



# GREEN COMMUNITIES GUIDE



**Tools to Help Restore  
Ecological Processes  
in Alberta's Built  
Environments**

## Preface

In keeping with LSCC's mandate, the Green Communities Guide was developed to be an essential tool to help communities develop strategies to conserve water, protect water quality, preserve valuable agricultural land, and protect critical open space and wildlife habitat. It strives to do this by highlighting community initiatives that have achieved these goals, always using case studies nearest to Alberta, when available. The key issues facing municipalities (elected officials and municipal departments), stewardship groups, and developers have been identified through a survey and have formed the basis of selecting the appropriate tools to address those issues. The tools then, have been researched and described, accompanied by case studies and incorporated into the Green Communities Guide. Through the guide, municipalities, stewardship groups, and developers will be informed about the innovative approaches other communities are taking to avoid, mitigate, or reduce the impacts of growth and development, to maintain the flow of ecological goods and services from their landscapes.

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### Contributions to Case Studies:

Tony Barber, Libby Fairweather, Kystle Fedoretz, Rocky Feroe, Dena Foo, Locke Girvan, Kathy Goble, Guy Greenaway, Steve Hanhart, Claudette Lacombe, David Leopold, Greg Lewin, Lesley Lovell, Harley Machielse, Dave Murray, Jorg Ostrowski, Kimron Rink, Kerry Ross, Neal Sarnecki, Kim Schmitt, Brad Stelfox, Guy St. Germain, Peter Vana, Nancy Weigel, Jay White, Kevin Wirtanen.

This publication was assembled by the Land Stewardship Centre of Canada, under the direction of Sarah Primeau, who developed the concept and proposal, and who was also the primary author. Other contributions are outlined below:

<i>Melanie Bell:</i>	<i>Case Study Research, Writing.</i>
<i>Dawn Doell:</i>	<i>Image Research, Editing, Administrative Support.</i>
<i>Ernie Ewaschuk:</i>	<i>Project Management, Fundraising, Writing, Editing.</i>
<i>Sarah Primeau:</i>	<i>Project Development, Fundraising, Research, Writing, Editing.</i>
<i>Michelle Riopel:</i>	<i>Project Coordination: Writing, Editing, Research, Design, Printing.</i>
<i>Cassandra Bencz:</i>	<i>Editing</i>

External input and direction was provided by:

- Alberta Environment - Sheleen Lakusta and Krista Tremblett
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## ***About the LSCC***

The main purpose of Land Stewardship Centre of Canada is to promote stewardship as a way to achieve sustainable land and resource use through the application of ecological principles to ensure maintenance of ecological function. Further, LSCC supports individuals and community-based groups trying to improve their local landscapes. LSCC participates in provincial and national initiatives that advance stewardship policy in all sectors of society. LSCC played a key role in the founding of the Alberta Stewardship Network (ASN) and is currently the Secretariat for that organization. In addition, LSCC assisted in the establishment of the Alberta Land Trust Alliance (ALTA) and is Chair of that Board of Directors.



**LSCC Vision:** Society demonstrates a stewardship ethic and an understanding of healthy ecosystems in its land use practices.

**LSCC Mission:** To facilitate stewardship by improving understanding of healthy ecosystems, supporting community stewardship, and strengthening policies that affect resource use.

Goal 1: To build knowledge about ecologically sustainable land use policy and practices.

Goal 2: To share and exchange information and knowledge with stewards and society.

Goal 3: To support and encourage community-based stewardship.

Goal 4: To strengthen policies to advance stewardship and promote sustainable land use.

# ***GREEN COMMUNITIES GUIDE:***

## **Tools to Help Restore Ecological Processes in Alberta's Built Environments**

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## Introduction

### The Need for a Green Communities Guide

The 2006 Canadian census revealed that the population of Alberta grew by an amazing 10.6% in only five years, which was almost double the average population growth rate for the rest of the country (5.4%). In some areas of Alberta the rate of growth was staggering, with the population of some towns doubling or tripling in that same time span. Calgary and Edmonton are also among the least densely populated of Canada's major urban centres, which contributes to the loss of agricultural land and natural spaces at city edges. Such fast rates of growth are inevitably accompanied by strain on municipal infrastructure, high costs of new infrastructure, and conversion of agricultural land and natural areas to residential, commercial, and industrial developments.

At the same time, development is facing new challenges, many of which result from human impacts on our natural systems. Through discussions and surveys that we've undertaken with municipal departments, elected municipal officials, stewardship groups, and developers, several concerns have been consistently reported. Climate-related lowering of groundwater, lake, and river levels have been common occurrences. A second area of concern has been the competition for use of increasingly limited water supplies, especially in light of the moratorium on new water withdrawals from the South Saskatchewan River Basin. Other water-related concerns include erosion of streambanks and sedimentation in water bodies, both of which are common consequences of increasing paved (impervious) surfaces in our built environments. Related to this have been issues with increased flooding and poor drainage, two impacts

that could be mitigated by reducing impervious surfaces and restoring wetlands. Deteriorating water quality and its impact on water treatment costs along with lost recreational opportunities have also been cited as important concerns to address. Problems of wildlife habitat loss and fragmentation, such as increasingly negative interaction between humans and wildlife and lost recreational and tourism opportunities were also reported. Furthermore, it is becoming apparent that some climate-related phenomena (e.g. increasing insect pests, plant disease, drought, severe weather) are linked to human-caused global climate change.

