DISCUSSION PAPER:

TOWARDS AN URBAN FOREST STEWARDSHIP STRATEGY FOR SOUTHERN VANCOUVER ISLAND

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Prepared on behalf of the Habitat Acquisition Trust

for the

Georgia Basin Ecosystem Initiative /
Georgia Basin Action Plan

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WORKING TOGETHER FOR THE GEORGIA BASIN

AU TRAVAIL POUR LE BASSIN DE GEORGIA

THE CORPORATION OF THE DISTRICT OF SAANICH

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- Picture of a Garry oak thicket, excerpted from Christopher Brayshaw's Trees and Shrubs of British Columbia (UBC Press, Vancouver, B.C. 1996)
- Picture of the two large shade trees and the flowering cherry tree, excerpted from Anthony Paul and Yvonne Rees' book Designing with Trees (Salem House Publishers, Topsfield, Massachusetts. 1989)
- Diagram of the urban tree gradient, excerpted from Gordon Bradley's article, "Urban Forest Landscapes: Integrating Multidisciplinary Perspectives," published in Urban Forest Landscapes, edited by Gordon Bradley (University of Washington Press, Seattle, Washington. 1995)
- Picture of the urban Garry oak meadow, excerpted from Lorraine Johnson's book Grow Wild, Native Plant Gardening in Canada and Northern United States (Random House Canada, Toronto Ontario. 1998)

Executive Summary (Expanded)

Southern Vancouver Island continues to enjoy robust economic and population growth. Managing that growth has become a significant challenge for our civic leaders. There are many values to be considered and much of the infrastructure and many of the impacts from urban development transcend local municipal boundaries. To add to this complexity, there is an emerging recognition that development must be sustainable: it cannot take place at the expense of future generations or of the natural processes that sustain life. Indeed, business leaders are increasingly aware that it is the natural beauty of this area, combined with the recreational opportunities it provides, which make southern Vancouver Island such an attractive area for the businesses, workers and consumers of the new economy.

As a part of this conversation, this discussion paper explores why we need to urgently re-consider the manner in which we think about and manage our *Urban Forest*. The authors argue that the urban forest is emerging as a major asset in the new economy. It also stands at the confluence of a number of important new initiatives in sustainable land-use planning. These include new models of storm-water management, watershed-based local area planning, urban stream restoration, greenway corridors, energy/carbon conservation and Species-At-Risk Recovery Plans. This important asset, however, is rapidly being degraded by urban planning and development practices that are, in some cases, badly out of step with the principles of sustainability. Similarly, our present tree bylaws and tree management practices also need to be reformed, if they are to help us rise to the challenge of sustainable development and a model of urban forest and natural areas stewardship that is based on sound ecological principles.

The paper begins by exploring what we mean by the term “urban forest,” advocating a broad and inclusive definition that is based on an understanding of trees as part of larger natural systems, as well as human-made landscapes. In Greater Victoria, for instance, the urban forest includes many different types of treed ecosystems, such as the old Douglas-fir forest of Royal Roads University, the rocky Garry oak woodlands of Mt. Tolmie, as well as riparian areas, shorelines, and human landscapes (such as boulevards, parks and backyards).

Urban trees are a vital part of our community; however, when trees are allowed to function as part of larger natural systems, they provide us with many more benefits than they can as isolated landscape elements. The paper explores some of the many economic, environmental and recreational benefits that trees can provide when they exist within broader functioning ecosystems. Emphasis is given to the significant infrastructural services that our forests and woodlands provide to our communities free of charge, but which are too often lost as a result of out-dated urban planning and development practices. The cost of this loss

amounts to millions of dollars to the region. As part of the natural infrastructure, the urban forest reduces stormwater flows, conserves energy (cooling our homes and streets in summer and reducing wind chill effects in winter), cleans our groundwater and air, accelerates the development of organic soils, reduces soil erosion, promotes carbon sequestration and provides critical wildlife habitat and biodiversity within the urban landscape.

The discussion paper scrutinizes our current tree regulation regime (i.e. the bylaws, permit processes, goals and objectives that characterize our present approach to urban tree management) and explores the limitations to this approach. The current model is characterized as one that focuses too exclusively on the amenity values of individual trees, to the detriment of other values. The current model is also criticized for focusing too exclusively on site-level planning and decision-making. Without a broader "landscape level" approach to tree planning that focuses on a broader range of values, we lose the opportunity to manage for such important stewardship objectives as biodiversity conservation, greenspace connectivity and watershed function.

The discussion paper does not argue simply for more regulation or more tree protection at the expense of the development community. It addresses many of the obstacles that are sometimes placed in the way of good development practice by the current tree regulation regime. These include such things as inconsistent nomenclature, uncertainty with respect to permit processes and conditions, delays in the development permit process associated with tree cutting regulations and inconsistent treatment between projects and jurisdictions. The paper suggests a number of changes to the current regime that are aimed at creating a better planning and regulatory environment for the development community to operate within, whilst improving the quality of urban forest conservation and restoration. These include integrating urban forest layers into our land-use mapping systems and incorporating urban forest values into our local area plans, official community plans and regional growth planning processes.

The discussion paper proposes a new model of urban forest stewardship that is based upon 14 strategic principles:

1. Urban forest stewardship must take a natural systems approach.
2. Urban forest stewardship planning must be regional in scope.
3. Urban forest stewardship must be integrated with other regional sustainability initiatives.
4. Managing for sustainability includes knowing what to manage for, at what scales and in which locations.
5. Effective planning recognizes urban forest as part of a continuum, extending from forested, rural watersheds to the highly densified urban core.
6. The Urban Forest, and the diversity of values that it embodies, must become an integral part of all strategic land-use plans within the region.

