotsuga menziesii)* trees. And areas of open grasslands with widely scattered oak trees are characterized as oak savannahs.

Interspersed among Garry Oak ecosystems, or found as isolated fragments, are other ecosystems that support many of the same plant and animal species, but have very few or no Garry Oak trees. These *associated ecosystems*[1] include maritime meadows, seasonal pools and seeps, rocky habitats such as coastal bluffs and rock outcrops, and former oak ecosystems that are becoming dominated by other tree species. **For the remainder of this document, the term Garry Oak ecosystems includes associated ecosystems unless otherwise specified.**

2.2 Heritage Values

When Europeans first arrived in the area in the 1800s, the vista was quite different than it is today. Within the mild, winter-wet and summer-dry rain shadow of the Olympic and Vancouver Island mountains, Garry Oak ecosystems were a dominant feature on the low elevation (sea level to ~550 m) coastal landscape (Erickson and Meidinger 2007).

Many Garry Oak ecosystems were carefully managed by Aboriginal People. Fire was used to maintain open meadows to support the growth of edible and medicinal plants and forage to attract deer and elk. Areas were harvested, replanted and otherwise tended to maximize the production of camas, chocolate lilies *(Fritillaria lanceolata)*, and other preferred species. Camas bulbs were part of a durable nature-based economy; these and other bulbs were formally exchanged to enhance social, economic and political standing (cf. Deur and Turner 2005). The ecosystems were also used in First Nations' governance practices, inspiring stories about peace-making and peace-keeping between families and larger groups (Acker 2012).

2.3 Rarity

In Canada, Garry Oak ecosystems occur in British Columbia on southeastern Vancouver Island, the Gulf Islands, Savary Island and on two isolated sites on the Lower Mainland (Figure 1).

---

[1] See GOERT's Best Management Practices for an overview of associated ecosystems, at www.goert.ca/documents/GOERT-BMPs-v1.1.pdf

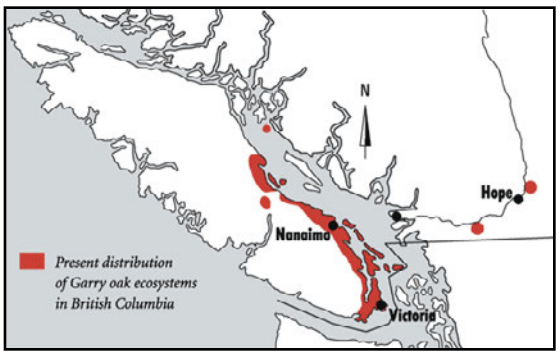
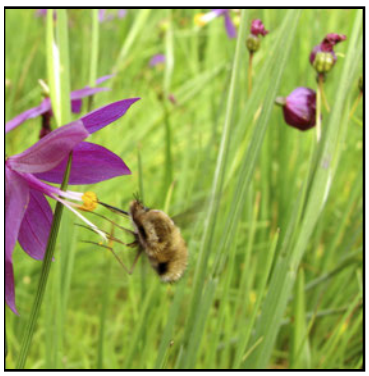


Figure 1. Present coarse-scale distribution of Garry Oak ecosystems in B.C.. Many of the ecosystems within this distribution have been destroyed, altered, fragmented and otherwise degraded. Map © Province of British Columbia.

Garry Oak ecosystems form part of the Coastal Douglas-fir (CDF) biogeoclimatic zone, the smallest (< 1% of B.C.) and most vulnerable (i.e., classified as imperiled) of British Columbia's 14 ecological zones (Austin et al. 2008). Today cities, towns and agricultural lands blanket the landscape where these ecosystems once thrived. Less than 5% of Garry Oak ecosystems in Canada remains in near-natural condition, and of these, most are fragmented by settlement and transportation infrastructure. Many are degraded by human activities and invasive species (Lea 2006).

Fragmented and degraded ecosystems were once considered to be of poor quality and were deemed expendable. For some Garry Oak ecosystems today, these parcels represent all that is left. Degraded sites may be worthy of restoration, and fragments may be vital stepping stones to other habitats.

To re-create these ecosystems once destroyed is an impractical goal. No one has successfully re-created an ecosystem. Sometimes, with a great deal of money and effort, surrogate ecosystems have been manufactured (e.g., artificial wetlands). It is far better to protect what we have.



Left: Bee fly (Bombylius sp.), a pollinator that relies on imperiled and critically imperiled Garry Oak ecosystems, on Satinflower (Olsynium douglasii) (Photo by Todd Carnahan);

Middle: Juvenile Sharp-tailed Snake (Contia tenuis), a provincially Red-listed and federally Endangered species that consumes garden slugs (Photo by Kristiina Ovaska);

Right: Yellow Montane Violet (Viola praemorsa ssp. praemorsa), provincially Red-listed and federally Endangered. (Photo by Chris Junck)

The extent of sensitive[2] ecosystems correlates closely with the habitats of at-risk species. At the time of this writing, there were more than 100 provincially Red and Blue-listed SAR, including more than 50 species nationally designated at risk (i.e., more than 40% of federally listed species in Canada) are at least partly dependent on Garry Oak ecosystems for their continued survival. The B.C. Conservation Data Centre (B.C. CDC) and the Committee on Endangered Wildlife in Canada (COSEWIC) are the provincial and federal listing agencies, respectively.

The range for Garry Oak ecosystems extends into Washington, Oregon and northern California. Garry Oak are known as Oregon White Oak in these areas, and ecosystems and associated SAR are facing challenges similar to those in B.C..

2.4 Ecosystem Services

Without protection, restoration and management, Garry Oak ecosystems and their species face a grim future. Why does this matter? For one thing, they are tied to our quality of life. Ecosystems provide services such as pollination, pest and disease regulation, nutrient cycling, filtering of pollutants from air and water,

[2] A sensitive ecosystem is an ecosystem that has been provincially designated as at-risk of extinction and/or is ecologically fragile and vulnerable to disruption by human-caused effects (B.C. Ministry of Environment 2006).

carbon sequestration and so on, that enable our well-being and survival. It is widely accepted that biodiversity contributes to the provision of ecosystem services. However, the mechanisms by which this happens are not fully understood (Cardinale 2011). Increasingly, there are examples where incremental destruction and degradation have caused productive ecosystems to "flip" into undesirable states upon reaching unanticipated thresholds. Coral reef ecosystems have transformed to algal ecosystems, lakes have grown stagnant, and agricultural fields have become saline (Walker and Salt 2006). At less than 5% of their former range, Garry Oak ecosystems are certainly near their functional limits.

Aside from the dire economic consequences of ecosystem collapse, safeguarding the remnants of these special places, and restoring others to their former glory have more immediate tangible monetary values. Ecosystem services have been valued at approximately $3,958 per hectare for ecosystems in the Lower Fraser Valley and its upper watersheds, for example (Suzuki Foundation 2010). In the Puget Sound region, a loss of 35% of tree canopy coverage over a 25 year period was estimated to be worth US$95 million; this canopy would have removed 13 million kg of pollutants from the atmosphere annually (American Forests 1998). By comparison, Colwood experienced a decrease of 46.7%, and Sidney had a 55.5% decrease in tree cover density between 1986 and 2005 (Urban Forest Stewardship Initiative 2008).

Properties adjacent to green space and properties with trees are worth up to 21% more than properties without these assets (Quayle and Hamilton 1999). Properties near protected green space tend to sell more quickly. When buildings are clustered to protect natural areas, there are often significantly lower costs for land clearing and infrastructure. Green space, environmental protection and recreation opportunities are features that help to attract new business to a community. Office workers with a view of green space experience greater job satisfaction and productivity than colleagues with no such view. In fact, there are a host of social benefits linked to natural ecosystems, including health and happiness.

2.5 Threats

Left: Residential development; Middle: All-terrain vehicles; Right: Invasive species

Consistent with trends in coastal ecosystems around the world, the primary threat to Garry Oak ecosystems has been direct destruction and indirect damage resulting from land development. Protected sites are burdened by recreational pressures and threats along their borders, such as changes to hydrological patterns and dumping of garden waste. The invasion of exotic grasses, forbs, shrubs, and animals is a pervasive threat. Herbivory and spread of invasive plants by introduced species such as rabbits, Canada Geese *(Branta canadensis)*, feral deer and goats, as well as by native deer, threaten a number of sites. Fire suppression continues to change Garry Oak stand structure and associated plant community composition, resulting in increased shading, thatch accumulation (i.e., a matted layer of dead stalks), and encroachment of shrubs and trees. Destruction and degradation of nearby forested habitats adversely affect Garry Oak ecosystems, by introducing or increasing the aforementioned threats and by disrupting species that use both types of habitats.

Some threats are more specific to individual species or species groups. An insufficiency of large and decaying trees near open forests and grasslands is believed to be partly responsible for the extirpation from B.C. of the Georgia Depression populations of Lewis' Woodpecker. Pesticide use has affected butterfly populations. Other specific threats, together with recommendations to manage and restore threatened populations, are identified in recovery plans and other documents for SAR.

There are also social threats to Garry Oak ecosystems, as too few appreciate the intrinsic, aesthetic and ecological values of these special places. Sensitive ecosystems and SAR are sometimes perceived as problems that must be quickly solved to allow development to proceed (Tarlock 1993). Many landowners prefer landscaped and manicured yards over natural ones. Covenants to protect ecosystems may reduce, rather than increase the assessed price of a property.

2.6 Climate Change

Climate change is expected to profoundly influence ecosystem dynamics such as soil moisture regimes, the spread of invasive species, and the scope and types of natural disturbances. Shifts in species ranges will disaggregate existing ecosystems, leading to the formation of novel ecosystems or possibly to the collapse of ecosystems already stressed by other factors.

Garry Oak ecosystems in B.C. are at the northern extent of their range, which extends south into California. Peripheral ecosystems such as this are bastions for the long-term survival of species whose core ranges have collapsed due to environmental changes (Gibson et al. 2009), and in fact, species at the edge of their ranges may be most suited to establishing in new habitats created by a changing climate (Fraser 2002). While climate models indicate that Garry Oak ecosystems could expand substantially (Wilson and Hebda 2008), this expansion will depend upon the viability of source habitats. Ecosystems that have lost key components, or are small and isolated may not be viable. By preserving the integrity of Garry Oak ecosystems, we are maintaining a measure of resilience and adaptability, keeping our options open for the future.

Garry Oak Ecosystems and CDF Forests

A rather perplexing challenge in protecting and restoring many Garry Oak ecosystems is their propensity to transform into forested ecosystems as a result of natural succession. Some suggest that management to prevent conifer encroachment into Garry Oak ecosystems is unnatural, and that succession towards a climax conifer forest should proceed without human intervention. However, the notion of a single climax ecosystem has accompanied the demise of the concept of equilibrium, or a single stable state; it is now widely accepted that ecosystems can have more than one stable state (Cumming 2011; Holling 1973). There is also much evidence that the notion of a completely natural or "pristine" ecosystem is a distortion of reality; First Nations, which inhabited Vancouver Island for thousands of years prior to European colonization, consciously shaped coastal ecosystems (Dudley 2011). Today, manipulation of ecosystems occurs for many reasons - to maximize productivity, enhance habitat for wildlife, or preserve ecosystem services for example.

There is also a concern that the protection of Garry Oak ecosystems will come at the expense of forested ecosystems that are equally at risk. Ancient CDF forests, with untold numbers of invertebrates and microorganisms, are at the brink of extinction, for example. Safeguarding and carefully monitoring *all* at-risk ecosystems is prudent.

3.0 JURISDICTION AND AUTHORITY

Left: Mill Hill Regional Park, Langford;
Middle: Garry Oak at Bear Mountain interchange;
Right: Langford SAR surveys (Photos by Chris Junck)

3.1 First Nations and the Land Code

This document has been developed primarily as a resource for local governments, yet it would be amiss to fail to acknowledge its potential use by First Nations. On reserve lands, First Nations that have developed their own Land Code now have the authority to enact laws with respect to land, the environment and resources (except oil and gas, uranium and radioactive minerals, fisheries, endangered species and migratory birds).

At long last, First Nations have the ability to employ local government-type planning initiatives and tools, as the Land Code is much like Part 26 (Planning and Land Use Management) of the *Local Government Act* [RSBC 1996]. Planners and land managers, among others, are tasked with releasing the development potential of First Nation lands and also with protecting the lands from development; whereas local governments have been attempting to balance these tasks for decades, reserve lands are available for the very first time.

Due in part to a lack of authority but also because of a traditional ethic of respect for the land and its offerings, some of the best examples of Garry Oak ecosystems occur on these lands. First Nations are challenged not only with the stewardship

of these ecosystems, but also with housing shortages and a recognition that many others have chosen to develop rather than protect most of these ecosystems, among other things. For First Nations, *Model Bylaws* is an offering designed to help with the tough decisions that lay ahead, in hope that they will be able to find the formula whereby sensitive ecosystems are managed and member needs are met.

3.2 The Power of Local Governments

"Local governments" in this document refer to regional districts and municipalities.

Regional districts are "regional governments" representing the interests of their region as a whole. Their boards are composed of elected municipal officials as well as directly elected electoral area directors. Regional districts are the local government for unincorporated electoral areas. They are required to balance representation by population with representation by communities, and are accountable to both by way of the regional district board of directors. Regional districts provide region-wide services, such as drinking water, sewage treatment and parks, while municipalities undertake local services such as roads, local sewers and garbage collection. Both types of local governments have the same land use planning and land development authority.

Municipalities are incorporated areas within a regional district. While they have the same land use planning authority as regional districts, they have broader and more specific service and regulatory powers. At times, it is necessary for a regional district and municipality to work together to define regulatory arrangements (Cashaback 2001).

Together, these local governments control a wide variety of legislative, planning and management mechanisms that can be used to protect and restore Garry Oak ecosystems and SAR, particularly on private lands. They also have a broad social network and numerous opportunities to work with the agencies, organizations and individuals who influence or may be influenced by the state of these ecosystems. Still, they may not experience, perceive or even desire this level of

control. They have limited resources, many responsibilities and conflicting priorities. Staff may feel saddled with responsibility downloaded from senior governments, limited by elected officials, and challenged to balance many competing interests. For local governments, *Model Bylaws* is intended to provide defensible rationale and clear direction to ease these challenges.

3.21 Letters Patent

The letters patent of a local government may confer specific powers. It outlines the basic rules, approved by the Provincial Government, that incorporate a municipality or a regional district and its electoral areas by name and defined boundaries, and sets out the political and administrative framework for the delivery of services.

3.22 Special Powers Relating to Property

Section 30 of the *Community Charter* [SBC 2003], and Section 302 (Part 8. Special Powers Relating to Property, Division 1. Reservation and Dedication of Regional District Property) of the *Local Government Act enable* the powers of reservation and dedication of land (i.e., for a particular purpose). Reservations can be for parkland, a public square or heritage conservation. As part of a parkland dedication, the works or bylaws adopted under a dedication can be used to meet non-recreation needs such as protection of SAR as part of the management function of the park.

3.23 Expansion of Local Government Powers

Upon request, regional districts and municipalities can be given additional powers by amendment to their charters or by provincial legislation (for example, *Community Charter*, CHAPTER 26, s. 281). A request to the Province was used to enable the Natural Areas Protection Tax Exemption Program in the Islands Trust area.

3.24 Restrictions of Local Government Powers

Local governments have limited authority to regulate how resource extraction

activities are conducted if they are regulated by the Province. They cannot directly or indirectly restrict forest management activities on private managed forest lands (*Private Managed Forest Land Act*, [SBC 2003] CHAPTER 80, s. 21). They cannot use zoning power to regulate resource extraction on Crown or private land, as "profit a prendre" is not a land use under common law. However, if the activity is a secondary activity, such as processing or not fundamental to the extraction process then a local government may be able to regulate through zoning.

All bylaws and plans must be consistent with the *Agricultural Land Commission Act* ([SBC 2002] CHAPTER 36, s. 46).

3.25 Concurrent Authority

While Section 8 of the *Community Charter* gives broad powers to municipalities, Section 9 (1) makes certain areas of environmental protection subject to provincial government oversight. Called concurrent jurisdiction, it applies to bylaws in the areas of Section 8 (3) (j) [protection of the natural environment], (c) bylaws under Section 8 (3) (k) [animals] in relation to wildlife, 8 (3) (m) [removal and deposit of soil and other material] that (i) prohibit soil removal, or (ii) prohibit the deposit of soil or other material, making reference to quality of the soil or material or to contamination. If a municipality wants to regulate in any of those areas it can only do so pursuant to a provincial regulation, with the permission of the Minister, or with approval of the municipal bylaw by the Minister. While no local governments to date have sought permission of the Minister, many regulate under the Spheres of Concurrent Jurisdiction – Environment and Wildlife Regulation B.C. Reg. 144/2004. It allows municipalities to regulate, prohibit and impose requirements for watercourse protection, the application of pesticides on residential properties, the sale of wildflowers, the control and eradication of certain alien invasive species, and feeding and attracting dangerous wildlife and members of the Cervidae (deer) family. These are described in the *Community Charter* Spheres of Concurrent Jurisdiction - Environment and Wildlife Regulation [includes amendments up to B.C. Reg. 235/2008, August 7, 2008] at www.bclaws.ca/EPLibraries/

bclaws_new/document/ID/freeside/144_2004.

3.3 Islands Trust

The Islands Trust area covers the Gulf Islands and waters between the B.C. mainland and southern Vancouver Island. It includes 13 major islands and more than 450 smaller islands. The Islands Trust area is governed by the *Islands Trust Act*. The Act, which was created to protect the unique natural amenities of the area, transfers land use planning powers from regional districts to elected Local Trust Committees, and prohibits a regional district from adopting bylaws, issuing permits or undertaking work contrary to a Local Trust Committee bylaw. Like Regional districts, committees do not have the extensive powers of municipalities, such as the ability to enact general tree protection bylaws. (Regional districts may enact tree protection bylaws but only in hazard areas.) For brevity, the Islands Trust will be treated as a regional district throughout this document. The Islands Trust Policy Statement identifies the unique amenities and environment that islanders and other stakeholders want the Islands Trust to preserve and protect. All land use bylaws must be consistent with this Policy Statement. The Islands Trust Fund acts as a conservation land trust for the Islands Trust Area.

3.4 Heritage Conservation

Heritage Conservation regulatory powers (*Local Government Act*, Part 27) can be used for natural landscapes when they are necessary for the conservation of adjacent or proximate protected heritage property. They can also be used to protect and buffer individual landmarks and other natural features that have cultural or historical value, such as a large Garry Oak tree or an archaeological site underlying a Garry Oak ecosystem.

3.5 Statutes and Initiatives Beyond Local Government

This section outlines the strengths and limitations of important senior government legislation and global initiatives to protect Garry Oak ecosystems. While local government initiatives are imperative, they exist within a broader framework that includes provincial and federal legislation and international

conventions.

3.51 Species at Risk Act

The purpose of SARA, the federal *Species at Risk Act,* is to keep SAR and the habitat that is critical to their survival from disappearing. It is intended to be timely, precautionary and non-discretionary. However, it has been designed to fit within a broader suite of provincial and federal conservation mechanisms. The tone and intent of the SARA is not heavy-handed in terms of enforcement, but one of cooperation and stewardship. GOERT, provincial and federal agencies work in collaboration with landowners and managers, including local governments, to ensure that protection and restoration efforts are manageable and worthwhile.

While the SARA is binding on the provinces through federal order, its implementation has focused on species listed in the SARA registry and their dwellings on federal lands or in the marine environment, or to projects funded by federal monies. SARA also protects listed species that are under federal jurisdiction, i.e., aquatic species and migratory birds, on all lands. Listing of species as threatened or endangered is at the discretion of the federal Cabinet, which considers input from the public and ecological assessments.

Identification of Critical Habitat through a recovery strategy and action plan(s) initiates protection requirements. On federal land, some form of legal protection must be placed on Critical Habitat within 180 days of the recovery strategy being included in the public registry. On non-federal lands, the SARA requires the Minister to report on how the Critical Habitat is legally protected within 180 days of the recovery strategy or action plan is included in the public registry. The process is results-based, and there are many ways that protection of Critical Habitat can be accomplished. A tool to protect a small population of a plant species will differ from a tool to protect a migratory bird, for example.

SARA Sections 32 and 33 (measures to protect listed wildlife species) do not apply outside areas of federal jurisdiction (i.e. to species and habitat other than marine and migratory birds), unless a ministerial order is made by the Governor

in Council. The order can only be made if the Minister is of the opinion that the law of the province do not effectively protect species or residences of individuals. The province has "effectively protected" a species, its residences or its critical habitat when an instrument of a binding nature is in place and is effective at producing the intended results. To be binding, it must be enforceable and have a meaningful consequence (e.g., legislation, a covenant, a contract).

In the absence of enforceable legislation, the federal government has strong mechanisms through SARA to regulate the protection of residences and critical habitat throughout Canada (i.e., the "safety net" and emergency order provisions of SARA Sections 29, 34 and 80 that would force other governments to comply). The preamble of SARA clearly suggests that cooperative and voluntary measures be viewed as the first option to securing protection. To their credit, many local governments are voluntarily taking steps to protect SAR.

From 2009 through 2011 there were several legal decisions in favour of defining critical habitat and using the safety net and emergency order provisions to protect SAR in Canada (Alberta Wilderness Association et al v. Minister of Environment, 2009 FC 710 (Sage Grouse); Environmental DefenceCanada et al. v. Minster of Fisheries and Oceans, 2009 FC 878 (Nooksack Dace); Environmental Defence Canada et al. v. Minster of Fisheries and Oceans, 2009 FC 131 (Nooksack Dace); Alberta Wilderness Association et al v. Minister of Environment, 2009 FC 882 (Greater Sage-Grouse); David Suzuki Foundation et al v. Minister of Fisheries and Oceans, Minister of Environment, 2010 FC 1233 (Orca); Adam Allan et al v. Minister of Environment, Attorney General of Canada, 2011 FC962 (Boreal Caribou)). Most of the case law has found that peer-reviewed science is not necessary to delineate Critical Habitat, rather it is to be based on the best biological and ecological information available at the time. Delineation must not take into account land tenure, or socio-economic impact. Critical Habitat "is where it is", and must be identified as such.

In late 2013, the first emergency order was issued, for the Greater Sage-Grouse in Alberta and Saskatchewan, and this is being challenged in court.

3.52 Provincial Legislation

British Columbia does not have dedicated legislation for SAR. The B.C. *Wildlife Amendment Act* (2004), which was to fulfill B.C.'s obligation under the *National Accord for the Protection of Species at Risk* to protect SAR on non-federal Crown lands and private lands, has not been brought into force. Under the B.C. *Wildlife Act* ([RSBC 1996], c.488), the Lieutenant Governor in Council (cabinet) may designate endangered and threatened species. However, only three endangered (Vancouver Island Marmot (Marmota vancouverensis), Burrowing Owl (Athene cunicularia), American White Pelican (Pelecanus erythrorhynchos)) and one threatened (Sea Otter (Enhydra lutris)) species have been designated (Wildlife Act Designation and Exemption Regulation [amendments up to B.C. Reg. 38/2013] at www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/13_168_90#).

The provincial Identified Wildlife Strategy was developed in 2004, and is currently carried out under provisions of the *Forest and Range Practices Act* [RSBC 2002], c. 69) and the Government Actions Regulation. Wildlife Habitat Areas (WHAs) can be mapped and General Wildlife Measures developed to limit activities. At the time of this writing, there was one Garry Oak Ecosystem WHA created under this provision. Spatial data and the order for WHA #1-037 (Douglas-fir/Garry Oak-oniongrass *(Pseudotsuga menziesii/Quercus garryana-Melica subulata)*, located at Schooner Cove in Nanoose Bay, can be found at www.env.gov.bc.ca/cgi-bin/apps/faw/wharesult.cgi?search=wlap_region&wlap=Vancouver%20Island. Other ecological communities, such as the Douglas-fir/Dull Oregon Grape *(Pseudotsuga menziesii/Mahonia nervosa)* forest community, have been designated within the CDF zone. However, no WHAs have been approved for these communities. (See www.env.gov.bc.ca/wld/frpa/species.html for the ministerial orders made for SAR).

Despite its lack of legislation, B.C. is actively involved in SAR protection. In 2012, the Province was leading or co-leading 32 SAR recovery teams engaged in planning for approximately 120 SARA-listed species. Provincial recovery

strategies are available for adoption by the federal Minister to meet SARA requirements. A federal recovery planning document may incorporate the provincial document, but may also add certain aspects if it does not meet legislative requirements. Often this will include a clarification as to what the Minister is going to identify as Critical Habitat for the species.

3.53 Global Initiatives

At an international scale, there are many significant initiatives underway with a goal to prevent further biodiversity loss. At the 2010 Conference of the Parties to the Convention on Biodiversity, a revised Strategic Plan for Biodiversity and 20 Aichi Biodiversity Targets for 2011-2020 were adopted. The Parties, including Canada, agreed to translate the plan into national biodiversity strategies and action plans within two years. Aichi Target 2 includes integrating biodiversity values into local government strategies and planning processes. In a resolution adopted December 21, 2010, the 65th session of the United Nations General Assembly approved the creation of the Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services (IPBES). This new body is expected to follow the model of the IPCC (Intergovernmental Panel on Climate Change). The UN General Assembly also declared 2011-2020 the UN Decade of Biodiversity, resolving to implement the Strategic Plan.

4.0 A PLANNING HIERARCHY

Left: Harewood Plains, a portion of which was protected by the City of Nanaimo; Middle: Building foundation in Garry Oak ecosystem overlooking Nanoose estuary; Right: Building lot on Triangle Mountain on rock outcrop Garry Oak ecosystem

Whether developing high level plans, creating zoning bylaws, conducting environmental impact assessments, or assessing applications for subdivision or other development, it is vital to conduct a pass/fail test. In other words, the question must be asked, "Is this development appropriate on this site?" A simple but firm hierarchy is recommended:

1) Identify and protect conservation areas or "no go zones" that include Garry Oak ecosystems;

2) Identify and protect areas that facilitate ecological connectivity among remnant Garry Oak ecosystems (not only protected areas);

3) If development is going to occur, strive to preserve, in its natural state, as much of the Garry Oak or associated ecosystem as possible (i.e., upwards of 50%); and

4) As development is occurring, strive to protect adjacent Garry Oak ecosystems from degradation.

If development is inappropriate for a site, i.e., if it would destroy or degrade a Garry Oak ecosystem, then all steps should be taken to ensure development does not occur.

5.0 ENVIRONMENTAL IMPACT ASSESSMENTS

Left: Moorecroft Regional Park, Nanoose Bay, established in 2011;
Middle:Fenced trails protect Garry Oak ecosystems at Moorecroft Regional Park;
Right: Coastal Wood Fern (Dryopteris arguta), a species of Special Concern federally and Blue-listed provincially, in Moorecroft Regional Park

An Environmental Impact Assessment (EIA) serves to assess the environmental impacts of a proposed project that will modify the land, and provide recommendations to mitigate those impacts. For Garry Oak and other sensitive ecosystems, there should always be sufficient time and care afforded to site surveys and/or inventories. (See also 18.4 Site Surveys and Inventories.)

5.1 Triggers

The level of assessment required depends on the circumstances, and can range from a mere inventory to a comprehensive assessment of ecological impacts and mitigation measures. A municipal development permit (DP) application is a potential trigger, where the land is located in a development permit area for protection of the natural environment (EDPA). Rezoning applications can precipitate EIAs, for example when a developer submits a landscape plan as a requirement of rezoning to increase density.

EIAs cannot be required for subdivision applications, however Official Community Plans (OCPs) can encourage both municipal and provincial Ministry of Transportation and Infrastructure approving officers to ask for them;

approving officers have the statutory authority to collect a wide range of information (See Section 86(1) of the B.C. *Land Title Act* [RSBC 1996] Chapter 250). By contrast, municipal and regional district staff can only ask for information if a Development Approval Information Area (DAIA) exists, or as rezoning or Development Permit Area (DPA) applications are presented. Local governments can designate DAIAs wherever alterations to land may warrant an assessment.

An EIA or biological assessment and report may be required through the permitting process in regulatory bylaws, such as when a landowner applies for a tree cutting permit. Temporary commercial or industrial use permits are also potential triggers.

PROVINCIAL LEGISLATION: EIA can be required and implemented by way of *Local Government Act* Sections 895 (Development approval procedures) and 919.1-920.1 (Designation of development permit areas, Development permits, designation of development approval information areas or circumstances, Development approval information). Section 921 (Temporary use permits) can specify similar terms and conditions. See Table of Contents at www.bclaws.ca/Recon/document/ID/freeside/96323_00

Local governments continue to find creative ways to acquire site information, for example through liberal use of Development Approval Information Areas, via application forms structured as screening tools, or by requiring sustainability statements.

The District of Saanich rezoning/OCP amendment/Development Permit/ Development Permit Amendment application form acts as a screening tool for EIA. See www.saanich.ca/business/apps/pdf/appl2_dprez.pdf.

5.11 Development Approval Information Areas

The areas in which, or circumstances for which DAIAs will be required must be set out in an OCP. If an OCP includes areas within which, or circumstances for

which, information may be requested in advance of approval for a development, the local government must enact a bylaw that establishes procedures and policies on the process for requiring development approval information and the substance of the information that may be required.

The City of Nanaimo's 2008 OCP identifies Development Approval Information Areas to help determine the formulation of conditions for development permits affecting ESAs, and the precise demarcation of boundaries of non-disturbance areas and buffer areas. See Section 7.6 in the OCP at www.nanaimo.ca/assets/Departments/Community~Planning/Offical~Community~Plan~-~10~Year~Review/OfficialCommunityPlan2008.pdf.

5.12 Sustainability Statements

Some local governments are requiring applicants to submit a comprehensive sustainability statement with development applications. Sustainability, sometimes referred to as sustainable development, is often defined as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (from *Our Common Future*, also known as the Brundtland report (WCED 1987). Sustainability principles generally include biodiversity conservation. (See also 6.32 Links to Sustainability in Regional Growth Strategies.)

Applications to develop within the City of North Vancouver must be accompanied by a Sustainability Statement. City guidelines advise developers to consider sustainability issues in the formative stages of their projects, and offer additional density in return for public benefits. See www.cnv.org/~/media/9144B61299134201AD99F96659C1259D.pdf.

In the District of Saanich, the Sustainability Statement provides an assessment of a project's contribution to sustainability based on environmental, social and economic indicators. See www.saanich.ca/business/apps/pdf/sustainabilityguidelines.pdf.

Other screening tools, sustainability statements and checklists are available on the Fraser Basin Council website at http://smartplanningbc.ca/Further_Resources.html and as part of the Climate Action Toolkit at www.toolkit.bc.ca/tool/sustainability-checklist.

5.2 Content

The primary purpose of an EIA is to determine whether the project is appropriate for the site. In other words, location is a pass/fail criterion before adverse impacts are evaluated and mitigation considered. Within a development plan, potential or anticipated changes to the structure or function of sensitive or at-risk ecological communities should be explicitly described, and adverse or beneficial impacts to SAR resulting from the development duly noted. Recommendations for mitigation of adverse impacts during and post-construction, and considerations for short and long-term management, can be used in concert with clear and simple measures (e.g., setbacks) and methods (e.g., photo monitoring) to assess compliance and results. Recommendations and considerations for mitigation of impacts can be found throughout this document.

A *Terms of Reference for Professional Reports for Planning Services* details the requirements of an EIA in the Regional District of Okanagan-Similkameen, at www.rdosmaps.bc.ca/min_bylaws/planning/RAR/Information/RDOSEnvironmentalAssessmentTORAugust2008.pdf.

Appendix B in the District of Summerland Policy Manual includes a Terms of Reference for EA reports, at www.summerland.ca/docs/policymanuals/DevelopmentServices/300.9%20Terms%20of%20Reference.pdf.