Though challenging to quantify, these impacts have clear economic and social costs to society. In addition to the rising drinking water treatment costs mentioned above, many summer villages and municipalities are being forced to upgrade or implement expensive wastewater treatment systems in order to reduce sewage-related incidents of toxic blue-green algae blooms in lakes. Decreased property values is another common consequence of deteriorating water quality (Krysel et al, 2003). High economic costs are also being felt as the need for expanded water distribution systems increases due to lowered groundwater levels. There is also increasing documentation related to the economics of insect populations, and the impacts that human activity can have on these (e.g. impacts of farming practices on crop pollinators, see Shuler et al, 2005). Questions about the possible health impacts (e.g. obesity) of car-dependent development are being raised (Sui, 2003). This could be significant in cities like Edmonton, where 77% of residents reported using their car exclusively for daily errands on the survey reference day (Statistics Canada, 2008). Innovative economic tools can begin to help municipal planners incorporate the environmental costs of proposed projects into ben-

enefit-cost analysis so that the true benefits and costs can be evaluated.

The good news is that many of these environmentally related development challenges can be addressed by better planning and design. “Green development” is one term that can be used to encompass more environmentally conscious planning and design, including but not limited to:

- Energy efficient buildings
- Waste reduction, recycling, composting
- Renewable energy sources
- Water conservation, wastewater recycling
- Stormwater management
- Wildlife habitat and natural areas protection, ecological restoration
- Recycled and recyclable building materials that are good for indoor air quality
- Effective public transportation and pedestrian-friendly urban design
- Agricultural land conservation for local food production
- Climate change mitigation
- Decentralized/district heating

An alternate way of evaluating the overall viability of development is to judge planning and design decisions on the basis of whether they are *ecologically-functional*. Ecologically-functional development is that which protects the ecological processes and functions of the landscape, restores them in areas where they have been previously lost, or creates them to compensate for the loss of ecological functions in other areas. There are many examples of ecological functions and processes that should be protected and restored, both for their own value and for the value that these services provide to society. Ecological processes that have value to society are often referred to as Ecological Goods and

Services, or EGS. Table 1, next page, illustrates some ecological processes and how they are beneficial to society.

## Barriers to Adoption of “Greener” Development

In our discussions and surveys of target audiences (elected municipal officials, champion municipal departments, stewardship groups, champion developers), we were told of several possible barriers to the advancement and implementation of green development practices. The following were some of the barriers identified from the Green Communities Guide survey (LSCC 2007-2008):

- **Overly restrictive development guidelines and standards:** Municipal department respondents indicated that they felt development standards and guidelines were not conducive to the approval of green developments.
- **Lack of understanding about long-term return on investment:** Both municipal department and elected official respondents cited a lack of understanding about the long-term return on investment of green development tools/practices (see CMHC 2005 and CMHC 2008, below, for information on addressing this barrier).
- **Lack of resources within municipal departments:** Elected officials and some municipal department respondents cited a lack of municipal resources as a barrier to green development. In particular, there may be a lack of resources to approve green developments on a special case basis, and/or a lack of resources to research and promote best practices. Often the municipality is simply in a position to respond to the proposals brought forward by developers, rather than proactively encouraging greener proposals.

**Table 1. Ecological processes and how they benefit society**

Ecological process	Benefits to society
Climate moderation, greenhouse gas sequestration	Moderation of the impacts of human-induced climate change and its resulting impacts (i.e. moderation of extreme weather events, more extreme drought/flooding, increasing populations of invasive insects)
Ecosystem succession	Establishment and development of different ecosystem types adapted to different geographic areas and conditions, establishment and restoration of naturalized landscapes
Flood attenuation/mitigation	Protecting flood mitigation/attenuation processes reduces water runoff that can cause flooding
Groundwater infiltration and aquifer recharge	Decrease in flooding, recharge of groundwater supplies that are used by humans
Nutrient cycling and sequestration	Decomposition of dead plant and animal material; uptake and storage of nutrients (e.g. in soil, plants) that could otherwise cause water quality problems
Pollination	Increased yields of agricultural crops
Predator-prey relationships	Overall maintenance of wildlife populations, prevention of population explosions of potentially-damaging species (e.g. browsers, crop pests)
Soil-building	Increased soil fertility to enhance productivity of agricultural crops and vegetation in natural areas; compensates for loss of topsoil and fertility due to erosion
Water cycling	Infiltration of water into the soil promotes subsurface irrigation of crops and plant communities; infiltration into groundwater recharges aquifers; evapotranspiration of water from plants provides atmospheric humidity and reduces excess runoff; provision of moisture in atmosphere maintains local hydrologic patterns and precipitation
Water purification	Natural water purification processes (e.g. via wetlands, soil infiltration) protect water quality of surface and groundwater reserves
Wildlife movement	Allowing wildlife movement supports healthy and genetically diverse wildlife populations

- **Lack of information and awareness:** Stewardship Groups indicated that they felt there was a lack of information on green development, and a lack of public awareness about the negative environmental impacts of conventional development practices.
- **Poor understanding of requirements for maintenance and upkeep of non-conventional infrastructure:** Some respondents indicated they felt that more affordable and locally appropriate ways of maintaining green development are needed (e.g. cleaning sediment from bioswales, clearing traffic-calmed roads of snow).
- **Developers are not proposing green development:** Stewardship Groups indicated that they felt developers were not proposing green development, possibly due to a lack of incentives from municipalities. In some cases, proposed green developments are often hampered by municipal development standards that are not conducive to approving developments with “green” features.
- **Lack of case studies to demonstrate successful tools that can be used:** Several respondents thought that the lack of case studies has been a barrier.
- **Perceptions about safety and attractiveness:** Interestingly, concerns about safety and/or attractiveness of green development were *not* cited as barriers to the advancement of green development.

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