

Building Agricultural Green Infrastructure

Background

Green or natural infrastructure consists of vegetation and natural features such as wetlands, sloughs, riparian buffers and trees. These natural features play an important role in mitigating the impacts of overland flooding, storm water, and drought. They improve air and water quality as well as providing other benefits such as carbon sequestration and habitat.

Canada's aging infrastructure has and will increasingly fail in part due to the increased strain from the loss of green infrastructure.¹ The loss of natural infrastructure in southern Canada is significant. For example, over 70% of southern Canada's wetlands have been destroyed, and freshwater supply has decreased by 8.5% since the 1970s. This is of concern particularly in the Prairies, the Okanagan, Southern Ontario, and the St. Lawrence Valley.

The "variability and availability" of freshwater will be even further impacted by climate change,² which will also increase the frequency and severity of extreme weather events and the associated economic costs to the Canadian economy. For example, major flood events in Manitoba and Alberta in the last decade have cost billions of dollars. Had the affected areas retained natural infrastructure – in particular wetlands which regulate water flow during snow melt and rainfall – the impact would have been much less.

The retention, creation and enhancement of natural infrastructure is an important component of any strategy to mitigate these increasingly severe economic and environmental problems.

Proposal

In its Green Infrastructure initiative, the federal government should:

- Require proposed infrastructure projects to examine the cost and benefit of upstream natural infrastructure, and, when cost-efficient, fund its creation/enhancement and maintenance.
- Identify priority areas (e.g prone to flooding) for integrated planning initiatives with dedicated and sustainable funding mechanisms.

¹ Searle, Rick; *Wetlands Matter: Reducing Canada's Municipal Infrastructure Deficit with Wetlands*; Municipal World, November 2015

² Environment: A Report of the Canadian Index of Wellbeing, 2011

- Establish a general fund for natural infrastructure, similar to the Federation of Canadian Municipalities' Green Municipal Fund.
- Establish accounting standards to allow the inclusion of natural infrastructure into operations and maintenance budgets. Many jurisdictions, including some in Canada, have made progress on these fronts.

Economic Benefits of Green Infrastructure

- In 2010 Halifax Water avoided a \$150,000 upgrade at the Middle Musquodoboit Water Treatment Plant (built in 2009-2010 for \$2.2M) by working with a farmer. The farmer is compensated \$300 on an annual basis for modifying agricultural practices and for maintaining a wider riparian buffer³.
- A comprehensive economic analysis⁴ of the ecological goods and services provided by wetlands in the Black River watershed of Lake Simcoe determined that:

a dollar invested in [wetland] retention produces \$3.66 of value, while a dollar invested in [wetland] restoration of up to 25 per cent of the subwatershed's wetlands produces \$2.01 worth of value.

This is a conservative valuation, given that it considered only a portion of wetlands' economic contribution (water quality improvement through phosphorous reduction, carbon sequestration, biodiversity and tourism) and did not include wetlands contribution to flood mitigation, groundwater filtration/recharge or erosion control.
- Ducks Unlimited Canada found the cost of wetland restoration vs. flood mitigation infrastructure in the Bow River and South Saskatchewan Rivers Basins to be comparable. Wetland Restoration costs were assessed at \$3.5 - \$6.7/ m³, whereas dry dam costs were \$1.4 - \$7/ m³ plus maintenance⁵. In addition to mitigating floods, wetlands provide carbon sequestration, water quality improvement, and habitat.
- According to a World Resources Institution study, six U.S. cities saved 60% on water infrastructure by integrating natural and built infrastructure⁶. New York City invested in watershed protection measures, including working with the

³ Barry Geddes, Watershed Manager, Halifax Water.

⁴ A Business Case for Wetland Conservation: The Black River Subwatershed, Ducks Unlimited Canada, 2011.

⁵ Wetlands Working: Flood Mitigation in the Bow River Basin, Ducks Unlimited Canada.

⁶ World Resources Institute: Natural Infrastructure: Investing in Forested Landscapes for Source Water Protection in the United States, 2013

agricultural community, to protect water quality (pollution reduction, conservation easements) rather than spend between \$ 6-8B on a new filtration system with annual costs of \$300 million. The rate of return on the natural infrastructure investment was between 90 to 170%⁷. An added benefit was the injection of \$100M per year into the rural parts of the watershed.

- A study of the Upper Mississippi and Missouri Basins in the U.S. Midwest concluded that wetland restoration would have accommodated the floodwaters of the 1993 flooding event⁸.
- Massachusetts wetlands were valued at \$96,010/acre for flood control, \$75,196/acre for nutrient filtering, and \$291,357/acre for water supply services⁹.

⁷ Ontario's Wealth, Canada's Future: Appreciating the Value of the Greenbelt's Eco-Services, David Suzuki Foundation, 2008.

⁸ World Resources Institute: Natural Infrastructure: Investing in Forested Landscapes for Source Water Protection in the United States, 2013

⁹ Olewiler, Nancy. The Value of Natural Capital in Settled Areas of Canada. Ducks Unlimited Canada and the Nature Conservancy of Canada, 2004.

The ALUS Approach

ALUS Canada provides programmatic and financial support to farmers and ranchers to create, enhance and maintain ecosystem services/natural infrastructure. Our organization recognizes the central stewardship role of farmers and ranchers, and the importance of engaging rural communities. By the end of 2017, ALUS Canada will have established nineteen community projects in Alberta, Saskatchewan, Manitoba, Ontario, and Quebec. These communities work collaboratively to restore and enhance wetlands, buffer riparian areas, plant trees, and modify agricultural practices to achieve environmental goals.

For More Information:

Lara Ellis

lellis@alus.ca / 416-303-7492

Markets and Policy Development Director

ALUS Canada

www.alus.ca

May 26, 2016