7. Urban forest planning and management must become integrated across public and private lands.
8. Tree-cutting applications that are associated with different types of land use must receive more appropriate levels of review. Rural woodlot management, residential tree maintenance and large sub-division re-development are very different from one another in their impacts to treed environments and in the considerations that need to be given to their regulation.
9. A diverse palate of tools is available for the implementation of a natural systems-based strategy for urban forest conservation.
10. Flexible tree management strategies are responsive to different land-use objectives for different areas.
11. An effective urban forest stewardship strategy must be authored and supported in large measure through the conservation community and the residents of the region in which the strategy is located.
12. First Nations must be involved in the drafting and implementation of the strategy.
13. An effective urban forest strategy must be supported by the development community.
14. Urban forest stewardship recognizes the complex and interdependent nature of urban planning, regional development and environmental conservation.

The paper concludes with a 25-year vision of a new regional urban forest, which includes the following passage on connectivity:

Generous greenbelts extend into our urban centres, buffering streams, tributaries and gorges, providing shelter, food and conduits for wildlife and linear parks and greenways for residents. Larger forested areas are connected to one another and to smaller treed environments through a diverse network of linear greenways. In residential areas, generous amounts of both private and public greenspace complement and support a diverse range of housing forms. Back- and side-yards are connected in many cases through corridors of native vegetation, providing shelter and food for a broad range of birds, small mammals and insects. Street trees are connected with one another and with residential yards through large contiguous planting areas that include either meadow or a viable under-story of shrubs and herbs.

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Introduction

When is a tree not just a tree? When it's part of a larger *natural system*[1], like a stream, a woodland or a watershed. Urban trees are more than just a pretty face. When trees are allowed to function as part of larger natural systems, they are able to provide us with many more benefits then they can as isolated landscape elements. As part of a broader community of plants, soils and wildlife, trees are able to intercept, detain and harness vast amounts of stormwater, provide shelter and food to wildlife and a home to rare plant and insect species. Trees along streambanks provide shelter and nutrients for fish. On steep slopes, trees prevent soil erosion and slope failure. In sufficient quantities, trees can remove significant amounts of pollutants from both the air and the soil. But to really "do their stuff," trees must be an integral part of broader functioning *ecosystems*. Such treed ecosystems can be natural or cultivated. When considered as a whole, this assemblage of treed ecosystems within our community is known as our "urban forest."

The Urban Forest Stewardship Project (or "UFSP") is being developed to help the communities of southern Vancouver Island rise to the challenge of sustainable living. Sustainability includes "ensuring the ongoing healthy functioning of the natural systems that sustain life."[2] In our coastal region, many of these natural systems are treed or are associated with trees to some extent. Urban growth, in its present form and at its present rate, poses a clear and present danger to these systems. The challenge of sustainability, broadly speaking, is to learn how to provide for ourselves without doing so at the expense of other species and the ecosystems that provide for us all. **An urban forest stewardship initiative can contribute to this goal by promoting the conservation and restoration of treed ecosystems and biodiversity within our community.**

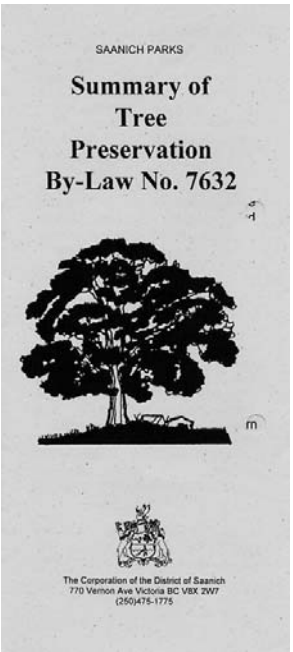
[1] Words in *italics* are defined in the glossary.
[2] This definition is provided in the CRD document, "The Framework For Our Future Guiding Principles," appended to the current CRD Regional Growth Strategy document, February 2002. (p. 32).

To be effective, however, the Urban Forest Stewardship Project must work in concert with other sustainability initiatives, many of which contribute to the "*smart growth*" of southern Vancouver Island These include ongoing efforts to contain and even reduce the present footprint of our built environment, change in the way we manage storm water, housing, transportation, industry and agriculture. Other initiatives include efforts to secure strategic parklands, create land trusts, establish greenways (which can link habitat fragments) and restore streams and other aquatic ecosystems. The UFSP must be understood within this larger "package" of reforms, all of which are needed to foster more sustainable forms of living and economic development.

Our Present Model: Management of Amenity Trees at the Site Level

Our present approach to urban tree management focuses on the role of trees in providing landscape amenity value. By "amenity value," we refer to landscape functions such as ornamentation, screening, shading, and the provision of "character" within our neighbourhoods. Trees are also valued and managed for their ability to provide oxygen, filter pollutants and moderate wind and temperature extremes within urban environments. On private lands, tree values are conserved through responsible home-owner stewardship, reinforced in some areas by the use of municipal tree bylaws. On public lands, trees are managed within boulevards and parks through a program of conservation, pruning, removal and replanting. In both private and public tree management, the emphasis is generally on the tree as a landscape amenity, with planning typically occurring on a site-by-site basis.