5.3 Sample Bylaw Wording

1. *An EIA may be required to define and evaluate the cumulative effects of a proposed development on the ecological features of the EDPA, including the impact on:*

- *water quality and quantity (ground and surface water)*
- *hydrology*
- *aquatic biology*
- *fauna (wildlife)*
- *flora (tree and vegetation inventory)*
- *species at risk populations and habitat for species at risk*
- *soils*
- *micro-climate*
- *First Nations historic use*

2. *All development permit applications shall be screened to determine whether or not an EIA is required. The [Local Government staff] shall consider whether an application should be recommended for an EIA.*

3. *In considering whether or not to recommend or require an EIA, the [Local Government staff] will consider the following questions:*
    a. *Available information - Is there site-specific biological and ecological information available? What additional information is needed to ensure ecosystem components or valuable resources are identified?*
    b. *Complexity - Are there numerous environmental issues raised by the application? Can staff identify the degree of impact and provide and coordinate mitigation measures outside the EIA process?*
    c. *Time and Resources - Do staff have the necessary time and resources to adequately assess the project without the benefit of an EIA?*

4. *Where an EIA is required, the applicant will undertake the review at his or her expense based on the Terms of Reference established by the [Local Government staff].*

5. *An environmental assessment should be prepared by a qualified professional biologist with Garry Oak ecosystem and SAR expertise together with other professionals of different expertise, as the project warrants.*

Hydrologists and hydro-geologists should be consulted where wetlands, riparian areas, and Garry Oak ecosystems exist within the development area to ensure the proper hydrological function is maintained within these ecosystems. A professional geoscientist should be consulted where there are erosion potential or slope stability hazards. The consultant or team of consultants should have an understanding of wildlife biology, with expertise in the species at risk in the region. Specific expertise in Garry Oak ecosystem and species at risk wildlife species, wildlife habitat, and ecosystems is highly preferred.

6. *The selection of the consultant shall be made by the applicant and approved by the [Local Government staff] prior to the work commencing.*

7. *The consultant involved in submitting any rezoning, development permit or temporary commercial or industrial use permit application for the same property shall not conduct or participate in the EIA.*

8. *The EIA is subject to appropriate [Local Government], Provincial and Federal agency review and comment.*

9. *A draft EIA shall be available to conservation organizations, such as the Garry Oak Ecosystems Recovery Team, for comment.*

10. *Upon acceptance of the final EIA by the [Local Government], community associations and interested members of the public shall be afforded an opportunity to review the report at the [Local Government offices].*

For more comprehensive and detailed bylaw provisions see the *Green Bylaws Toolkit* at www.greenbylaws.ca.

5.4 Challenges and Opportunities

5.41 Defending an EIA Requirement

As EIAs can prolong the approvals process, and may ultimately increase security deposits and limit development plans, they are viewed by applicants as a

expensive nuisances that undermine private property "rights". Note that private property rights are not entrenched in the Canadian Constitution, and consequently B.C. local government bylaws do not create "development rights"; this is discussed in 9.31 Property "Rights" and Zoning). Regardless, it can help to portray EIA as the high resolution aspect of a big picture, which in all likelihood has included planning for sustainability and growth, Official Community Plan (OCP) visioning exercises, and countless hours of deliberation among planners, citizens and Council defining and refining the aspirations of their communities. A defensible EIA terms of reference sets a process for development applicants that will in time become a tested and accepted standard.

5.42 Contributing to Comprehensive Databases

Consultants and others can be encouraged to share the data they collect through an EIA process or DPIA bylaw. Information regarding at-risk ecosystems and species should be shared with the B.C. Conservation Data Centre at www.env.gov.bc.ca/cdc/contribute.html.

While local governments and their consultants are more likely to be accessing information on where existing conservation areas currently exist, to optimize habitat connectivity in assessment and planning, there may be times when they are able to contribute to conservation databases. Increasingly, local governments share title and manage conservation lands with other agencies and organizations, for example.

Data for conservation areas should be shared via the Canadian Conservation Areas Database at http://gcmd.nasa.gov/records/CANADA-CGDI_Canada_GeoGratis_CCAD.html (a NASA: Global Change site); with the Conservation Areas Reporting Tracking System (CARTS) of the Canadian Council on Ecological Areas at www.ccea.org/en_carts.html, and with the B.C. Conservation Areas Database currently managed by The Nature Trust of British Columbia and Ducks Unlimited Canada. (The Land Trust Alliance of B.C.'s British Columbia Lands in Trust Registry is now defunct.)

5.5 Additional Resources

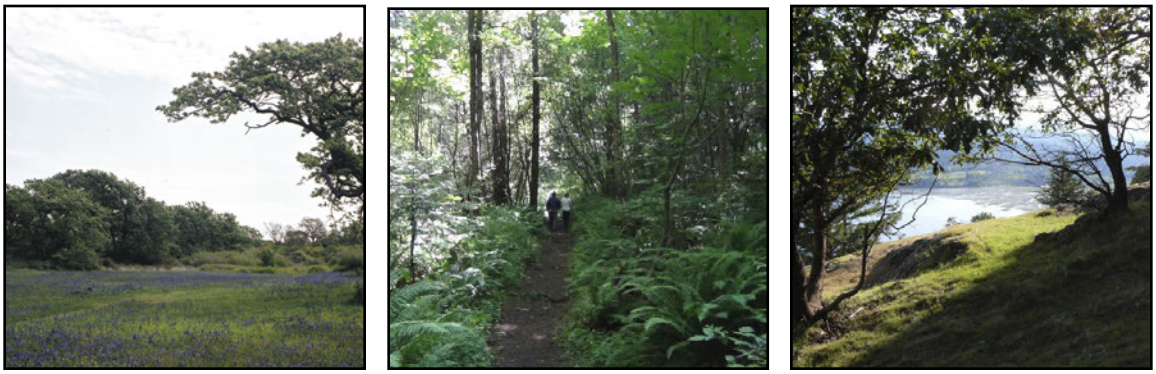
Okanagan-Similkameen Environmental Impact Assessment Checklist for Planning Staff, reprinted with permission from A. McIndoe

Description	*Yes*	*No*	*Comments*
Local Government Requirements and Incentives			
The site is subject to development permit guidelines	[ ]	[ ]	
Incentives are in place to encourage environmental protection and restoration (e.g. density bonusing, faster approvals, tax exemptions on conservation covenants)	[ ]	[ ]	
Policy in place to encourage amenity bonuses (e.g. contributions to park acquisition funds) or other forms of mitigation for habitat lose	[ ]	[ ]	
The Official Community Plan identifies ESAs or environmentally valuable resources and hazard lands on or near the development site	[ ]	[ ]	
A preliminary site survey (bio-inventory) has been conducted and provided to the local government	[ ]	[ ]	
A detailed EIA was conducted and provided to the local government	[ ]	[ ]	
Professional Standards			
Does the submitted report meet the Terms of Reference for EIA reports	[ ]	[ ]	
Report was prepared, signed and sealed by a QEP (RPBio, RPF etc.)	[ ]	[ ]	
Report reflects site conditions prior to disturbance	[ ]	[ ]	
Data and non-standard methods contributing to the EIA were included in the report, copied as appendices, or shown in a digital format	[ ]	[ ]	
Data Deliverables			
Legal site description included Lot #, Plan #, District Lot, and UTM	[ ]	[ ]	
Site location was mapped with scale 1:10,000 to 1:50,000	[ ]	[ ]	
Site map included inventory results and project components with scale 1:500 to 1:5,000	[ ]	[ ]	
Maps are in full-sized, color format with at least one copy printed to scale	[ ]	[ ]	
Site plans/sketches/ photographs indicate project location, site features and activities	[ ]	[ ]	
Site profiles and cross sections were included, demonstrating conditions pre and post development	[ ]	[ ]	
Digital copies (shapefiles) were provided, of supporting information in NAD83 UTM Zone 11	[ ]	[ ]	
Appropriately referenced data sources and most up-to-date information was used in EIA	[ ]	[ ]	

Bio-inventory Phase			
Bio-inventory completed identifying ESAs and environmentally valuable resources on or near (within 100 m of) the development site	[ ]	[ ]	
Timing of all bio-inventories clearly stated and justified as appropriate for habitats and potential species present	[ ]	[ ]	
Methodology used was in general accordance with the BC Environmental Assessment Act and provincial standards	[ ]	[ ]	
The bio-inventory was done at a 1:500 to 1:5,000 scale	[ ]	[ ]	
Potential occurrences of rare and endangered species and plant communities were assessed and reported	[ ]	[ ]	
RAR assessment was conducted and appended to report	[ ]	[ ]	
ESAs were stratified using, at minimum, the evaluation of habitat /ecosystem rarity, wildlife habitat suitability, rare and endangered species, functional condition, and fragility	[ ]	[ ]	
The report includes the specific criteria/rating system for ESA evaluation	[ ]	[ ]	
Any confidence gaps in existing information were discussed	[ ]	[ ]	
Where additional inventories recommended?	[ ]	[ ]	
Impact Assessment			
Regulatory trigger for EIA was clearly stated	[ ]	[ ]	
All necessary regulatory approvals and permits are described	[ ]	[ ]	
Potential impacts to rare and endangered species, ESAs, and environmentally valuable resources from the proposed development were assessed for before, during, and after construction	[ ]	[ ]	
Duration of impacts identified (short/long term, residual)	[ ]	[ ]	
Cumulative impacts were assessed	[ ]	[ ]	
Assessment indicates whether a HADD has been triggered or not	[ ]	[ ]	
Pre-construction Mitigation			
The report considers all federal and provincial Best Management Practice guidelines and publications	[ ]	[ ]	
The development proposal follows the qualified biologists' recommendations	[ ]	[ ]	
ESA 1 and 2, buffers, and other environmentally valuable resources were recommended as 'no-development' zones	[ ]	[ ]	
Wildlife corridors recommended to be retained to link to nearby habitat	[ ]	[ ]	
Roads designed to minimize disruption to wildlife movements	[ ]	[ ]	
Fencing to prevent access of livestock to watercourses will be installed	[ ]	[ ]	

Rainwater will be managed onsite	[ ]	[ ]	
The development will avoid or mitigate off-site impacts (e.g. modified hydrology, impacts on neighboring environmentally sensitive areas, potential wildlife conflicts)	[ ]	[ ]	
Opportunities for restoration have been identified and incorporated into plan	[ ]	[ ]	
The buffers around ESAs and environmentally valuable resources have been identified and meet or exceed the Ministry guidelines	[ ]	[ ]	
Shorelines and stream banks are protected in the plan	[ ]	[ ]	
During-construction Mitigation			
A monitoring plan and security deposits are recommended	[ ]	[ ]	
An on-site monitor will be hired where needed, and given authority to halt work if necessary	[ ]	[ ]	
Permits and approvals for construction have been identified and obtained	[ ]	[ ]	
Construction scheduled ONLY during recommended timing windows	[ ]	[ ]	
Surface/ground water, and air quality will be protected during construction	[ ]	[ ]	
Measures are in place to prevent and control contamination and spills	[ ]	[ ]	
There are measures in place to protect ESAs and environmentally valuable resources during construction (e.g. fencing, timing windows)	[ ]	[ ]	
Recommendations that within non-disturbance areas and buffers, gravel, sand, soils and peat must not be removed; and soil or other fill must not be deposited.	[ ]	[ ]	
There is an erosion and sedimentation control plan in place to be followed	[ ]	[ ]	
Post-construction Mitigation			
Natural/native landscaping techniques will be followed	[ ]	[ ]	
There is an invasive species control plan	[ ]	[ ]	
Use of pesticides will be minimized or avoided	[ ]	[ ]	
Post development impacts to be monitored for future action if needed	[ ]	[ ]	

6.0 REGIONAL GROWTH STRATEGIES



Left: Uplands Park, Oak Bay (Photo by Chris Junck);
Middle: Vanier Grove, a unique mixed forest with Garry Oak, Courtenay;
Right: The Notch, above Nanoose Harbour

Regional Growth Strategies (RGSs) provide a regional framework for directing growth and land use activities across the land base of a regional district. It is an agreement between a regional district and member municipalities about how and where growth will take place. The Province maintains an explanatory guide at www.cscd.gov.bc.ca/lgd/intergov_relations/library/RGS_Explanatory_Guide_2005.pdf. The guide identifies the primary purpose of a RGS, i.e., "to promote coordination among municipalities and regional districts on issues that cross municipal boundaries, and provide clear, reliable links with the provincial ministries whose resources are needed to carry out projects and programs".

For Garry Oak ecosystems, the primary benefits of a RGS are its regional scope and timeframe of 20 years or more. A regional geographic scope more accurately portrays the habitat needs of species and more effectively encompasses the multiple scales at which ecosystems typically function. The longer timeframe better reflects an understanding of dynamic ecological processes such as forest succession, hydrological patterns and nutrient cycling. It is also more attune to restoration efforts, which tend to take time.

A RGS can drive the protection and development of ecological networks across jurisdictional and ownership boundaries (Figure 2) by designating biodiversity corridors, enhance the effectiveness of stewardship initiatives and facilitate collaborative financing. It can state objectives and policies for ecosystem protection, raise the profile of regional issues, and explain the linkages of sensitive ecosystems and biodiversity to programs such as waste management (e.g., handling of garden waste), water conservation and responses to climate change. It can recommend that protection of these ecosystems be incorporated into biodiversity conservation strategies, economic development plans, transportation plans, environmental management systems and other corporate strategic and operational documents. A RGS may also identify land acquisition priorities, and may itself include a regional biodiversity conservation plan. Perhaps most importantly, almost all RGS in the province contain urban growth boundaries and policies to direct new development into serviced or near urban areas, leaving the rural and natural landscape undisturbed.

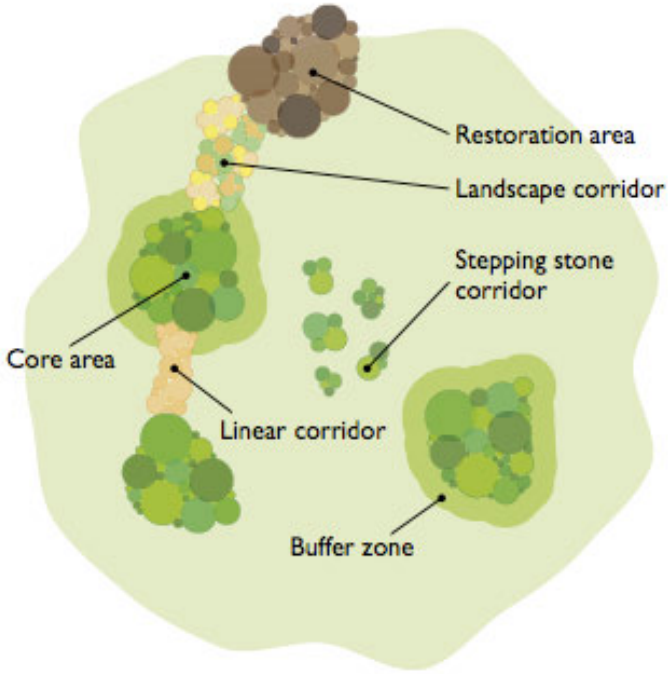


Figure 2. Ecological network, from *The Natural Choice: securing the value of nature* (Her Majesty's Government 2011) at www.official-documents.gov.uk/document/cm80/8082/8082.pdf

6.1 Triggers

The provincial government can mandate a regional district to undertake a RGS, otherwise it is voluntary.

PROVINCIAL LEGISLATION: Local Government Act, CHAPTER 323, Part 25 - Regional Growth Strategies www.bclaws.ca/Recon/document/ID/freeside/96323_29

6.2 Content

To protect Garry Oak ecosystems and other Environmentally Sensitive Areas (ESAs), a RGS should, at a minimum, contain policies that:

- clearly define "urban" and "rural" in terms of lot size and density;
- contain urban areas, and direct development and density into already serviced areas;
- protect rural landscapes from fragmentation;
- include maps designating land into classes or categories, including sensitive ecosystems, regional greenway or biodiversity corridors, unprotected green space, and priority parkland acquisitions;
- cluster development away from Garry Oak ecosystems and SAR; and
- enable the development of a regional biodiversity conservation strategy.

Ideally, a regional biodiversity conservation strategy precedes the RGS, as the conservation strategy generally includes the identification and mapping of Garry Oak and other sensitive ecosystems.

In the Regional District of Okanagan-Similkameen RGS (Bylaw 2421, 2007, p. 12), Policy EN1 is to coordinate management of regional biodiversity conservation, including the development of an inter-regional Biodiversity Conservation Strategy. Policy EN2 supports environmental stewardship strategies, including the mapping of sensitive ecosystems. See www.rdosmaps.bc.ca/min_bylaws/contract_reports/planning/Regionalgrowth/RGSBYLAW2421_ScheduleA_071008reread2nd_forOct22BoardAgenda.pdf.

The Regional District of Nanaimo RGS (Bylaw 1615, 2011), available at www.shapingourfuture.ca/downloads/rgs_final_draft.pdf, states, "the ecosystems of the area are threatened by the impacts of growth" (p. 8). This section and 4.2 Policies (p. 17) describe the CDF zone as an area of "great significance" and "one of the rarest ecosystem complexes in B.C.". Sections 2.11 through 2.17 (pp. 23-24) outline a series of policies for ESAs, including preparation of a complete bioinventory of regionally significant ESAs, SAR, and the natural biodiversity of the region.

The Comox Valley Regional District RGS (Bylaw 120, 2010), at www.comoxvalleyrd.ca/assets/Governance/Bylaws/Regional~Strategies/Bylaw%20120%20-%20Comox%20Valley%20Regional%20District%20Regional%20Growth%20Strategy%20Bylaw,%202010.pdf, demonstrates how an RGS can be used as an educational tool as well as a mechanism to protect ecosystems. Goal 2 (p. 31) includes an issue overview where the concept of regional conservation is endorsed, with rationale. Objective 2-A (p. 33), and Objective 2-B (p. 36) outline policies and rationale for protecting and managing sensitive ecosystems. Objective 5-C (p. 55) notes a critical threshold when there is more than 10% impervious area within a watershed or drainage catchment, and sets the stage for Integrated Stormwater Management to be used in the subdivision approval process. A Regional Conservation Framework Concept Map shows sensitive ecosystems, biodiversity corridors and proposed ecological greenways.

6.3 Sample Bylaw Wording

A) Regional Biodiversity Conservation Strategy

1. *The [Regional District] has adopted a [Name of Biodiversity Conservation Strategy] that is the basis for this Regional Growth Strategy. Its key policies are included in this RGS.*

B) Establish Urban Containment and Servicing Boundary

1. *The [Regional District] and member municipalities agree to designate in their official community plans the following Policy Areas, as depicted on Map [ ]:*
    - *Protected Green Infrastructure Policy Area: Includes Ecological Reserves, [Regional District] water supply lands, and Major Parks identified in [Map ____ or another regional plan such as a parks plan];*
    - *Renewable Resource Green Infrastructure Policy Area: Includes lands within the Agricultural Land Reserve (ALR) and Crown and private forest lands identified in [Map ____ or a regional plan];*
    - *Urban Containment and Servicing Policy Area (UCSA): Includes lands, at the date of the adoption of and designated in the Regional Growth Strategy bylaw in Map [ ] primarily for urban development (including attached housing, detached and duplex housing, commercial, industrial, and large scale institutional and utility designations).*
    - *Unprotected Green Infrastructure Policy Area: Includes lands identified in [Map [ ] or a Regional Plan] as unprotected core green space.*
    - *Rural Policy Area: Includes lands at the date of adoption of and designated in the Regional Growth Strategy bylaw in Map [ ] for rural and rural residential purposes. The policy area also includes pockets of small lot detached, duplex and other housing, and isolated commercial and industrial land uses, in areas of predominantly rural character.*
    - *[Special Policy Area]: [May include federal land, large industrial facilities, lands adjacent to First Nations communities].*

2. *The [Regional District] and member municipalities agree to adopt policies regarding the protection, buffering and long term maintenance of the UCSA boundaries.*

3. *Except as permitted in this bylaw, the [Regional District] and member municipalities agree not to further extend urban sewer and water services, or increase servicing capacity to encourage growth outside the UCSA generally described on Map [ ].*

4. *The [Regional District] and member municipalities agree to extend urban sewer and water services, or increase servicing capacity to encourage growth beyond designated limits in Map [ ] only:*

    i. *to address pressing public health and environmental issues;*

    ii. *to provide fire suppression;*

    iii. *to service agriculture; or*

    iv. *as part of a comprehensive review of the RGS where it is determined that additional land is required for urban development because existing development densities have reached at least 40 units per hectare in the municipality requesting an extension of servicing.*

C) Direct Development into Serviced Areas

1. *The [Regional District] and member municipalities agree to approve new urban development only on land designated inside the UCSA boundary. Urban development includes residential development at a density greater than 1 unit per hectare, commercial uses, and institutional uses.*

2. *The [Regional District] and member municipalities agree to locate a minimum of 95% of the region's cumulative new dwelling units to [year Regional Growth Strategy expires] within the UCSA.*

3. *The [Regional District] and member municipalities agree to designate, as appropriate in their official community plans, the major centres shown on Map [ ], and undertake detailed centre planning through their official community plan and zoning processes.*

4. *The [Regional District] and member municipalities agree to review, modify and implement policies to best facilitate growth and investment in the major centres in partnership with the [Regional District].*

5. *The [Regional District] and member municipalities agree to permit the designation and development of additional major centres only as an outcome of a comprehensive 5–year review of the Regional Growth Strategy.*

6. *The [core urban municipalities] agree to accommodate a minimum of 50% of the region's cumulative new dwelling units and 60% of the region's cumulative new commercial space to [year Regional Growth Strategy expires], to reinforce the regional core.*

D) Protect the Green Infrastructure Lands

1. *The [Regional District], member municipalities and the Province agree to establish or strengthen policies within official community plans that ensure the long term protection of Protected Green Infrastructure lands depicted on Map [ ], including policies aimed at buffering Protected Green Infrastructure lands from activities in adjacent urban areas.*

2. *The [Regional District], member municipalities and the Province agree to establish or strengthen policies within official community plans that ensure the long term protection of Renewable Resource Green Infrastructure lands depicted on Map [ ], including policies that buffer Renewable Resource Green Infrastructure lands from activities in adjacent urban areas and support farming within the Agricultural Land Reserve.*

3. *The [Regional District] and member municipalities with lands identified as Protected Green Infrastructure lands, Renewable Resource Green Infrastructure lands or Rural lands on Map [ ], agree to establish or strengthen policies within official community plans and regional context statements that limit rural subdivision and development to the capacity levels as described in Table [ ]. Regional context statements will reference*

specific mechanisms (for example, density bonusing provisions) that could be used to achieve this overall goal.

4. *Member municipalities agree to negotiate, where necessary, bilateral agreements regarding buffering and land use transition where the UCSA boundary coincides with a municipal jurisdictional boundary.*

5. *Member municipalities agree to include in Regional Context Statements, where appropriate, policy guidelines for buffering and land use transition between urban areas and Protected Green Infrastructure lands and Renewable Resource Green Infrastructure lands, and how the guidelines will be applied through regulation.*

D) Protect the Green Infrastructure Network

1. *The [Regional District] and member municipalities agree to work as partners and individually to establish the Regional Green Infrastructure System identified on Map [ ]. Priority will be given to community and regional park land acquisition, conservation corridors, sensitive ecosystems, public and private land stewardship programs and regional trail network construction.*

2. *The [Regional District] and member municipalities agree to establish, through regional context statements and official community plan policies, programs aimed at protecting lands and sensitive ecosystems within the area identified as Unprotected Green Infrastructure Policy Area on Map [ ], including policies, regulations, development permit area guidelines, incentives and initiatives delivered at the local level.*

3. *The [Regional District] and member municipalities agree to establish programs aimed at protecting sensitive ecosystems within the areas identified as Renewable Resource Green Infrastructure Lands, Rural lands, and UCSA (urban) lands on Map [ ], including policies, regulations, development permit area guidelines, incentives and initiatives delivered at the local level.*

4. *The [Regional District] and member municipalities agree to require an environmental assessment, including seasonally-appropriate SAR surveys by a qualified biologist with SAR and GOE expertise for projects with the potential to negatively affect sensitive ecosystems or environmental quality.*

5. *The [Regional District] and member municipalities agree to adopt "green infrastructure" practices through bylaw provisions and permit approvals. This includes low impact development approaches and rainwater management based on infiltration as found in the following best practices documents:*

    - *Model Bylaws for the Protection of Garry Oak and Associated Ecosystems and Species (GOERT 2014);*
    - *Best Management Practices for Garry Oak and Associated Ecosystems (GOERT 2012);*
    - *Develop with Care 2012: Environmental Guidelines for Urban and Rural Land Development in British Columbia (B.C. Ministry of Forests, Lands and Natural Resource Operations 2012);*
    - *Stormwater Planning: A Guidebook for British Columbia (Ministry of Water Land and Air Protection 2002);*
    - *Water Balance Model for British Columbia (waterbalance.ca);*
    - *Green Bylaws Toolkit (Wetlands Stewardship Partnership 2007);*
    - *Green Infrastructure Guide (West Coast Environmental Law 2007);*
    - *Groundwater Bylaws Toolkit (Okanagan Basin Water Board 2009);*
    - *Topsoil Bylaws Toolkit (Okanagan Basin Water Board 2012);*
    - *Best Management Practices Guide for Stormwater (Greater Vancouver Sewage and Drainage District 1999);*
    - *Water Conservation Planning Guide for British Columbia Communities (The POLIS Project on Ecological Governance 2009); and*
    - *Land Development Guidelines for the Protection of Aquatic Habitat (Department of Fisheries and Oceans 1993).*

For more comprehensive and detailed bylaw provisions see the *Green Bylaws Toolkit* at www.greenbylaws.ca.

6.4 Challenges and Opportunities

6.41 Landscape Modeling

The *Local Government Act* requires the inclusion of projections (e.g., for housing demand) and a regional monitoring program to evaluate progress made on the RGS. Thus RGS planning and review presents an opportunity to examine trends and explore future trajectories and scenarios based on current and alternative policies. There are now landscape modeling tools that can help in this process.

Universities are hubs for innovative landscape modeling. The Collaborative for Advanced Landscape Planning (CALP) at the University of British Columbia www.calp.forestry.ubc.ca/ is a leader in landscape modeling, bringing visualizations, innovative environmental design and participatory processes to community and landscape planning. Another source of mapping and modeling tools is the University of Victoria-based B.C. Centre for Applied Remote Sensing, Modeling, and Simulation (BC-CARMS) and the Spatial Sciences Laboratory housed in the department of geography.

In 2010, the Cowichan Valley Regional District (CVRD) worked with a landscape modeling company to produce scenarios based on data collected for a *State of the Environment Report* www.cvrd.bc.ca/index.aspx?nid=1233. They could, for example, envision residential buildout over time, based on current policies.

6.42 Links to Sustainability, Resilience and Adaptability

A RGS may address sustainability by including a set of sustainability principles, a vision that includes sustainability, or some other recognition of the concept. The RGS may be viewed as one of several sustainability initiatives, or as a foundation document for further sustainability programs. Sustainability inherently includes a long-term perspective, and an understanding that vibrant economies and societies are contingent on healthy ecosystems.

Still, it is important to ensure that RGS sustainability goals are not at cross-purposes. For example, food security goals should not inadvertently lead to further destruction of Garry Oak ecosystems.

Some regional districts have used the **board strategic plan** to promote sustainability. As the highest level plan for the organization, and one that sets the direction for each board term, this theoretically forces all lower level plans, including the RGS, to incorporate and operationalize that concept. However, the board strategic plan is usually developed every year or few years, may change in response to board policy, and focuses on the short-term. The RGS is long-term, requires the approval of all municipalities to change, and maintains a regional vision.

A RGS can, with a subtle yet substantial shift in direction and scope, be transformed into a **sustainability strategy**. (From the provincial perspective, a Regional Sustainability Strategy would need to fulfill the legislative requirements of the RGS.)

In the Capital Regional District, the RGS is transitioning to a Regional Sustainability Strategy (RSS). The RSS will use the RGS as a base, increasing its scope to provide leadership and direction on climate action, social well-being and food security in addition to its current topic areas. See http://sustainability.crd.bc.ca.

To actualize the terms of a RGS, local governments typically review their OCPs and other bylaws. It may also be beneficial to adopt a more direct approach, with sustainability checklists. See also 5.12 Sustainability Statements.

A sustainability checklist is available for South Okanagan residents to ensure new development plans are consistent with the policies and intent of the RGS www.rdosmaps.bc.ca/min_bylaws/planning/rgs/RSG_checklist_v2_140812.pdf.

To address complex challenges such as climate change, global economic forces, and cumulative effects, it is imperative that an RGS assess resilience (the ability

to resist and rebound from disturbance, and change with disturbance). With a resilience approach, the region is treated as a single social-ecological system. Incorporating resilience into planning involves examining adaptive cycles, non-linear dynamics, thresholds and cross-scale interactions, as well as exploring and managing uncertainty and surprise (cf. Folke 2006; Gunderson and Holling 2002).

Photographing Endangered and Red-listed Deltoid Balsamroot *(Balsamorhiza deltoidea)* and other wildflowers (Photo by Chris Junck)

6.5 Regional Context Statements

To spell out the relationship between the RGS and municipal OCPs, Sections 866 of the *Local Government Act* requires that a municipality prepare a regional context statement for inclusion in its OCP. It is not enough to simply acknowledge the broad goals and objectives of the RGS; the regional context statement must specify the policies and actions the municipality will take to make the OCP consistent with the RGS over time. The regional context statement is an opportunity to recognize Garry Oak ecosystems as rare and sensitive, and requiring protection and restoration. For regional districts, Section 865 requires all bylaws, including electoral area OCPs, be consistent with the RGS. Figure 3 shows how the RGS and regional context statement relate to other bylaws.

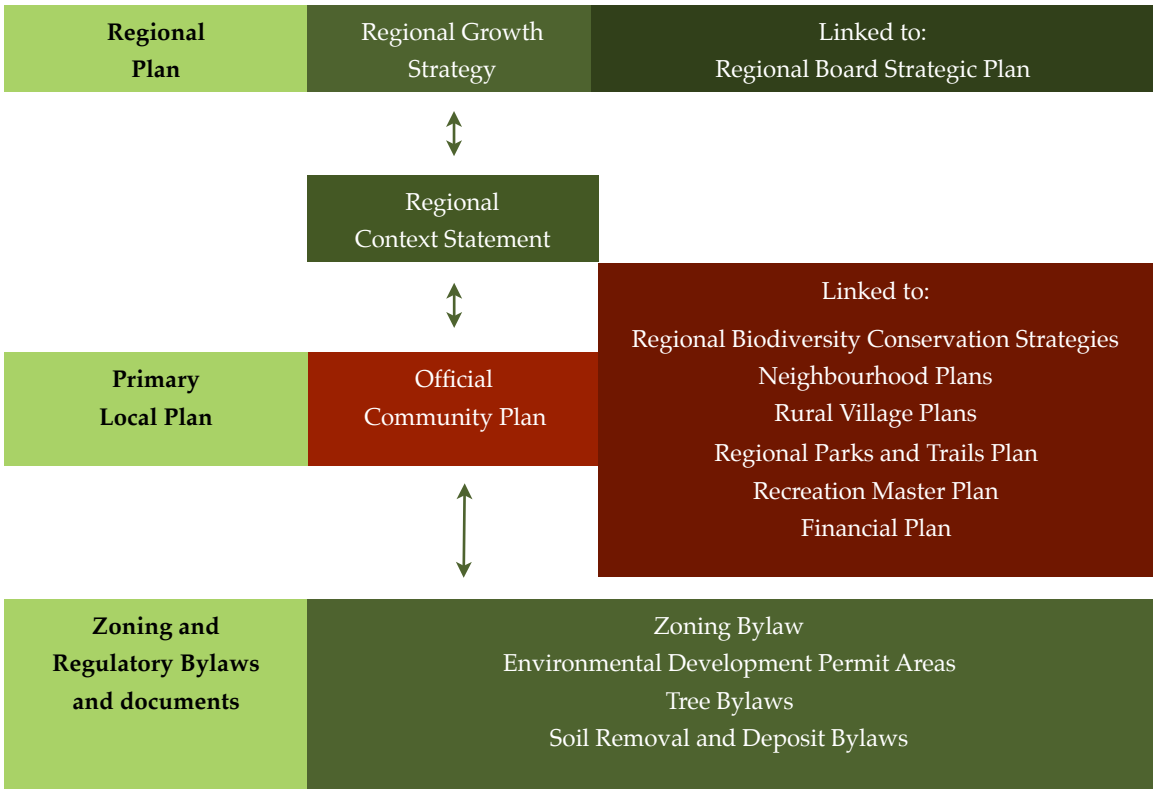


Figure 3. A simple relational diagram of local government bylaws. This diagram is not comprehensive.

