Grasslands in British Columbia

a Primer for Local Governments

A COMPANION TO THE GREEN BYLAWS TOOLKIT
FOR CONSERVING SENSITIVE ECOSYSTEMS AND GREEN INFRASTRUCTURE

The Wetland Stewardship Partnership (WSP) is a multi-agency group dedicated to the conservation of British Columbia's wetlands and other sensitive ecosystems. WSP Partners include BC Hydro, BC Nature (Federation of BC Naturalists), BC Wildlife Federation, Ducks Unlimited Canada, Environment Canada, Fisheries and Oceans Canada, Grasslands Conservation Council of BC, BC Ministry of Environment, BC Ministry of Forests and Range, BC Ministry of Healthy Living and Sport, Nature Conservancy of Canada, The Nature Trust of BC, Pacific Salmon Foundation, Royal Roads University, and the Union of BC Municipalities.

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Summary

Grasslands in British Columbia: A Primer for Local Governments provides the rationale and clear explanation as to WHY grasslands need and are worthy of protection. The Primer discusses the ecosystem services provided by grasslands, and summarizes the status and trends of grassland ecosystems in BC. The Primer also describes some of the work being done and legislation being used in different parts of BC to protect grasslands.

Grasslands in British Columbia: A Primer for Local Governments is intended as a companion to the *Green Bylaws Toolkit for Conserving Sensitive Ecosystems and Green Infrastructure*. The *Green Bylaws Toolkit* provides information on a wide range of tools that can be used to protect natural values through both legal and voluntary measures. The Toolkit begins with a section on the values of green infrastructure, but does not provide detailed information on the values of different ecosystem types. The focus of the Toolkit is HOW to protect grasslands, other sensitive ecosystems, and the green infrastructure in general.

Contents

What Are Grasslands?

Grasslands cover less than 1% of our province, but provide habitat for over 30% of our species at risk. Photo: Chris Harris

Grasslands are open landscapes where grasses, or grass-like plants, are the dominant vegetation. Grasslands are generally found in arid areas where there is more precipitation than in deserts, but not enough to support forests, and where frequent, low-intensity fires occur naturally. Although native grasses dominate the landscape, other plants such forbs, shrubs, mosses and lichens thrive in this environment. The varied habitats found in grasslands support diverse forms of life, and provide an important ecological role for not only the environment, but for humans as well.

Grasslands are often interspersed with aspen and coniferous stands, ponds, wetlands, lakes and streams, and cliffs and rocky outcrops. Together with these elements, grasslands combine to support a rich variety of plants and animals, as well as ranches and communities.

Why Should Local Governments Protect Grasslands?

Grasslands play an integral role in improving air, water and human health, and are an important component of the historical and social fabric of nearby communities. However, development pressure has resulted in widespread loss of grasslands, such that they are now considered a critically endangered ecosystem in BC.

Some of the important roles that grasslands provide include:

- Erosion protection
- Water regulation, filtration and supply
- Disturbance protection (flood and drought)
- Carbon sequestration, and a contribution to climate stability
- A viable ranching industry, including many related business opportunities
- Local food supply
- Pollination for agriculture
- Habitat for wildlife, including at-risk species
- Recreational, tourism and cultural opportunities
- Economic development opportunities
- Natural green spaces and viewscapes

Many communities are surrounded by grasslands, which provide important ecosystem services to those communities that live there. Photo: Terry McIntosh

What Healthy Grasslands Provide to Your Community

Healthy grasslands provide significant ecological services that are beneficial to your community and your residents. Once lost, these functions can be very costly to replace; often, the service is lost forever, as grasslands are difficult and expensive to restore. Unlike grasslands of the prairies, seed sources for BC grasslands are nearly impossible to obtain. The most effective way to restore a grassland is to let it rest, a process that can take several decades.