The current approach to urban tree management in metropolitan B.C. emerged in its mature form about 10 years ago. In 1992, provincial and municipal planners began a concerted effort to reduce the rate of tree loss associated with land development in the urban centres of the Greater Vancouver and Victoria. Amendments were made to the *Municipal Act* of B.C., which enabled local jurisdictions to draft tree protection bylaws, strengthen development permit conditions and create Official Community Plans to guide development in their communities. Concurrently, changes of a more technical nature were occurring in the fields of arboriculture and urban design, which would facilitate tree retention



and establishment in highly urbanized environments.[3] These advancements included research into "structural soils" (which are designed to support root growth within a media that has been engineered to provide a stable road or sidewalk base); diagnostic equipment, which allows more precise assessment of woody tissue decay in standing trees; and the emergence of a landscape professional—the Consulting Arborist—whose job it is to work with other design and planning professionals to conserve large, established trees on building sites. The emphasis in all of these changes was to keep more trees standing. Taken together, these regulatory and technical innovations—and the social, economic and political impulses that engendered them—have given rise to a particular model of urban tree management. This model has a number of defining attributes, but its underlying focus remains the site-level management of discrete trees for their amenity value.

The Limitations of the Current Model

While the current model has been responsible for a number of important advances in tree management, it has some significant limitations. These limitations are of three kinds:

1. Its planning perspective remains too focussed on individual trees and sites. Natural systems embrace more than just trees and span larger planning areas than the average city lot. This myopia—which affects not just tree regulation, but urban and landscape planning more broadly—has resulted in a proliferation of problems at the broader landscape level. These include the following:
   - inadequate rates of native plant regeneration (in Victoria, we are witnessing the passing of a whole cohort of even-aged Garry oak, already at less than 5% of its known historical extent [Lea, 2002]);
   - habitat fragmentation and loss;
   - changes in hydrology,;
   - loss of biodiversity, including the simplification of the genetic pool of native flora and fauna
   - the proliferation of invasive plant and animal species (with a concurrent decline of native species;
   - degradation of water quality; and

[3] The main technical resource for tree managers was and continues to be the International Society of Arboriculture, an educational and certification body whose perspective on tree care is clearly rooted in the "amenity tree" tradition. Notably absent as an influence on tree managers, administrators and educators has been the discipline of *urban forestry*, which tends to consider trees as aggregate populations at the level of the city, district or region.

- loss of *watershed function*.

When developing more sustainable modes of living, these are the forms of ecosystem degradation that must be tackled. While these environmental impacts affect many stakeholders and are the subject of numerous sustainability initiatives (see below), they nevertheless remain core threats to the urban forest. As such, they need to be addressed in an integrated fashion as part of an overall stewardship strategy for the urban forest.

2. The emphasis given to amenity value in the present model is unduly restrictive. **Insufficient attention is given to the other values** that trees provide. These include:
    - ecosystem function and structure;
    - their economic benefit as providers of natural services and both timber and non-timber products; and
    - their spiritual, emotional and recreational value to both traditional cultures and modern urbanites.

This inability to attribute meaningful values to our tree resource also results in compensation agreements for lost tree habitat that are woefully low. In most cases only a single juvenile nursery tree is required in compensation for the cutting of a large shade tree, arguably worth thousands in lost ecological services and amenity benefits.

3. The **regulatory processes** that the current model has spawned are **moderately dysfunctional** from several perspectives.

    Firstly, actual levels of tree conservation are poor—even by the standards of our current model—as ecologically viable greenspace continues to give way to land conversion. Ironically, in many instances, those trees that are spared the bulldozer are often poor candidates for retention in the first place.

This is particularly the case on sites where second growth conifer forest is "developed." Tall, drawn-up evergreens, which once enjoyed the protection of a forest environment, are left isolated and exposed. With their tall "lever-arm" and weak root systems, these trees often rapidly succumb to wind failure.

Secondly, permit processes vary from one jurisdiction to another, fail to differentiate adequately amongst different classes of applicants (e.g. individual landowners versus large-scale developments), and apply different standards to private versus public developments.

A further significant flaw in the review processes of many communities is that treed habitat is not adequately differentiated in terms of the values and benefits it confers to the community. Garry oak meadow and older forests are converted with the same equanimity as an unused lot populated with young alder.

As these limitations become more apparent, other changes are occurring in our society that require us to reconsider the role of and benefits of trees in our communities and how they are managed.

Urban Forest Stewardship as Part of Sustainable Communities

Local and senior levels of government, as well as community-based stewardship groups, have sponsored several exciting new initiatives in recent years, with a goal of achieving more sustainable communities. The challenge of sustainable communities is how to restore and sustain ecosystem health within built environments.

Recent initiatives have included:

- A new provincial "smart" stormwater management strategy;
- "Smart (urban) Growth" advocacy;

- Regional biodiversity and natural-areas conservation strategies (such as the Biodiversty Conservation Strategy for the Greater Vancouver Region or the CRD's Regional Green/Blue Spaces Strategy);
- Streamside Protection Regulation (Fisheries Act);
- Stream and watershed restoration projects;
- Digital mapping of environmentally sensitive areas;
- Watershed-based local area planning;
- A Garry Oak and Associated Ecosystems Recovery Strategy;
- Emergent *Greenways* programs;
- Institutional support for conservation efforts in the form of a burgeoning non-profit resource sector, which offer legal, educational, strategic planning, funding, land trust and stewardship services to the conservation community and private landowners (e.g. Habitat Acquisition Trust, West Coast Environmental Law);
- New options for protecting private land, such as land trusts and conservation covenants; and
- A sustainable forestry movement for small private woodlands and community-owned forests.