7.0 OFFICIAL COMMUNITY PLANS

Left: Chocolate Lily (Fritillaria lanceolata);
Middle: Blue-eyed Mary (Collinsia sp.);
Right: Spring-gold (Lomatium utriculatum),
wildflowers common to Garry Oak ecosystems (Photos by Chris Junck)

An Official Community Plan (OCP) is a comprehensive, strategic bylaw that sets both broad and specific policies on land use, community development, operations and conservation in a community. Once enacted, all bylaws of a municipality, including zoning, subdivision and regulatory, must be consistent with the OCP (*Local Government Act,* Section 884). Importantly, OCPs designate Environmental Development Permit Areas (EDPAs) and often contain the guidelines that direct how development will occur on lands within EDPAs.

While few OCP policies are directly enforceable, the bylaw represents a great deal of planning effort and often reflects lengthy, lively public consultation processes. Consequently, OCPs provide valuable guidance to decision-makers, including staff, elected council members, and subdivision approving officers, when they are assessing the merits of development applications. Indeed, approving officers are prohibited from approving subdivision applications that do not conform to all bylaws. Local governments should avoid vague wording in OCPs or rushed review processes and amendments as these often result in habitat destruction.

7.1 Triggers

PROVINCIAL LEGISLATION: Local Government Act, CHAPTER 323, Part 26, Divisions 1 and 2 - Official Community Plans. Table of Contents www.bclaws.ca/Recon/document/ID/freeside/96323_00

An OCP and its sub-plans, such as neighbourhood, local area, or watershed plans, should contain policies for the preservation, protection, restoration and enhancement of the natural environment, its ecosystems and biological diversity (*Local Government Act* Section 878 (1)(d)). Section 877(1)(d) requires statements and map designations that place restrictions on the use of land that is environmentally sensitive to development.

7.2 Content

Some local governments prefer brevity over depth in explaining the scientific and ecological rationale for policies establishing protected and sensitive ecosystem designations. GOERT recommends providing detailed natural and social scientific rationale for protection of sensitive ecosystems. OCPs should promote awareness, understanding and appreciation of Garry Oak ecosystems. They can provide the justification for protection or restoration, and guidelines and exemptions when working in or around these ecosystems. A comprehensive justification is important, in particular, for designating EDPAs and setting out guidelines to which development applicants must adhere. **A detailed justification section in the OCP can help protect Garry Oak ecosystems.**

To reduce pressure on sensitive habitats, OCPs should contain maps that identify Garry Oak ecosystems, as well as critical habitat for SAR. In the natural environment chapter of the OCP, some local governments have applied specific policies to mapped ecosystem types, such as SEI or ESA categories like Garry Oak ecosystems and CDF ecosystems.

At a minimum, an OCP should contain policies that:

- clearly define “urban” and “rural” in terms of lot size and density;
- establish urban containment boundaries;
- direct development into existing serviced areas with target densities (e.g., 40 units per ha), before new greenfield development is allowed;
- protect Garry Oak ecosystems and SAR, including those that have not yet been discovered or mapped;
- cluster development away from Garry Oak ecosystems and critical habitat for SAR, on a local government-wide scale and within areas considered for development;
- create land use designations and matching zoning that prioritize protection of at-risk and sensitive ecosystems over other uses;
- identify greenway or biodiversity corridors and set targets for their protection and ecosystem function;
- set targets for biodiversity function (e.g., 40 to 70% park dedication for greenfield (bare land) development projects requiring rezoning);
- establish a rigorous EDPA regime to protect ESAs; and
- establish a schedule for monitoring and updating the OCP with new SAR information.

7.3 Sample Bylaw Wording

OCP Goals and Objectives

1. *Manage growth and protect the rural and green infrastructure areas by directing new development into existing serviced areas of the [Local Government] by establishing an urban containment boundary or boundaries.*

2. *Protect sensitive ecosystems, including Garry Oak and associated ecosystems, SAR, and the connections between them.*

3. *Maintain and restore natural values and ecosystem functions.*

4. *Ensure that development results in no net loss of native biodiversity.*

5. *Establish a network of connected sensitive ecosystems, including Garry Oak and associated ecosystems.*

OCP Policies

A) Regional Conservation

1. *The [Local Government] will work with the [Regional District] to create a regional conservation fund.*

B) Growth Management

1. *The Urban Containment and Servicing Policy Area (UCSA) is established as shown in Map [ ].*

2. *The [Local Government] Greenways System is established as shown in Map [ ].*

3. *Except as required to improve health and safety of existing development, no public funds will be expended for the capital cost of extending servicing of roads, water, sewer and stormwater/rainwater systems to lands outside of the UCSA.*

4. *Land use designations outside the UCSA will be rural resource lands, parks, and water supply lands. Development in these areas must avoid destruction of sensitive ecosystems, minimize building footprints, and support natural resource uses.*

5. *Minimum lots sizes outside the UCSA will be ten hectares or larger, in recognition that these areas will remain rural with limited commercial, institutional, industrial and residential uses, community services, and infrastructure.*

6. *[Local Government] will adopt minimum density targets for each neighbourhood that provide a standard to which development should occur*

before additional land is included in the UCSA and new development on bare land or greenfield sites is allowed.

7. *Within the UCSA, development will be concentrated in compact, mixed-use, complete communities.*

8. *Zoning will direct development away from the [Local Government] Greenways System.*

9. *A minimum of 95% of new development in the [Local Government] will occur within the UCSA.*

10. *Council will only consider amendments to the UCSA during a comprehensive review of the official community plan.*

11. *The development of possible amendments to the UCSA must include public consultation.*

C.) Environmental Protection

1. *All development proposals that involve a change in zoning, subdivision, amendment to an OCP, or in DPAs for protection of the natural environment must be considered under the EIA process as part of the application process for these proposals. The purpose of the assessment is to review impacts on the environment of proposed uses and to identify necessary development monitoring and mitigation measures.*

2. *The applicant will conduct inventories for sensitive ecosystems and SAR (plants, vertebrate and invertebrate animals) in appropriate seasons by qualified professional biologists with SAR identification expertise prior to the completion of the EIA to substantiate the findings of the EIA.*

3. *Some of the key considerations to be addressed through the EIA process include:*

    - *Protection of watercourses, including ephemeral and permanent water courses. Note the principal watercourses are designated in Map [ ], however this only represents a landscape level of designation. More*

detailed on the ground assessment of the actual protection area is still required.

- *Preservation of other sensitive habitats including Garry Oak and associated ecosystems, grasslands, mature and old growth forests, vernal pools, rock outcrops, habitats for species at risk, and connections between them.*
- *Preservation of functioning ecosystems including conservation areas, buffers and wildlife movement corridors or stepping stones.*
- *Appropriate mitigation measures to minimize impacts or habitat loss.*
- *Use of covenants, park dedication of riparian areas, or other appropriate measures to address the preservation of ecologically sensitive areas within the development blocks.*

4. *The EIA must meet the [Local Government's] ecosystem and biodiversity protection, mitigation, compensation, or replacement goals to ensure the maintenance of ecological features and ecosystem functioning.*
5. *Development design must reflect the objectives and guidelines of Best Management Practices, including:*
   - *Model Bylaws for the Protection of Garry Oak and Associated Ecosystems and Species (GOERT 2014);*
   - *Best Management Practices for Garry Oak and Associated Ecosystems (GOERT 2012);*
   - *Develop with Care 2012: Environmental Guidelines for Urban and Rural Land Development in British Columbia (B.C. Ministry of Forests, Lands and Natural Resource Operations 2012);*
   - *Stormwater Planning: A Guidebook for British Columbia (Ministry of Water Land and Air Protection 2002);*
   - *Water Balance Model for British Columbia (waterbalance.ca);*
   - *Green Bylaws Toolkit (Wetlands Stewardship Partnership 2007);*

- *Green Infrastructure Guide (West Coast Environmental Law 2007);*
- *Groundwater Bylaws Toolkit (Okanagan Basin Water Board 2009);*
- *Topsoil Bylaws Toolkit (Okanagan Basin Water Board 2012);*
- *Best Management Practices Guide for Stormwater (Greater Vancouver Sewage and Drainage District 1999);*
- *Water Conservation Planning Guide for British Columbia Communities (The POLIS Project on Ecological Governance 2009); and*
- *Land Development Guidelines for the Protection of Aquatic Habitat (Department of Fisheries and Oceans 1993).*

6. *The [Local Government] will develop a sound information base about all sensitive ecosystems to inform land use plans, regulatory processes and other priorities for protecting sensitive ecosystems. The [Local Government] will map ESAs, including Garry Oak and associated ecosystems and species at risk, and create a comprehensive Sensitive Ecosystems Inventory that describes all sensitive ecosystems.*

7. *Applicants for development must obtain and present all available information about their site from the Conservation Data Centre, Sensitive Ecosystems Inventories, natural areas atlases and other relevant inventories.*

8. *The [Local Government] will provide, or assist other government agencies and community organizations to provide information through brochures, seminars, presentations, and other educational activities, to landowners of sensitive ecosystem lands and all residents of the [Local Government] on the importance of Garry Oak and associated ecosystems and other sensitive ecosystems that will include ways in which they can help to preserve these important resources.*

9. *The [Local Government] will work with senior agencies and community organizations to restore damaged habitat and sensitive ecosystems.*

10. *The [Local Government] will require security deposits as part of the DP process to ensure the completion of landscaping and environmental rehabilitation, including invasive species management, and to address damage to the environment caused by development activity.*

11. *The [Local Government] will protect and preserve sensitive ecosystems using one or more of the following measures, where appropriate:*

    a. *dedication as a [Local Government] park or greenway, where the area complements the goals and objectives of the [Local Government]'s park or greenway systems. Sensitive ecosystems acquired as parks or greenways will be managed to protect their sensitive features from public use;*

    b. *dedication to a private land trust or non-government organization, which are eligible to receive donations of land under the Federal Ecological Gifts Program for conservation purposes;*

    c. *use of conservation covenants to preserve the natural values of sensitive ecosystems. The covenants will be held by at least two parties, and ideally by three parties, one of which will be the [Local Government]. The other parties that may hold these conservation covenants are the Provincial government and nongovernmental conservation organizations eligible to hold conservation covenants;*

    d. *registration of a statutory right-of-way under the Land Title Act;*

    e. *adoption of bylaws to exempt eligible riparian property from property taxes where a property is subject to a conservation covenant under Section 219 of the Land Title Act;*

    f. *density bonusing, cluster housing, or other development incentives within the UCSA to facilitate the protection of all or a significant portion of sensitive ecosystems;*

    g. *amalgamating lots to achieve greenways and ESA goals outside of urban containment boundaries; and/or*

h. *tailoring Development Cost Charges to include park planning and other core infrastructure functions associated with park acquisition.*

12. *The [Local Government] will encourage cluster forms of development to reduce the amount of land affected by residential growth where the permitted number of units is clustered on part of the site. The remainder of the site, usually 50 percent or more, is protected in its natural state. A proposal for clustering should meet the following conditions:*

    a. *the total area of land to be subdivided, excluding undevelopable land such as land in the Agricultural Land Reserve and EDPAs, divided by the number of lots to be created is no greater than the density permitted under the Zoning Bylaw,*

    b. *the parcel configuration and sizes are adequate to accommodate buildings and structures appropriate to the intended use and in compliance with the Zoning Bylaw,*

    c. *a restrictive covenant is registered in the name of the [Local Government] against the title to the land at the time of registration of the subdivision, prohibiting the further subdivision of the original parcel(s) under covenant,*

    d. *a long term management plan, including responsibilities and actions, for the future management of the remaining protected area is approved by the [Local Government].*

    e. *Where additional conservation measures or provision of amenities are included in the cluster development proposal, the Director of Planning may recommend to the [Local Government] that a comprehensive development zoning bylaw be considered.*

    f. *Garry Oak and associated ecosystems restored as part of development activities will be included in the Garry Oak and associated ecosystems EDPA.*

C) Encouraging Stewardship and Private Conservation

1. *The [Local Government] will use and contribute to Natural Resources Canada's Canadian Conservation Areas Database for keeping track of covenants related to protecting sensitive ecosystems, and for informing residents of their presence and significance.*

2. *The [Local Government] will encourage the protection, preservation, enhancement and management of sensitive ecosystems or land contiguous to sensitive ecosystems through the following methods:*

    a. *encouraging conservation organizations to secure priority habitat by purchase, conservation covenant or other options, including the use of amenity density bonusing;*

    b. *encouraging the donation of the areas to the [Local Government], or the Crown or a conservation organization;*

    c. *encouraging the donation of the areas to a land trust or conservation organization eligible to receive land under the Federal Ecological Gifts Program;*

    d. *encouraging the amalgamation of lots outside the urban containment boundary;*

    e. *establishing conservation covenants under the Land Title Act;*

    f. *acquiring statutory rights-of-way under the Land Title Act;*

    g. *entering into long-term leases for the area;*

    h. *encouraging private land stewardship and participation in stewardship or conservation initiatives;*

    i. *granting tax exemptions;*

    j. *using development works agreements;*

    k. *promoting guidelines or handbooks of best practices for mitigating the loss of Garry Oak and associated ecosystems and species at risk.*

3. *The [Local Government] will undertake, or assist other government agencies and community organizations in undertaking, to provide information through brochures, seminars, presentations, etc., landowners of*

sensitive ecosystem lands and all residents of the [Local Government] on the importance of aquatic habitat and other sensitive ecosystems, and ways in which they can help to preserve these important resources.

4. *The [Local Government] will encourage senior agencies and community organizations to restore damaged habitat and sensitive ecosystems.*

D) Public Use of Sensitive Ecosystems

1. *Heighten awareness of the ecological and economic importance of sensitive ecosystems by providing opportunities for public enjoyment of them in ways that respect their environmental sensitivity.*

2. *Comprehensively limit recreational access into sensitive ecosystems to minimize impacts.*

3. *Limit public trails and public access points in sensitive ecosystems to locations and times of use where and when their presence will not compromise the habitat and ecological function of these areas.*

4. *Protect sensitive ecosystems within [Local Government] parks by building public trails and access points so as not to compromise the ecological functions of these areas.*

5. *Encourage development of appropriate interpretive media to explain why access is restricted and the ecological significance of the sensitive ecosystems.*

E.) Rainwater

1. *Establish integrated rainwater management policies that maintain the natural hydrology and natural environment of watersheds, groundwater, streams, and other waterbodies, including provisions that ensure the maintenance of minimum base watercourse flows.*

2. *Preserve the natural hydrologic cycle, including vegetative rainfall interception and evapotranspiration, and groundwater infiltration and percolation to the extent that subsurface conditions permit.*

3. *Preserve the site characteristics, including natural terrain, drainage patterns, soil structure, and native vegetation to the maximum extent possible.*

4. *Manage development to maintain rainwater characteristics that emulate the pre-development natural watershed (no net increase in rainwater flows off each site and into receiving watercourses), including adopting maximum effective impervious standards in the zoning and subdivision bylaws.*

5. *Predict the cumulative rainwater impacts of development and integrate this information with other economic, land use, and sustainability objectives and policies when considering land use change.*

6. *Implement watershed-specific performance targets for rainfall capture, runoff control, and flood risk management during development, and refine these targets over time through an adaptive management program.*

F) Groundwater

2. *Undertake integrated watershed planning that includes groundwater assessment.*

3. *Maximize aquifer recharge by limiting effective imperviousness to 10 percent of any watershed and infiltrating 90 percent of rainwater.*

4. *Promote and implement regional water sustainability policies through [Name of Regional District] Regional Growth Strategy*

5. *Coordinate with other agencies and organizations to develop a regional agricultural water conservation strategy.*

6. *Work with the Ministry of Environment, other local governments and conservation organizations to undertake aquifer and groundwater mapping.*

G) Wetlands and Watercourses

1. *Protect water quality through best management practices for land development.*

2. *Use engineered wetlands, oil/water separator or other water detention facilities to filter pollutants before they enter streams, creeks, or groundwater.*

3. *Require the use of vegetated waterways and swales or other measures to prevent the movement of road salts and other contaminants into sensitive habitats.*

4. *Enact or amend watercourse protection provisions in bylaw format that:*

    a. *restricts the polluting or obstructing or impeding the flow of a watercourse and imposes penalties for contravention of the prohibition;*

    b. *establishes a maximum percentage of lot or watershed areas that can be covered by impermeable material, particularly adjacent to sensitive ecosystems;*

    c. *establishes standards for drainage works for the ongoing disposal of surface runoff and stormwater from paved areas and roof areas during and after construction to maintain natural runoff volumes and water quality.*

5. *Where appropriate, require erosion and sediment control plans before construction begins, including the construction and stabilization of runoff management systems at the beginning of site disturbance and construction activities.*

6. *Minimize disturbed areas and the stripping of vegetation and soils, particularly on steep slopes.*

H.) Conservation Zoning

1. *Review and amend permitted uses in zones near sensitive ecosystems to prohibit or regulate uses that would have adverse impacts on the ecological function of the sensitive ecosystem.*

2. *Review and amend density, lot size, and site coverage regulations on a watershed basis to ensure that zoning maintains or enhances ecosystem function.*

3. *Review and amend regulations for the siting, size, and dimensions of uses and buildings in zones adjacent to sensitive ecosystems to ensure the uses will not compromise the sensitive ecosystem.*

4. *Ensure that protection and dedication of sensitive ecosystems is the priority amenity for any development that involves a density bonus.*

5. *Create cluster housing zones for residential areas adjacent to sensitive ecosystems to allow a tighter grouping of houses or multiple-unit buildings on the most buildable portions of a site in exchange for retaining a large portion of the land, such as a sensitive ecosystem, in a natural state.*

6. *Establish comprehensive development zones for complex sites within the UCSA development areas to enable careful site planning for conservation of sensitive ecosystems.*

I.) Partnerships

1. *The [Local Government] will provide leadership in the development and implementation of a long-term strategy to acquire priority sensitive ecosystems, including:*

    a. *acquiring and preserving sensitive ecosystems as part of local parks programs;*

    b. *identifying acquisition priorities in co-operation with non-government and government conservation organizations;*

c. *identifying priorities for protection through development permit, rezoning, subdivision, and other regulations;*

d. *acquiring additional lands that focus and limit the spatial growth of communities and provide a natural landscape setting for a community;*

e. *working with the [Name of Regional District] and other municipalities to create a regional conservation fund; and*

f. *tailoring development cost charges to support park planning and other elements of park acquisition.*

For more comprehensive and detailed bylaw provisions see the *Green Bylaws Toolkit* at www.greenbylaws.ca.

7.4 Challenges and Opportunities

7.41 Setting Targets

Setting targets for ecosystem protection to ensure they continue to function and provide ecosystem services can be challenging for policy makers, as the supporting science is very complex. For example, there are a range of values that an ecological threshold might take (Pannell 2012) and research in this arena generally requires investigations with multiple species, extrapolation, surrogates for missing information, and modeling (cf. Holt 2007; Price, Holt and Kremsater 2007; Price, Roburn and MacKinnon 2008). With less than 5% of Garry Oak ecosystems remaining, however, target setting becomes very straightforward - we have far exceeded a reasonable balance between protection and destruction of these ecosystems. **Local governments are urged to set targets for protection that include all remaining Garry Oak ecosystems.**

Where this is impossible, targets for protection as well as restoration should be developed and implemented at both landscape and site level scales. At a minimum, there should be no net loss of Garry Oak ecosystems. Still, it is important to consider offsetting measures as a final option. Restoration is often difficult, expensive, and tends to take place over many years. It is important to be

mindful of ecosystem-based landscape planning principles such as maintaining natural biodiversity, physical structure, ecological connectivity, ecosystem functioning, and provision of ecosystem services. Also, ecosystems cannot be re-created and attempts to mimic them often fail.

An excellent way to approach the challenge of developing meaningful targets that enhance landscape level connectivity, the resilience of ecosystems and species, and provision of ecosystem services is through the development of a Regional Biodiversity Conservation Strategy. The conservation strategy, which was recommended for inclusion in the RGS, is discussed in more detail in Chapter 8.

The Capital Regional District's 2012-2021 Regional Parks Strategic Plan, at www.crd.bc.ca/parks/planning/strategicplan.htm, subscribes to the idea that "nature needs half". It strives to conserve at least half of the region's land base for nature, noting also that Garry Oak ecosystems are underrepresented in the parks system [requiring a higher relative target].

7.42 The Parenting Role of OCPs

OCPs are occasionally referred to as "motherhood" documents. Just as a parent plays many roles to protect and guide his or her child (e.g., rule-maker, teacher, nurse, coach), the OCP as a parent document takes on many roles to guide other plans, regulatory bylaws and legal agreements. In its objectives, for example, it can identify, protect, conserve, restore, and enhance. In its policies, it can encourage, require, assist, support and designate. Just as a good parent explains "why", an OCP should provide a convincing argument for protecting Garry Oak ecosystems. Like a caring parent, it should set sufficient boundaries to protect them. Like an enthusiastic parent, it reminds us to strive for high ideals in all our endeavours. Just because a development with LEED buildings is nicely clustered does not mean it should get a free pass from all other requirements in the OCP and RGS that addresses ecosystem protection, for example. In the same way that parents strive to provide the best resources for their developing child, an OCP can use, create, and legitimize a suite of tools to protect Garry Oak ecosystems. It can, for example, identify gaps in mapping, trigger EIAs under certain circumstances,

and direct developers to GOERT Best Management Practices. The OCP is an opportunity to set a “fair but firm” tone requiring protection for Garry Oak ecosystems that diffuses into all other documents.

The Town of Oliver’s OCP (Bylaw 1070 (2003, with amendments up to July 8, 2013) reflects the efforts of the region’s shared environmental planner, and is available at https://oliver.civicweb.net/Documents/DocumentList.aspx?ID=41302.

Canada’s largest Garry Oak tree, Cowichan Garry Oak Preserve (Photo by Chris Junck)

8.0 REGIONAL BIODIVERSITY CONSERVATION STRATEGIES



Left: Springbank Clover (Trifolium wormskjoldii), its rhizomes once an important food source for First Nations;
Middle: Bare-stem Desert Parsley/Consumption Plant (Lomatium nudicaule), a medicinal and food plant for First Nations (Photos by Chris Junck);
Right: Bog Bird's Foot Lotus (Hosackia pinnata, formerly Lotus pinnatus), federally Endangered, provincially Red-listed, and the City of Nanaimo's official flower

A Regional Biodiversity Conservation Strategy (RBCS), also called a Regional Conservation Strategy or a Biodiversity Strategy, creates a regional vision for biodiversity conservation and provides a framework to integrate biodiversity values into land use and development policies and decisions. Regional Districts can adopt an RBCS in a RGS and in OCPs for electoral areas, while municipalities can adopt a RBCS as part of an OCP.

The first step is to establish a geographical foundation for the strategy, by mapping sensitive ecosystems, critical habitat for SAR, and other environmentally valuable resources such as ungulate winter range or wildlife trees. These resources are assessed and ranked to set scientifically defensible goals and priorities for protecting and restoring important natural areas at watershed, ecosystem, and site-specific scales. The RBCS also outlines processes for coordinating and supporting management of biodiversity values across the region.

8.1 Triggers

An RBCS can be the basis for, become a part of, or precipitate from a RGS or OCP. Some RBCSs have been initiated by conservation groups or have been managed in partnership with senior governments and conservation groups.

8.2 Content

An RBCS process should:

- map sensitive ecosystems including Garry Oak ecosystems, known locations and critical habitat for SAR, and other environmentally valuable resources;
- assess and rank mapped valued resources in the context of protected status, land cover, access, condition, etc. (similar to the methods used to assess Garry Oak ecosystems in 18.33 Priority Site Records);
- identify potential buffers around sensitive ecosystems;
- identify wildlife corridors and other modes of habitat connectivity;
- identify key challenges and opportunities that communities encounter when working to conserve biodiversity, and ways to overcome them (for example, using threats of sea level rise and concerns about loss of viewscapes to protect shoreline ecosystems);
- identify indicators for measuring biodiversity and ecosystem health;
- document the range of efforts to conserve biodiversity in the region, including regulatory mechanisms, planning tools, stewardship initiatives, research, monitoring and educational programs; and
- collaborate among agencies and conservation organizations across jurisdictional boundaries in the region.

The RBCS document should include:

- justification for conserving biodiversity;

- maps of relative biodiversity and connectivity;
- goals and objectives for conserving biodiversity in the region;
- commitments for protecting green infrastructure through urban containment boundaries and other means;
- policies that enhance connectivity among habitats and protected areas;
- policies that help buffer sensitive areas (for example, to encourage protection of upslope areas that are hydrologically linked to Garry Oak ecosystems);
- descriptions of the ecological principles that underlie biodiversity conservation, such as ecosystem representation, structural diversity, and connectivity;
- regional priorities for land securement, at ecosystem and site scales;
- regional priorities for management or restoration activities for Garry Oak ecosystems;
- research needs to address data gaps;
- biodiversity indicators and schedules for monitoring; and
- processes for coordinating biodiversity conservation activities across jurisdictions in the region.

One of the earliest RBCSs was the *Green/Blue Spaces Strategy* created in 1997 by Capital Regional District Parks and the Provincial Capital Commission, available at https://www.crd.bc.ca/docs/default-source/parks-pdf/greenblue_spaces_strategy.pdf?sfvrsn=0. The strategy was described as "neither a park plan nor a policy document, but a vision of cooperative stewardship".

Strategic Directions for Biodiversity Conservation was published in 2008 by the Biodiversity Conservation Strategy Partnership as an initiative under the Georgia Basin Action Plan. The RBCS provided a framework to incorporate biodiversity into Metro Vancouver's land use policies, plans and programs. Embedded in the strategy is a Regional Biodiversity Mapping Project that identified biodiversity hot spots, categorized the region's habitats into types, established the relative importance of these types, identified larger habitats and the connectivity among

them, and determined whether areas of high biodiversity were protected. The report is available at www.metrovancouver.org/about/publications/Publications/StrategicDirectionsBiodiversityConservation.pdf.

In 2011, Metro Vancouver produced an *Ecological Health Action Plan*. The plan summarizes how ecological health is being incorporated into the region's plans and operations, and proposes 12 projects to be implemented within 2 to 5 years. These projects include advancing a regional green infrastructure network, redeveloping green spaces, and more. The plan can be viewed at www.metrovancouver.org/planning/development/ecologicalhealth/EcologicalHealthDocs/ECOHealthActionPlan_Nov2011.pdf.

The 2012 B*iodiversity Strategy for the South Okanagan and Similkameen*, available at www.soscp.org/wp-content/uploads/2012/11/KNOIF-2013-web.pdf, was informed by an analysis that integrated a variety of regional-scale environmental and land tenure data together with associated attributes, resulting in a series of maps that depict habitat connectivity and the relative biodiversity of the region. *Biodiversity Conservation Analysis and Mapping for the South Okanagan Similkameen Region: Keeping Nature in Our Future Volume 1* (2011) can be accessed through EcoCat at http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=23903. "Primer reports" with recommendations for conservation and restoration of natural areas, and maps showing the location of sensitive ecosystems, were prepared for each municipality and rural area in the Regional District South Okanagan-Similkameen; these are available at www.soscp.org/biodiversity/primer-reports/.

The Islands Trust Fund Regional Conservation Plan is updated every five years. The 2011-2015 plan, at www.islandstrustfund.bc.ca/media/9359/regional_conservation_plan.pdf, describes Garry Oak ecosystems and their importance today and in the future. It examines threats to these ecosystems and references GOERT as an important resource. At-risk ecological communities and species are documented along with their rankings in the provincial Conservation Framework.

Enviroplan: An Environmental Strategic Plan for the City of Coquitlam, available at www.portcoquitlam.ca/Dynamic/Page4758.aspx, promotes biodiversity conservation in a variety of ways. These include working towards connectivity, protecting urban forests, encouraging protection and creation of small-scale habitats through backyard stewardship and green yard care, supporting restoration projects and SAR recovery, and controlling invasive species. "Big Idea 5" describes a "Green Network" that uses the state-wide Delaware Ecological Network as a model. The Delaware model was described by Weber (2007) and can be found at www.dnrec.delaware.gov/GI/Pages/Conservation.aspx.

Biodiversity by Design: A Guide for Sustainable Communities was produced by the Town and Country Planning Association in England. Available at www.tcpa.org.uk/data/files/bd_biodiversity.pdf, this guide presents a range of European examples where biodiversity has been integrated into planning and design.

8.3 Challenges and Opportunities

8.31 Collaboration Across Jurisdictions

The development of a RBCS by definition must include collaboration across jurisdictions. This is facilitated by partnerships among local governments, senior governments, organizations, and corporate landholders. Outcomes of effective collaboration during the RBCS process include working relationships among dedicated project partners, and mechanisms for long-term regional coordination and resource sharing. For example, local governments together with land trusts and conservation organizations can use the strategies to direct land securement and stewardship programs.

8.32 Connectivity Across Jurisdictions

Ecosystems and species do not recognize jurisdictional boundaries, therefore management of these requires a regional scope and attention to ecological

connectivity. Connectivity, or the lack of it, is a reflection of our ability to organize and protect our natural infrastructure relative to the built environment.

The spatial pattern of remaining patches of ecosystems on a fragmented landscape, and the sequence of patch removal (i.e., the relative order of habitat losses) are known to be significant predictors of ecosystem health and the persistence of species over time. This pattern directs important genetic exchange and allows species to move as opportunities arise or as conditions worsen. Worldwide, species range shifts are occurring with startling frequency as a result of climate change. Climate-related migration barriers are expected to contribute to unprecedented levels of extinction. The present extent of at-risk ecosystems and numbers of SAR are strong indicators that the current pattern of protected areas will leave our communities vulnerable to losses of ecosystem services and other risks associated with climate change. In 2012-13, GOERT and Vancouver Island University worked together to address the challenge of maintaining connectivity among Garry Oak ecosystems - see Spotlight page 84.

The Green Links Project in Greater Vancouver planted native vegetation in utility rights of way, riparian areas, backyards, and hedgerows to improve connectivity among natural ecosystems. Plant stock was purchased from nurseries or salvaged from development sites. Five thousand community participants planted 50,000 trees, shrubs, and perennials, and sowed hundreds of pounds of seeds. The project encountered a number of challenges. Disturbed sites were frequently devoid of topsoil, with drastically altered drainage patterns. Impervious surfaces caused wide swings in moisture availability, which destabilized plant communities (Schaefer 2003).

The Biodiversity Strategy for the South Okanagan and Similkameen, described at the end of this section, is being used to develop a connectivity strategy. The strategy confronts habitat fragmentation by examining structural and functional connectivity in the context of habitat patch size, shape, quality, and configuration. Landscape management principles and more specific guidance are provided to guide reserve selection and design of corridors, buffers and stepping stones.

The Comox Valley Conservation Strategy Community Partnership, a conglomeration of stewardship groups, land trusts, residents, and ratepayers associations, developed *Nature Without Borders* in 2008, available at www.cvconservationstrategy.org/strategy/. In its RGS, the Comox Valley Regional District endorsed the concept of regional conservation put forward by the RBCS and used its mapping to demonstrate connectivity at a regional scale.

The City of Edmonton created the *Natural Connections Biodiversity Action Plan* in 2009, available at www.edmonton.ca/environmental/documents/Edmonton_Biodiversity_Action_Plan_Final.PDF. The straightforward layout of this document is its greatest strength - "Why have we set out in this direction?" is followed by "Where We Are", "Where We're Going", and "How We'll Get There".

A RBCS-style report commissioned by Scottish Natural Heritage used habitat surveys, aerial photography, and ground-truthing to identify wildlife corridors and stepping stones. The features identified were assessed in terms of connectedness, habitat quality, diversity, vulnerability, and extent and classified as either strategic, local, or fragmented corridors or fragmented wildlife habitats. See *The Network of Wildlife Corridors and Stepping Stones of Importance to the Biodiversity of East Dunbartonshire*, at www.snh.org.uk/pdfs/publications/commissioned_reports/fo1li04b.pdf.