The fragmentation and loss of grasslands threaten the many benefits that grasslands offer to your community, and the very reasons that people choose to live there. Grasslands provide the following services to your community:

- **Grasslands clean water and maintain the water supply.**

Grasslands play a central role in protecting water quality and helping ensure sustainable, clean water supplies. Grassland soils and plants absorb precipitation and run-off; water is stored in the soil, and released slowly from the site through the root systems back into the ground. Grasslands serve as biological filters, slowing water runoff and filtering contaminants such as chemicals and pollutants. Where grasslands have been degraded or destroyed, more contaminants find their way into our water, requiring costly water treatment and causing serious risks to human health.[1]

- **Grasslands mitigate the impacts of climate change.**

Both the plants and soils of undisturbed grasslands function as a carbon sink, or reservoir. Plants remove carbon dioxide from the atmosphere, and use it to build roots, stems and leaves. Dead plants are buried in the soil, removing carbon from the atmosphere until the soil is disturbed. This carbon sequestration reduces carbon dioxide in the atmosphere, thereby mitigating global climate change. Because much of the carbon in grasslands is stored beneath the ground, it is not susceptible to loss from fire, drought and disease. One-third of the terrestrial global stock of carbon is stored in grasslands.[2] North American grasslands have an enormous capacity to store atmospheric carbon and mitigate the negative impacts of greenhouse gases. For example, the restoration of 1.6 million hectares of marginal cropland to grassland in South Dakota alone would remove over 500 million metric tons of carbon dioxide equivalents from the atmosphere over 80 years.[3]






Grasslands are home to species such as (clockwise from top left): the Endangered/red-listed American Badger, the yellow-listed Sharp tailed Grouse, the Threatened/blue-listed Great Basin Spadefoot, Threatened/blue-listed Gopher Snake, Threatened/red-listed Behr's Hairstreak, and the blue-listed California Bighorn Sheep. For more information, see BC Ecosystems and Species Explorer at http://www.env.gov.bc.ca/atrisk/toolintro.html. Photos, clockwise from top left: Roger Packham, Bob Scheer, Karl Larsen, Neil Dawe, Neil Dawe, and Tasha Sargent.

- **Grasslands conserve soil and regulate flooding and drought.**

Grasslands ensure healthy soil. Layers of dead debris and living plants protect soils that have taken centuries to develop. Root systems hold soil particles together, preventing both water and wind from eroding topsoil. Perennial grass and other plant cover slows the flow of water over the ground, reducing erosion.

Healthy grassland soils and plants absorb excess water, reducing the risk of flooding and debris flows during storm events. Keeping grasslands intact lessens or eliminates the costs for flood restoration and property damage, and decreases the chance of human casualties from flooding events.

Grasslands reduce the risk of flooding and debris flows during storm events.

- **Grasslands provide habitat for species.**

Grassland habitats support and maintain a wide diversity of lichens, mosses, forbs, grasses and shrubs. The unique structure and composition of grassland plant communities provide cover and food for large and small mammals, birds, reptiles, amphibians and insects. One of the most important ecological functions of grasslands is that they provide diverse habitat for wildlife. Although grasslands occupy less than 0.8% of the provincial landbase, more than 30% of British Columbia's species at risk depend on grasslands for their survival. Indeed, more species at risk are found in the grasslands of the South Okanagan than in any other area of Canada.[4]

Development and fragmentation of grassland habitat seriously threaten the survival of these species. Habitat loss, habitat fragmentation, increased mortality on roads and disturbance by people and pets are some of the threats associated with the development of grasslands. Already a number of grassland species, such as the Sage Grouse, Pygmy Short-horned Lizard and the Large Marble Butterfly have entirely disappeared from BC. Other species such as the Sharp-tailed Grouse and Long-billed Curlew have been lost from many parts of their former range.

Recent polling has shown that the majority of British Columbians express support for species at risk protection in BC.[5] While some of these rarer species may not be visible or appreciated by general society, they provide an important ecological role, including enhancing the survival of more visible species that have tremendous public appeal and are highly valued by the general public, such as Grizzly Bear, Bald Eagle, Bighorn Sheep and Mountain Goat.

- **Grasslands provide land for ranching and maintain the local food supply.**

Grasslands are essential to the ranching industry, providing over 95% of the province's grazing land for livestock. British Columbia has over 4000 cattle ranches; the total beef sector contribution to the provincial economy is conservatively estimated to be approximately $500 million annually.[6] Related enterprises that support ranching communities, such

as feed companies, machinery retailers, mechanics and animal health providers, also need intact grasslands in order to thrive. Grasslands play a critical role in supporting the livestock industry, and provide significant opportunities to capitalize on emerging markets for natural BC range beef and other products. Managed in a sustainable way, grassland ranches can provide a sustainable and renewable resource to our local communities.