Trees and "Natural Systems"

Implicit in most of these initiatives, and of fundamental importance to the creation of sustainable communities, is the conservation and restoration of natural systems. It is natural systems—ecosystems—that sustain the environment in a state fit for humans to live in.

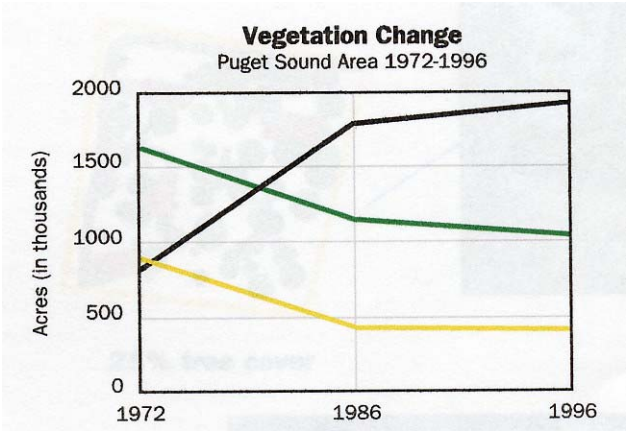
"Natural systems" include both physical elements and natural processes, but, most importantly, they include the interdependent web of diverse life forms that are supported by and contribute to the ecosystem. Forests and woodlands are a good example of natural systems in action. Water captured by the tree's canopy is allowed to infiltrate in the rich organic soils below, where it is banked and slowly released into the creeks and streams that transit our watersheds. Nutrients are added to the forest soils by the fallen leaves, twigs and trunks of trees, there to be composted by an intricate web of fungi, bacteria and insects into a form that can be re-used by the trees and other plants of the forest. Fallen and standing trees provide critical habitat for a wide range of wildlife.

Treed Ecosystems Provide Valuable Economic Benefits to the Community

At the landscape level, many of the natural services provided by urban forests have considerable economic value. American Forests[4] has conducted several region-wide studies in the United States to measure the loss in economic benefits derived from treed ecosystems that have accompanied land conversion and the replacement of tree canopy coverage with impervious surfaces. One study assessed an area, which forms part of the Georgia Basin ecosystem—the Puget Sound. As a study area, the Puget Sound has enormous relevance to southern Vancouver Island because our landforms are similar and we share so many other environmental attributes. More importantly, both regions share a similar development path.

The American Forest study found that the Puget Sound region has lost 37% of its high vegetation and tree canopy coverage over the past 25 years (American Forests, 1998). This has resulted in the loss of the following economic benefits:

- lost stormwater retention capacity associated with tree removal amounted to some US$2.4 billion dollars; and
- the lost tree canopy would have removed about 35 million pounds of pollutants from the atmosphere annually, at a value of approximately US$95 million dollars.[5]



Other Benefits Conferred by Urban Forests

In addition to its many ecological and economic benefits, urban forests provide a multitude of other, less well-known, values. These include their historical value to

[4] A non-profit citizens' conservation organization

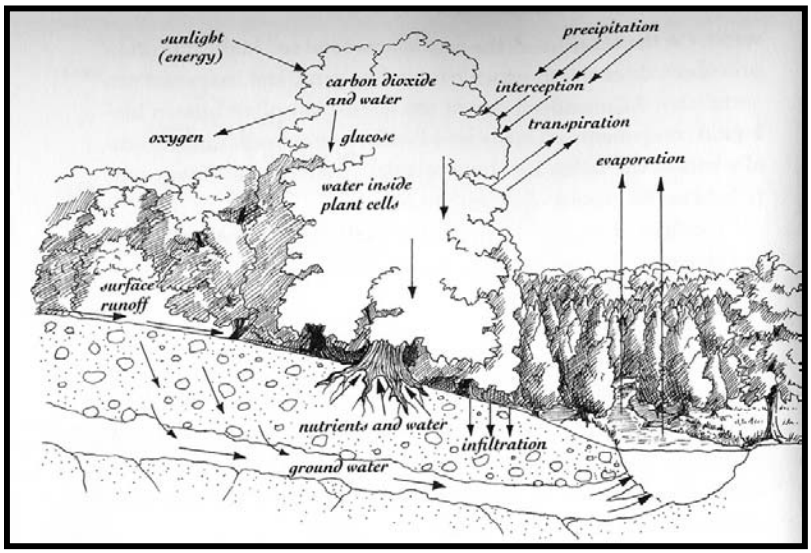
[5] American Forests, Final Report: 7/25/98, "Regional Ecosystem Analysis Puget Sound Metropolitan Area: Calculating the Value of Nature."

the customs and practices of First-Nations peoples or the spiritual, emotional and recreational value provided by trees for busy urban dwellers. In this respect, our natural areas have a big role to play in helping local communities to attract and retain the type of businesses and workers needed for economic development in the 21st century.

Redefining the "Urban Forest"

Most conventional definitions of the urban forest focus on two concepts: the spaces in which we live and the trees that occupy these spaces. From the point of view of sustainable communities, we need a definition that speaks about trees not just as landscape objects, but more about the natural systems they support. Some important values to consider in this respect are:

- biodiversity conservation,
- stormwater management and hydrology,
- water conservation and ground-water purity,
- carbon sequestration,
- energy conservation,
- wildlife habitat,
- nutrient cycling,
- soil productivity and development, and
- natural disturbance (an important, but often overlooked, component of dynamic ecosystem maintenance).