8.33 Bylaw Reviews and RBCS Reporting

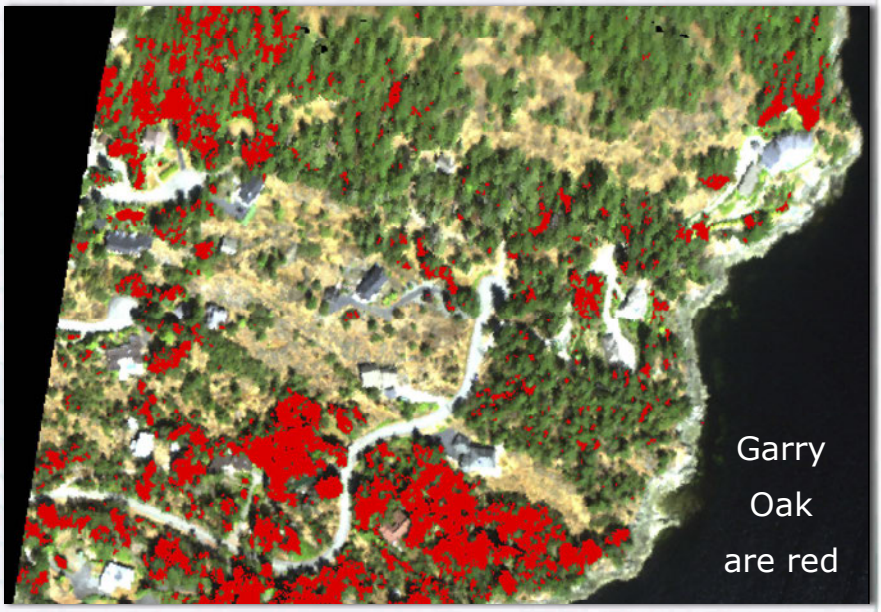
Reviews for OCP and zoning bylaws should be scheduled to follow regular reporting on environmental, social, and economic indicators identified in the RBCS. Environmental indicators should include, for example, "hectares of Garry Oak ecosystems", "number and status of provincially Red-listed and Blue-listed ecological communities, and SARA and provincially listed species".

SPOTLIGHT

GOERT- PLANNING AN ECOSYSTEM-BASED GREEN INFRASTRUCTURE NETWORK

Connectivity Prototype

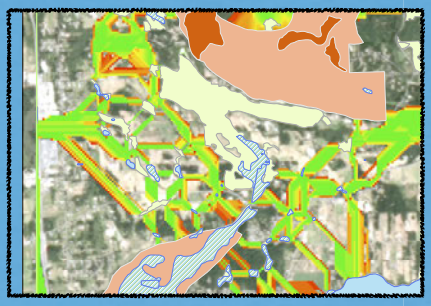
Building transportation infrastructure and developing communities in ways that conserve biodiversity and ecosystem connectivity takes effort. In 2012, GOERT and Vancouver Island University began designing a Geographic Information System (GIS)-based prototype that would ease the level of technical effort needed, by finding remaining corridors and stepping stones connecting Garry Oak ecosystems. The model, once completed, will enable users to enhance their unique datasets as new data become available, at the same time planning for connectivity with neighbouring jurisdictions using a standardized framework. Partnerships are needed to facilitate more of this work.



Mapping Garry Oak

While developing a connectivity prototype, we discovered a promising new way of mapping ecosystems and their linkages more precisely than ever before. With two advanced remote sensing technologies-LiDAR and hyperspectral, it is possible to identify and map individual Garry Oak trees and sensitive ecosystems directly, rather than relying on coarse scale air photo interpretation products such as the Sensitive Ecosystems Inventory.

DIALOGUE SESSION
for a pilot area in the Cowichan Valley and on Saltspring Island



MAPPING CONNECTIONS
among Garry Oak and other sensitive ecosystems

FIELD-CHECKING
hyperspectral data by kayak in Maple Bay

9.0 ZONING BYLAWS

Left: Oaks felled for the Bear Mountain interchange;
Middle: Residential building site on Triangle Mountain (Photos by Chris Junck);
Right: Potential development in Nanaimo.
All of these developments affect Garry Oak ecosystems.

Zoning is the most straightforward way of protecting Garry Oak ecosystems by simply directing development away from them. Zoning bylaws establish the use of land, the density and placement of buildings and other structures on the land, the connectedness and retention of natural areas, and sometimes requirements for landscaping.

For both urban and rural properties that contain Garry Oak ecosystems, zoning can first direct intensification of the built environment to lands without ESAs on them. Large lots with ESAs and biodiversity connections can be retained through zoning.

Zoning may also support other ecosystem protection tools. It may support EDPAs by requiring setbacks from identified ESAs. Conservation zones, maximum densities, downzoning, density transfer between and within parcels, and landscaping and screening requirements (including tree retention and replacement) are other ways that the zoning bylaw can protect ecosystems.

"A zoning bylaw is not planning by any stretch of the imagination....How do you make decisions? It's not because the zoning bylaw says so, because you can change a zoning bylaw. The way I look at it is that you have to provide the information to the decision-makers and the more information we have the tighter the decision can be....You know when you have a fire triangle, you have your heat, your fuel, your oxygen, you get a fire. The way that I look at it, you have your site, you have the attributes of the site - both surface and subsurface, you have the community - how do they feel about it? When you have these things together, you have a good plan, a good site plan."..... GOERT Dialogues 2012

A good zoning bylaw rests on a strong foundation of well-written higher level plans and detailed site-specific data that has been collected according to widely accepted, standardized practices.

9.1 Triggers

PROVINCIAL LEGISLATION: Local Government Act, CHAPTER 323, Part 26, Division 7 – Zoning and Other Development Regulation. Table of Contents www.bclaws.ca/Recon/document/ID/freeside/96323_00

9.2 Content

At a minimum, zoning should:

- establish zones for conservation to protect Garry Oak ecosystems and SAR;
- establish clear urban and rural categories for density, avoiding intermediate lot sizes that fragment ecosystems (Smart Growth B.C.'s 2008 position statement suggests a minimum rural lot sizes of 8 hectares or more than 10 dwelling units per ha for urban and suburban areas, at www.smartgrowth.bc.ca/Portals/0/Downloads/SGBC_UCB_positionstatementFinal.pdf.)

- allow intensive residential development[3] in urban zones, clustered away from sensitive ecosystems and greenways;
- permit uses appropriate for the area and that minimize disturbance to Garry Oak ecosystems;
- establish setbacks from ESAs;
- enable density bonus for appropriate areas, including for rural areas where there are significant ecological values and the density bonus would result in clustering the development without compromising rural character or ESAs;
- establish a maximum percentage of the area of land that can be covered by impermeable material; and
- set standards for screening and landscaping that protect ESAs.

The Regional District of Central Okanagan's Zoning Bylaw 871 (revised August 20, 2012), available at www.regionaldistrict.com/media/27155/consolidated_zoning_bylaw_no._871.pdf, includes a Conservation Lands zone (CL8), dedicated to protection and conservation of the natural environment, with a maximum parcel coverage of 5%.

9.3 Sample Bylaw Wording

General Provisions

1. *Where a lot contains an ESA identified in Schedules [ ] and [ ], the ESA is not to be included in the area of the lot for the purposes of calculating permitted lot coverage or units per hectare.*

[3] To prevent the inefficient use of land, Smart Growth B.C.'s position statement on urban and rural containment boundaries (2008) recommends urban densities of at least 30 units per ha. To provide cultural context, a United Kingdom example categorizes low density sites as 30 to 40 units per ha, medium density sites as 40 and 110 units per ha, and high density sites above 110 units per ha (Ipswich Borough Council 2006). In a U.S. study, Kopits, McConnell and Miles (2009) found evidence that people were willing to trade lot size for more open space in their area.

2. *Where land is dedicated for environmental conservation or stewardship purposes, the regulations in this Bylaw dealing with lot coverage, and the minimum lot area required for particular uses are to be applied to the lot as if the land had not been dedicated.*

3. *The setback adjacent to riparian areas and terrestrial ESAs identified in Schedules [ ] and [ ] shall include a perpendicular line away from the identified feature 30 metres (49.2 feet) from the boundary of the riparian area or ESA (see Diagram [ ]).*

4. *No building, structure, road, parking lot, driveway, patio, games court or other impermeable surface shall be located within a setback.*

Parcel Size

1. *To create a buffer, each parcel created by subdivision that abuts an ESA shall be large enough to ensure that development activity on the new parcel is at least 30 metres from the ESA.*

2. *If a subdivision is proposed that yields the maximum number of lots permitted by the applicable minimum and average lot areas specified by this Bylaw, and one or more of the lots being created has an area equal to or greater than twice the applicable average lot area, the applicant must grant a covenant complying with Section [ ] of this Bylaw for every such lot, prohibiting further subdivision of the lot.*

3. *Where the approval of a bare land strata plan would create common property on which this Bylaw would permit the construction of a residential dwelling unit or seasonal cottage if the common property were a lot, the applicant must grant a covenant complying with Section [ ] of this Bylaw for the common property prohibiting the further subdivision of the common property, the construction of any residential dwelling unit or seasonal cottage on the common property, and the disposition of the common property separately from the strata lots.*

Amenity Density Bonus

A.) Intent

The purpose of this zone is to allow and regulate the development of family-oriented housing on a large site, in the form of duplexes, triplexes or fourplexes on individual lots, or in the form of ground-oriented multiple unit residential buildings with substantial public open space protected within the development site in accordance with a comprehensive design. This Zone shall only be considered if there are special amenities such as Garry Oak and associated ecosystems, mature vegetation, watercourses, sensitive ecosystems, or other landscape or heritage features worthy of preservation, or the site can contribute open space to a park designated in the Official Community Plan.

B.) Permitted Uses

Land and structures shall be used only for the following uses and if clustered on less than 50% of the landscape:

- *Duplexes, triplexes and fourplexes on individual lots;*
- *Rowhouses;*
- *Ground-oriented multiple unit residential buildings, or a combination of ground-oriented multiple unit residential buildings, duplexes, triplexes and fourplexes; and*
- *Mixed-use Residential/Commercial on up to 10% of the property.*

C.) Lot Area

The minimum lot area for subdivision shall be 1 hectare.

D.) Density

(Note: 1a is a provision to facilitate amenity density bonusing, i.e., developers will be urged to strive for a higher density (up to 40 units per ha) in return for conserving a landscape that might otherwise be developed.)

1. For the purpose of subdivision:

a. *In lands within the Urban Containment and Servicing Area as described and outlined on the maps attached as Schedule [ ] to this Bylaw, the maximum unit density shall not exceed 15 units per hectare. The maximum unit density may be increased to 40 dwelling units per hectare calculated on the basis of the entire lot, provided that:*

b. *Open space is preserved in its natural state and retained for public park purposes as follows:*

- *Duplexes, triplexes and fourplexes 50% of the site area for subdivision;*
- *Ground-Oriented Multiple Unit Residential Buildings 70% of the site area for subdivision;*
- *Mixed-Use Residential/Commercial 70% of the site area for subdivision; or*
- *A combination of the above, between 60% and 80% of the site area for subdivision.*

c. *The open space shall contain Garry Oak and Associated Ecosystems and other ESAs identified in Schedules [ ] and [ ], other natural features worthy of preservation, and*

d. *The open space shall be accessible by the public from a highway.*

2. *Floor Area Ratio*

a. *For the purpose of this Section and notwithstanding the definition of floor area ratio in Part 1 Definitions of this Bylaw, all covered areas used for parking shall be included in the calculation of floor area ratio unless the covered parking is located within the basement; and*

b. *For building construction within a lot created under this Zone, the maximum floor area ratio (FAR) shall be as follows:*

- *Duplexes, triplexes and fourplexes 0.70*
- *Ground-Oriented Multiple Unit Residential Buildings 0.80*
- *Mixed-Use Residential/Commercial 0.80*

For more comprehensive and detailed bylaw provisions see the *Green Bylaws Toolkit* at www.greenbylaws.ca.

9.4 Challenges and Opportunities

9.41 Property "Rights" and Zoning

As noted in the *Green Bylaws Toolkit* (Wetland Stewardship Partnership 2007), **private property rights are not entrenched in the Canadian Constitution, and consequently B.C. local government zoning bylaws do not create "development rights".** Local governments are free to change Zoning (and OCP) bylaws without compensating landowners as long as the change does not restrict the use of the land to a public use (*Local Government Act*, Section 914(1-2). In other words, no compensation is owed for changes in land value due to rezoning (or issuance of a permit), however, the land cannot be zoned for a public use without compensating the landowner. An exception to this is where a landowner has submitted a development application based on existing zoning, or otherwise vested the ability to develop (Deborah Curran and Company 2011).

Yet, there is sometimes an expectation among purveyors and buyers of real estate that upzoning may occur but downzoning will not, even when decreasing the density or intensity of use reflects the public interest as expressed in planning documents (Deborah Curran and Company 2011). Downzoning in the public interest can be confusing to landowners because property ownership and management agreements sometimes confer legal rights (e.g., riparian rights to protect waterfront properties from erosion[4]), and some hail from jurisdictions that have explicit private property rights (e.g., Alberta, United States). Clarity in perception and understanding is needed to protect remaining Garry Oak ecosystems.

It is important to shift from the language of property or development "rights" to property or development "permissions" or "opportunities". Case law can also be

[4] See B.C. Ministry of Agriculture and Lands (2008) at www.salishsea.ca/resources/Riparianrights/riparianrightsinBC.pdf)

used to reinforce this very important principle (e.g., British Columbia v. Tener, [1985] 1 S.C.R. 533, 17 D.L.R. (4th) 1, 28 B.C.L.R. (2d) 241, 32 L.C.R. 340, 36 R.P.R. 291, [1985] 3 W.W.R. 673, 31 A.C.W.S. (2d) 47, 59 N.R. 82 at 557; Per Cory J. in Toronto Area Transit Operating Authority v. Dell Holdings, [1992] 1 S.C.R. 32 at 51-52; Mariner Real Estate Ltd. v. Nova Scotia (Attorney General), (1999) 177 D.L.R. (4th) 696, 68 L.C.R. 1, 90 A.C.W.S. (3d) 589, 178 N.S.R. (2d) 294, (N.S.C.A.) (as noted in Deborah Curran and Company 2011).

Because ecosystems do not recognize ownership boundaries, yet are highly susceptible to them, to be effective protection tools, bylaws must prioritize ecosystem integrity over private property concerns. Through zoning bylaw review processes and responses to requests for zoning changes, local governments have an opportunity to instill property owners with a view of themselves as short-term managers of portions of a greater landscape under collective stewardship. Each landholder then has a responsibility to ensure that their activities do not negatively impact the integrity of shared resources - such as the ecosystems that we all rely upon. This is not to say that the wishes of individual property holders not be respected, only that they be considered alongside the needs of others, including future landowners.

"We cannot transfer development rights. You can do a density bonus and protect another area. It's important not to message it as a transfer of rights, so that landowners don't think they have vested rights. There was inappropriate zoning in the 70s and 80s, and though unpopular, we need to change it." ...Deborah Curran, Lawyer, February 2012, SEAR LG WG workshop, Victoria

9.42 Amenity Density Bonus

Protection of Garry Oak ecosystems can be achieved by negotiating with landowners who desire more density through rezoning. Local governments may allow more density through density bonus zoning if the developer provides an amenity in exchange, such as dedication of parkland, protection of ESAs by covenant, or restoration of degraded ecosystems. The acquisition, protection, or restoration of Garry Oak ecosystems can be considered "amenities" within the meaning of Section 904 of the *Local Government Act*. Likewise, phased

Development Agreements can include a wide variety of terms of conditions, including provision of amenities (See Sections 905.1-6 of the *Local Government Act*).

Policies in the OCP and zoning bylaw should include the maximum increase in density over base density that is permissible, a short list of desired amenities, and a clear formula that calculates and demonstrates the benefits of the density to the landowner and the community.

The City of Nanaimo Amenity Requirements for Additional Density employs a point system to assess different categories of amenities (e.g., site connectivity, retention of natural features, water management) in Schedule D of the City's Zoning Bylaw No. 4500 (Updated August 2011) at www.nanaimo.ca/UploadedFilesPath/Bylaws/BylawNo4500.pdf#nameddest=Schedules

9.43 The Problem with Clustering

"Too many people think that subdividing into half acre lots is the way to go. Clustering buildings... and having the land around the higher density preserved forever would be a nicer place to live and it would also be a better habitat for wildlife"....GOERT Dialogue Sessions, February 2012

While clustering development may protect Garry Oak ecosystems from destruction and/or further fragmentation, it also increases the likelihood that there are many more people residing nearby - particularly when combined with amenity density bonuses. When residential areas are created near parkland, the parks are subject to higher use and degradation; this is true for other natural areas as well. It is important that access to, and projected use of, Garry Oak ecosystems be evaluated when contemplating zoning and rezoning. Controlling access to sensitive ecosystems with perimeter trails, fencing, or low barriers together with signage may help preserve the integrity of ecosystems adjacent to clustered developments. Local governments can encourage land owners and managers of clustered developments to recruit volunteers to steward these properties, similar to volunteer warden programs for parks.

9.44 Runoff Control Requirement

Although Garry Oak ecosystems are capable of withstanding torrential winter storms and prolonged summer droughts, they are remarkably sensitive to subtle changes in the timing and amount of precipitation and runoff. Zoning bylaws can include regulations for controlling surface and rainwater runoff, and by doing so, maintain hydrological patterns, contribute to good surface and groundwater quality and quantity, and reduce strain on storm/rainwater infrastructure. Section 907 (2) of the *Local Government Act* allows a local government to establish the maximum percentage of the area of land that can be covered by impermeable material. It is important to consider this in terms of topography, the quality and depth of substrates (e.g., depth to bedrock, types of soils, presence of karst[5]), current and anticipated extent of trees and other vegetation in the area contributing water vapour through transpiration, water use and demands over seasons and time, and anticipated changes to weather patterns, surface runoff, and aquifer recharge. See also Chapter 14 Rainwater Management Bylaws.

9.45 Screening and Landscaping

Local governments have the power to set standards for and regulate the provision of screening or landscaping to preserve, protect, restore, and enhance the natural environment (*Local Government Act*, Section 909 (1) (b)), and these requirements are often found in the zoning bylaw. This enables governments to promote the use of appropriate native species in landscaping and to use natural vegetative buffers to protect Garry Oak ecosystems from the built environment. Standards during and post-construction can help prevent the use, establishment, and spread of invasive species; the creation of trails and other forms of trampling; dumping of garden and construction waste; and other typical incursions into sensitive ecosystems. See also Chapter 15 Invasive Species Bylaws.

---

[5] Karst is a distinctive type of topography characterized by caves, sinkholes, disappearing streams and springs. It is found in only 3% of the Coastal Douglas-fir biogeoclimatic zone (P. Griffiths, APB conference, May 6, 2011) and can occur in Garry Oak ecosystems.

10.0 ENVIRONMENTAL DEVELOPMENT PERMIT AREAS

Left: Garry Oak on cliff edge;
Middle: Garry Oak woodland at Observatory Hill (Photos by Chris Junck);
Right: Garry Oak along the shores of Birds Eye Cove at Maple Bay

EDPAs are the most versatile tool for shaping how development occurs on a site. For land in an EDPA, subdivision, building or site alteration is prohibited until a local government issues a development permit (DP) that includes conditions that an applicant must meet. The DP may specify areas of land that must remain free of development, require natural features or areas be preserved or restored, require natural water courses to be dedicated, and require protection measures such as tree planting or retention. EDPAs are enforced by application to court.

10.1 Triggers

EDPAs are designated in OCPs, with justification, objectives, guidelines, exemptions, and maps. They can also be developed through Neighbourhood Plans, as long as the plans are incorporated as part of the OCP.

PROVINCIAL LEGISLATION: Local Government Act, CHAPTER 323, Part 26, Division 9, Section 919.1 - Designation of Development Permit Areas, Section 920 - Development permits, Section 922 - Development variance permits. See Table of Contents www.bclaws.ca/Recon/document/ID/freeside/96323_00.
Bill 27, the *Local Government (Green Communities) Statutes Amendment Act*

(2008) enabled local governments to establish DPAs for the objectives of water conservation. This type of EDPA can help protect Garry Oak ecosystems and the hydrological conditions that support them, by requiring drought-tolerant native plantings or permeable paving for example.

A DPA intended to apply a setback along the Nanaimo Parkway was incidentally found to benefit Garry Oak ecosystems.

10.2 Content

At minimum, EDPAs for Garry Oak ecosystems should include guidelines that:

- designate areas of environmentally sensitive land for which a development permit is needed;
- provide justification for the designation (see recommendations in 7.2 OCPs, Content);
- rely on high quality mapping of ESAs to a scale of 1:5,000 or larger;
- include a disclaimer that states that the map may not accurately show all ESAs in a EDPA and will be updated as new information becomes available or as ecosystem boundaries change over time;
- provide for EIA or review;
- establish general and ecosystem-specific guidelines and conditions to direct development away from Garry Oak ecosystems and the corridors and stepping stones that connect them, including limiting development to a specified footprint or location (Note: Unless all development activities will be clearly outside the EDPA, these determinations generally need to be made by a B.C. Land Surveyor (BCLS). However, they can be incorporated into the BCLS-certified site plan that is a standard requirement of any development proposal); and

- set performance-based standards for ecosystem protection, for example, “no net loss” provisions with appropriate qualifications on the replacement of natural habitat with new “habitat”. (Note: “No net loss” provisions must be framed as a less desirable alternative to direct protection. Ecosystems cannot be re-created, and attempts to mimic them often fail.)

In 2011, the Town of Comox created a DPA for Garry Oak Habitat, available at http://comox.ca/hall/bylaws/official-community-plan-ocp-bylaw-1685-consolidated/.

10.3 Sample Bylaw Wording

Justification

The objective of this development permit area designation is to minimize the impact of development on the natural environment and ecologically sensitive and rare ecosystems. Terrestrial and aquatic ecosystems are increasingly fragmented and habitat is lost due to urbanization, water use, agriculture, forestry and expansion of alien invasive plants.

The primary function of the development permit area designation is to ensure that decision makers have the ability to secure the necessary information and are able to establish conditions on development, so that Garry Oak and associated ecosystems and species at risk are protected, and development impacts mitigated.

Garry Oak and associated ecosystems provide a specialized habitat for a diverse and unique set of species assemblages, and perform a number of essential and varied natural functions that are significant in maintaining local biodiversity. Garry Oak “associated ecosystems” support many of the same plant and animal species, but may contain fewer Garry Oaks, if any. These include grasslands, rocky habitats such as coastal bluffs, maritime meadows, vernal pools, and former oak ecosystems that are now dominated by other tree species. Garry Oak areas are the richest land-based ecosystems in southwest British Columbia, providing habitat for more than 100 species of birds, 7

amphibian species, 33 mammal species, more than 800 invertebrate species, and about 700 plant species.

Very little Garry Oak habitat remains in near-natural condition in British Columbia (less than 5%), mostly due to habitat loss from land development. The remaining habitat is highly fragmented, and threatened by further urban development and recreational pressures.

The invasion of exotic grasses, forbs and shrubs is a pervasive threat to all habitats and species. Fire suppression is changing Garry Oak stand structure and associated plant community composition, resulting in increased shading, thatch accumulation, and encroachment of shrubs and trees. Herbivory by exotic species and by livestock or deer may also be a potential threat.

Garry Oak areas are some of Canada's most endangered ecosystems. There are more than 100 species at risk in Garry Oak areas—species that are identified by the federal or provincial governments as 'at risk' of becoming extinct. Therefore, it is equally important to protect the Garry Oak ecosystems, connected by greenways, as the trees themselves.

Garry Oak and associated ecosystems of all sizes are a critical component of [Local Government]'s ecologically sensitive areas and require the highest level of protection. Garry Oak and associated ecosystems are sensitive because they exhibit rarity and fragility. They are important because they exhibit high biodiversity, specialized habitat, specialized functions, and connectivity. Because of the importance and sensitivity of Garry Oak and associated ecosystems, preservation of all remaining lands of this designation in [Local Government] is warranted.

Finally, Garry Oak and associated ecosystems form part of the "green infrastructure," a term gaining popularity that refers to the ecological processes, both natural and engineered, that provide economic and environmental benefits fits in urban and near urban areas. Local governments are recognizing that green infrastructure often provides necessary services at a lower cost than hard infrastructure, and offers aesthetic and recreational

benefits. The green infrastructure includes:

- *rivers, creeks, streams, wetlands and ditches that retain and carry stormwater, improve water quality, and provide habitat*
- *parks and greenways that link habitat and create recreation opportunities*
- *working lands such as agricultural, forested, and grassland areas*
- *aquifers and watersheds that provide drinking water*
- *engineered wetlands and retention ponds that retain stormwater and improve infiltration*
- *urban forests and individual trees, rooftop gardens and community gardens that clean air and cool urbanized areas*

Designation and Exemptions in OCP

1. *The [Name of Sensitive Terrestrial Ecosystem] development permit area for protection of the natural environment (EDPA) is established (see Map [ ] and the guidelines in Appendix [ ]). Except where exempted in this bylaw, no development may occur in that area without first obtaining a development permit that tailors the proposed activities to ecosystem conditions. The DPA also establishes no development zones and buffers around sensitive ecosystems.*
2. *The location of development in or near an EDPA shall be determined accurately by survey to determine whether a development permit application is required. The applicant shall retain a Qualified Professional and provide the survey to the [Local Government] at the applicant's cost.*

The following development activities are allowed to occur in this EDPA without a development permit.

3. *Emergencies: Activities to prevent, control or reduce flooding, erosion or other immediate threats to life or property do not require a development permit, including:*

a. *emergency flood or erosion protection works;*

b. *clearing of an obstruction from a bridge, culvert or drainage flow; and*

c. *repairs to bridges or safety fences.*

Emergency actions for flood protection and clearing of obstructions by anyone other than City staff must be reported to the Public Works Department immediately.

4. *Hazardous trees: Cutting down of hazardous trees that present an immediate danger to the safety of persons or are likely to damage public or private property. Tree cutting of hazardous trees must be reported to the [Municipal staff] immediately.*

5. *Subdivision: For subdivision of lands containing a leave strip where:*

   a. *minimum lot areas are met exclusive of the DPA/setback, as required under the Zoning Bylaw;*

   b. *no development activities relating to the creation of lots or provision of services for those lots will occur in the DPA; and*

   c. *all requirements made under the [Subdivision Bylaw] for identifying and marking watercourses, natural boundary, top of bank and other watercourse-related features are met.*

6. *Approved Trails: Construction of a [Local Government]-approved trail within the leave strip where this is proposed as part of subdivision, provided trail design and construction meets [Local Government] standards specified in the subdivision approval. Restoration or enhancement of the leave strip, particularly where previous development may have already had an impact on the leave strip, may be a condition of subdivision approval.*

6. *Revegetation: Planting of trees, shrubs, or groundcover for the purpose of enhancing the habitat values and/or soil stability within an EDPA/leave strip provided such planting is carried out in accordance with guidelines provided by the City.*

7. *DP Issued: Where a development permit of this type has already been issued or a covenant dealing with aquatic or terrestrial sensitive ecosystem issues is already registered on property title, the conditions in the development permit or covenant have all been met, and the conditions addressed in the previous development permit or covenant will not be affected.*

8. *Fencing Erected: Where the EDPA is fenced and signage erected in a way acceptable to the [Local Government staff] in order to prevent any accidental disturbance, and, there is a permanent protection of the DP area by means such as a restrictive covenant, return to Crown Land, provided as public park, or similar method acceptable to the [Local Government staff].*

9. *Site Inspection: Where upon specific inspection of the site the [Local Government staff] is satisfied that the location of the [aquatic/terrestrial] ecosystem is not located upon the subject property.*

11. *Agricultural Practices: Where the land is located within the Agricultural Land Reserve and the activities are responsible, normal agricultural practices in accordance with the Farm Practice in B.C. Reference Guide (located at www.agf.gov.bc.ca/resmgmt/fppa/refguide/intro.htm) and Farm Practices Protection Act. Interpretation or disagreements will be resolved through the provisions of the Act. Activities not covered by the Act or Guide will require a development permit.*

12. *The activity is conducted under direction of the Provincial Emergency Program.*

EDPA Objectives

1. *Ensure an ecosystem-based planning and management approach in protecting and enhancing the environment.*

2. *Protect and enhance watercourse ecosystems such as stream corridors, lake or pond edges, wetlands and other riparian areas.*

3. *Protect and enhance sensitive ecosystems such as Garry Oak and associated ecosystems, vernal pools, seeps, grasslands, unique species and mature old*

growth forest.

4. *Connect ecosystems through undisturbed open space or greenways corridors to support the movement of various species.*
5. *Protect and enhance the habitat for species at risk.*
6. *Ensure that land development does not result in any further loss of existing Garry Oak and associated ecosystems or other habitat for species at risk.*

EDPA Guidelines

1. *In EDPAs, the [Local Government] must approve a development permit before land is subdivided or development is undertaken.*

Definitions:

1. *For these guidelines, "development" means any of the following:*
    a. *removal, alteration, disruption or destruction of vegetation;*
    b. *disturbance of soils;*
    c. *construction, erection or alteration of buildings and structures;*
    d. *creation of non-structural impervious or semi-pervious surfaces;*
    e. *flood protection works;*
    f. *preparation for or construction of roads, trails, docks, wharves and bridges;*
    g. *provision and maintenance of sewer and water services;*
    h. *development of drainage systems;*
    i. *development of utility corridors; and*
    j. *blasting.*

Application:

1. *Development within an EDPA will generally only be considered where historical subdivision or construction of structures has occurred prior to the designation of EDPAs and:*

a. *an EDPA takes up so much of a pre-existing lot that it makes the lot undevelopable for the use permitted under its existing zoning; or*

b. *due to topographic, natural hazard or other environmental constraints on the lot, there is no acceptable building site outside the EDPA; and*

c. *all opportunities to relax other development requirements (such as yard setbacks, minimum lot size, parking, etc.) have been exhausted.*

2. *The onus lies with the applicant to demonstrate that encroaching into an EDPA is necessary due to the above circumstances, in order to allow the use of a site as otherwise permitted under existing zoning.*

3. *To determine whether a proposed development is inside an EDPA:*

    a. *Locate the EDPA boundaries on the ground. On any given site, this means:*

        i. *locate the sensitive ecosystem boundary relative to the property lines;*

        ii. *locate the top of bank (for creeks, streams and rivers) or natural boundary (for wetlands, ponds, lakes, and terrestrial sensitive ecosystems); and*

        iii. *measure the applicable 30 metre EDPA buffer area from that top of bank or natural boundary.*

    Locate the proposed development (buildings, yards, driveways, patios, walkways, etc.) relative to the EDPA boundaries.