- **Grasslands provide recreation, tourism and cultural opportunities.**

Grasslands provide diverse recreational opportunities, such as hunting, fishing, hiking, horseback riding, wildlife viewing, camping, mountain biking, backpacking, picnicking, nature interpretation and photography. Grasslands help generate the $1.3 billion that British Columbia residents spend annually on outdoor activities in natural areas, including $268 million annually on wildlife viewing.[7]

Grasslands have tremendous tourism and recreational potential. However, access and recreational uses need to be managed carefully to protect grassland values. Many regions are capitalizing on the recreational attractions that grasslands offer. For instance, the South Okanagan Grasslands Protected Area is highlighted as Canada's "premier star-gazing location, with breathtaking views in the daylight."[8] Grasslands National Park of Canada in Saskatchewan offers captivating night and day viewscapes, unique prairie species and ecosystems, and a rich cultural heritage to tourists.[9]

Grasslands provide grazing land for livestock, and support communities that have been developed around the ranching industry. Photo: Bruno Delesalle

Working ranch grasslands have become a symbol of our national heritage. Many communities near grasslands were founded on ranching, and the social values embedded in grasslands cannot be ignored. The ranching industry supports rodeos, stampedes and a Western culture that is important for tourism. As well, BC's grasslands have been featured in a number of feature film productions. This has had a significant economic impact on communities, both from film production and subsequent tourism generated by the release of the films. The loss of grassland ranching would be devastating to many rural communities.

Grasslands also play a significant role in aboriginal culture in BC. Grassland plants are valuable for traditional use, and many archaeological sites are located within grassland areas. Grasslands exist within the traditional territory of several First Nations people in British Columbia, and bands continue to use grasslands for ranching, hunting and other traditional purposes.[10]

- **Grasslands provide community economic development opportunities.**

Property values are positively affected by large, natural spaces as found in intact grasslands.

Grasslands create distinctive natural viewscapes, lending an open feeling to an area, reflecting light and shadow across the landscape. Vast expanses of grasslands give people a place of recreation and reflection with an uncluttered horizon. The attractiveness of your grassland-based community provides a quality physical environment both for residential and corporate growth. The preservation of these values and the resulting quality of life is essential for long term economic, ecological and cultural sustainability.

Grasslands can help to attract businesses to locate in a community. Parks and green space are essential to the high quality of life that a prosperous workforce demands. As a result, green space is one of the most important factors modern companies look at when seeking to locate new enterprises. For example, the CEO of one of California's largest corporations has found that corporate decision-makers consistently rank the quality of an area's physical environment as one of the top factors in determining a location for an enterprise.[11] In the United States, numerous state governments officially recognize that protection of open space must be a critical part of their economic development strategy.

Many people are moving to grassland communities for the sweeping vistas and natural beauty. Property values are positively affected by large, natural spaces. Undeveloped green space has been shown to increase the value of nearby property by 5 to 32%, directly benefiting local governments through increased property taxes. In fact, these areas are so valued by society that many realtors are using it as a marketing tool, listing the grassland viewscapes as an amenity to the property. Furthermore, studies have also shown that agricultural lands and large, natural spaces pay significantly more in taxes than they require in servicing from local governments.

- **Grasslands provide a positive ratio between tax dollars received and municipal services required.**

Fragmentation and loss of grasslands puts all benefits discussed above at risk, often at a net economic cost to local government. The economic value that grasslands provide in the form of erosion control, waste water treatment, pest control and pollination services have been well-documented.[13] Numerous studies have shown that conversion of rural land to residential uses costs more in services than it produces in revenues. For instance, American Farmland Trust cites a Texas study that found that for every dollar ranch and open land provides in revenue from property tax, sales tax and other revenues, they demanded only $0.26 back in services, whereas residential development required $1.10 in services for every tax dollar it generated.[14]

Conversion of rural land to residential uses costs more in services than it produces in revenues.

Rural subdivision of grasslands costs communities more because of the loss of the valuable natural services that grasslands provide. Degraded or destroyed grasslands may also end up costing more to provide municipal services than will be recovered in taxes; costs for reestablishment of vegetation, human-made retaining walls, pesticides, improving water quality and supply, and importing insects for pollination are extremely high. In contrast, cost of retaining native grassland is significantly more economical, and the conservation of grassland landscapes and ranchlands will benefit the sustainability and liveability of communities in the long term.

