

POLICY BRIEF

The Case for Using Green Infrastructure as a Planning Tool to Build Resilient Rural Communities

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Introduction

Rural areas often face challenges around many intertwined issues involving economic, social and environmental circumstances. Although it is hard to generalise across diverse rural settings, there are often common situational problems. For example, rural inhabitants exhibit poor health outcomes relative to their urban neighbours (obesity, chronic diseases); rural communities face demographic challenges (loss of overall population due to general societal changes; an aging population with youth out-migration). Rural municipalities may also struggle with insufficient financial resources, deficient 'grey' infrastructure (transport/piped service facilities), lack of community services (health, park, recreation), deficiencies in community social cohesion and environmental degradation issues. Larger issues such as addressing or mitigating the impacts of climate change, or providing for biodiversity protection, may also present significant challenges to rural capacity (Caldwell, 2010; Canadian Rural Revitalization Foundation, 2015; Rural Ontario Municipal Association, 2015; Rural Ontario Institute, 2015; Breen, 2015).

Green Infrastructure (GI) can be used as a planning tool to assist in addressing the many challenges found within rural settings. For simplicity sake, GI comprises the natural assets that are found within any community. These assets comprise ecological goods and services (G+S) as defined by the World Health Organization's Millennium Ecological Assessment, i.e., supporting, provisioning, regulating and cultural services that provide life to all living things (Corvalán, Hales. and McMichael, 2005). To add additional substance to the notion of using GI in land use planning, the United Kingdom's Department of Communities and Local Government has provided a succinct definition of GI: *A network of multi-functional green space. . . which is capable of delivering a wide range of environmental and quality of life benefits for local communities* (United Kingdom, 2012). In addition, the Ontario Government has recently outlined in its principal land use planning guidance document for municipalities that GI should be used in community infrastructure provision (see footnote for definition).¹

Rural areas by their definition of containing dispersed low-density land uses have an abundance of open space and naturalized spaces. The challenge of GI planning is to derive utility out of these existing spaces and to create new strategically-placed elements

¹ 2014 Ontario Provincial Policy Statement definition of Green Infrastructure: means natural and human-made elements that provide ecological and hydrological functions and processes. Green infrastructure can include components such as natural heritage features and systems, parklands, stormwater management systems, street trees, urban forests, natural channels, permeable surfaces, and green roofs.

that can aid human health and wellbeing while also providing for community resilience mechanisms.

GI Planning Research

Research on the topic of GI planning is underway at the University of Guelph. The research examines how this form of planning is being used in rural Ontario today², and how it is understood in other parts of the world.

Although the term GI is a relatively new notion, the idea of recognizing open space as a building block for community development has been around for quite some time. Examples of distinctive community form development come from the Garden City movement of the UK in the later years of the 19th century. During the 20th century there are many examples where open space has been used as a defining mechanism for community sense of place – these plans include the ‘green wedges’ for Melbourne, Australia and the ‘green fingers’ plan for Copenhagen, Denmark.

In Ontario, the notion of GI planning is in its infancy. The following discussion highlights some interesting examples of where components of a GI planning system are in place in Ontario rural municipalities. The GI elemental suggestions presented here are intended to extend beyond the usual park, and protected natural areas that are found in all communities. The GI element examples are grouped around nine basic themes:

1) Community Livability:

The Township of Georgian Bay defines itself as a ‘green community’ as its protected environmental setting on the Canadian Shield is of primary importance to the community’s existence, i.e., a tourism economy. Distinctive cultural landscapes are also defined within the community’s plan.

2) Culture, Education, Recreation, Tourism:

The Temagami Aboriginal Eco-Cultural Tourism plan promotes its area for low-impact tourism within a wilderness setting of northern Ontario. All aspects of this theme are or planned to be at work in the area.

3) Biodiversity, Habitat/Species Protection:

Wingham River Flats Ecological Park is an example of local enhancement of a former mill pond that has been re-naturalized for both ecological and human benefit. Examples of beneficial effects include pollinator plants, and riparian buffers to the river.

4) Water, Stormwater Management:

Low Impact Development (LID) design is a recent engineering design device for increasing storm water infiltration on the land to prevent harmful discharges of pollutants into receiving waterbodies. LID uses features such as bioswales and artificial wetlands to treat and control storm water flows. The Lake Simcoe Conservation Authority is promoting the use of LID to assist in reducing phosphorous loads into Lake Simcoe which is in a current environmentally-degraded state.

² Green infrastructure research from the University of Guelph can be found at the following link:
<http://www.waynecaldwell.ca/Projects/greeninfrastructure.html>

5) Woodlands, Woodlots, Street Trees:

The Green Legacy program of Wellington County is a very successful tree planting program that involves many stakeholders in the community and is delivered in a very cost-effective manner. Trees are planted for the general beneficial impact (air, water, land betterment), and also in strategic locations to reduce municipal operational costs, e.g., living snow fences to prevent snow drift onto municipal roads.

6) Soil Quality Enhancement:

There are efforts by the Maitland Valley Conservation Authority to protect agricultural soils and reduce nutrient rich runoff into receiving water bodies through greenway initiatives in the Garvey Creek-Glenn Drain sub-watershed.