4. *The [Local Government] will weigh the applicant's interest in encroaching upon the sensitive ecosystem against the potential impacts of the encroachment on the habitat.*

5. *The applicant and [Local Government] will seek to vary other land use requirements under the Zoning Bylaw before or, where necessary, along with encroaching into the leave strip in order to minimize the encroachment. One or more of the following variances from existing Zoning Bylaw requirements may be applied:*

a. *front and/or rear yard setback reductions;*

b. *site coverage increased by up to 50% of maximum;*

c. *maximum height increased by up to 3 metres; and/or*

d. *parking requirement reductions.*

6. *An application for a development permit shall be in Form [ ], which includes the following information:*

   a. *An EIA that conforms with the [Local Government] Terms of Reference, including:*

      i. *a description of the existing conditions of the site and an analysis of any adverse impacts of the proposed work on the environment during and after the work having regard to such matters as the topography of the work site and surrounding area, and the effects on the stream corridor or waterfront including effects on: water quality and quantity; hydrology; fisheries; species at risk, wildlife, tree and vegetation inventory; soils; climate; land use;*

      ii. *a description of all federal and provincial environmental standards that apply to the proposed work during and after the work and during operations; and*

      iii. *evidence that all adverse environmental impacts during and after the work and once in operation will be insignificant or mitigated to insignificant levels by the work methods, design and mitigation measures that will be used or incorporated into the work.*

      iv. *a plan showing the replanting of vegetation in disturbed areas using approved species from those listed in Schedule [ ].*

      v. *a copy of any applicable federal or provincial approval.*

   b. *a detailed map of the site clearly depicting the extent of all sensitive ecosystems and habitat of species at risk. Descriptions of sensitive ecosystems can be found in the Sensitive Ecosystems Inventory for Eastern Vancouver Island and the Gulf Islands. Descriptions of species*

at risk can be found on the species at risk public registry at www.sararegistry.gc.ca.

c. *detailed drawings or plans clearly describing proposed and existing structures and the materials and type of construction to be employed including a cross section of proposed structures and their layout on the site;*

d. *a detailed drawing or plan clearly describing any area of the removal of trees, rock, gravel or soil, and other natural features;*

e. *the reason and purpose of the work;*

f. *the name of the contractor, if any, who will do the work;*

g. *time required for completion in calendar days; and*

h. *any further information required by the [Local Government staff] to ensure compliance with this Bylaw including design construction or structural detail of any part of the proposed works.*

8. *The [Local government staff] may require the applicant to prepare one or more management plans to mitigate any potentially negative impacts determined by the EIA.*

9. *As a condition of the development permit and in accordance with the EIA for the project, the [Local government staff] may require monitoring of the development by a qualified professional such as a professional engineer or professional biologist.*

10. *Should damage occur to an environmentally sensitive area during development, the [Local Government] may require the applicant to commission a professional assessment of the damage and a report on recommendations for rehabilitation.*

Guidelines:

1. *Land development activities must be planned, designed, and implemented in a manner that does not disturb or fragment sensitive ecosystems including:*

   a. *Garry Oak and associated ecosystems;*

b. *habitat for species at risk;*

c. *other rare or uncommon animals, plants or plant communities;*

d. *wetland vegetation and structure;*

e. *wildlife habitats such as breeding and nesting sites; and*

f. *soils and soil conditions.*

2. *Link EDPAs and other sensitive ecosystems through greenways corridors, as identified in Schedule [ ], to develop a continuous network of ecosystems and provide continuity between important habitats and leave areas.*

3. *Demonstrate that a diligent effort has been made in site design to:*

   a. *preserve both the natural vegetation and tree cover;*

   b. *restore and enhance Garry Oak and associated ecosystems habitat for conservation; and*

   c. *avoid disturbing and protect habitat for species at risk.*

4. *Adequately setback buildings and reflective surfaces from ESAs to avoid harmful shading of and albedo effects on plants and habitat.*

5. *Prevent disturbance of nesting sites and breeding areas.*

6. *Encroachment into the EDPA by development activities will not exceed that indicated in the site plan approved in the development permit. All development activities will avoid or minimize disturbance in the EDPA beyond the building footprint. This may mean adjusting conventional practices such as locating machinery and stockpiles on already-disturbed areas and using hand labour as opposed to machinery.*

7. *Prior to any development activity, boundaries of the EDPA and the extent of encroachment allowed by the development permit will be clearly marked with bright orange or other highly visible temporary fence with a minimum height of 1.2 m (3.94 ft) and supported by poles a maximum distance from one another of 2.5 m (8.2 ft). This fence will remain in place throughout*

clearing, site preparation, construction, or any other form of disturbance. This area is called the non-disturbance area.

8. *Within a non-disturbance area, trees and vegetation must not be cut, pruned, altered, removed or damaged in any way other than minor damage incidental to the construction of the barrier under paragraph 7 above.*

9. *Manage rainwater on site and maintain pre-development drainage flows.*

10. *Within the EDPA, development must not either increase or decrease the amount of surface and /or groundwater or affect the quality of water available:*

    a. *within the non-disturbance area; or*

    b. *within the buffer area, other than development expressly permitted within the buffer area within the development permit.*

11. *The applicant may be required to provide an erosion and sediment control plan that reflects measures prescribed in the "Land Development Guidelines for the Protection of Aquatic Habitat" (1992: note Section 3), "Stream Stewardship: a Guide for Planners and Developers" (1994: note pages 30-34), or other standards or guidelines adopted or approved by the [Local Government]. This plan is a condition of the development permit.*

12. *As a general rule, clearing of land, grubbing, grading and other activities that expose expanses of soil will be completed during the dry months of the year, generally June through September.*

13. *Sediment containment and erosion control measures will be installed prior to development activity.*

14. *Development will be avoided on slopes greater than 30% (approximately 7°) due to the high risk of erosion and bank slippage.*

15. *Within a non-disturbance area, gravel, sand, soils and peat must not be removed; and soil or other fill must not be deposited.*

16. *Within a non-disturbance area, vegetation that is not indigenous or*

appropriate for the habitat at the location must not be planted.

17. *Maintain natural sites and plant gardens with appropriate native species.*
18. *Retain mature vegetation wherever possible and incorporate into the design of the project.*
19. *Conserve trees in communities (groups of trees along with their associated understory) rather than isolating individual specimens.*
20. *Existing trees and vegetation within the EDPA will not be disturbed except where allowed under this development permit.*
21. *Conserve snags and standing dead trees where safe to do so. Standing dead trees are typically topped to within 6 metres of the ground in an area that is safe should it eventually fall. It is recognized that dead wood decays over time and the eventual removal of standing dead wood and snags is acceptable. Locate settlements, drives, construction and other development away from existing large, old trees and snags.*
22. *All existing trees to be retained will be clearly marked prior to development, and temporary fencing and signs installed at the root zone to protect them during clearing, grading and other development activities.*
23. *Where existing trees and vegetation are retained, the following are allowed:*
    a. *pruning or removing of hazardous trees (as determined by the [Local Government] arborist or approved arborist), but leaving wildlife trees and snags (dead, upright trees or stumps) if safe.*
    b. *pruning of undergrowth within 1 meter of existing or proposed public trails to avoid injury to users, but no disturbance of vegetation within 3 meters of the natural boundary of the watercourse.*
    c. *supplementing existing vegetation with planted stock as needed to landscape bare or thin areas.*
24. *To replace portions of the leave strip that are permanently removed, remaining portions may be enhanced by supplementing existing vegetation,*

re-vegetating bare or thin areas, or by adding to (widening) the leave strip in other portions of the site not affected by the development.

25. *EDPA or habitat enhancement in another portion of the same watercourse that is in need of restoration may be considered as compensation for habitat that is permanently displaced on a given site, but only as a last resort when options to avoid, mitigate, restore or enhance on-site habitats are exhausted.*

26. *EDPA boundaries will be marked on the property, and where the development involves a subdivision, the applicant will provide information to purchasers of the property on the importance of Garry Oak and associated ecosystems and species at risk and that activities are not permitted within a leave strip without a Development Permit.*

27. *Avoid locating road and utility corridors along, parallel to, or across riparian ecosystems in order to maintain natural connectivity. Where it can be demonstrated that alternatives are not possible, design crossings that are narrow and perpendicular to riparian areas and elevated in order to maintain natural connections may be considered.*

28. *The [Local Government] encourages proposals that offer to register a conservation covenant on the title of the lands. The covenant will be registered prior to any development including subdivision, and is intended to protect habitat in ESA, including habitat for species at risk, and ensure that it remains in a natural and vegetated state and/or free of development. The covenant will be registered in favour of the [Local Government], other public agencies including the Province, or non-governmental organizations, such as a private land trust committed to the preservation of sensitive ecosystems.*

29. *Where development is considered in sensitive ecosystems the [Local Government] may use the following methods to prevent or minimize encroachment into the environmentally sensitive area:*

    a. *bare land strata to allow flexibility in conserving the feature or area;*

b. *density bonus, or density averaging, on the developable portion of the site;*

c. *development variance permits to vary conditions other than use or density (such as front and/or rear yard setbacks, increasing the maximum site coverage of buildings provided that density is not increased, increasing the maximum building height, reducing parking space requirements); and/or*

d. *voluntary stewardship to protect the feature or area.*

Planting & Retention Requirements

New development must meet the following standard, using one of the three options below in descending order of priority:

1. *Tree preservation. At least 5 centimetres of existing tree diameter per 90 square metres of site area must be preserved. On lots that are smaller than 300 square metres, at least 8 centimetres of existing tree diameter must be preserved per lot. This standard may be met using trees on the lot and within 2 metres of the edges of the lot. Trees within public and private rights-of-way may not be used to meet this standard. When this option is used, a tree preservation plan as part of an EIA is required.*

2. *Tree planting. At least 5 centimetres of tree diameter per 90 square metres of site area must be planted. On lots that are 300 square metres or smaller, at least 8 centimetres of tree diameter must be planted per lot.*

OR

1. *Replanting of disturbed areas or supplementing existing vegetation with planted stock in thin or bare areas of a leave strip will be required in accordance with the following:*

    a. *Replanting will use trees, shrubs and ground cover native to the area and selected to:*

        - *suit soil, light and groundwater conditions of the site; and*

- *promote habitat for native biota or erosion control functions as necessary.*

b. *Individual trees will be replaced at the following ratios except for Garry Oak trees:*

TREE DIAMETER BREAST HEIGHT	# REPLACEMENT TREES	MINIMUM HEIGHT
1 - 151 mm (6″)	2 or 4 shrubs for up to 50% of total trees being replaced	1.5 m
152 - 303 mm (12″)	3	1.5 m
305 - 456 mm (18″)	4	2 m
457 - 609 mm (24″)	6	> 2 m
610 - 914 mm (36″ or >)	8	> 2 m

Garry Oak saplings, krummholtz and trees that are less than 151 mm will be replaced on a 1:2 basis (two trees replaced for every one removed) with replacement stock that is at least two years old. Other replacement standards for Garry Oak trees will be determined by the [Local Government staff] considering limitation imposed by the characteristics of the species and local availability.

Species native to the area and appropriate to the site must be used. If needed, trees should be placed to enhance bank stability and to provide cover to watercourses.

c. *For wooded areas, clearing should not exceed 10% of the EDPA, should be confined to the outer portions of the EDPA, and must not be on slopes greater than 50% (27°). The same replacement ratio, average tree density and site features as in the previous Guideline apply.*

d. *The following minimum specifications for topsoil or amended organic soil are required for replanting on a property:*

- *organic matter content of 15% dry weight in planting beds and 8% in*

turf areas;

- *depth of 300 mm for turf;*
- *depth of 450 mm for shrubs/trees;*
- *depth of 300 mm around and below the root ball of all trees;*
- *pH from 6.0 to 8.0 or matching that of the original undisturbed soil;*
- *subsoils scarified to a depth of minimum 100 mm with some topsoil being incorporated into the subsoil; and*
- *planting beds mulched with a minimum of 50 mm of organic material.*

e. *A shrub layer will be provided for a minimum of 33% of the restoration area; shrubs will be planted at an average density of 1.0 meters apart and a minimum #2 pot size at time of planting.*

f. *Groundcover may be substituted for shrubs; if used, groundcover will consist of brush layers or planted groundcover species at a maximum average spacing of 0.5 meters with plants of minimum 10 cm pot size at time of planting.*

g. *Areas not covered by trees, shrubs or groundcover will be seeded with local native herbaceous plants, grasses, or legumes. Avoid wildflower mixes that may contain seeds inappropriate to the region.*

h. *All vegetation will be protected from intrusion by motor vehicles with a suitable protective barrier if roads, driveways or parking areas abut the leave strip.*

i. *All planted stock will be maintained for a minimum of two years; within that time, any unsuccessful stock will be replaced at the owner's expense.*

2. *Tree Fund. This option may be used where site characteristics or construction do not support the preservation or planting options.*

a. *The Tree Fund fee is collected by [Municipal Department] and is administered by the [Municipal Department]. The funds collected will be used to plant trees on public or private property in the same watershed as the site.*

b. *Applicants must contribute the cost to purchase and plant trees, as set out in c), below. The cost to purchase and plant trees will be adjusted annually as determined by the [Municipal Department] based on current market prices per centimeter for materials, labor, and maintenance.*

c. *The applicant must contribute the following to the Tree Fund before a building permit will be issued:*

    i. *For lots with 300 square metres or more of area, the cost to purchase and plant at least 5 centimetres of tree diameter per 90 square metres of site area; or*

    ii. *For lots with less than 300 square metres of area, the cost to purchase and plant at least 8 centimetres of tree diameter per lot.*

3. *To replace portions of the leave strip that are permanently removed, remaining portions may be enhanced by supplementing existing vegetation, re-vegetating bare or thin areas, or by adding to (widening) the leave strip in other portions of the site not affected by the development.*

Species at Risk

1. *Maintain a naturally vegetated "no disturbance" buffer of 30 metres, measured as a radius from the SAR occurrence, or where Critical Habitat for the SAR has been mapped, measured from the Critical Habitat polygon boundary. The distance may be reduced to a radius of 20 metres provided that the ecosystem function is not compromised through grading or other disturbance, that all vegetation within this zone is retained, and that no structures or other property are located within the "no disturbance" buffer area.*

Requirements for development permit may be waived where the landowners have offered and entered into a Land Title Act Section 219 covenant to maintain an acceptable no disturbance buffer as part of a subdivision approval application, provided that ecosystem functions and processes including hydrologic regimes are not compromised.

Security

1. *Prior to issuing a development permit for an EDPA, the applicant will provide a security deposit.*
2. *A security deposit must be in the form of cash, certified cheque or an unconditional, irrevocable letter of credit issued by a financial institution acceptable to, and in a form acceptable to, [Local Government staff].*
3. *Security deposits shall be in an amount equal to 110% of the estimated cost of the landscape and restoration work to be performed under the permit.*
4. *The amount of maintenance security shall be 10% of the cost of the works.*
5. *The amount of security required is based on estimated costs provided by the Consulting Engineer as agreed to by the [Local Government staff] on the works, excluding landscaping, and by the Landscape Architect as agreed to by the [Local Government staff] with respect to landscaping.*
6. *No security deposited shall be returned unless and until all of the requirements for which the security has been deposited have been completed to the satisfaction and approval of [Local Government staff]. Security deposited under the provisions of this Bylaw shall be returned to the Owner only.*
7. *If the applicant does not comply with the terms and conditions of the permit the [Local Government] may use all or a portion of the security deposit or call for and receive the funds secured by the letter of credit and use the funds to remedy the non-compliance.*
8. *If the work under the permit is not completed before 1 month before the*

expiry date of the letter of credit, the [Local Government] may call for and receive the funds secured by the letter of credit and retain the funds until the applicant delivers a replacement letter to the [Local Government] in the same form and amount.

9. *All or part of the security may be held for up to three years.*

For more comprehensive and detailed bylaw provisions see the *Green Bylaws Toolkit* at www.greenbylaws.ca.

10.4 Challenges and Opportunities

10.41 Stay the Course

When EDPAs are first introduced by a local government, processing development permits can overwhelm planning departments. Local governments that have been firm in protecting ESAs have found that the culture of development slowly changes in their jurisdiction such that developers and their consultants learn how to comply with EDPA requirements over time, thus decreasing staff time needed for each application. Some local governments have used an "impact threshold", for example, a certain number of hectares of sensitive ecosystems affected, below which EDPAs are not as closely scrutinized. This approach is inappropriate for Garry Oak and other ecosystems at risk.

In interviews with landowners on Salt Spring Island, Brownrigg (2010) found that DP requirements had improved decision-making regarding their developments and aside from the lack of cost-sharing (as some of the benefits accrue to the community), they felt the requirements were reasonable. However, they wished for clear, dependable information on the rationale for the DPA and a more substantial and cooperative relationship with the Islands Trust during the DP process. Comparatively, environmentalists wanted a transparent, tight DP process that would not enable developers to meet requirements and still "develop irresponsibly". More information on the logic for compliance and logistics and costs of the process, as well as outreach to other stakeholders, such as realtors and community leaders, were also recommended.

10.42 Linking EDPAs to Other Bylaws

EDPAs must not vary the use or density of the land or the specifications for flood plains. Concurrent reviews of the OCP and zoning bylaw can be helpful in avoiding incompatibilities. Ideally, setbacks in EDPA guidelines are reinforced through the zoning bylaw.

Because enforcement of EDPAs can be challenging, they work best when they overlap with prohibitions in regulatory bylaws, such as bylaws for tree protection or for soil deposit and removal. Failing to adhere to a development permit can also mean contravening a regulatory bylaw, which can be enforced through municipal tickets. To accommodate this, EDPA guidelines should be performance-based, i.e., the desired results should be clear.

10.43 Give and Take

Local government staff have flexibility and discretion in the way in which EDPA guidelines are applied and in determining the terms and conditions of development variance permits. Prioritizing the health of Garry Oak ecosystems over other values can be made more palatable by creating policies that exempt highly disturbed natural areas from "greenfield" standards. Exemptions and the use of regulatory permits can ease the burden for minor projects. Maintaining a setback may involve compromise and granting variances for other aspects of a development, such as building height or site coverage outside of leave strips. However, effectively walking this fine line requires considerable staff expertise.

10.44 Security Deposits and Monitoring EDPAs for Compliance

Security deposits are monies paid to and held by a local government to ensure that sites are protected and restored through the land development process. They can be used to prevent or correct damage to Garry Oak ecosystems. Local governments can require security deposits as part of the development permit process to ensure the completion of landscaping and environmental restoration. In the absence of security deposits, monitoring for compliance with development permits is often complaint-driven and discretionary, due to lack of staff time, funding, and expertise. However, landowners are not averse to a fair, dependable

monitoring process that takes into account the individual property and development (Brownrigg 2010). In the short-term, this could be met through photo monitoring. In the case of a strata development, strata owners could collectively be held responsible for retaining an environmental monitor. The *Ecostrata Guide* for Metro Vancouver (www.oneearthweb.org/uploads/2/1/3/3/21333498/2009_march_eco_strata_guide.pdf) suggests forming a sustainability or landscaping committee; either could fulfill this role.

Many remnant Garry Oak ecosystems are found along the shore and have not been mapped in terrestrial surveys.

SPOTLIGHT

CITY OF NANAIMO - DEVELOPMENT PERMIT AREA FOR ENVIRONMENTALLY SENSITIVE AREAS

DPA for ESAs

In June 2006, Nanaimo Council endorsed the creation of an Environmentally Sensitive DPA.

To create the DPA, Sensitive Ecosystem Inventory mapping was reviewed and a consultant hired to conduct a follow-up review with ground-truthing to confirm locations, sizes and compositions of the ESAs. Properties with ESAs were then included within a DPA, which went through an OCP amendment process before being adopted. In response to concerns, staff assured property owners that they would not necessarily lose development potential from having their properties identified. The purpose of the DPA is to better inform staff about properties that will require greater effort to find solutions to protect significant environmental features.

Developers Collect ESA Data

As part of the development permit process, developers are required to conduct surveys to identify environmentally significant features within the DPA including rare plants and the habitat needed to sustain them. Appropriate non-disturbance and buffer areas around this habitat must be identified. The developer also needs to determine the impact of the proposed development on all non-disturbance and buffer areas, and on water flow and quality.

WOODLAND
Piper's Lagoon Park, Nanaimo

TERRESTRIAL HERBACEOUS
Linley Valley, Nanaimo

COASTAL BLUFF
Piper's Lagoon Park, Nanaimo

11.0 REGULATORY BYLAWS: AN OVERVIEW

Left: Two years after a vehicle drove through a Garry Oak meadow, damage still apparent; Middle: Black-tailed Deer (Odocoileus hemionus columbianus), browsing Garry Oak; Right: Scotch Broom (Cytisus scoparius) in bloom, displacing native species

Although regulatory bylaws cover a broad range of topics, *Model Bylaws* will focus on regulations affecting trees, soil removal and deposit, rainwater management, and invasive species (Chapters 12 through 15).

As noted above in Chapter 3 Jurisdiction and Authority, municipalities have autonomy to regulate, prohibit, and impose requirements for tree cutting, removal and deposit of uncontaminated soil, drainage, and removal of invasive species, among other things. In spheres of concurrent authority, for removal of soil of a particular quality, for example, the provincial government must approve local government bylaws, either by regulation, an agreement, or direct appeal to the Minister responsible.

Regional districts have fewer regulatory powers when compared with municipalities. However, there are mechanisms for regional districts to similarly influence activities, particularly within electoral areas. In their ability to regulate land use and subdivision, they can direct landscaping design, including selection of vegetation, for example. With member municipalities, they can establish bylaws for regional services and develop programs that benefit Garry Oak ecosystems.

Often local governments prohibit activities that damage the landscape or ecosystem components, but permit certain activities subject to a development permit that contains conditions about how the activity or ecosystem restoration will occur. Through ancillary powers, local governments may enforce regulatory bylaws through licenses, permits, or approvals together with requesting fees and security deposits, imposing fines, and suspending, canceling, or attaching conditions to permissions.

In this way, they help manage incremental habitat damage, particularly when the landholder is not rezoning or subdividing. Regulatory bylaws can bolster setbacks in zoning bylaws and conditions in EDPAs, and enable enforcement through ticketing of bylaw infractions. They can also provide opportunities for local governments to educate landowners about best management practices[6] for Garry Oak ecosystems.

Regulatory bylaws may bring challenges as well. They are often poorly received by those who are regulated and results-based performance is difficult to monitor and measure, leading to troublesome enforcement issues. Public dialogue is an important precursor to bylaw development and implementation. By grounding them in popular support, one can generally increase their longevity.

11.1 Agricultural Lands

Most Garry Oak ecosystems capable of supporting agriculture were cleared long ago. Protecting the remnants on existing farmland will require special effort as well as special provisions.

Local governments have the power to regulate certain aspects of farming through Section 917 of the *Local Government Act*. In general, bylaws apply on land in the Agriculture Land Reserve (ALR) except that they cannot limit farm practices. If the local government intends to limit the extent or methods of farming in the ALR in tree protection and soil removal bylaws, these must be developed in consultation with the B.C. Ministry of Agriculture and the Agricultural Land Commission. Regulatory bylaws typically exempt farm practices (e.g., land

[6] See GOERT's Best Management Practices at www.goert.ca/documents/GOERT-BMPs-v1.1.pdf

clearing, addition of compost and other soil amendments, soil brought on and off site for nursery operations), as restrictive environmental policies can be interpreted as restricting a farmer's "right to farm" under the *Farm Practices Protection* (RIGHT TO FARM) *Act*, [RSBC 1996] CHAPTER 131). The Act can also apply on lands outside of the ALR where a local government allows agriculture (Section 2 (2) (b) (ii)). Note: This is a complex area of law that is beyond the scope of this document.

The B.C. Environmental Farm Plan Program provides support to B.C. farmers interested in improving environmental stewardship practices. *Planning for Biodiversity* is a program guide focused on designing, implementing, and monitoring a Biodiversity Management Plan (www.agf.gov.bc.ca/resmgmt/EnviroFarmPlanning/EFP_Biodiversity_Guide/Biodiversity_Guide_toc.htm).

12.0 TREE BYLAWS

Left: Krummholz oak (Photo by Kathy Dunster);
Middle: Krummholz oak, also called "Elfin-wood" (Photo by Loijs Maingon);
Right: Exotic oak tree on a city boulevard

Tree bylaws establish a framework for managing the urban forest and can support EDPA permit conditions by providing a means for enforcement. They must, however, avoid affecting density or permitted land uses. Tree bylaws by definition are limited to protecting individual trees, rather than ecosystems. Nevertheless, these bylaws can:

- regulate activities according to species of tree, defined areas, activities (e.g., cutting a specific number of trees), or size of tree;
- prohibit the cutting of trees in ESAs, riparian corridors, or steep-slope areas;
- prohibit the cutting down of significant or wildlife trees;
- prohibit engaging in tree-damaging activities, and limit large pruning cuts that expose trees to pathogens and decay;
- establish a maximum cleared or non-treed area during development;
- set tree replacement standards;
- establish requirements for and exemptions to permits;
- create offenses and penalties; and
- contribute to regional or municipal tree canopy goals (for example, see Fairfax County Tree Preservation Ordinance at www.fairfaxcounty.gov/news/

2007/232.htm, which established a goal to blanket 45% of the county with tree cover by 2037).

12.1 Triggers

By way of the Community Charter, municipalities have more power than regional districts to protect trees. Whereas municipalities have broad power regarding trees, regional districts are limited to designating tree-cutting permit areas and regulating or prohibiting the cutting down of trees on lands that are subject to flooding, erosion, land slip, or avalanche. Slope protection, which typically occurs through DPAs, can be used to protect trees on, above or below a slope; however, case law will uphold the intent of the bylaw, which in this case is to protect the slope, not the trees.

PROVINCIAL LEGISLATION:
Community Charter [SBC 2003] CHAPTER 26, Part 2, Division 1, Section 8 - Fundamental powers www.bclaws.ca/Recon/document/ID/freeside/03026_00
Community Charter, CHAPTER 26, Part 3, Division 7 - Authority in Relation to Trees
Local Government Act, CHAPTER 323, Part 26, Division 9, Section 923 - Tree cutting permits

12.2 Content

At minimum, a municipal tree bylaw should contain provisions that:

- prohibit the cutting of Garry Oak trees, including saplings and seedlings, contrary to the bylaw;
- require a landowner to obtain a permit to cut Garry Oak trees;
- require tree retention and replacement plans for development;
- create tree replanting specifications if a landowner contravenes a tree permit, that are based on lost biomass; and
- provide for offenses, strong penalties, and enforcement of the bylaw.

12.3 Sample Bylaw Wording

Definitions

"Tree" means any living, erect, woody plant that is 15 centimetres or more in diameter or, irrespective of size, is of the species Garry Oak.

Location and Measurement of Trees

a. *The location of a tree shall be measured at the point at which the centre of the tree stem meets the ground;*

b. *The diameter of a tree shall be determined by dividing the circumference of the trunk measured 1.4 metres above the ground by 3.142;*

c. *The diameter of a tree having multiple trunks 1.4 metres above the ground shall be determined by the sum of 100% of the diameter of the largest stem and 25% of each additional trunk.*

Prohibition

1. *No person may cut down, or permit the cutting down of a tree:*
    a. *without obtaining a permit issued pursuant to this bylaw; or*
    b. *contrary to a permit issued pursuant to this bylaw.*
2. *No person may damage a tree:*
    a. *by any activity that would significantly interrupt or stop the flow in, or introduce a substance toxic into, the cambium layer of a tree by such means as cutting, scarring, constricting, piercing or crushing the cambium layer;*
    b. *by applying or placing a substance in a concentration toxic to the tree on the leaves, limbs, trunk or roots of the tree or within the root zone of the tree or into groundwater flowing to the tree;*
    c. *by failing to maintain the tree in a manner conducive to its survival, including methods set out in "Pruning and Tree Repair" and "British Columbia Landscape Standard";*

d. *by breaking limbs, topping, deadheading or pruning contrary to the methods set out in "Pruning and Tree Repair";*

e. *by doing any of the following within 3 metres or within the root zone of the tree, whichever is the greater distance:*

i. soil compacting;

ii. depositing or removing of soil;

iii. placing of concrete or other hard or impervious surface; or

iv. by doing any blasting within 2 metres of the root zone of a tree.

Exemptions

3. *a. Notwithstanding section 2, a permit under this Bylaw is not required for:*

   i. *the pruning of trees that does not interfere with the safe and healthy development of the tree, and complies with "Pruning and Tree Repair";*

   ii. *emergency modification or removal of trees where:*

      - *the tree or tree limb has been severely damaged by a natural cause; and*
      - *the tree or tree limb is in imminent danger of falling and injuring persons or property.*

   b. *Where emergency modification or removal of damaged trees is allowed under subsection (a)(ii): all persons must notify the [Municipal arborist] after they have modified or removed a damaged tree;*

      i. *the [Municipality] may require such trees to be replaced in accordance with the replacement tree standards in Schedule [ ]; and*

      ii. *following the safe modification or removal of the tree, the [Municipal arborist] may require a risk assessment of the tree, in either its standing or fallen condition, by an arborist certified to conduct tree risk assessments.*

Application Requirements

4. *A written application for a tree cutting permit shall be made in the form of Schedule [ ] and submitted to the [Municipal staff] by the owner or agent of the owner.*

5. *The [Municipal staff] may also require the applicant to submit one or more of the following:*

    a. *a tree survey drawing in accordance with Schedule [ ];*

    b. *a tree retention, cutting and replacement plan in accordance with Schedule [ ];*

    c. *an arborist report in accordance with Schedule [ ].*

6. *Upon application, the [Local Government staff] shall issue a permit authorizing the cutting down of a tree or damage to a tree which would otherwise be prohibited under this Bylaw, where the action allowed by the permit is in their assessment required:*

    a. *to eliminate a hazard caused by a tree or part thereof which is dead, dying, severely damaged, unstable or severely leaning and in danger of falling;*

    b. *to eliminate a hazard caused by interference with utility wires;*

    c. *to eliminate a situation where a water line, sewer pipe or drain pipe is being chronically blocked or damaged by roots, or where pressure or penetration from tree growths above or below ground is causing damage to a building or part thereof, or to a significant structure, and there is no other reasonable solution that would not impose an undue hardship;*

    d. *to allow the construction of a principal building in the location shown on a building permit application that complies with all applicable enactments and bylaws, where the plans for the same have been approved by the building permit issuing authority for the Municipality, and where it would cause undue hardship to move the building envelope;*

e. *to allow the construction of an accessory building or structure in a location complying with all applicable bylaws and regulations where a requirement to construct the building or structure in an alternate location would impose an undue hardship;*

f. *to prevent a foreseeable hazard that would be created by damage to the root system of a tree attributable to the construction of a building or structure in a location approved by the permit issuing authority for the Municipality;*

g. *to allow the installation of underground or overhead services where a requirement to install the same in an alternate location would impose an undue hardship;*

h. *to allow the installation of a driveway or required off-street parking area where a requirement to install the same in an alternate location would impose an undue hardship;*

i. *or warranted because the tree, due to disease, decay, dieback or other pathological condition, mishap or pest attack is in an advanced and irreversible state of decline:*

   - *that will on balance of probability cause the death of the tree within 5 years or less; or*
   - *which has already caused the tree to deteriorate to the point that its continued retention can no longer reasonably be considered to serve the tree protection objectives of this Bylaw in accordance with sound arboricultural principles and practices, and pursuant to the goal of maintaining the native urban forest in a state of ongoing renewal, to promote and protect the health and vigour of at least 2 other protected trees; or*

j. *to prevent foreseeable damage to a building, or to a significant structure, from: a limb, trunk or stem failure; or pressure or penetration from tree growths above or below ground, which the [Local Government staff] has identified as a substantial risk based on examination of the tree in the context of its location, characteristics and general*

environment, notwithstanding that the tree may not at the time of application exhibit any hazardous conditions set or actually be causing damage.

Replacement Trees

7. *Where the [Municipal staff] requires a tree retention, cutting, and replacement plan as part of a tree cutting permit application, the tree replacement standards shall conform with the standards set out in Schedule [ ].*

8. *a. Replacement trees shall be maintained for the following periods from the date of acceptance of the planting by [Municipal Staff]:*

    i. *for sensitive ecosystems identified in Schedule [ ], for a three year period.*

    ii. *for all other plantings, for a two year period.*

    b. *Where a replacement tree dies within the maintenance period, it shall be replaced at the owner's expense;*

    c. *All installation and maintenance shall be in accordance with the British Columbia Landscape Standard.*

9. *The following minimum specifications for topsoil or amended organic soil are required for replanting on a property:*

    - *organic matter content of 15% dry weight in planting beds and 8% in turf areas;*
    - *depth of 300 mm for turf;*
    - *depth of 450 mm for shrubs/trees;*
    - *depth of 300 mm around and below the root ball of all trees;*
    - *pH from 6.0 to 8.0 or matching that of the original undisturbed soil;*
    - *subsoils scarified to a depth of minimum 100 mm with some topsoil being incorporated into the subsoil; and*

- *planting beds mulched with a minimum of 50 mm of organic material.*

10. *After all other tree replacement options for the site have been evaluated, if the [Municipal staff] determines that it is not feasible or practical to replace the trees on the same parcel due to site characteristics:*

    a. *the replacement trees may be planted offsite, including on City lands, in a location approved by the [Municipal staff]; or*

    b. *the owner shall pay into the municipal Tree Fund, funds from which will be used to plant trees on public or private property in the same watershed as the site, as follows:*

        i. *For lots with 300 square metres or more of area, the cost to purchase and plant at least 5 centimetres of tree diameter per 90 square metres of site area; or*

        ii. *For lots with less than 300 square metres of area, the cost to purchase and plant at least 8 centimetres of tree diameter per lot.*

Security deposit

11. *The applicant must submit a security deposit in the form of a cash deposit or irrevocable letter of credit drawn upon a chartered bank in a form acceptable to the [Municipal staff] for full and proper compliance with all terms and conditions in the tree cutting permit including provision of all replacement trees and materials required for site reinstatement.*

12. *The amount of the security shall be 120% of the value of all replacement trees and site restoration measures required by the [Municipal staff].*

13. *The foregoing does not apply if the [Municipal staff] is of the view that other security has been provided by the permit holder to the [Municipality] that serves the same purposes in relation to the same matter.*

14. *Should the permit holder fail to comply with the terms and conditions of the tree cutting permit in the opinion of the [Municipal staff], the [Municipality] may retain all or a portion of this security, and the [Municipal staff], employee or agent authorized by the [Municipal staff] may, but is not*

required to, enter onto the property and perform such work as is necessary to restore the lands to the condition specified in the tree cutting permit.