A more "*biocentric*" (or ecologically responsive) definition of the urban forest might include the following:

"The urban forest is a series of treed **plant communities** that **span both natural and built environments** and which **contribute important ecological benefits** to the region."

Thus, some of the many types of "urban forests" include:

- older forests such as those found at Royal Roads University;
- patches of remnant Garry oak ecosystems, which include not only trees but the wildflowers, shrubs, fungi and fauna associated with the many ecosystems in which Garry oak are found;
- treed environments in natural parks;
- streams, ponds, lakes and other aquatic environments to which trees contribute important ecological benefits;
- hedgerows of trees and shrub thickets that provide habitat for small birds, mammals and insects;
- naturalized areas that connect large woodland areas and provide opportunity for the movement of wildlife, seeds and other genetic material;
- Engineered systems that contain treed elements and provide ecological processes (e.g. bio-swales, porous parking areas, "daylighted" urban creeks etc.)
- treed residential backyards;
- Remnant patches of woodland that survive around commercial or industrial parks; and
- foreshore areas that are populated with arbutus, Shore pine, and Douglas fir.

Sustainable Ecological Stewardship: A New Model of Urban Forest Care

Trees clearly play an important role in urban ecosystems, even if our present regime of tree management has failed to recognize the value of this. If we expand our perspective beyond simple amenity tree management, urban forests

can contribute enormous benefits to the drive toward more sustainable communities.

What kinds of changes are required to our present model of tree management to maximize these benefits? The following strategic principles provide a basis for the discussion of a new form of urban forest stewardship, which emphasizes the conservation of treed environments and the natural systems they support.

Principles to Inform the Urban Forest Stewardship Strategy

The Urban Forest Stewardship Initiative advocates the following principles for the stewardship of urban forests on southern Vancouver Island.

1. **Urban forest stewardship uses a natural systems approach.**
   The urban forest stewardship model broadens our perspective from "trees as amenity objects" to the important ecological role played by trees within broader natural systems. The resulting conservation plans go 'beyond trees' to include the land-base, plant-assemblages and ecological features and functions with which they are associated.

2. **Urban forest stewardship planning is regional in scope.** Many treed ecosystems, such as watersheds, cover large areas. When planning for sustainability, it is prudent to consider all of one's natural resources, and their interdependence, from the bioregional level to the site level.

3. **Urban forest stewardship is integrated with other regional natural systems initiatives.**
   Urban forest management should be integrated with other significant environmental initiatives such as the new provincial stormwater management guidelines, the regional Sea-to-Sea strategy, the local Garry Oak Ecosystem Recovery Strategy, and local efforts to conserve biodiversity, protect and restore streams, and develop watershed-based approaches to local area planning..

4. **Managing for sustainability includes knowing what to manage for, at what scale and in which locations.**
   We need to inventory and map our urban forest resource. We need to characterize our woodlands, forests and other treed environments according to the various ecological attributes they possess and support. Preliminary conservation and restoration goals for this resource must be established; these should be based on a wide range of social, economic and environmental criteria and make use of the best science available.

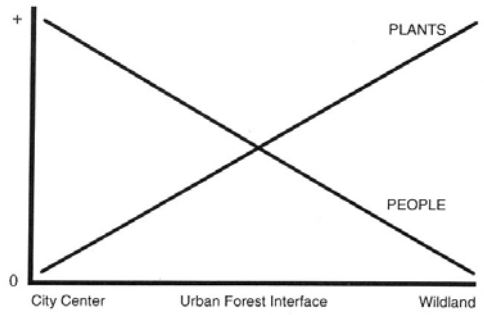


Figure 1-1. Urban forest landscape gradient.

5. **Effective planning recognizes urban forest as part of a continuum, extending from forested, rural watersheds to the highly densified urban core.**

Not only does the character of the urban forest change along this continuum, but so do the benefits, conflicts and stewardship challenges. Finally, the cost of tree conservation increases the further in toward the urban core we move.

6. **Urban forest stewardship is an integral part of strategic land-use plans.** Many OCPs and other strategic planning documents are beginning to incorporate language, which highlights green spaces and environmentally sensitive areas as a planning priority. More effort is needed, however, to "connect the dots" so that we begin to manage urban forests as a connected and coherent biological system. By integrating information and planning objectives regarding the urban forest into regional and municipal land use plans, we can promote a coordinated approach to stewardship at the regional level and more ecological functionality from our treed environments.

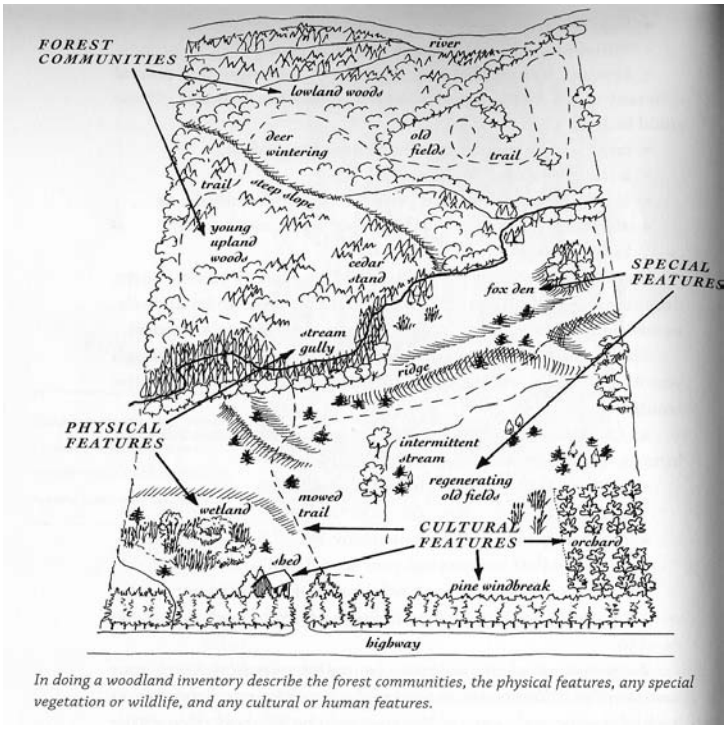
7. **Urban forest planning is integrated on both public and private lands.** Currently, public lands are administered independently of private lands. To be successful, a regional urban forest stewardship strategy needs to integrate resource planning in all jurisdictions and across private/public boundaries.