7) Climate Change Adaptation & Mitigation:

Tay Valley Township has adopted development standards to anticipate impacts of climate change, primarily in the form of more intense rainstorms. The Adaptation Plan work by the local Conservation Authority informs the need for new municipal requirements in storm water management to promote increased water infiltration.

8) Local Food:

Community leaders in the Town of Perth are furthering the local knowledge base for permaculture to feed residents in a low environmental impact manner. Examples are the use of municipal parklands for local food production as well as the development of food-forests.

9) Other mechanisms:

Linear features on the landscape such as shorelines, creek/river valley lands are attractive locations for active transportation initiatives. Severn Township and Essex County have extensive trail systems that utilize portions of greenway corridors. These linear corridors also provide natural system connectivity benefits as well.

The research on the use of various GI elements illustrates a wide range of application within diverse rural settings. The specific application of an element can be tied to circumstances found in an area. Factors impacting action implementation can relate to economic development opportunities/employment diversification as well as resource conservation responses concerning land and water resources. Community leaders whether they are from government, private business or NGOs are key to driving understanding and action on a topic. In most instances, the multifunctional attributes of individual actions are not well developed or linked within overall community plans.

GI Planning Outside of Ontario

As outlined above, holistic community plans using various GI elements are not in place in Ontario. However, in examining the literature, there is a rich description of planning cases from various areas of the United States. GI plans have been formulated that define areas for conservation (agriculture, recreational space, water management) as well as other areas for settlement, e.g., Pennsylvania, Maryland, New York (Williamson, 2003; Weber, 2003; Rouse and Bunster-Ossa, 2014). In Europe, there are a multitude of examples of GI plans at many scales – sub-municipal drainage areas, municipality level plans, regional plans and national/international level plans. These plans provide many multifunctional

benefits that have been described in the elemental GI components described above in various Ontario municipalities. The plans, in addition to supporting the economic, social and environmental health of local communities, have been created to address anticipated climate change impacts as well as to meet biodiversity enhancement objectives of the European Union (Kraehling, 2015).

Conclusion

Indications suggest that many issues within rural communities may be addressed through a GI planning lens. This conclusion is derived by reviewing the literature in the USA and Europe where plans are in place today, as well as in consideration of recent research findings on the use of GI elements in Ontario municipalities.

A GI approach to planning can be tailored to a specific rural circumstance in terms of planning governance and stakeholder interest. In Ontario, the Greenbelt of the Toronto-centred region is an example of an area where multiple beneficial attributes of a ‘protected countryside’ can be leveraged to maximize environmental, social and economic pursuits. The Greenbelt protects important provincial assets - agricultural land, natural features, water/land/air cleansing capabilities – while also clearly defining areas for conservation and growth in local municipalities. This is illustrative of a GI form of planning, and may be instructive for future thinking on the topic.

GI may be an effective tool in structuring discussions where there are competing land use interests and priorities. A common GI language is available as it considers environmental assets that encompass various municipal administrative operations, and GI can also cross municipal boundaries. The beauty and value of nature at the core of GI planning is understandable to most people; this can form a consensus-building platform upon which collaborative relationships among those that often have diverse perspectives on a topic can be formed - residents, businesses, government agencies, and environmental advocacy groups. It can provide a common starting point where public and private interests of the use of land can be discussed and deliberated on.

Just as elements within a healthy system of natural heritage features are more resilient to stresses in the natural world, a similar perspective to a connected multi-functional network of GI in rural places can provide synergies for effective health and wellness conditions.

Implications and Recommendations

A framework model to guide GI planning should be formulated for use in rural places of Ontario as well as in other parts of Canada. The guide needs to be reflective of the diverse settings of rural communities across the country. For example, these areas should include settings that are near-urban versus remote locales; landscapes comprising extensive versus few resource-extractive activities; settings that offer ample versus few pastoral/aesthetic viewsheds. There are several resource guides from other parts of the world that can provide inspiration (Williamson, 2003; European Environment Agency, 2012; Rouse and Bunster-Ossa, 2013).

The acknowledgement of the need for a new form of planning to enhance community and environmental community resilience wellbeing is coming from various sources. At the local level, evidence of the impacts of climate change, natural system degradation and economic

system instability are becoming increasingly evident. At the senior levels of government, new ways of doing things – for example, better ways to manage soil, water, and air ‘resources’ are being devised. The federal government for the first time is providing ‘green infrastructure’ dollars for natural system design associated with water and wastewater management systems. In Ontario, the provincial government is updating stormwater management design guidelines that will require the use of green infrastructure ‘low impact design’ mechanisms for new land use developments. Other players are at work encouraging the adoption and use of natural systems design. A strong advocate, for example comes from the Green Infrastructure Ontario Coalition which comprises various environmental NGO groups in the province. Another advocacy group, Ecohealth Ontario represents a broad spectrum of public health advocates and planners associating nature with healthy community design and development.

All in all, there are a wide range of entities interested in GI. This bodes well in the potential synergies for holistic planning of local community land uses on a base of using traditional ‘grey’ infrastructure and existing/new green infrastructure features.

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