Offences

15. *In addition to any other penalty that may be imposed under this Bylaw:*

    a. *Where a person cuts or damages a tree in contravention of this Bylaw, that person shall make out a tree cutting permit application in accordance with Part 3 of this Bylaw and pay the applicable permit fees; and*

    b. *Where a person cuts or damages a tree in contravention of this Bylaw or a permit, that person shall, within 30 days of receiving notice from the [Municipal staff] submit for the [Municipal staff]'s approval a tree cutting and replacement plan in accordance with the requirements in Schedules [ ] and [ ], specifying the location, size and species of all replacement trees.*

Penalties

16. *Any person who contravenes this Bylaw by doing an act that it forbids, omitting to do an act that it requires to be done, or by failing to comply with a condition or order imposed commits an offence and is liable upon summary conviction to a fine of not more than ten thousand dollars ($10,000).*

17. *It is an offence under this Bylaw for any owner or occupier of land or any person acting under the authority of an owner or occupier of land to hire, permit or suffer another person to cut down or damage a tree, or do any other act in contravention of this Bylaw.*

18. *It is a separate offence under this Bylaw for each tree unlawfully cut down, damaged or pruned without a permit, or contrary to the conditions of a permit.*

12.4 Challenges and Opportunities

Tree bylaws typically allow the cutting of trees smaller than a certain diameter at breast height (dbh). This presents an immediate challenge to maintain Garry Oak ecosystems, as Garry Oak suffer from poor regeneration. In nature, very few acorns become mature trees. In order to germinate, acorns must be concealed or protected from acorn-loving consumers, have adequate soil moisture, and experience minimal competition from grasses and weeds. Early growth of oak seedlings is often very slow, less than 8 cm or three inches in height annually during the first year or two. They can take 10 or more years to grow 1 m in height. Survival rates of both seedlings and saplings are low. Thus young oak benefit greatly from human care. (See GOERT's Garry Oak Gardener's Handbook at www.goert.ca/handbook for how to care for them.)

In addition, growth rates differ widely among sites and even among seedlings on the same site (Devine and Harrington 2010). It is not uncommon to find a Garry Oak that is "small for its age". Even very old Garry Oak may be small in stature and dbh. Furthermore, in most cases Garry Oak become shade intolerant as they grow older. If they are overtopped by adjacent trees or shaded by a large building, their vigour will decline (*ibid*).

Along the coastline, Garry Oak sometimes have a krummholz form, with numerous crooked stems. Bylaw provisions that add the dbh of the main trunk and a percentage of the dbh of secondary stems are probably unsuitable for assessing and protecting even the oldest krummholz oak.

Another challenge for Garry Oak in many tree bylaws is in the definition of the absorptive rooting zone. "Wrist-sized" roots have been observed more than 15 m from the nearest Garry Oak tree. Tree bylaws often rely on the perimeter of the crown of the tree (i.e., the "drip zone") in defining the rooting zone, which is insufficient for oak.

To help maintain what is left of Garry Oak ecosystems, it is important to protect all trees, including vulnerable seedlings and saplings and a tree's root zone. If

specifying tree size, requiring that oak have reached a certain height is preferred over protecting trees that have attained a particular dbh.

Even more importantly, tree bylaws for Garry Oak should expand to include more than just individual trees. Through rezoning or DPA, developers and purchasers can be required to plan developments in ways that minimize tree and habitat loss, and to maintain undisturbed natural or native plant zones through mandatory covenants with local land trusts and governments.

Local governments can maintain a database to track cut Garry Oak, to ensure that the pace of cutting versus regeneration does not further overwhelm already at-risk ecosystems. In the U.S., ordinances have been developed that specify that a certain percentage of tree cover (e.g., 30-50%) must be maintained on an individual property. Developers there use a chart that identifies the canopy or cover area of mature trees under average conditions to assess coverage by existing trees. Saplings, seedlings, or newly planted trees then make up the difference. In the case of Garry Oak ecosystems, such provisions would need to account for open habitat such as meadows.

Finally, tree bylaws in jurisdictions with Garry Oak should prohibit the planting of exotic oak trees. Introduced oak species are known to hybridize with Garry Oak, affecting their genetic provenance.

"Permits unwittingly promote gradual losses of trees. Track losses of Garry Oak. Host a Tree Appreciation Day and give away acorns."... GOERT Dialogues 2012

Esquimalt and Victoria tree bylaws include provisions that prohibit damage to Garry Oak seedlings, trees taller than 50 cm, and their root zones without a permit. The bylaws describe many activities that cause damage to trees, and include a schedule of Significant (heritage) Trees.

The Esquimalt Tree Protection Bylaw describes in detail protective measures required during the construction period, and calls for replacement trees to be maintained for at least three years. The 2007 Township of Esquimalt Tree Protection Bylaw No. 2664 is available at www.esquimalt.ca/files/PDF/Bylaws/

2664_Tree_Protection_Bylaw.pdf. The introductory web page www.esquimalt.ca/parksRecreation/parks/trees.aspx states that a permit will be required "if no alternatives exist" to cutting, removing or altering a tree that interferes with construction. There are three brochures available: *Esquimalt Loves Its Trees* (information about the bylaw), *Love the Trees in Your Yard* (information for homeowners), and *Love the Trees on Your Construction Site* (information for developers). The latter two brochures include "Trees 101" which states, "An average tree has a horizontal root spread much wider than its branch spread; Most nutrient absorbing roots reach beyond the branch spread; Most tree roots are in the top meter of soil; and Most of the fine, absorbing roots are in the top 15 cm of soil". Cutting without a permit in Esquimalt draws fines from $250 to $10,000, depending on the circumstances.

The introductory web page for the Victoria Tree Protection Bylaw, at www.victoria.ca/EN/main/departments/parks-rec-culture/parks/urban-forest/tree-preservation-bylaw.html, asserts that "Victoria has one of the rarest and most threatened urban forests in the Pacific Northwest". The City of Victoria Tree Preservation Bylaw No. 05-106 can be found at www.victoria.ca/assets/City~Hall/Bylaws/bylaw-05-106.pdf.

In Oak Bay, a fine of up to $10,000 may be issued for each Garry Oak tree that is damaged or cut. See the bylaw at https://www.oakbay.ca/sites/default/files/municipal-services/bylaws/4326.pdf. Note: The amount that a local government is able to charge for an offense depends on whether it has adopted a bylaw opting into the Municipal Ticket Information system.

The Significant Tree Grants Program in Saanich assists landowners with the cost of hazard abatement pruning/bracing and health maintenance. Owners pay half of the lowest of three quotes. See www.saanich.ca/parkrec/parks/trees/pdf/SignificantTreeguidelines.pdf

12.5 Additional Resources

The Regional District of Nanaimo has used one of their most widely communicated publications, the *Active Living Guide*, to promote Garry Oak ecosystems and encourage the public to grow Garry Oak trees.
Reprinted with permission:

Garry oaks - a national treasure in our back yard!

Did you know we live in one of the few places on earth where Garry oak ecosystems are to be found? Check them out at Moorecroft Regional Park and nearby Beachcomber Regional Park.

Garry oak ecosystems range from shady woodlands to open meadows with scattered trees. The Garry oak, the only native oak in Canada west of Manitoba, often grows in mixed stands with other trees like the arbutus and Douglas-fir. Spring wildflowers such as the lovely blue camus lily, grasses, mosses, and a variety of shrubs and animals flourish under the shelter of Gary oak canopies. However these ecosystems are endangered, primarily from human development.

See *The Garry Oak Gardener's Handbook* (www.goert.ca) to learn how to restore natural coastal plant and animal communities in your own back yard.

How to Grow a Garry oak

First, conduct the "float test". Acorns that sink when dropped into a pail of water are the best for growing purposes. Acorns that float may have an insect inside.

Plant acorns soon after collecting them. They won't grow if they dry out.

The best way to plant an acorn is in the ground where you plan to have it grow. Clear away any grass and lay the acorn on its side, then cover it with leaves.

The roots and leaves will grow from the pointed end of the acorn.

If starting an acorn in a pot, use a tall container to provide roots with room to grow and place in a cool, lightly shaded area. Transplant Garry oak seedlings in the fall, when rain and cool soils help roots to grow.

Garry oaks will grow tall and wide and don't like to be located in wet areas or under an automatic sprinkler.

13.0 SOIL REMOVAL AND DEPOSIT BYLAWS

Left: Old trail material inadvertently placed over adjacent Garry Oak ecosystems;
Middle: Camas flourishing in fragile, shallow soils along a rock-lined trail;
Right: A very rare deep soil Garry Oak ecosystem, Cowichan Garry Oak Preserve

Soil removal and deposit bylaws can regulate activities that disturb land both inside and outside of EDPAs. They provide a way to impose a monetary penalty in support of the EDPA requirement that landowners obtain a permit before altering land. In addition, local governments can require sediment and erosion control plans through soil bylaws for developments of a certain type or size, or in ESAs.

13.1 Triggers

PROVINCIAL LEGISLATION:
Local Government Act, CHAPTER 323, Part 22, Division 3, Section 723 - Removal and deposit of sand, gravel and other soil
Local Government Act, CHAPTER 323, Part 24, Division 4, Section 797.1 - Specific regulatory and other powers
Community Charter, CHAPTER 26, Part 2, Division 1, Section 8 - Fundamental powers and Section 9 - Spheres of concurrent authority

13.2 Content

At minimum, a soil removal and deposit bylaw should contain provisions that:

- prohibit the removal or deposit of soil contrary to the bylaw;
- require a landowner to obtain a permit to remove or deposit soil of a certain quantity or in a specified land area (the threshold needed to trigger the permit is significant);
- require sediment and erosion control plans for development;
- create restoration specifications if a landowner contravenes a soil permit; and
- provide for offenses, penalties, and enforcement of the bylaw.

In 2012, the *Topsoil Bylaws Toolkit* was published by the Okanagan Basin Water Board. This appendix to the *Green Bylaws Toolkit* is available at http://waterbucket.ca/wp-content/uploads/2012/05/OBWB-and-PWSBC_Topsoil-Bylaws-Toolkit_2012.pdf.

13.3 Sample Bylaw Wording

Prohibition

1. *No person shall, unless exempted by this Bylaw, remove soil or deposit soil or other materials:*
   a. *without a permit issued pursuant to this Bylaw; or*
   b. *contrary to a permit issued pursuant to this Bylaw.*

Exemption from Permit

2. *A permit shall not be required where the soil removal or deposit:*
   a. *is related to the construction of buildings or structures for which a building permit is in good standing;*
   b. *is related to development in accordance with an approved subdivision of land;*
   c. *is in accordance with a valid development permit;*
   d. *involves less than 5 cubic metres of soil per parcel of land per calendar year;*

e. *is performed by an employee of agent of the [local government] in the creation or maintenance of a public trail, park or recreation facility, or in the reclamation of a disturbed area;*

f. *is required as part of a solid waste processing and disposal operation, including composting facilities, which has the appropriate senior and local government approvals;*

g. *is required as part of the clean-up or remediation of contaminated soils as directed and approved by the Ministry of Environment;*

h. *is required for the construction or maintenance of a private sewage disposal system for which a sewage disposal permit pursuant to the B.C. Health Act has been issued;*

i. *involves the open storage of soils which are intended to be processed and removed in connection with a present lawful use of the land on which they are stored.*

Application Requirements

3. *A written application for a soil removal and deposit permit shall be made in the form of Schedule [ ] and submitted to the [Municipal staff] by the owner or agent of the owner.*

4. *The [Municipal staff] may also require the applicant to submit one or more of the following:*

   a. *The methods proposed to control the erosion of the banks of the deposit;*

   b. *The proposed methods of drainage control for the site during and after the deposit or removal operation;*

   c. *The proposed methods of access to the site during the deposit or removal operation, including the routing of truck and vehicular traffic supplying or removing the soil;*

   d. *The proposed methods of noise and dust control during the deposit or removal operation;*

   e. *proposed buffer zones, tree retention areas and the location, grade and*

width of proposed berms;

f. specific description and proposed metric volumes of soil intended for deposit or removal;

g. the proposed contour of the ground in its final state upon completion of the deposit or removal, with contours at no greater than 1 metre intervals, showing the methods of access and methods of permanent drainage on a separate plan;

h. a restoration plan where the proposed removal or deposit of soil is within 60 metres of an environmentally sensitive area, as defined in Schedule [ ].

Damages Repaired

5. All damage to adjacent [Local Government] or privately owned sensitive ecosystems, drainage facilities, roads, lanes, or other property, or natural watercourses, resulting from the removal or deposit of soil shall be repaired by the permit holder at his or her expense to the satisfaction of the [Local Government Staff].

Erosion Control

6. No permit holder shall cause or allow any soil or other matter or thing originating from the lands to obstruct or pollute any drainage facility, watercourse, or environmentally sensitive area as identified in Schedules [ ] and [ ].

7. The owner will provide erosion control measures during soil removal and deposit activities as follows:

a. for parcels smaller than 0.5 hectare, where deposit or removal is less than 20 cubic metres in one year, and where outdoor works are undertaken in the dry period from May 1 to September 30, best management practices described in Schedule [ ];

b. for soil removal or deposit activities in excess of 20 cubic metres per year, on parcels greater than 0.5 hectare, or where outdoor works are

undertaken in the wet season between October 1 and April 30, works should include:

i. *the best management practices described in Schedule [ ];*

ii. *erosion control measures identified in an erosion and sediment control plan prepared by a certified erosion control specialist;*

iii. *a letter from a certified erosion control specialist confirming their appointment for field reviews during construction; and*

iv. *a letter from a certified erosion control specialist confirming that the required erosion control works were employed as specified.*

Security and Restoration

8. *The applicant must submit a security deposit in the form of a cash deposit or irrevocable letter of credit drawn upon a chartered bank in a form acceptable to the [Municipal staff] for full and proper compliance with all terms and conditions in the soil removal and deposit permit including restoration activities.*

9. *The amount of the security shall be 100% of the value of all site restoration measures required by the [Municipal staff].*

10. *The foregoing does not apply if the [Municipal staff] is of the view that other security has been provided by the permit holder to the [Municipality] that serves the same purposes in relation to the same matter.*

11. *Should the permit holder fail to comply with the terms and conditions of the soil removal and deposit permit in the opinion of the [Municipal staff], the [Municipality] may retain all or a portion of this security, and the [Municipal staff], employee or agent authorized by the [Municipal staff] may, but is not required to, enter onto the property and perform such work as is necessary to restore the lands to the condition specified in the tree cutting permit.*

12. *The permit holder shall complete all restoration works within one year of*

the expiration date of the permit.

For more comprehensive and detailed bylaw provisions see the *Green Bylaws Toolkit* at www.greenbylaws.ca.

13.3 Challenges and Opportunities

Few people recognize the importance or value of native, undisturbed soils. Virgin soils are characterized by accumulations of nutrients fine-tuned to meet the needs of a multitude of native plants, vast numbers of specialized microorganisms, a web of cooperative root-fungi relationships, and spatial variation in elements and texture that allows soil moisture to ebb and flow with the seasons, the weather, and the needs of plants. Soils are the foundation of ecosystems, and undisturbed or relatively undisturbed soils that support native ecosystems are extremely rare. Bylaws for Garry Oak ecosystems must prevent removal from, or deposit over soils in these areas.

It is important to protect ecosystems from the spread of invasive species when adjacent soils are moved, by ensuring native soils remain undisturbed and nearby soil deposits are free of invasive plant seeds or fragments. During construction, monitoring and enforcement in the vicinity of undisturbed soils is very important.

14.0 RAINWATER MANAGEMENT BYLAWS

Left: Seep area on Triangle Mountain (Photo by Chris Junck);
Middle: Vernal pool habitat characterized by shallow soils over bedrock, Harewood Plains;
Right: Bench improperly placed over a vernal pool with SAR

As Garry Oak ecosystems are sensitive to changes in moisture regimes, rainwater management bylaws can protect them by preserving the natural hydrology, or water movement, in an area. This includes maintaining rainfall interception by vegetation and rates of evapotranspiration[7], and ensuring rainwater continues to infiltrate into and percolate through site substrates to area aquifers. In order for this to occur, a significant portion of a site's characteristics (i.e., topography, drainage patterns, soil structure, and native vegetation) should be maintained, and modified areas designed to mimic natural rainwater movement. To minimize the adverse effects of climate change on ecosystems and the built environment, rainwater management systems must be developed that anticipate increases in the intensity and duration of precipitation, impacts such as windfall and erosion, and prolonged periods of drought.

14.1 Triggers

Sections 540 to 548 (Division 6 - Sewers, Storm Drains and Drainage) of the

[7] Evapotranspiration is the process by which water is transferred from the land to the atmosphere by evaporation from the soil and other surfaces and by transpiration from plants (Apple Dictionary version 2.03, 2005).

*Local Government Ac*t can be used by regional districts, and sections 69 (Specific authority in relation to drainage and sewage and dikes), 70 (Drainage control) of the *Community Charter* can be used by municipalities to manage drainage when sites are developed.

PROVINCIAL LEGISLATION:
Local Government Act, CHAPTER 323, Part 15, Division 6, Sections 540-548 - Sewers, Storm Drains and Drainage
Community Charter, CHAPTER 26, Part 3, Division 11, Sections 69-71 - Other Powers

14.2 Content

At a minimum, bylaw provisions for rainwater management should:

- ensure the quantity of rainwater leaving the site after development is equal to or less than the quantity of rainwater before development;
- during and after construction, mitigate drainage from all impervious surfaces through on-site rainwater control structures;
- consider oversizing infrastructure to accommodate anticipated increases in the intensity and duration of storm, flood, and drought events; and
- require security deposits for bio-retention areas (absorbent landscaping); trees, shrubs, and ground cover; on-lot infiltration trenches; vegetated swales; and pervious paving. Note that monitoring for compliance is required when security deposits are involved. (See 10.34 Monitoring EDPAs for Compliance.)

14.3 Sample Bylaw Wording

See Sample Bylaw Wording in Chapter 7 OCPs and Chapter 10 EDPAs for additional rainwater management provisions. The sections set out below are performance-based regulations that could be included in drainage or subdivision bylaws.

All watercourses shall be protected as open channels and left in a natural state or restored using best practices to enhance the riparian zone and stream channel.

Any flow of surface water from adjoining land or from the applicant's land shall be maintained naturally along the existing ground surface.

All new developments require a rainwater management system that will retain natural hydrology and will maximize ground water recharge.

All developments require a rainwater management system that provides rainwater detention on site.

To meet the rainwater management principles outlined in subsection [ ], the following methods will be applied:

- *Capture rainfall on-site and infiltrate, evaporate, transpire, or reuse it;*
- *Implement low impact development standards and source controls such as rain gardens, absorbent landscaping, infiltration facilities, swales, porous pavement, and green roofs;*
- *Detain runoff and release at rates that approximate natural forested watershed conditions;*
- *Base flows and natural forested watershed flows of [list base flow volume e.g., 3.5 l/s/ ha] to the creek system will be maintained.*

Please refer to the *Green Bylaws Toolkit* at www.greenbylaws.ca/ for a more complete account of rainwater management provisions. An appendix to the *Green Bylaws Toolkit,* the *Groundwater Bylaws Toolkit,* was published in 2012 by the Okanagan Basin Water Board. This report is available at www.obwb.ca/library/groundwater-bylaws-toolkit/.

14.4 Challenges and Opportunities

See also 9.34 Runoff Control Requirement.

15.0 INVASIVE SPECIES BYLAWS

Left: Cowichan Tribes nursery;
Middle: Shootingstars (Dodecatheon hendersonii ssp. hendersonii);
Right: Removing Daphne/Spurge-laurel (Daphne laureola) at a restoration workshop
(Photos by Chris Junck)

Invasive species, whether they are native or introduced "aliens" and "exotics", are a major threat to Garry Oak ecosystems. Bylaws that facilitate the removal and management of invasive species and encourage the use of appropriate native plants in landscaping are pivotal to the health of these ecosystems.

15.1 Triggers

Regional districts may be able to use nuisance jurisdictions (*Local Government Act,* Section 725) to control invasive plants. Municipalities have specific powers under Sections 8 and 9 of the *Community Charter* and the Spheres of Concurrent Jurisdiction - Environment and Wildlife Regulation B.C. Reg. 144/2004 to regulate, prohibit, and impose requirements for invasive species.

Sections 703 (Animal control authority) and 797.1 (Specific regulatory and other powers - noxious weeds) of the *Local Government Act can* be used by regional districts, and Sections 8 (3)(k) and 9(1)(c) of the *Community Charter*, and Sections 1(b)(iv) and 1(c) of the Spheres of Concurrent Jurisdiction - Environment and Wildlife Regulation can be used by municipalities to manage exotic wildlife.

PROVINCIAL LEGISLATION

Plants

Local Government Act, CHAPTER 323, Part 22, Division 3, Section 725 - Nuisances and disturbances and Section 797.1 Specific Regulatory and Other Powers

Animals

Local Government Act, CHAPTER 323, Part 22, Division 3, Section 703 - Animal control authority

Community Charter, CHAPTER 26, Part 2, Division 1, Section 8 - Fundamental Powers and Section 9 - Spheres of concurrent authority

15.2 Content

At a minimum, bylaw provisions for invasive species management should:

- contribute to regular updates to a schedule listing invasive species;
- require the immediate removal of listed invasive species that have been newly introduced, imminently threaten critical habitat for species at risk, or threaten human health;
- require the timely management of all other listed invasive species;
- require the disposal of invasive species in designated bins at appropriate waste management facilities;
- prohibit the use of listed invasive species in landscaping;
- encourage the use of appropriate native plants in landscaping; and
- promote invasive-free certification programs.

The Sea To Sky Invasive Species Council has initiated a program to reward horticulture and landscape companies for integrating invasive species management practices into their work, with an "invasive-free certification". See www.ssisc.info/home/news_and_events.

15.3 Sample Bylaw Wording

1. *This part applies to alien invasive species as defined in the Schedule to the Spheres of Concurrent Jurisdiction – Environment and Wildlife Regulation.*

2. *Unless permitted or exempted in accordance with this bylaw, no person shall plant, cause or permit to grow, or allow to inhabit a property, an alien invasive species within 30 days of receiving notice of such an infraction.*

3. *[Name of Municipality] staff is authorized under the provisions of Section 16 of the Community Charter to enter at all reasonable times upon any property for the purpose of ascertaining whether the regulations of this bylaw are being observed.*

4. *If the [Name of Municipality] is not satisfied that the owner has taken appropriate steps to mitigate the damage caused by the breach of any provision under this bylaw, the [Name of Municipality] may enter onto the land to take such steps as are necessary to remedy the bylaw contravention.*

5. *If the [Name of Municipality] takes action pursuant to Section [paragraph above on entering lands to remedy damage], every owner and occupier shall pay to the [Name of Municipality] within thirty (30) days of demand of same, all costs and expenses incurred by or on behalf of the [Name of Municipality in removing alien invasive species and generally taking all remedial measures required in order to comply with this bylaw caused by the breach of any provision of this bylaw.*

6. *Any amount unpaid together with interest on the 31st day of December in any year shall be added to and form part of the property taxes payable in respect of the real property on which the [Name of Municipality] took the remedial action, or the real property that caused the environmental degradation breaching this bylaw and necessitating the remedial action, and shall be deemed to be taxes in arrears and may be so entered on the tax roll by the collector.*

7. *Any person who contravenes this bylaw is guilty of an offence and, upon*

conviction, is liable to a fine not exceeding $10,000.

8. *Each day a person plants or causes or permits to grow an alien invasive species contrary to this bylaw shall constitute a separate offence.*

15.4 Challenges and Opportunities

15.41 The Two Faces of Invasive Species Bylaws

Occasionally bylaws to manage invasive species such as noxious weeds have unintended consequences. Landowners attempting to nurture and restore Garry Oak ecosystems have at times been targets of complaints regarding unkempt yards and the subsequent application of municipal bylaws. This has occurred even in municipalities where policies have explicitly encouraged landscaping with native vegetation or Naturescaping (www.naturescapebc.ca/). Although some neighbours fear the long grass is a fire hazard, the bunch grasses in native Garry Oak ecosystems remain green far longer than the introduced, exotic grasses commonly used to grow lawns. Additionally, the native grasses are more likely to attract native animals than pests such as rats.

There are several ways that local governments can protect native gardeners from harassment. Residents can be encouraged to alert their local government about their native gardens to ensure bylaw officers understand their plans and activities. Local governments can provide small signs or garden ornaments, and feature native plant gardens in community newsletters to enhance awareness and encourage others to develop their own native plant gardens.

Local governments can also provide novice native plant gardeners with helpful information, including links to GOERT's publications (e.g., Gardener's Handbook, Best Management Practices for Garry Oak and Associated Ecosystems, Restoring British Columbia's Garry Oak Ecosystems). These resources indicate, for example, that many native plant gardens with grasses may be mowed after the grasses and forbs have set seed. This is sometimes used to mimic prescribed burning, which First Nations used to increase the abundance of certain forbs and prevent encroachment of shading shrubs and conifers. However, the potential benefits of mowing are highly dependent on the needs of

desired species, as well as on the time of year and variations experienced in annual weather patterns; some native species are adversely affected by mowing at any time of year. GOERT's Restoration and Management RIG and Native Plant Propagation Subcommittee may be helpful when gardeners are looking for answers to complex questions.

15.42 Native Plants in Landscaping

Propagation protocols have been developed for only a handful of plant species native to Garry Oak ecosystems. As a result, few species are available for landscaping or restoration work. GOERT's Native Plant Propagation Subcommittee compiles plant propagation information for nurseries and other plant propagators, available at www.goert.ca/propagation. At www.goert.ca/suppliers, there are lists of nurseries that stock native plants to support landscaping and restoration efforts.

15.43 Insect Infestations

Nuisance bylaws can also be used to manage insect infestations (e.g., jumping gall wasps, oak leaf phylloxeran, winter moths and gypsy moths) that affect Garry Oak. (Management practices for these pests are continuously evolving. Links for current methods of control can be found at www.goert.ca/gardeners_restoration/garryoak_trees.php.

The primary source of information regarding invasive species is the Coastal Invasive Plant Committee at www.coastalisc.com. In the CRD, there is a regional sub-committee known as the Capital Region Invasive Species Partnership (CRISP) (www.coastalisc.com/regional-committees/crisp). GOERT's Invasive Species Sub-Committee is a sub-committee of the Restoration and Management Restoration Implementation Group (R&M RIG) , and focuses on research and management of invasive species in Garry Oak ecosystems. This group has developed a *General Decision Process for Managing Invasive Plant Species in Garry Oak and Associated Ecosystems*, annotated bibliographies and a field manual for invasive species. See www.goert.ca/invasive for these resources and additional information.

SPOTLIGHT

DISTRICT OF SAANICH NATIVE PLANT SALVAGE PROGRAM

Preserving our Natural Heritage

The municipality of Saanich is a beautiful place to live for many reasons, but especially because of our spectacular and diverse natural environment.

Preservation of our natural heritage in Saanich is a goal shared by the Municipality and the community. The Saanich Native Plant Salvage Program is working to preserve native plants in our region and provide volunteers with access to development sites in order to rescue plants.

Since 2001, where opportunities exist, native plants have been rescued from sites where they would otherwise be lost due to development. Plants salvaged from these sites are used in private and public local restoration projects to benefit the entire community and are not permitted to be sold.

More than 400 members

Landowners and developers participate in this program by granting permission for volunteer members of Saanich's Native Plant Salvage Program to access their property before development begins. Currently there are over 400 members.

To become a member, participants must attend an orientation session and sign an agreement/waiver form to release landowners from liability and to ensure appropriate practices.

Native plant salvaging is not considered to be an alternative to habitat or species protection.

http://saanich.ca/living/natural/npsp.html

16.0 SUBDIVISION

Left: Garry Oak woodlands in the Lakes region of Fairwinds, Nanoose Bay; Middle: Garry Oak amid Sitka Spruce (Picea sitchensis), Red Alder (Alnus rubra) and other tree species in a seasonal wetland, Vanier Grove, Courtenay; Right: Building lot on Garry Oak ecosystem on Triangle Mountain (Photo by Chris Junck)

Subdivision involves the division of land into two or more parcels, the re-alignment of property lines, or the creation of strata lots. Often, it is a "make or break" time for a property's natural areas.

Although subdivision that creates new lots typically results in additional pressure on natural areas by virtue of increases in population and development, it may present opportunities to identify, map, assess, and protect Garry Oak ecosystems and SAR.

There are a variety of mechanisms through which this can take place, addressed in more detail in previous chapters of this document. As an example, local governments can require EIAs in DAIAs or EDPAs. Or they can adopt zoning and rural land use bylaws that establish parcel sizes, amenity and service requirements, etc., that must be considered when designing a subdivision.

Subdivision also offers an outstanding opportunity to protect Garry Oak ecosystems in the long-term, by overcoming one of the greatest hurdles for preservation of ecosystems: the high cost of acquiring land.

16.1 Triggers

PROVINCIAL LEGISLATION
Local Government Act, CHAPTER 323, Part 26, Division 11 - Subdivision and Development Requirements and Section 941 - Provision of Parkland.

Local Government Act, CHAPTER 232, Part 26, Division 10 - Development Costs Recovery
Local Government Act, CHAPTER 323, Part 26, Division 10, Section 933 - Development cost charges generally and Section 933.1 - Development for which charges may be waived or reduced.

Land Title Act, CHAPTER 250, Part 7, Division 6, Section 99 - Registrar to determine whether description of land acceptable. Table of Contents www.bclaws.ca/Recon/document/ID/freeside/96250_00

16.2 Challenges and Opportunities

16.21 Site Size Averaging on Bare Land Strata

In subdividing bare land strata into residential strata lots and common property, site size averaging can be used to cluster a development and protect Garry Oak ecosystems under common ownership (Bish and Clemens 2008).

Common property in a strata can be protected by a conservation covenant. The Siskin Lane Strata on Cortes Island goes one step further by protecting the entire strata. See www.renewalpartners.com/renewalland/siskin.html.

16.22 Acquiring Land During Subdivision

Section 941 of the *Local Government Act* allows local governments to acquire land or an equivalent amount of money at the time of subdivision; however, the required amount of land must not exceed 5% of the land being subdivided. As "park land" is not a defined term, allowances for park land can be used to protect natural environments for conservation objectives. The park dedication in Section

941 of the *Local Government Act* can also be triggered when bare land strata creates three or more additional lots or the smallest lot is smaller than 2 ha.

In general, ecosystem protection and ecological connectivity cannot be achieved with 5% contributions. Cash contributions in lieu of donations may be pooled and used to acquire privately owned Garry Oak ecosystems. There are a variety of mechanisms (e.g., density transfer, ecological gifts, Development Cost Charges, etc.) to encourage developers to donate additional lands.

When land is donated for parks or conservation, the dedication may qualify for an expedited subdivision under Section 99(1)(h) of the *Land Title Act*. The landowner can bypass the usual subdivision approval process by transferring a portion to a local government or land trust. A reference plan or metes and bounds description is needed, rather than a full survey. Local governments can also provide tax receipts for parkland donations.

The 50 ha Morrison Marsh Nature Reserve on Denman Island, donated to the Islands Trust Fund, is an example of a Section 99 transaction.