8. **Different types of permit applicants are subject to different levels of review.** The magnitude of tree loss in our region differs widely amongst at least three different types of applicants: developers, suburban homeowners and rural woodlot owners. Most significant tree loss is associated with land conversion associated with new development. Established residential or multi-family sites, on the other hand, contribute a positive gain in biomass from their landscapes each year, regardless of tree removals associated with on-going maintenance. The same may be said for small woodlot owners, provided they do not log off this resource. Therefore, different levels of review are required for these different types of applicants. Conditions for tree-impact mitigation will also vary between applicant classes. (Large institutional landholders and municipal operations departments may form two further potential classes of applicants for tree-cutting permits.)

9. **A diverse palate of tools is available for the implementation of a natural systems-based strategy for urban forest conservation.** This palate needs to include best management practices, new technologies for natural systems

mapping, assessing and planning, legal and planning tools for facilitating more sustainable forms of development, a communications/outreach program, appropriate levels of research and development, effective methodologies for landscape-level ecological restoration, funding sources and a regional agency to coordinate the strategy and oversee its implementation.

10. **Flexible tree management strategies are responsive to different land-use objectives for different areas.**



In doing a woodland inventory describe the forest communities, the physical features, any special vegetation or wildlife, and any cultural or human features.

Currently, most tree protection bylaws apply equally to the many different types of land use. Using urban forest stewardship principles, management objectives would be expected to vary from one area to another within a broader integrated plan for the region. Management tools would be diverse and might include tree or land-base conservation, woodland restoration, land swapping, establishment of reserve areas, land acquisition and mixed-use forestry (agro-forestry).

11. **An effective urban forest stewardship strategy must be authored and supported in large measure through the conservation community and the residents of the region in which the strategy is intended.** While leadership, input and resources are required from all levels of government; ultimately, a vigorous network of community-based activists must support the success of any program that proposes significant and ongoing reforms to land-use and community development. Such a network provides the countervailing support, continuity and vigilance that our civic leaders require, in the face of ongoing pressure from the development community, in order to effectively represent the public interest.

12. **First Nations are involved and supportive of the regional strategy.** First Nations communities are the original stewards of the forests and woodlands of the south island; they are also some of the largest landholders. As such, it will be critical for municipal and regional levels of government to work closely and effectively with First Nations peoples if this initiative is to be a success.

13. **The Development Community supports an effective Urban Forest Strategy.** The development community will support regulatory requirements that are transparent, fair and efficient in their administration—particularly if these requirements result in positive value-added benefits to their properties and the communities in which they are situated. An Urban Forest Stewardship Strategy that makes sense to the development community and recognizes their needs is most likely to be effectively implemented.

14. **Urban forest stewardship recognizes the complex and interdependent nature of urban planning, regional development and environmental conservation.**
    Economic, political, social, geographic and ecological considerations all compete for attention. While an effective urban forest stewardship strategy must be responsive to this planning environment, as well as to the fiscal realities of public sector spending, it challenges us to adopt a more credible approach toward "sustainable development."

A 25-year Vision for the Urban Forest

A bird's eye view of our regional urban forests reveals clear urban containment boundaries, with high percentages of forest cover in rural areas.

Generous greenbelts extend into our urban centres, buffering streams, tributaries and gorges, providing shelter, food and conduits for wildlife and linear parks and greenways for residents. Larger forested areas are connected to one another and to smaller treed environments through a diverse network of linear greenways. In residential areas, generous amounts of both private and public greenspace complement and support a diverse range of housing forms. Back- and side-yards are connected in many cases through corridors of native vegetation, providing shelter and food for a broad range of birds, small mammals and insects. Street trees are connected with one another and with residential yards through large contiguous planting areas that include either meadow or a viable under-story of shrubs and herbs.

As a result of its "smart growth," stunning maritime environment and beautiful urban forest, the Capital Region has become a prized place to live. Developers build beautiful homes that are well integrated into the natural environment. Undisturbed soils and native plant communities are conserved to a much greater degree on new building sites. Recreational opportunities abound and people enjoy an urban environment, which is attractive and pedestrian friendly.

Conservation of natural greenspace on private land is supported by a new "Conservation Land Reserve Program" that provides welcome tax relief, as rural property values rise to reflect strong market demand.

Development companies with the vision and technical capacity to innovate sustainable forms of development have thrived. The regulatory environment for

development is predictable, fair and efficient; moreover, it is consistent from one jurisdiction to another. Local stewardship groups have become key players in ensuring that community development remains sustainable. The conservation community has become an important and valued partner to both municipal government and the development community. Most importantly, a "conservation culture or ethic" is well established throughout the community.