Grasslands provide sweeping viewscapes and have tremendous aesthetic value. Photo: Kathleen Moore

Grasslands: A Vanishing Resource

Of all the ecosystems on earth, none has been more dramatically affected by humanity than native grasslands. Although native grasslands at one time covered 40% of the North American continent, the vast majority have been transformed into agricultural lands, urban settings, and other settlement uses, with less than 1% remaining today.[15] In places with significant development and agricultural pressures, nearly all native grasslands have disappeared.

Low elevation grassland communities are the rarest land cover type in British Columbia.

Grasslands are recognized as one of BC's most threatened ecosystems. Grasslands represent less than 1% of the provincial land base, making them more endangered than old growth forests. One of the major findings in a 2008 Biodiversity BC report entitled *Taking Nature's Pulse: The Status of Biodiversity in BC* was that low elevation grassland communities are the rarest land cover type in British Columbia, and are concentrated in the biogeoclimatic zones of conservation concern.[16] Okanagan Antelope-Brush grasslands are one of the four most endangered ecosystems in Canada.

However, the most urgent threat to native grasslands is us. Sprawling urban development and the fragmentation of rural landscapes for ranchettes and recreational properties are destroying grasslands at a phenomenal rate. With more than 40% of BC grasslands held as private land and a population that is expanding rapidly, development pressure on our remaining grasslands is intense.[17] Other threats, such as forest encroachment, invasive plants and abusive recreation are also significantly impacting grasslands. Lastly, climate change is impacting grasslands; as temperatures rise, lower, mid and upper elevation grasslands shift their boundaries, drastically altering the vegetation and the species that rely on them. Climate change projections indicate that the warming of BC may result in expanded grasslands, but these habitats are projected to be weedy grasslands of much lower quality and productivity than native grasslands.[18]

Urban Encroachment in BC

Populations are growing rapidly in grassland areas, particularly in the Okanagan Valley, Southern Interior and East Kootenays, and local governments are under pressure to expand urban boundaries in order to accommodate housing demands. Although there are legal tools and planning approaches that aim to contain urban sprawl, such measures are not consistently applied. As a result, both low and high density subdivisions are steadily encroaching on grasslands.

Historical mapping indicates that 39% of grassland ecosystems in the Okanagan Valley have been lost since 1800. In the South Okanagan Basin, more than 20% of the native grasslands have been lost to urban uses, rural residential development, hobby ranches, agriculture

and industrial development, transportation and recreational uses. The South Okanagan Highland, near Osoyoos, has lost 38% of its grasslands, and the North Okanagan Basin, near Vernon, has lost 45%. The municipality of Kelowna has lost 7692 hectares, or 81%, of its original grasslands. Similarly, Williams Lake, Oliver and Lillooet have lost more than 80% of their municipal grasslands; Keremeos, Armstrong, and Chase have already lost 100% of their limited original grasslands.[19]

Fragmentation of Rural Landscapes

There is an increased demand for grasslands to be developed into rural homes, recreational developments and small hobby ranches. Because urban land values are increasing and a higher proportion of citizens are near retirement or are affluent enough to acquire "getaway" homes, rural land values in British Columbia are rising rapidly. High land prices combined with the economic difficulties that the cattle industry faces create pressure to subdivide large ranches and sell off individual parcels within the ranch. Ranches have an important role to play in protecting grassland values; subdivision of ranches for development breaks up the continuity of grassland ecosystems, bringing in roads and invasive species, destroying habitat for common and at-risk species, and fundamentally damaging grassland ecosystems and the species that rely on them.

Urban expansion into grasslands is the greatest threat to this endangered ecosystem. Photo: Cameron Carlyle

How Local Governments are Protecting Grasslands in BC

If the full value and benefits of grasslands are to be maintained for sustainable communities in BC, local governments need to take action. Various local governments are beginning to do so. Initiatives include:

- All of the Official Community Plans (OCP) in the Regional District of Okanagan-Similkameen recognize the value of grasslands and other important habitats through parks and natural areas policy. In four of the electoral areas, the OCP further acts to consider grasslands through Environmentally Sensitive Development Permits which provide guidelines for development in these areas.
- The Regional District of Okanagan-Similkameen's recently adopted South Okanagan Regional Growth Strategy (RGS) allows for consideration of policy and regulation to protect grasslands through mapping and designating development permit areas. As supported in the RGS, a biodiversity conservation strategy is currently in development to coordinate biodiversity conservation and ecosystems protection.