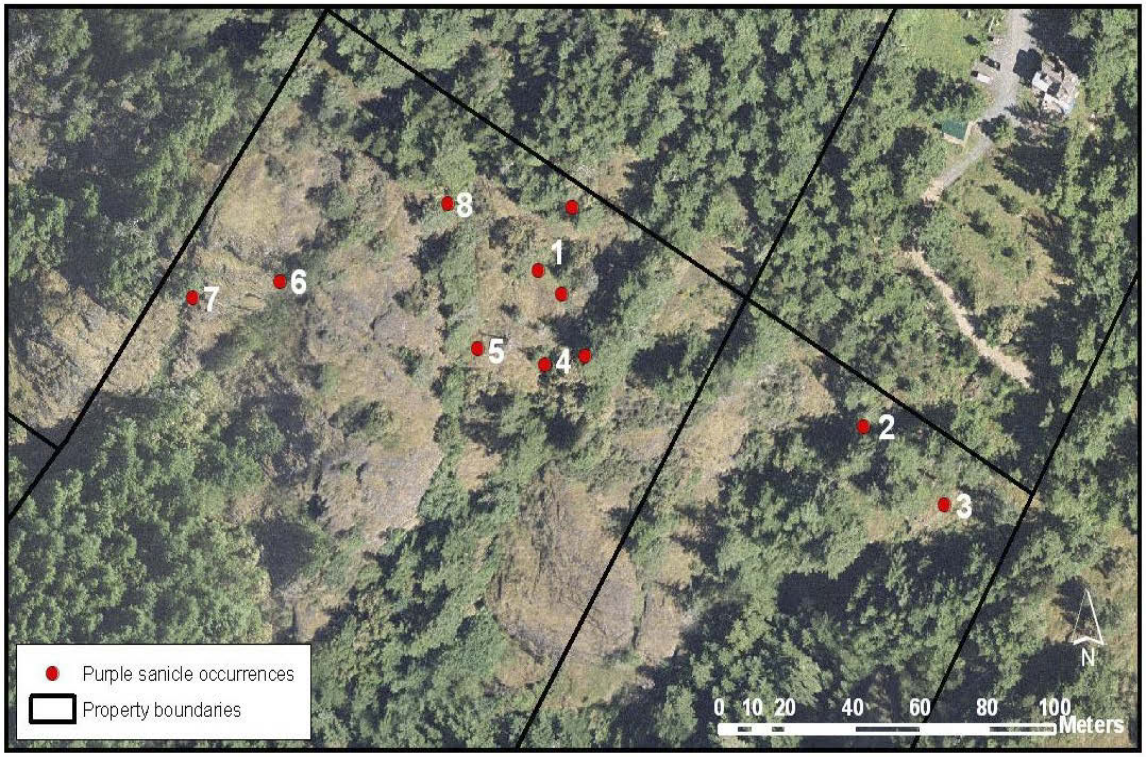
16.23 Development Cost Charges

Local governments can levy one-time Development Cost Charges (DCCs) in the form of parkland or cash on most new units per square metre at the time of approval. DCCs shift financial responsibility from the general taxpayer to the developer for providing capital costs for off-site infrastructure such as roads, drainage, and parkland. DCCs for parkland enable local governments to acquire land beyond the 5% required through Section 941.

Section 933.1 (1)(d) of the *Local Government Act* allows local governments to lower DCCs for developments that result in a low environmental impact. This enables subdivision applicants to “do well by doing good”.

The City of Nanaimo’s 2008 Bylaw to Impose Development Cost Charges for Parkland (Bylaw No. 7069) enables the City to collect funds to pay the capital costs of providing, constructing, altering, or expanding parkland, which serve the

development directly or indirectly. See www.nanaimo.ca/UploadedFilesPath/Bylaws/7069.pdf.



Species at Risk map for Purple Sanicle *(Sanicula bipinnatafida)*. Mapping sensitive ecosystems and SAR occurrences prior to subdivision; the siting of buildings, roads and other infrastructure; and any construction will help protect remaining Garry Oak ecosystems and SAR populations. Maps should be provided to anyone working on the site.

SPOTLIGHT

CITY OF NANAIMO - HAREWOOD PLAINS SUBDIVISION APPLICATION

Environmentally Sensitive Areas DPA at Work

Because of earlier work in creating Development Permit Area 2 (Environmentally Sensitive Areas) in the OCP, Nanaimo City staff were aware of the significant features located on 1099 Bruce Avenue upfront.

Using Subdivision to Protect ESAs

When the property owner and an interested developer came forward with a subdivision application, staff began to look at how the subdivision process could be used to help conserve the environmentally sensitive areas on the property.

Park Dedication, Eco-Gift, Density Transfer and Covenant

Through negotiation with the property owner and developer, additional parkland was dedicated beyond the required 5% by using the federal Ecological Gifts Program and transferring density within the proposed subdivision. A covenant was placed on the property that was not subdivided off, which identified the remaining meadow areas that would be contained within a future lot to be sold for conservation purposes at a later date.

BOG BIRD'S FOOT LOTUS (*Hosackia pinnata*) - Endangered and the City of Nanaimo's official flower, it is known at only 6 sites in Canada

GOERT FIELD WORKSHOP - SAR expert Matt Fairbarns shares his knowledge with an enthusiastic group of City employees and others

GROUNDED IN GEOLOGY - The Plains' vernal pool habitats and fragile meadows reflect a pattern of shallow soils over expanses of bedrock

17.0 OTHER MODES OF PROTECTION

This chapter is arranged alphabetically.

Climate Action Revenue Incentive Program

Monies from B.C.'s Carbon Tax can be redirected to local governments. The Climate Action Revenue Incentive Program (CARIP) is a conditional grant program that provides funding to Climate Action Charter signatories equivalent to 100 percent of the carbon taxes they pay directly. This funding supports local governments in their efforts to move forward on achieving their Climate Action Charter goals. In 2010, these goals included adopting a park acquisition policy, implementing an Urban Forest Strategy, designating EDPAs, developing a plant and tree protection bylaw, and creating DPA regulations for green space protection. More information about the program can be retrieved from www.cscd.gov.bc.ca/lgd/greencommunities/carip.htm.

Conservation Fund

A Conservation Fund can be developed to facilitate conservation efforts, including the timely acquisition and management of Garry Oak ecosystems and other significant natural areas threatened with development.

Establishing a Regional Conservation Fund in British Columbia, published in 2011 by the South Okangan-Similkameen Conservation Program, is available at www.soscp.org/wp-content/uploads/2011/12/Conservation-Fund-Guide-Web.pdf. The guide provides an overview of the steps involved in establishing a conservation fund and a service based on a levy or fee and includes examples of successful conservation fund campaigns and experiences.

Covenants

Covenants can be placed on land titles to protect Garry Oak ecosystems. A conservation covenant is a written agreement between a landowner and a

covenant holder whereby the landowner promises to protect all or portions of their land or ecological features (such as individual Garry Oak trees) in ways that are specified in the covenant. Ideally, a covenant is among three parties, and two of them, a local government and a land trust, are responsible for monitoring and enforcement. The conservation covenant is registered against the title to the property under section 219 of the *Land Title Act*. For a comprehensive understanding of conservation covenants, see Hillyer and Atkins (2005) at www.olta.ca/docs/Publications/Greening%20Your%20Title1.pdf.

Covenants can be used to protect Garry Oak ecosystems without having to purchase them, and therein lies their greatest strength. The benefits to landowners can also be considerable, particularly when they are associated with the Ecological Gifts Program and Natural Areas Protection Tax Incentive Program (described below).

However, people hoping to protect their environmentally sensitive lands with covenants may need to confront certain disincentives. First, the covenant may affect property values. Currently, covenants lower the future value of the land, because they limit development. If natural areas were correctly valued for their ecological goods and services and other attributes, covenants would be more palatable to landowners. Secondly, landowners often bear the costs of surveys, baseline reports, tax and legal advice, registration costs, an appraisal (if entering the Ecological Gifts Program), and application fees (if entering the Islands Trust Natural Areas Protection Tax Exemption Program). The Nancy Waxler-Morrison Biodiversity Protection Legacy Fund, at www.penderconservancy.org/what-we-do.html, assists Pender Island property owners to cover the cost of placing conservation covenants, however, such funds are currently the exception rather than the rule. Also, monitoring of covenants to ensure they are enforceable is labour intensive and expensive. Covenant holders sometimes require an endowment to cover the costs of monitoring and enforcement.

PROVINCIAL LEGISLATION
Land Title Act [RSBC 1996] CHAPTER 250, Part 14, Division 4, Section 219 - Registration of covenant as to use and alienation

Development Cost Charges Scaled to Protect Adjacent Parks

DCCs can be scaled to better protect Garry Oak ecosystems in parks and conservation areas. Developers who own lands adjacent to these natural areas are able to sell their lots for considerably more than they could without the proximal protected areas, yet the developments inevitably increase park use and degradation. Increased DCCs for developments near parks and conservation areas could be used to develop management plans, install fencing and create signage and educational materials to mitigate the damage.

Ecological Gifts Program

Canada's Ecological Gifts Program, facilitated by the *Income Tax Act of Canada* and administered by Environment Canada, offers tax benefits to landowners who donate ecologically sensitive land or a partial interest in the land to a qualified recipient. Eligible recipients include federal, provincial, and municipal governments, or an approved land trust. Undeveloped land, wetlands, riparian areas, rare ecosystems, and areas with rare species typically qualify. Eligible property interests include fee simple lands, conservation covenants, and life estates. The donor may receive an income tax deduction based on the fair market value of the gift, no capital gains on the transfer, and carryover of tax benefits for 10 years. The deal can involve split receipts, which are a combination of donation and sale; the landowner sells the land at a discounted price to a land trust or other charitable organization and receives tax credits on the difference between the actual value of the land and the discounted price. For some landowners, it can be lucrative; each person considering an ecogift should consult a tax accountant to assess his or her personal situation. **Lands must be gifted prior to subdivision**, in cases that include subdivision. The program is described at www.cws-scf.ec.gc.ca/ecogifts/intro_e.cfm.

Environmental Mitigation and Offsetting

In 2010, seven hundred and fifty hectares of private and Crown lands on Denman Island were protected from development through a combination of mechanisms that included carbon offsets, or more specifically the transfer of carbon rights

associated with the privately owned lands. This initiative protected critical habitat for the Taylor's Checkerspot Butterfly (*Euphydryas editha taylori*), a SAR found in Garry Oak ecosystems. The Province has drafted an Environmental Mitigation and Offsetting Policy, available at www.env.gov.bc.ca/emop/.

Environmental Valuation

In their efforts to protect the environment, regional district boards and municipal councils often look for ways to minimize lost opportunity costs to developers. Currently the market determines the price of many lands based on their potential for development and resale, without first valuing the ecological productivity or services provided by the undeveloped lands. Environmental valuation is the process of putting monetary values on environmental goods and services. It is based on the premise that destruction and degradation of these goods and services occur as externalities, which are the side effects or consequences of commercial activities that are not reflected in the cost of doing business. If these costs were taken into account, people would appreciate the value of ecosystems, developers would benefit from owning lands with ecosystem services, and all would be less likely to contribute to their demise.

Methods to price ecological goods and services are quite well developed and tested, and there are publications that can inform such pricing within the range of Garry Oak ecosystems. For example, *Natural Capital in B.C.'s Lower Mainland: Valuing the benefits from nature* was published in 2010 by the David Suzuki Foundation, available at www.davidsuzuki.org/publications/reports/2010/natural-capital-in-bcs-lower-mainland/. The Foundation has also developed a tool to "put natural capital on the map"; see www.davidsuzuki.org/issues/wildlife-habitat/projects/natural-capital/putting-natural-capital-on-the-map/.

Habitat Stewardship Program

The Habitat Stewardship Program (HSP) allocates federal funds to projects that protect SAR and their habitat. See www.ec.gc.ca/hsp-pih/default.asp?lang=En for additional information.

Land Swaps

In the range of Garry Oak ecosystems, 80% of lands are privately owned. Privately owned, ecologically valuable lands may be exchanged for local government-owned lands that are more suitable for development. Stewart, McDannold and Stuart provide an overview of the steps required of a local government to dispose of property, including property involved in a land exchange, at www.sms.bc.ca/2011/06/selling-land-for-local-governments-part-1/. It is notable that Crown-private land exchanges are common practice, often used to accommodate forestry and other resource interests.

Natural Areas Protection Tax Exemption Program

The Natural Areas Protection Tax Exemption Program (NAPTEP) is a program of the Islands Trust and Islands Trust Fund. The *Islands Trust Act* was amended to accommodate the program. Areas included in the program are shown at www.islandstrustfund.bc.ca/initiatives/privateconservation/naptep.aspx. The Islands Trust is working to expand the program to include Bowen Island and Metro Vancouver Islands.

NAPTEP effectiveness is evaluated by its ability to provide precisely the right balance between uptake for ecological protection and costs to the tax system. It is a variation on the covenant designed to permanently protect natural features on private lands. It offers people who enter a strict covenant a 65% savings on their property taxes. The exemption is based on the natural lands, not the house or areas supporting other structures. Phase one determines whether a landowner is eligible for the program. Phase two requires registration of the NAPTEP covenant on the land's title and results in the issuing of a Natural Area Exemption Certificate. The landowner pays an administration fee for each phase and will incur additional costs that depend upon the size of the area and complexity of the covenant and survey. Some participants report saving more than $3,000 annually (Islands Trust Fund 2010).

The NAPTEP covenant prevents removal of native plants, use of herbicides and pesticides, alteration of natural watercourses or waterbodies, grazing of animals,

and modification of the soil or geological features. Covenanted areas are monitored annually.

Other local governments can introduce NAPTEP or a similar program by way of Section 281 the *Community Charter*. The Province has recognized there is a difficulty with the "one size fits all properties" aspect of the program. Regional districts are encouraged to bring forward proposals with their vision for the program through Orders-in-Council.

PROVINCIAL LEGISLATION
Community Charter, CHAPTER 26, Part 9, Division 2, Section 281 - Regulations providing additional powers and exceptions

NAPTEP-like Programs

In Nova Scotia, the Conservation Property Tax Exemption eliminated property taxes for eligible conservation properties. The Province of Nova Scotia established a $23 million trust fund to provide funds to land trusts for private land conservation, and provides an annual grant to municipalities to compensate for lost tax revenue. See www.gov.ns.ca/nse/protectedareas/cpte.asp for more information.

Ontario's Conservation Land Tax Incentive Program also provides 100% tax relief for provincially significant conservation lands. Additional information can be found at www.mnr.gov.on.ca/en/Business/CLTIP/index.html.

Natural Heritage Protection Act

Local governments in B.C. can lobby for additions or changes to provincial legislation respecting biodiversity. The province of Québec has a *Natural Heritage Conservation Act*, "to contribute to the objective of safeguarding the character, diversity and integrity of Québec's natural heritage through measures to protect its biological diversity and the life-sustaining elements of natural settings". The Act "is intended to facilitate the establishment of a network of protected areas representative of biodiversity by introducing protection measures for natural settings that complete existing measures, including the assigning of

protection status to certain areas under the responsibility of other government departments or bodies".

Under this legislation, private properties can be recognized as nature reserves for 25 years or longer. While owners do not part with their rights to the land, they must agree to apply specific conservation measures in an agreement with the Minister of Sustainable Development, Environment and Parks or with an approved non-profit conservation organization. The agreement is registered on title and is binding on subsequent owners. Recognized nature reserves are exempt from school and municipal taxes. See www.mddep.gouv.qc.ca/biodiversite/prive/depliant-en.htm for more information.

Revitalization Tax Exemptions

Revitalization tax exemptions are intended to encourage environmental revitalization (e.g., environmental sustainability). They may include exemptions for developments adjacent to Garry Oak ecosystems that use "green" approaches to minimize runoff, for example. A revitalization program may apply to a small area or areas, a certain type of property or properties, a particular activity or circumstance related to a property or properties, or an entire municipality.

To use the authority provided in Section 226 of the *Community Charter*, a Council must establish a revitalization program (with defined reasons for and objectives of the program), enter into agreements with property owners, and then exempt their property from taxation once all specified conditions of the program and the agreement have been met. Exemptions may apply to the value of land or improvements, or both. An exemption my be granted for up to 10 years. For more information, see *Revitalization Tax Exemptions: A Primer on the Provisions in the Community Charter* www.brownfieldrenewal.gov.bc.ca/docs/community_charter_revital_tax_exemptions.pdf.

PROVINCIAL LEGISLATION
Community Charter, CHAPTER 26, Division 7, Part 7, Section 226 - Revitalization tax exemptions

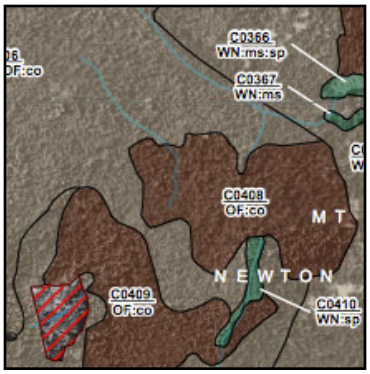
Sponsored Crown Grant or Nominal Rent Tenures

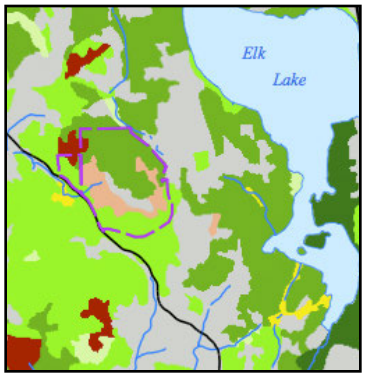
Each year an allocation from the Crown Land Special Account is used to support Sponsored Crown Grant or a Nominal Rent Tenures, and these can be used to protect Garry Oak ecosystems on provincial Crown land. Sponsored Crown Grants are transfers of Crown land from the Province to municipalities and regional districts. Nominal Rent Tenures are leases and licenses of occupation of Crown land provided to municipalities, regional districts, and community organizations for a token or nominal amount of rent. Ministry sponsorship is required for all Sponsored Crown Grants and for many Nominal Rent Tenure applications.

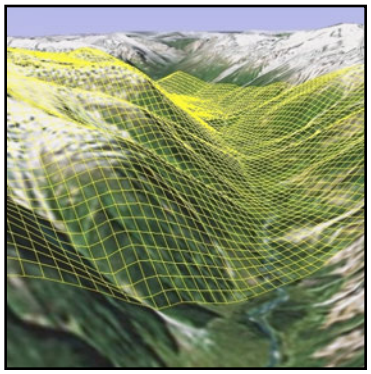
The Islands Trust Fund (ITF) has created nature reserves by securing Crown lands through Crown Grant applications sponsored by the Ministry of Community, Sport and Cultural Development. While avoiding the high costs of acquisition, there have been costs for surveys, appraisals, and management plans. Mount Arrowsmith Massif Regional Park was acquired by the Regional District of Nanaimo through a Nominal Rent Tenure granting a License of Occupation to the RDN for a 30 year period. The agreement required proof of insurance, and management planning in collaboration with the Hupacasath First Nation, the Federation of Mountain Clubs of B.C., and the Alpine Club of Canada.

For more information about Sponsored Crown Grants and Nominal Rent Tenures, see www.cscd.gov.bc.ca/lgd/gov_structure/sponsored_crown_grants/index.htm

18.0 RESOURCE GUIDE







Left: Sensitive Ecosystems in the Mount Newton area, on SEI map sheet 92B.063 (2004). Polygons with red hatching were originally identified as SEI ecosystems but have been disturbed and are no longer deemed to be viable ecosystems.

Middle: Garry Oak ecosystems (in red) in the Elk Lake area, on CDF Terrestrial Ecosystem Thematic Map, Saanich and Victoria (Map 9 of 9) (2008).

Right: Visualization of the Hectares B.C. grid (2007). Reprinted with permission from Refractions Research.

In order to protect Garry Oak ecosystems and SAR, we first need to know where they are. To locate and map these ecosystems and species, specific skills and technical expertise are required. Similarly, specialized expertise may be needed to integrate scientific information into various bylaws and other planning documents. Chapter 18 outlines where these resources may be found. For ecosystem and species resources, a summary of strengths and limitations is provided.

18.1 Human Resources

18.11 Specialized Expertise

When biological and ecological information is required, it is very important that such information is collected by qualified personnel. This is especially true when SAR must be identified; SAR are by definition rare and few individuals have seen them. Only a small number of individuals are capable of doing this specialized

work, and expertise is often particular to a taxon. Surveys for rare butterflies will require the expertise of an invertebrate biologist, while rare plant surveys will need a botanist.

The Association of Professional Biologists of B.C. (APBBC) hosts a searchable database of consultants by geographical area and type of expertise https://professionalbiology.com/membership/find-a-consultant. GOERT can also recommend biologists with appropriate expertise. While some Registered Professional Biologists can identify SAR, other very experienced SAR biologists are not Registered Professional Biologists.

18.12 Integrated Design Teams

Integrated Design Processes address issues of sustainability in the design phase of development by encouraging collaboration of professionals with diverse expertise. These have tended to focus on green building initiatives, yet there is no reason why these innovative ways to develop real estate need stop at high performance energy systems or life cycle costing. When developers, planners, surveyors, landscape architects, engineers and biologists come together, they can create developments that are successful in simultaneously protecting ecosystems, satisfying social interests and fulfilling economic aspirations. Developers are often very creative and know how to work with engineers to make things happen on the ground. Biologists are commonly adept at anticipating the effects of development on species and their habitats. Landscape architects can integrate ecological design principles into development at multiple scales, to ensure flows of water and wildlife are maintained. Planners, often relegated to being service providers, are important change agents. Effective planners can synthesize vast amounts of information into formats that appeal to Councils and the public.

Biologists and land surveyors should be brought in early to identify natural values and boundaries, respectively. By addressing site and building design at an early stage in the development process, integrated design teams minimize costs and time while maximizing the benefits of involving specialized expertise. These teams are especially appropriate for larger scale developments.

18.13 Local Government Partnerships

Local governments are expected to assess whether inventories, surveys, and EIAs are adequate and to ensure protective measures will be effective. Yet resources are often sparse and in-house expertise may be unavailable for a variety of reasons.

Some local governments have found creative ways to secure the necessary expertise, such as sharing staff among the regional district and member municipalities, funding work through grants-in-aid to NGOs, or managing Regional Conservation Funds (See Chapter 17 Other Modes of Protection).

18.14 Interdepartmental Communication

In-house expertise may be overlooked and departments may be siloed due to time or other constraints, with inadvertent consequences. A population of an at-risk plant species, well known to planning and gardening staff, was destroyed when engineers approved the widening of a roadway. In another instance, a gardener restoring her backyard to a Garry Oak meadow was served with an ordinance to mow her “unkempt grass”, while the same local government encouraged residents to plant native species.

Policy implementation discussions among government departments not only help to protect Garry Oak ecosystems and SAR - they create relationships among staff, unearth challenges so they can be managed internally or without fanfare, and foster efficiencies in other areas. Ideally, every local government department is informed, held responsible, and has identified goals and objectives for the protection and restoration of ecosystems and species.

18.15 GOERT Partnerships

GOERT can assist local governments and First Nations by providing seminars and field workshops for planning and management of Garry Oak ecosystems and SAR, by providing technical advice on specific developments and restoration projects on a fee-for-service basis, or by connecting local governments and landholders with specialized expertise. On large, priority sites with dedicated

parkland and covenants, for example, GOERT can work with partners to coordinate surveys that distribute costs among the local government or First Nation, the landholder, and other non-profit organizations. Sometimes, when landholders cannot afford to hire a biologist, GOERT RIG members are willing to do *pro bono* work. They may visit sites to help others and to expand their knowledge of SAR and further their understanding of Garry Oak ecosystems.

SAR botanist Matt Fairbarns presenting at GOERT dialogue session, February 2012

Matt leading a GOERT field workshop, May 2011

SPOTLIGHT

SOUTH OKANAGAN-SIMILKAMEEN - REGIONAL ENVIRONMENTAL PLANNING ROUNDTABLE

Regional Collaboration

In 2009, the South Okanagan Similkameen Conservation Program (SOSCP) brought together key partners and local government planners to establish a regional Environmental Planning Roundtable that encourages information sharing and develops regionally consistent approaches to land use that are responsive to the needs of communities.

For three years, the partners have worked together to identify priorities, guide the work plan and deliverables of a shared environmental planner. The planner provides hands-on assistance to the Regional District of Okanagan Similkameen, and the communities of Summerland, Oliver, Keremeos and Penticton. The roundtable brings forward innovative and exemplary case studies and expertise from other regions in the province, and creates a positive community of environmental planning practice and support.

A Rare Skill Set

It can be challenging to garner consistent funding for the contract, and to attract and retain a qualified professional as the required skill set is a rare one. Someone with a strong biology background with a good footing in local knowledge of species and ecosystems is key, and experience in the local government and planning milieu is critical. The position also requires an approach that is collaborative and builds relationships and partnerships. Working within multiple organizations each with their own needs, cultures and demands can be challenging. Addressing the needs of an entire region for a single full time equivalent is also extremely challenging and the position requires someone to be able to self-direct, set clear limits to what is manageable, manage their time efficiently and keep in close contact with the communities.

BIODIVERSITY MAP data were used by the shared environmental planner to help delineate Environmentally Sensitive DPAs for 3 municipalities.

18.2 Ecosystem Classification

Classification provides a common language for identifying and mapping sites, and for Garry Oak and associated ecosystems this is quite challenging. Few fully developed Garry Oak ecosystems remain due to fragmentation and encroachment by conifers and exotic plants. Patterns of communities are patchy, variable and incomplete (Erickson and Meidinger 2007). Therefore, several overlapping classification systems are used to describe them.

GOERT primarily uses Erickson and Meidinger's 2007 *Garry Oak Plant Communities in British Columbia: A Guide to Identification*, available at www.for.gov.bc.ca/hre/pubs/pubs/1421.htm and the Biogeoclimatic Ecosystem Classification (BEC) interpreted by the B.C. CDC at http://a100.gov.bc.ca/pub/eswp/. Erickson and Meidinger's classification covers native plant communities with a component of Garry Oak. It can be applied to woodlands, savannah (grassy areas with few trees), meadows and rock outcrops within and near the influence of oak canopy. It does not cover vernal pools, or associated ecosystems. This guide describes 7 plant associations:

- Garry Oak – Grey Rock-moss – Wallace's Selaginella
- Garry Oak – Broom-moss
- Garry Oak – Hairy Honeysuckle
- Garry Oak – Roemer's Fescue
- Garry Oak – Common Camas – Blue Wildrye
- Garry Oak – Great Camas – Blue Wildrye
- Garry Oak – Oceanspray – Common Snowberry

These are further subdivided into 17 plant community types and six sub-communities, with categories for bedrock outcrop and colluvial, early and late season, grassy, and shrub thicket communities.

The CDC's classification of ecological communities, which is derived from the forest ministry's vegetation classification (a component of BEC), includes 4 plant associations or ecological communities with a dominant Garry Oak component:

- Garry Oak - Arbutus
- Garry Oak - California Brome
- Garry Oak - Oceanspray
- Garry Oak - Bigleaf Maple - cherries (found on the B.C. mainland near Yale)

Descriptions for some associated ecosystems are also available (e.g., Wallace's Selaginella - Reindeer Lichens).

Erickson's 1998 classification, at www.for.gov.bc.ca/hre/becweb/Downloads/Downloads_GarryOak/garry_oak_communities.pdf can be used to examine disturbed plant communities.

Mackenzie's 2012 publication *Biogeoclimatic Ecosystem Classification of Non-forested Ecosystems in British Columbia* groups ecosystems into broad categories, and may be consulted for associated ecosystems. Available from www.for.gov.bc.ca/hfd/pubs/Docs/Tr/Tr068.pdf, its terrestrial classification identifies Beachland, Grassland, Hydrogenic (i.e., having unusual hydrology, including vernal pools), Rock, and Disclimax (persisting as a result of disturbance) groups.

There are also U.S. classification systems for ecosystems that resemble Garry Oak and associated ecosystems, including Chappell's 2006 *Plant Associations of Balds and Bluffs of Western Washington*, available from www.dnr.wa.gov/Publications/amp_nh_balds_bluffs.pdf, Rocchio and Crawford's 2008 draft publication *Field Guide to Washington's Ecological Systems* at http://www1.dnr.wa.gov/nhp/refdesk/pubs/wa_ecological_systems.pdf, and several others.

Navigating these classification systems requires experience and patience.

18.3 Ecosystem Mapping

The bylaw provisions in this document assume that a local government has current mapping indicating the whereabouts and extent of Garry Oak and associated ecosystems and SAR. By mapping sensitive ecosystems in advance of

development applications, planners and others are empowered to protect them. While many local governments have habitat atlases, some are based solely on external mapping sources. Local governments can gather information about properties through development processes, incrementally adding to the mapping database and providing critical site-specific information whenever development occurs near Garry Oak ecosystems (See, for example, Chapter 5 EIA).

It is also important to periodically assess the quality of mapping resources, whether they are derived from external or internal sources. They may not be the best or most appropriate resource available, or may differ from what is found on-the-ground. Know precisely how the maps were created: who was involved in their production, the year and season when remote sensing and ground-truthing/ field sampling were undertaken, map scale, and the process of interpretation. On recognizing any limitations, your mapping can be improved and updated to suit your needs.

18.31 Sensitive Ecosystems Inventory

The most commonly used source of ESA information is the Sensitive Ecosystems Inventory (SEI) developed by senior governments. The SEI project identified and mapped rare and fragile ecosystems using aerial photography interpretation or Terrestrial Ecosystem Mapping (TEM) polygons with selective ground-truthing. It has been completed for the east coast of Vancouver Island, the Sunshine Coast, the Okanagan Valley, Metro Vancouver and parts of the Fraser Valley. See www.env.gov.bc.ca/sei/

The SEI was mapped at a scale of 1:20,000. The original maps were based primarily on air photography taken between 1984 and 1993, at scales ranging from 1:8,000 to 1:20,000. The minimum target mapping size for non-forested ecosystems was 0.5 ha. About 30% of sites were visited to verify the air photo interpretations and to evaluate condition (McPhee et al. 2000; Ward et al. 1998). The spatial information was later updated and examined to determine the extent of disturbance, by overlaying the original polygons on 1:10,000 digital orthophotos taken in 2002; most of this imagery was black and white. Some forms of disturbance were difficult or impossible to identify, such as invasion by

exotic species (Axys Environmental Consulting 2005). Vernal pools, which are ephemeral wetlands, may have been missed altogether on photos taken in the summer. While the SEI is a valuable coarse filter resource, it is not a substitute for a first-hand, on-the-ground overview or site surveys by qualified professionals with Garry Oak ecosystem expertise.

Local government habitat atlases often include SEI as a data layer. In some cases, the SEI data is not entirely displayed; for example, a secondary ecosystem in a polygon may be absent.

Some local governments have updated and expanded upon the SEI information by conducting their own ESA inventories. Having such information in advance of development applications has been pivotal to their ability to protect Garry Oak ecosystems.

The City of Nanaimo mapped SAR occurrences and associated Critical Habitat, and then established DPAs to protect them. The City has also used its ESA inventory to negotiate setbacks, for example, to preserve the hydrology of a sensitive site with shallow soils and SAR. (See also Spotlight pages: District of Saanich ESAs in this chapter, City of Nanaimo DPA for ESAs in Chapter 10 - EDPAs.)

Garry Oak and associated ecosystems may include woodlands, meadows, grasslands, vernal pools, rocky areas such as coastal bluffs, and transitional forests. These categories may or may not translate directly into SEI classes, which include Woodland, Terrestrial Herbaceous, Coastal Bluff, and Sparsely Vegetated ecosystems.

McPhee et al. (2000) noted that Garry Oak woodlands are the most biologically rich of the three SEI woodland communities, the other two being mixed stands of Arbutus and Douglas-fir, and pure stands of Trembling Aspen. Garry Oak is often interspersed with Arbutus and Douglas-fir, and occasionally with Trembling Aspen.

SEI Terrestrial Herbaceous Ecosystems include Garry Oak meadows and grasslands.

Coastal Bluff Ecosystems include rocky shorelines with grasslands, rocky shorelines with mosses, vegetated rocky islets, and coastal cliffs; all of these can include Garry Oak and associated ecosystems.

SEI's Sparsely Vegetated Ecosystems category includes spits and inland cliffs and bluffs - all of which can include Garry Oak and associated ecosystems. Coastal sand dunes are generally not considered Garry Oak or associated ecosystems, however, they are sometimes adjacent and can have species in common, including krummolz Garry Oak (a form with crooked stems).

When found near shorelines, Terrestrial Herbaceous Ecosystems may overlap with Coastal Bluff Ecosystems. They may also be interspersed with woodlands and forests.

Vernal pools are classified in the SEI as wetlands. Additionally, Miskelly (2012) identified oak-associated wetlands. By now you are probably ready to lump them into one ESA and be done with it. In some circumstances that may be appropriate. At the site level however, each of these ecosystems may require different kinds of care[8].