Trees retained in new developments tend to be younger, in good health and structurally sound and are located in generous "leave-zones" that are connected to greenspace in adjacent parcels. Due to optimal levels of reforestation, energy costs are reduced as houses remain naturally cooler in summer and protected from high winds in winter. Adequate levels of compensation for tree-loss associated with new development means that larger reserves of both existing and new urban forest are established for long-term conservation. These reserves are act to restore critical ecosystem biodiversity, structure and function. The amount of viable restored Garry oak habitat and associated ecosystems is now far larger than what it was at the turn of the millennium. The Conservation Data Centre reports a significant reduction in the number of blue and red-listed species over the past 25 years, as wildlife populations and other biodiversity indicators have recovered. Most streams are now fully restored and supporting viable populations of fish stock.

Conclusion

Our current models of urban land use planning and tree management are clearly out of step with both the goals and the work of establishing ecologically sustainable communities. The question is: how do we change it? This discussion paper has attempted to provide a framework for a new approach—an approach that emphasizes forests over trees, ecosystem values over simple amenity benefits and regional "multi-tiered" planning in favour of simple site-level regulatory approaches.

A note of caution: it really is a question of perspective and emphasis. While we have attempted to point out some of the limitations in the perspective of the existing tree management model, we don't want to "throw out the baby with the bathwater." The Amenity Tree Model is responsible for some compelling advancements in the care and management of urban trees. Our goal is to build on these gains as we move toward an ecosystem-based model of urban forest planning and stewardship. Toward this end, we have provided some "organizing principles" around which we hope to focus public discussion, as we all attempt to engage with the challenge of living "more gently upon the land."

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References

Agee, J. K., 1995. *Management of Greenbelts and Forest Remnants in Urban Forest Landscapes.* in Bradley, G.E. (ed.) Urban Forest Landscapes – Integrating Multidisciplinary Perspectives. University of Washington Press, Seattle, USA.

American Forests, 2001. *Regional Ecosystem Analysis for the Willamette/Lower Columbia Region of Northwestern Oregon and Southwestern Washington State. Calculating the Value of Nature.* American Forests, Washington, D.C. USA.

American Forests, 1998. *Regional Ecosystem Analysis for the Puget Sound Metropolitan Area. Calculating the Value of Nature.* American Forests, Washington, D.C. USA.

Brown, D. W., 1996. *Strategic Land Use Planning Source Book*. Commission on Resources and Environment, Victoria, B.C. Canada.

Burton, P. J. (ed.), 2002. *Garry Oak Ecosystem Restoration: Progress and Prognosis. Proceedings of the Third Annual Meeting of the B.C. Chapter of the Society for Ecological Restoration.* Published by the B.C. Chapter of the Society for Ecological Restoration, Victoria, B.C. Canada.

Clark, J.R., N.P. Matheny, G. Cross, and V. Wake,.1997.. *A model of urban forest sustainability.* Journal of Arboriculture 23(1): 17-30.

Dobson, C. and G. G. Beck, 1999. *Watersheds, A Practical Handbook for Healthy Water.* Firefly Books, Willowdale, Ontario, Canada.

Dunster, J. & K. Dunster, 1996. *Dictionary of Natural Resource Management*. UBC Press, Vancouver BC.

Dwyer, J. F., J. D. Nowak and M. H. Noble, 2003. *Sustaining Urban Forests.* Journal of Arboriculture 29(1): 49-55.

Dwyer, J. F., J. D., Nowak and G. W. Watson, 2002. *Future Directions in Urban Forestry Research in the United States.* Journal of Arboriculture 29(1): 49-55.

North Island College. 2001. *Forest Regeneration: An introductory guide for the small woodland owner*. A Handbook to accompany the Forest Regeneration Course, North Island Forest Resource Centre/Small Woodlands Program.

Harrington, S. (ed.), 1999. *Giving the Land a Voice, Mapping our Home Places.* The Land Trust Alliance of British Columbia., Salt Spring Island, B.C. Canada.

Jungwirth, P.,2001. *Ecoforestry*. New Dimension Forestry Consulting, Courtenay, B.C. Canada.

Lea, Ted, 2002. *Historical Garry Oak Ecosystems of Greater Victoria and the Saanich Penninsula: A 1:20,000 Map.* In Burton, P. J. (ed.), 2002. *Garry Oak Ecosystem Restoration: Progress and Prognosis. Proceedings of the Third Annual Meeting of the B.C. Chapter of the Society for Ecological Restoration.* (See above.)

Ministry of Environment, Lands and Parks and Department of Fisheries and Oceans, 1996 – 2002. *Stewardship Series.* Victoria, B.C. Canada.

Liegel, K., 1995. *Land Use Control as a strategy for Retaining and Integrating Urban Forest Landscapes.* in Bradley, G.E. (ed.) Urban Forest Landscapes – Integrating Multidisciplinary Perspectives. University of Washington Press, Seattle, USA.

Matheny, N. and J.R. Clark, 1998. *Trees and Development: A technical guide to preservation of trees during land development.* International Society of Arboriculture, Champaign IL

Milligan Raedeke, D.A. and K.J. Raedeke, 1995. *Wildlife Habitat Design in Urban Forest Landscapes.* in Bradley, G.E. (ed.) Urban Forest Landscapes – Integrating Multidisciplinary Perspectives. University of Washington Press, Seattle, USA.

Mitchell, P., 2002. *Canada's Urban Forest, A Collection of Stories.* University of Guelph and Barney Printing Ltd., Woodstock, Ontario. Canada.