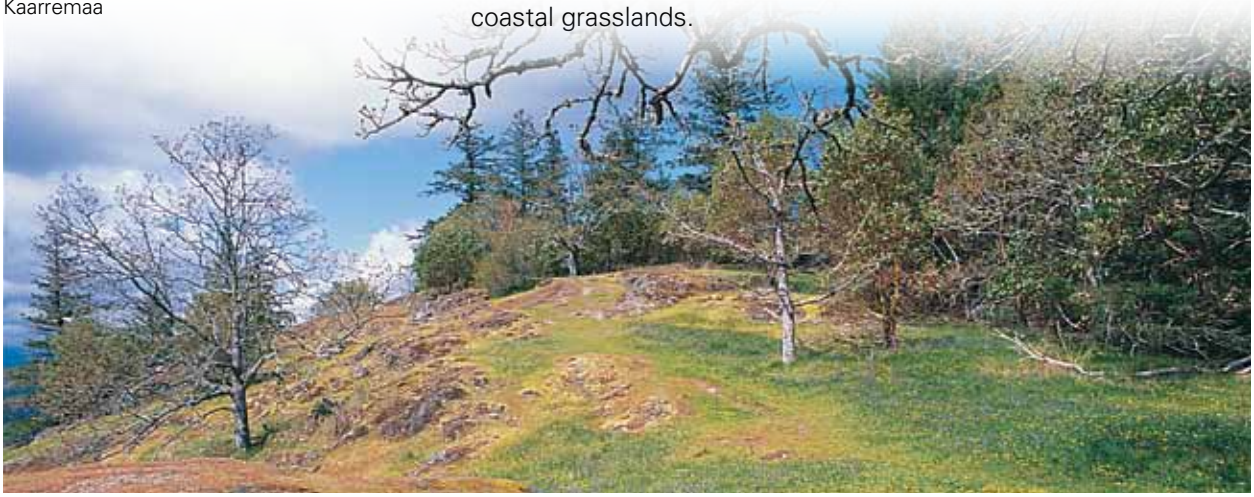
The Lone Butte Ranch in the East Kootenay Trench was protected from development pressures by a combination of purchase and conservation covenants by the Nature Conservancy of Canada. Photo: Richard Doucette

- The Town of Osoyoos' OCP has established Environmentally Sensitive Areas to protect grasslands and other sensitive ecosystems through the development approval process, and the communities of Oliver, Keremeos and Summerland are also proposing protections. Penticton's Northeast Sector Plan identifies considerable Conservation and Open Space Areas in respect of grassland ecosystems and other sensitive ecosystems such as mature forests and old growth forest. These core conservation lands along Environmentally Sensitive Areas (ESAs) within the adjoining proposed development blocks will form continuous tracts of important habitat necessary for functioning ecosystems. These ESAs are subject to environmental assessments.

- Local governments and the conservation community in the South Okanagan Similkameen are working in partnership to share expertise and resources for increased environmental planning assistance and grasslands protection. With support from the South Okanagan Similkameen Conservation Program (SOSCP), funders Real Estate Foundation of BC's Communities in Transition program and Government of Canada's Habitat Stewardship Program, local governments are leveraging funding for a shared environmental planner among three communities.

- The City of Kamloops has been working with the Grasslands Conservation Council of BC (GCC) to create the Aberdeen Area Plan, a development plan for an area encroaching onto grasslands. Actions in this plan include containing growth, protecting areas deemed high priority for conservation and infilling areas that are of low ecological value with higher density development. Using this and other mapping done by the GCC and partners, the city is now proposing a Development Permit Area for all designated Environmentally Sensitive Areas to further protect the sensitive grasslands from being degraded and destroyed but still meet growth targets for the city.

- The District of Saanich and other local governments decline to provide services to new development in areas outside of urban containment boundaries, thereby curbing the sprawl that threatens coastal grasslands.



Grasslands on the coast are often represented within scattered patches of Garry Oak ecosystems. Only 5% of the original coastal grasslands remain. Photo: Mark Kaarremaa

The Green Bylaws Toolkit:
Practical Support for Conservation Planning

While many local governments in BC are working to protect grassland ecosystems, few have a strategic conservation plan in place. Due to increasing development pressure in many parts of BC, local governments are often working reactively and in a site-specific manner, largely in response to development applications. Local governments also have a responsibility to implement provincial regulations.