18.32 Coastal Douglas-fir Terrestrial Ecosystem Mapping

A Terrestrial Ecosystem Mapping (TEM) project on Salt Spring Island in 2006-07 marked the beginning of standardized data collection to support land use planning and conservation in the CDF zone. TEM was then expanded to the range of CDFmm, excluding the Gulf Islands falling within the Gulf Islands National Park Reserve (GINPR) and the Fraser Lowlands. The Province commissioned the collection of these data. Parks Canada led TEM for the islands within GINPR, including North and South Pender, Saturna, Prevost, Mayne, Sidney and surrounding islets.

---

[8] See GOERT's Best Management Practices for an overview of vernal pools and seeps, at www.goert.ca/documents/GOERT-BMPs-v1.1.pdf

Similar to the SEI, polygons were delimited through digitized image or aerial photograph interpretation, and verified by field sampling. The air photos for the CDF TEM project spanned a full 25 years, taken between 1980 and 2005 at scales ranging from 1:10,000 to 1:16,000. Field sampling was undertaken during the autumn and winter months. This timing, combined with limited access to private lands, precluded comprehensive inventories (Madrone Environmental Services 2008). The Parks Canada TEM project used 1:10,000 scale colour air photos flown in 2004, and defined a minimum polygon size of 0.5 ha. Field sampling was conducted from April through June, 2006. The Parks Canada TEM project separately mapped and tracked stable features such as terrain properties, and dynamic features such as structural stage, allowing for more efficient future updates (Green 2007). Classification of ecosystems in both projects was hampered by disturbance of, and modifications to, ecosystems (Green 2007; Madrone Environmental Services 2008).

The spatial data for the CDFmm area excluding the GINPR and Fraser Lowlands are available at ftp://ftp.geobc.gov.bc.ca/publish/Regional/Nanaimo/CoastalDouglasFirMoistMaritime/data/.

Thematic maps from the Province-led project were created at a 1:50,000 scale and can be found by searching EcoCat www.env.gov.bc.ca/ecocat/. Garry Oak ecosystems are a separate category on the thematic maps and are easily identified by their red colour. These maps also include Non-forested Ecosystems, which encompass rock outcrops, meadows, woodlands, coastal bluffs, beaches and shorelines (Madrone Environmental Services 2008). A wide variety of ecosystem maps (e.g., sensitive ecosystem maps, dry soil ecosystem maps), ranging in scale, have been created for the Islands Trust area www.islandstrust.bc.ca/maps/trust-area-mapping/ecosystem-mapping.aspx.

18.33 Garry Oak & Associated Ecosystems Priority Site Records

The Garry Oak and Associated Ecosystems Priority Site Records database, updated and expanded in 2011-12, was created to help governments, land trusts, and others identify areas of conservation value or special interest, and establish priorities for acquisition and stewardship activities. Priority sites are delineated

by ecological rather than cadastral boundaries, and many contain more than one ecosystem type.

Once housed within the B.C. CDC and now an ongoing GOERT project, the records are based on Natureserve methodology standardized for Conservation Data Centres and Natural Heritage Programs worldwide.

Sites are fully described, digitally mapped and include ratings for biodiversity significance, connectivity, representativeness, protection urgency, management urgency, cultural/heritage and other values (recreational, aesthetic, etc.). A site description includes key environmental factors, general biological/ecological information, climate, land use history, elevation and area. A site design and mapping section includes a site significance summary, as well as boundary justification and rationale for ratings. As landowners were contacted to gain access to the sites for the 2011 update, the ownership and protection section often includes information on the landowners' level of awareness of site values. A management section includes current land uses, natural hazards, exotics, relevant offsite land uses, inventories (e.g., SEI polygons), as well as information and management needs.

Like many resources, this is not a comprehensive collection of priority site records. Most, for example, are in proximity to roads.

18.34 Conservation Data Centre Ecological Communities

The B.C. Species and Ecosystems Explorer www.env.gov.bc.ca/atrisk/toolintro.html is the central database for ecological communities at risk. It is the provincial source for conservation information on more than 600 ecosystems. One can generate lists of ecological communities based on a number of criteria options, including spatial distribution and conservation or legal status. This tool is further described in 18.5 Species at Risk Surveys and Mapping, below.

18.35 Hectares B.C.

Hectares B.C. is a mapping resource developed as part of the same Biodiversity B.C. initiative that produced *Taking Nature's Pulse: The Status of Biodiversity in*

British Columbia (Austin et al. 2008). Its creators called it "a collaborative environmental analysis system for B.C.", as it was designed to reduce redundancy in collecting, processing and overlaying spatial data (Refractions Research 2007). Hectares B.C. is searchable by regional district or municipality, and can be queried for area-based calculations, such as the extent of Garry Oak - Arbutus ecological communities in a particular municipality. See http://hectaresbc.ca/app/habc/HaBC.html

SPOTLIGHT

DISTRICT OF SAANICH - ENVIRONMENTALLY SENSITIVE AREAS

Public Suggest New ESAs

To expand its inventory of mapped Environmentally Significant Areas, the District of Saanich turned to its residents for help. Fifty-six people responded to the call, identifying 46 potential sites to be screened with project priorities. A high priority site, for example, might be a Garry Oak meadow adjacent to a park, while a low priority site would be an area already identified and mapped. Thirty-one priority sites were assessed for ecological integrity based on landscape context such as fragmentation, site condition including the extent of invasive species, and the level of effort required to restore the site to its natural state. Twenty of these were recommended for consideration by the District as potential new ESAs.

A Phased Process

A technical advisory group, with representatives from Saanich, senior governments and GOERT, set the priorities for site selection and criteria to evaluate the sites.

A biological consultant was hired to apply the priorities and criteria to the sites.

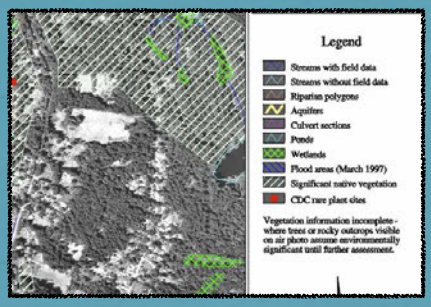
Phase 1 offered the public an opportunity to inform the consultant of sites that might be interest. In Phase 2, the consultant will give broader consideration to new potential sites based on technical data resources and expertise.

When the project was presented at an open house in July of 2012, some people were eager to participate in another round of ESA identification.

Photos by M. Grau for the District of Saanich

WOODLAND - Scotch Broom hovers over Broad-leaved Shootingstar (*Dodecatheon hendersonii* subsp. *hendersonii*) in a Garry Oak woodland.

TERRESTRIAL HERBACEOUS - A rock outcrop at Observatory Hill supports Chickweed Monkey Flower (*Mimulus alsinoides*) and other wildflowers.



ESA ATLAS - New ESAs are added to the Environmentally Significant Areas Atlas, available from www.saanich.ca/living/natural/esaatlas.html.

18.4 Site Surveys and Inventories

Surveys and/or inventories are recommended prior to the design of any development and essential prior to any modifications to the site. They are often required and analyzed as part of EIA.

Whenever possible, the geographical survey area should encompass adjacent areas as well as the parcel in question. Often ecological areas of influence lie outside of subject properties, or alternatively alterations to the subject property may affect adjacent sensitive areas. To better understand how a site's ecosystems function over time, the survey report should document the history of the site (and adjacent parcels), examining topography, hydrology, surface geology, soil and vegetation in the context of current and historical land uses.

For Garry Oak and associated ecosystems, a multi-year, multi-season, multi-expert site inventory with special attention to SAR is ideal. All taxonomic groups should be included, not only plants. The time of year and amount of time required for surveying differs for various species and taxonomic groups. For example, timing of plant surveys should be based on the weather together with the phenology of the plants suspected to be present (i.e., cyclic and seasonal timing of flowering, setting seed, etc.). SAR surveys are discussed in more detail in 18.5 SAR Surveys and Mapping.

There are many types of surveys and inventories to identify and assess a site's ecological values. While a qualified expert is best equipped to determine the type of assessment needed, Chapter 7 in GOERT's 2011 publication *Restoring British Columbia's Garry Oak Ecosystems: Principles and Practices*, available at www.goert.ca/gardeners_restoration/restoration.php, outlines ecological inventory principles and practices for Garry Oak and associated ecosystems, albeit from a restoration perspective. Readers are urged to use standardized methods for inventory of ecosystem components, published by the B.C. Resources Inventory Standards Committee (RISC) at www.ilmb.gov.bc.ca/risc/standards.htm. GOERT's restoration guide also refers to another resource designed to guide inventories on conservation properties, i.e., the Land Trust

Alliance of B.C.'s *Guide to Baseline Inventories*, available at http://ltabc.ca/2011-11-10-09-15-27/ltabc-publications/61-ltabc-guide-to-baseline-inventories.

18.41 Bio-inventory Terms of Reference

MFLNRO's Ecosystems branch created a Bio-inventory Terms of Reference as an appendix to *Develop with Care 2012: Environmental Guidelines for Urban and Rural Land Development in British Columbia*, available at www.env.gov.bc.ca/wld/documents/bmp/devwithcare2012/DWC-Appendices-A-F.pdf. The Terms of Reference outlines how to determine the level of survey or inventory required, and identifies standardized procedures to collect the necessary information.

18.42 Assessing Hydrology

Garry Oak ecosystems are particularly vulnerable to subtle changes in hydrology. Examining how changes in topography and permeability/infiltration have affected the area's ecosystems in the past, together with maps and field surveys reflecting conditions in both wet and dry seasons, can help determine whether a hydrological survey will be necessary and predict how the ecological values on the site may respond to proposed site modifications. The Water Balance Model (http://waterbalance.ca/) is a decision support tool that may be helpful in conducting the assessment. It allows one to simulate and compare pre-development, base cases and multiple scenarios. *Re-inventing Rainwater Management: A Strategy to Protect Health and Restore Nature in the Capital Region* was published in 2010 by the University of Victoria Environmental Law Clinic and submitted to the Capital Regional District on behalf of the Veins of Life Watershed Society; it is available at www.elc.uvic.ca/press/documents/stormwater-report-FINAL.pdf. *Peeling Back the Pavement: A Blueprint for Reinventing Rainwater Management in Canada's Communities* is a follow-up publication and part of the POLIS' water sustainability handbook series, developed in partnership with the Environmental Law Centre. The publication and webinar can be accessed at http://poliswaterproject.org/publication/426.

Stormwater Planning: A Guidebook for British Columbia was designed to eliminate the root cause of negative ecological and property impacts of

stormwater by addressing the spectrum of rainfall events. It can be found at www.env.gov.bc.ca/epd/mun-waste/waste-liquid/stormwater/index.htm

18.5 Species at Risk Surveys and Mapping

Although a landscape or ecosystem-based approach can protect some populations of SAR, a concentrated search effort by professionals skilled in rare species identification is typically needed. SAR are frequently found in small, isolated patches that are easily overlooked, and may be found outside of areas identified for protection through landscape approaches.

Only a handful of specialists have the knowledge and experience to find and identify SAR, and to assess the site conditions that are contributing to their persistence. Identification is further complicated by the presence of diagnostic features only available at specific times of year. Phenology can be determined from CDC records and local observations, yet is subject to fluctuations in weather. Nonetheless, there are easy ways to gather preliminary information about SAR, and these are discussed below.

18.51 Conservation Data Centre

The B.C. CDC is the primary source of information for SAR. It is part of a network of Natureserve CDCs, an international community with a common framework for assessing SAR. The B.C. Species and Ecosystems Explorer www.env.gov.bc.ca/atrisk/toolintro.html is the central database for ecological communities and species at risk. It amalgamates information for more than 6000 species and 600 ecosystems, and it is where many paid consultants secure the bulk of the information provided to local governments. It is searchable by regional district and municipality with surprisingly little effort.

The CDC has a mapping service (the CDC Internet Mapping Service) that enables the production of maps of known species locations www.env.gov.bc.ca/atrisk/ims.htm. These locations are limited to those mapped by the CDC and do not yet represent a comprehensive distribution for the species or ecosystem. This mapping can also be accessed through imap B.C.'s "Endangered Species and Ecosystems" layer, available at http://geobc.gov.bc.ca, and via Data B.C. (http://

data.gov.bc.ca). Non-sensitive occurrences and masked sensitive occurrences are available. You can directly contact the CDC at cdcdata@gov.bc.ca to discuss access to confidential information for sensitive species or ecosystem occurrences. In turn, data for rare ecosystems and SAR collected through local government planning processes should be submitted to the CDC.

18.52 E-Flora and E-Fauna

E-flora B.C. (www.geog.ubc.ca/biodiversity/eflora/) and E-fauna B.C. (www.geog.ubc.ca/biodiversity/efauna/) are useful tools to pare down species lists (e.g, to eliminate plant species found at high elevations when looking at coastal sites).

18.53 SAR Local Government Primer

The SAR Local Government Primer, at www.speciesatrisk.bc.ca, is a searchable database that condenses and summarizes the CDC data. It provides species lists by regional district, for example, and briefly describes each species.

18.54 SAR Recovery Planning Documents

Recovery planning documents must include maps showing the extent of a species' Critical Habitat. Ideally the information comes from recent surveys where people skilled in SAR identification have secured permission from landowners and confirmed that the species and habitat are still there.

The extensive expertise and magnitude of local and scientific knowledge that is leveraged for recovery planning is often undervalued. A species assessment is completed, a status report written, and the species is assigned a status by the CDC (as presumed extirpated, possibly extirpated, critically imperiled, imperiled, or vulnerable) and COSEWIC (as Extinct, Extirpated, Endangered, Threatened, of Special Concern, or Not at risk). Parks Canada and Environment Canada then work with experts on the GOERT RIGs and others to develop recovery strategies and action plans. Parks Canada conducts jurisdictional reviews and consults with affected parties. In many cases, these parties have already been contacted by

GOERT or its partners to request permission to conduct surveys or to provide information.

Recovery strategies outline the general framework for species recovery. They include a description of the species and its needs; identification of threats to survival of the species and its habitat and a strategy to address these threats; identification of the species' Critical Habitat (to the extent possible), examples of activities likely to cause destruction to habitat, and a schedule of studies to identify Critical Habitat when information is inadequate; and a statement of population and distribution objectives and the research and management activities needed to meet these objectives.

Action plans contain specific measures to ensure recovery. They must include a description of Critical Habitat (to the extent possible) and examples of activities likely to destroy it; a statement of proposed measures to protect Critical Habitat; identification of portions of Critical Habitat that have not been protected; a statement of measures to implement recovery strategy and methods to monitor recovery; and an evaluation of the socio-economic costs and benefits.

Critical Habitat in recovery strategies and action plans encompass the population plus any supporting habitat. For example, if a plant SAR is found in a seepage site, it is not enough to protect the small area where it exists when its survival depends upon the hydrology of the upslope area. Also, habitat for some species will expand or shrink depending on the weather and other factors, and in some years the population may be absent altogether. The habitat may be patchy, or have a convoluted boundary.

To account for these dynamics and attributes, Critical Habitat is often mapped as a "bounding box". This is a larger square or rectangle that encompasses the known population as well as an area where there is a significant potential for the habitat to be (e.g., a meadow of an appropriate size and opportunities for sunlight, moisture, etc.). It is noteworthy that a bounding box can create the false perception that Critical Habitat is the entire area within the box; rather, Critical Habitat is known to occur somewhere in the box.

A landholder may be reluctant to allow SAR surveys that enable Critical Habitat mapping to be conducted on his property, fearing a discovery of SAR will prevent him from managing or developing the land as he pleases. Yet believing that Critical Habitat is always a "no go zone" is subscribing to a myth. One SAR thrived on a military reserve where 400 soldiers marched from July through January; the rest of the year, they stayed on established trails which allowed the plants to persist. SAR have been, or could have been, protected simply by re-routing trails or by shifting a road by a few metres. Also, when recovery planners do not have sufficient detail about the location of Critical Habitat, they must create a larger bounding box around un-surveyed areas to fully encompass areas where the species might exist.

18.55 GOERT Species at Risk Field Manual

GOERT's *Field Manual: Species at Risk in Garry Oak and Associated Ecosystems in B.C.*, is formatted to fit into a small binder for field use and is updated every year. For each species, it includes scientific and English names, risk status, range/known distribution, a field description with photos and illustrations, life history, habitat, why the species is at risk, and what you can do to help the species. The manual can be downloaded from ://www.goert.ca/publications_resources/species_at_risk.php

18.56 Alberta Native Plant Council Guidelines

The Alberta Native Plant Council (ANPC) Guidelines for Rare Plant Surveys succinctly outline field survey methods, qualifications of surveyors, minimum requirements for a rare plant survey, requirements for a thorough plant survey, and reporting requirements. The guidelines are available from www.anpc.ab.ca/assets/rareplant.pdf.

18.57 A New Provincial Tool for SAR Recovery

The B.C. Ministry of Environment is developing a tool that will identify areas that are important for SAR conservation. By linking species to habitat and ecosystems on the landscape, it will be more comprehensive than what could be derived using individual element occurrences identified by the CDC or Critical Habitat

mapped in action plans, and more specific than broad ecosystem-based tools such as the SEI. The tool will enable identification of species and ecosystem values within an area, area-based conservation planning (restoration, protection, inventory, etc.), multi-species recovery planning and risk assessment. Using a Geographic Information System (GIS), one could for example select an ecosystem polygon (i.e., a biogeoclimatic classification unit) to get a list of potential species in that area, or select a species and get a list of polygons that potentially provide habitat. Next steps include piloting the tool in areas of the province where ecosystem and species data is most available.

18.6 General Resources

18.61 Ecological Reports Catalogue and Cross-linked Information Resources

The Ecological Reports Catalogue, or EcoCat, is a one-stop shop for digital reports and publications, as well as associated files such as maps, datasets and published inventory information that have been completed by, or commissioned for the Province (www.env.gov.bc.ca/ecocat/). The SEI and CDF TEM information are available here. Report subjects pertinent to Garry Oak ecosystems include water, wildlife and wildlife habitat, terrestrial information, soils, and vegetation.

Cross-linked Information Resources (CLIR) is a way to access multiple sources of environmental and natural resource information simultaneously through a single search window. It searches for information in 6 provincial government databases, including EcoCat, B.C. Species and Ecosystems Explorer, Biodiversity/ Environmental Information Resources e-Library, Environmental Protection Information Resources e-Library, Ministry of Forests and Range Library (shared with Ministry of Environment), and Species Inventory Web Explorer - a component of the Species Inventory Data System (SPI) system. The CLIR is available at www.env.gov.bc.ca/clir/.

18.62 Community Mapping Network

The Community Mapping Network hosts a number of atlases that are relevant to the protection of Garry Oak ecosystems and SAR (See www.cmnbc.ca/atlas_gallery). These include but are not limited to the Comox Valley Project Watershed site, Cowichan Valley Watershed Atlas, Invasive Species Atlas, Natural Areas for the Capital Region, Sensitive Habitat Inventory and Mapping (SHIM), and Species at Risk & Local Government site. The SHIM includes the Nanaimo Environmentally Sensitive Areas Atlas, Comox-Strathcona Sensitive Habitat Atlas, and Saanich Environmentally Significant Areas. Many of these atlases link to, and/or can be accessed on partner websites. The SEI in the CMN requires updating; until then, please refer to www.env.gov.bc.ca/sei/.

18.63 Stewardship Centre for B.C.

The Stewardship Centre for B.C. (SCBC) hosts the *Green Bylaws Toolkit*, Green Shores, the SAR Local Government Primer, and the Stewardship Series - 19 guides designed to provide scientific, legal, and technical information to protect ecosystems and facilitate stewardship of natural resources.

18.64 B.C. Ministry of Environment Guidelines and Best Management Practices

The B.C. Ministry of Environment Guidelines and Best Management Practices (BMPs) website at www.env.gov.bc.ca/wld/BMP/bmpintro.html is a gateway to *Develop with Care 2012: Environmental Guidelines for Urban and Rural Land Development in British Columbia* and many other guidelines and BMP documents. Chapter 2 “Community Planning” provides information that reinforces and is complementary to these *Model Bylaws*. The *Guidelines for Translocation of Plant Species at Risk in British Columbia* (Maslovat 2009) can also be found here.

18.65 GOERT Best Management Practices

Best Management Practices for Garry Oak and Associated Ecosystems complements *Model Bylaws for the Protection of Garry Oak and Associated Ecosystems* by describing many simple precautions that can help avoid destruction and damage of ecosystems and SAR. It also offers sector-specific

checklists, including one for municipal and regional planners. The document can be retrieved from www.goert.ca/documents/GOERT-BMPs-v1.1.pdf.

18.66 GOERT Protect Your Community's Future Brochure

Protect Your Community's Future is an attractive brochure with eight glossy inserts. These include: Why protect Garry Oak areas?, Benefits of protecting Garry Oak areas during land development, Success stories: benefits of protecting Garry Oak areas during land development, Ways that local governments can protect Garry Oak areas during land development, Ways that developers can protect Garry Oak areas during land development, Useful contacts, References and additional information, and a Glossary. They are accessible from www.goert.ca/documents/GOERT_Fact_Sheets.pdf, or contact info@goert.ca to order printed copies.

18.67 Species and Ecosystems at Risk Local Government Working Group

The B.C. Ministry of Environment established a Species and Ecosystems at Risk Local Government Working Group (SEAR LG WG) in 2009. The purpose of this group, which consists of representatives from municipal, regional and provincial governments and the Union of B.C. Municipalities (UBCM), is to develop a strategic approach to protection of at-risk species and ecosystems on private land, including municipal and regional government land. In 2011, the SEAR LG WG completed a discussion paper, available at www.env.gov.bc.ca/wld/searl_gwg/, that outlines 45 recommendations under 5 strategies:

- Increase local government awareness of SAR.
- Facilitate use of effective tools and techniques.
- Identify and collaborate on shared responsibilities.
- Conduct ecosystem mapping and encourage data sharing.
- Engage landowners in SAR habitat protection.
- Regional working groups are planned to address the recommendations at a regional scale.

18.68 Coastal Douglas-fir and Associated Ecosystems Conservation Partnership

The CDFCP, initiated by MFLNRO Ecosystems staff, is bringing people together to identify and implement priority actions for the protection of ecosystems within the CDF biogeoclimatic zone. GOERT has participated in this group since its inception. See www.cdfcp.ca for more information.

LITERATURE CITED

Acker, M. 2012. Garry Oak and Camas Farms: Policies and Strategies for Recovery and Reconnection. Gambier Island.

Austin, M. A., D. A. Buffett, D. J. Nicolson, G. G. E. Scudder, and V. Stevens. 2008. Taking Nature's Pulse: The status of biodiversity in British Columbia. Retrieved from www.biodiversitybc.org.

Biodiversity Conservation Strategy Partnership. 2008. Strategic Directions for Biodiversity Conservation in the Metro Vancouver Region. Retrieved from www.metrovancouver.org/about/publications/Publications/StrategicDirectionsBiodiversityConservation.pdf.

Bish, R. L., and E. G. Clemens. 2008. Local Government in British ColumbiaFourth. Union of British Columbia Municipalities.

B.C. Ministry of Environment. 2006. An Approach to Mapping Ecosystems at Risk and Other Sensitive Ecosystems. Prepared by the Ecosystems Branch for the Resources Information Standards Committee. Retrieved from www.for.gov.bc.ca/hts/risc/pubs/teecolo/habitat/assets/standards_for_mapping_ear_version1.pdf

B.C. Ministry of Water, Land and Air Protection. 2002. Stormwater Planning: A Guidebook for British Columbia. Retrieved from www.env.gov.bc.ca/epd/mun-waste/waste-liquid/stormwater/.

Brownrigg, C. 2010. Monitoring development permits and restrictive covenants on Salt Spring Island. Master of Public Administration, University of Victoria, Victoria, B.C.. Retrieved from https://dspace.library.uvic.ca:8443/bitstream/handle/1828/2971/brownrigg_caitlin.pdf?sequence=1.

Caslys Consulting. 2011, September. Biodiversity Conservation Analysis and Mapping for the South Okanagan Similkameen Region: Keeping Nature in Our Future Volume 1. Prepared for the South Okanagan Similameen

Conservation Program. Retrieved from http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=23903.

Cornell, S., H. Wetterstrand, and E. Hermansson Török, editors. 2013. Co-Chair's Report: Integrating Social-Ecological Resilience into the New Development Agenda. Multi-Stakeholder Dialogue, Side event to the UN Open Working Group on Sustainable Development Goals, December 2-4, 2013, Medellín, Colombia. Published by the Resilience and Development Programme at Stockholm Resilience Centre, Stockholm University.

Cumming, G. S. 2011. Conceptual Background on Social-Ecological Systems and Resilience. Pages 9–27 Spatial Resilience in Social-Ecological Systems. Springer Science+Business Media.

Deborah Curran and Company. 2011. Community-Initiated Rezoning and Development Moratoria.

Deur, D., and N. J. Turner. 2005. Introduction: Reconstructing Indigenous Resource Management, Reconstructing the History of an Idea. Pages 3–34 Keeping It Living: Traditions of Plant Use and Cultivation on the Northwest Coast of North America. UBC Press, Vancouver, B.C..

Dudley, N. 2011. Authenticity in Nature: Making choices about the naturalness of ecosystems. Earthscan, New York.

Fisheries and Oceans Canada. 1993. Land Development Guidelines for the Protection of Aquatic Habitat. Produced by the Habitat Division of DFO and the Integrated Management Branch of the Ministry of Environment, Lands and Parks. Retrieved from www.dfo-mpo.gc.ca/Library/165353.pdf.

Folke, C. 2006. Resilience: The emergence of a perspective for social-ecological systems analyses. Global Environmental Change 16:253–267.

Garry Oak Ecosystems Recovery Team. (2012). Best Management Practices for Garry Oak and Associated Ecosystems. 89 pp. Victoria, B.C..

Greater Vancouver Sewerage and Drainage District. 1999. Best Management Practices Guide for Stormwater. Burnaby, B.C.. Retrieved from www.metrovancouver.org/about/publications/Publications/BMPVol1a.pdf.

Gunderson, L. H., and C. S. Holling. 2002. Panarchy: Understanding transformations in human and natural systems. Island Press, Washington, DC.

Holling, C. S. 1973. Resilience and stability of ecological systems. Annual Review of Ecology and Systematics 4:1–23.

Holt, R. 2007. Conservation planning and targets for the Coastal Douglas-fir ecosystem. A science review and preliminary approach. Retrieved from www.env.gov.bc.ca/esd/distdata/species_and_ecosystems_at_risk/CDF/CDF_Targets_FINAL.pdf.

Ipswich Borough Council. 2006, June. Ipswich Local Development Framework Issues and Options: Supporting paper on housing density in Ipswich. Retrieved from www.ipswich.gov.uk/downloads/Housing_density.pdf.

Islands Trust Fund. 2010. Saving property tax on Denman and Hornby. The Heron.

Kopits, E., V. McConnell, and D. Miles. 2009. Lot size, zoning, and household preferences: Impediments to Smart Growth? Resources for the Future. Retrieved from www.rff.org/rff/documents/RFF-DP-09-15.pdf.

Lea, T. 2006. Historical Garry Oak Ecosystems of Vancouver Island, British Columbia, pre-European Contact to the Present. Davidsonia 17:34–50.

McPhee, M., P. Ward, J. Kirkby, L. Wolfe, N. Page, K. Dunster, N. K. Dawe, and I. Nykwist. 2000. Sensitive Ecosystem Inventory: East Vancouver Island and Gulf Islands 1993-1997. Volume 2: Conservation Manual.

Miskelly, J. 2012. Garry Oak-associated wetlands in Victoria, British Columbia. Botanical Electronic News ISSN 1188-603X. Retrieved from www.ou.edu/cas/botany-micro/ben/ben450.html.

Nicolescu, E., N. Thompson, and L. Van-Meer Mass. 2010. The Density Bankers: An analysis of Vancouver's Heritage Revitalization Agreements and Density Transfer System. Retrieved from http://lvmmass.files.wordpress.com/2011/07/heritage-density.pdf.

Okanagan Basin Water Board. 2009. Groundwater Bylaws Toolkit. Kelowna, B.C.. Retrieved from www.obwb.ca/fileadmin/docs/groundwater_bylaws_toolkit.pdf.

Okanagan Basin Water Board. 2012. Topsoil Bylaws Toolkit. Kelowna, B.C.. Retrieved from http://waterbucket.ca/wp-content/uploads/2012/05/OBWB-and-PWSBC_Topsoil-Bylaws-Toolkit_2012.pdf.

Pannell, D. 2012, August. What happens when an economist approaches a threshold? Ecological thresholds, uncertainty and decision making. Decision Point:9. AU. Retrieved from www.decision-point.com.au/images/DPoint_files/DPoint_62/dpoint_62.pdf#page=4.

POLIS Project on Ecological Governance. 2009. Water Conservation Planning Guide for British Columbia's Communities. Retrieved from http://poliswaterproject.org/publication/243.

Price, K., R. Holt, and L. Kremsater. 2007. Representative forest targets: Informing threshold refinement with science. A review paper for RSP and CFCI, . Retrieved from http://archive.ilmb.gov.bc.ca/slrp/lrmp/nanaimo/cencoast/docs/representation_paper_posted.pdf.

Price, K., A. Roburn, and A. MacKinnon. 2009. Ecosystem-based management in the Great Bear Rainforest. Forest Ecology and Management 258:495–503.

Quayle, M., and S. Hamilton. 1999. Corridors of Green and Gold: Impact of Riparian Suburban Greenways on Property Values. Prepared for Fraser River Action Plan, Department of Fisheries and Oceans, Vancouver, B.C.. Retrieved from http://mtwatercourse.org/media/downloads/Greenway_economic_study.pdf.

Schaefer, V. 2003. Green Links and Urban Biodiversity - an Experiment in Connectivity. Retrieved from http://planet.botany.uwc.ac.za/nisl/Conservation%20Biology/Conservation_CCT/2c_schae.pdf.

Sorensen, J. 2010. Vancouver heritage-building developers left in the lurch by city. Journal of Commerce. Retrieved from www.vpacconstruction.com/images/Journal_of_Commerce_2010_04_20.pdf.

Walker, B., and D. Salt. 2006. Resilience Thinking: Sustaining ecosystems and people in a changing world. Island Press, Washington.

Weber, T. C. 2007. Development and application of a statewide conservation network in Deleware, U.S.A. Journal of Conservation Planning 3:17–46. Retrieved from www.journalconsplanning.org/2007/Volume3/JCP_V3_Weber.pdf.

West Coast Environmental Law. 2007. The Green Infrastructure Guide: Issues, Implementation Strategies, and Success Stories. Page 88 pp. Vancouver, B.C.. Retrieved from http://wcel.org/resources/publication/green-infrastructure-guide-issues-implementation-strategies-and-success-storie.

Wetland Stewardship Partnership. (2007). Green Bylaws Toolkit for conserving sensitive ecosystems and green infrastructure.

ACRONYMS AND ABBREVIATIONS

ALR	Agricultural Land Reserve
B.C.	British Columbia
BEC	Biogeoclimatic Ecosystem Classification
BMP	Best Management Practices
CDC	(B.C.) Conservation Data Centre
CDF	Coastal Dougas-fir (biogeoclimatic zone)
CDFmm	Coastal Douglas-fir moist maritime biogeoclimatic subzone
CLIR	Cross-Linked Information Resources
CPSP	Conservation Planning and Site Protection (RIG)
dbh	tree diameter at breast height
DCC	Development Cost Charges
DP	Development Permit
DPA	Development Permit Area
EcoCat	Ecological Reports Catalogue
EDPA	Environmental Development Permit Area
EIA/EA	Environmental Impact Assessment
ESA	Environmentally sensitive area
GOERT	Garry Oak Ecosystems Recovery Team
MFLNRO Operations	B.C. Ministry of Forests, Lands and Natural Resource
OCP	Official Community Plan
RCS	Regional Conservation Strategy
RIG	Recovery Implementation Group
RGS	Regional Growth Strategy

SAR	Species at risk
SARA	Species at Risk Act
SHIM	Sensitive Habitat Inventory and Mapping
SEI	Sensitive Ecosystems Inventory
TEM	Terrestrial Ecosystem Mapping
UCS	Urban Containment and Servicing (Policy Area)
UNEP	United Nations Environment Programme
WCED	World Commission on Environment and Development
WHA	Wildlife Habitat Area

A Lifeline for Our Rarest Species

Garry oak ecosystems recovery team

www.goert.ca | info@goert.ca | 250-383-3427