Nowlan, L., C. Rolfe and K. Grant, 2001. *The Smart Growth Guide to Local Government Law and Advocacy: A project of the institute for new economics and smart growth British Columbia*. Smart Growth British Columbia and West Coast Environmental Law Research Foundation, Vancouver BC

Capital Regional District, Regional Planning Services, 2002. *The Capital Regional District Regional Growth Strategy.*

Rowntree, R.A., 1995 *Toward Ecosystem Management: Shifts in the Core and the Context of Urban Forest Ecology.* in Bradley, G.E. (ed.) Urban Forest Landscapes – Integrating Multidisciplinary Perspectives. University of Washington Press, Seattle, USA.

Springgate, L. and R. Hoesterey, 1995. *Bellevue, Washington: Managing the Urban Forest for Multiple Benefits.* in Bradley, G.E. (ed.) Urban Forest Landscapes – Integrating Multidisciplinary Perspectives. University of Washington Press, Seattle, USA.

GLOSSARY

amenity value The contributions made by trees as landscape amenities, such as aesthetics (form, flowering, character etc.) shading or screening.

best management practices Management practices that represent the most current and progressive approaches available. Best management practices, or BMPs, may be considered at any level or scale of management, from single trees to entire ecosystems for from the site-level to the broader regional landscape-level.

biocentric This term is used to describe a perspective that considers the world in terms of the totality of natural values and ecosystems at play within it and their mutual interdependence. Biocentrism is often contrasted to the term "anthropocentrism," which conceives of the world in utilitarian terms (e.g. as a pool of "natural resources") and places human interests and concerns at the center of its thinking.

biodiversity The variety, distribution, and abundance of different plants, animals, and micro organisms, the ecological functions and processes they perform, and the genetic diversity they contain at local, regional or landscape levels of analysis

bio-mass The total mass of dead and living tissue produced by one or more individuals of a species (in this case tree species) at a given moment in time. The biomass of a tree would include the total mass of its canopy, stem and roots.

bioregion The largest ecologically meaningful and coherent planning unit for a regional area. A bioregion is generally made up of large assemblages of ecosystems and contains one or more watersheds.

bio-swale A constructed and vegetated swale or depression, which is designed to collect and treat storm water in a manner which mimics natural ecosystem functions.

carbon sequestration The uptake of surplus carbon into organic or inorganic forms. Young forests play a significant role in taking up and storing carbon.

ecological restoration The science of, and the application of scientific principles to, the restoration of natural structure, function and successional processes within degraded or damaged environments.

ecosystem A complex system of living organisms, together with their abiotic environment (soil, water, air and nutrients) that function together to circulate organic nutrients, inorganic elements and energy.

habitat Those parts of the environment on which an organism depends in order to carry out its life processes

forest canopy The uppermost continuous layer of branches and foliage in a stand of trees

greenways Linear vegetated corridors that connect natural areas and the community.

hydrology The science of water, its properties, and movement (cycling) over and under land surfaces

landscape-level A mosaic of habitat types occupying a spatial scale intermediate between an organism's normal home-range size and its regional distribution. In the context of this paper, "landscape-level" planning is intended to refocus planning horizons away from a narrow site-level or neighbourhood focus to the watershed or bioregional level.

natural disturbance Natural forces, such as wind, fire or pestilence, which create a sudden and significant change in the prevailing successional state of an ecosystem or ecosystems.

riparian area A corridor of vegetation that buffers and supports water bodies such as streams, marshes or lakes; influenced by nearby water and soil wetness, and influences the neighbouring aquatic system

natural system Synonymous with "ecosystem"' (see above).

nutrient cycling Circulation or exchange of elements, such as nitrogen or carbon dioxide, between living and non-living portions of the environment. For instance, the breakdown of leaf litter on the forest floor can provide the trees above with nitrogen.

pioneer species A species capable of invading disturbed areas, often in large numbers and over considerable areas, and of persisting until displaced by other species as natural succession proceeds. Pioneer species often act as "keystone" species, which create changes to the ecology of a disturbed site that are beneficial to the colonization of the site by later successional species.

plant-assemblages Aggregations or populations of plants and plant species that are associated with a particular ecosystem or site series.

site-centric The tendency in urban planning, particularly with respect to tree management, to focus on the building lot or "site" as the main locus of activity and planning regulation.

soil productivity and development The capacity or suitability of a soil for the establishment and development of a particular plant community.

smart growth Refers to integrated models of urban development that are fiscally, socially and environmentally responsible. Smart growth enhances the quality of the life in communities, ecosystem functioning and uses tax revenue wisely.

sustainability Ensuring the ongoing healthy functioning of the natural systems that sustain life.

tree-centric The tendency in tree management planning to focus on the conservation of individual trees as landscape amenities. This planning approach is to be contrasted on one that focuses on the role and contribution of aggregations of trees to natural systems.

urban containment boundary A planning boundary, which is intended to distinguish a core urban and suburban area from a rural periphery. Different development goals and objectives, derived from the Official Community Plan, will apply to the areas on either side of this boundary. As the name suggests, one of the purposes of the boundary is to "contain" urban development, and thereby conserve the rural character and form of the land outside of the boundary.

urban forest The urban forest is a series of treed plant communities that span both natural and built environments and which contribute important ecological benefits to the region.

watershed An area of land which drains water, organic matter, dissolved nutrients and sediments into a lake or stream.

watershed function The capacity of a watershed to intercept, retain and exfiltrate stormwater in a manner that supports the natural ecosystems that have developed within it.