The *Green Bylaws Toolkit for Conserving Sensitive Ecosystems and Green Infrastructure* provides practical examples of what is being done by local governments around the province. The Toolkit integrates the tools that are being used to protect not just grasslands, but the entire green infrastructure, including other sensitive natural areas and systems that provide ecological services.

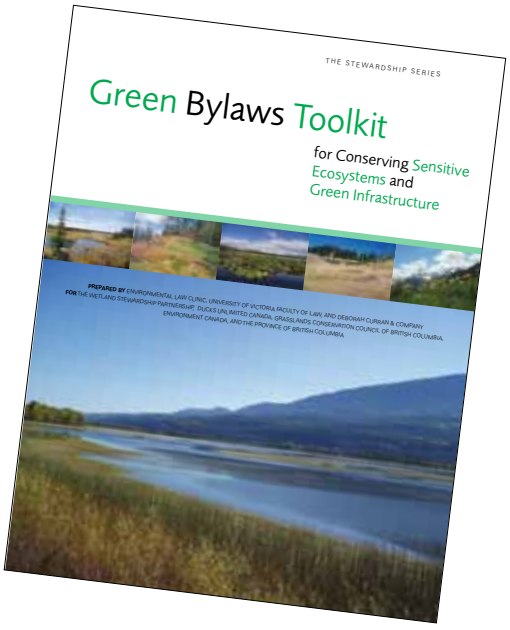
The key benefit of this resource is in the comprehensive approach that it advocates. This toolkit demonstrates the possibility of developing integrated tools. Local governments can get beyond reacting to specific issues, regulatory or otherwise, by ensuring that systems are in place that enable a proactive approach to managing their entire green infrastructure.

Sustainable communities now recognize that the organizing principle of community planning should be to plan development around the green infrastructure of natural areas, instead of around an arbitrary grid of service infrastructure (e.g., roads).

Sustainable communities:

- Examine the landscape's particular characteristics in order to determine the optimal uses for all its different parts; and
- Identify the natural systems, such as water, soil and biota, and plan development around that green infrastructure.

Sustainable planning does not preclude development; it simply directs development to occur in a manner that does not negatively impact sensitive ecosystems. Planning for green infrastructure promotes ecological, economic and social health and sustainability.



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The Substantive Advantages

The *Green Bylaws Toolkit for Conserving Sensitive Ecosystems and Green Infrastructure* can assist local governments in protecting grasslands in order to maintain:

- The natural infrastructure necessary to sustain grassland ecosystems and associated services
- The purity of your community's water
- Natural drainage and natural flood control systems
- Crucial wetland habitat for wildlife in your community and the related recreational, tourism, and economic development opportunities.

The Legal Advantages

The *Green Bylaws Toolkit for Conserving Sensitive Ecosystems and Green Infrastructure* will help you to proactively and effectively respond to and create environmental legislation by outlining tools and strategies that direct development away from sensitive areas.

The integrated regulatory approach suggested in the *Green Bylaws Toolkit* will assist you in conserving grassland ecosystems. Using a combination of setbacks and development permitting, municipalities can exercise greater control over development. The focus is on maintaining the ecological function of all grasslands and associated ecosystems that form part of the green infrastructure. This integrated approach will also assist municipalities in developing systems and best practices that should meet senior government regulatory requirements in the future.

The *Green Bylaws Toolkit* will also assist local governments in addressing the federal *Species at Risk Act*. Protection of natural infrastructure is a necessary component of any strategy to protect species at risk, because the majority of such species depend on either native grasslands or wetlands. Conserving grassland ecosystems helps to protect habitat for a suite of at-risk species associated with grasslands. Proactive local action at the ecosystem level to protect these areas will reduce the need for more costly single species recovery plans for such species.

Adopting bylaws that protect green infrastructure helps communities be proactive and prepared for future regulatory and legislative requirements, and helps government of all levels work toward achieving their shared conservation goals.

In addition, steering development away from grassland areas that are important components of surface runoff management may reduce municipal liability for the cumulative impacts of development in areas subject to flooding and erosion. Other relevant resources in this series include *Wetlands in British Columbia: A Primer for Local Governments*, available at www.bcwetlands.ca.

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Wetland Stewardship Partnership