

NATURAL CREDIT

FACT SHEET



Estimating the Value of Natural Capital in the Credit River Watershed

The Credit River Watershed provides at least \$371 million per year in ecological services to the residents of the watershed

Without nature, humans could not survive. Nature provides the raw materials for every product we consume. More importantly, it constantly supplies services that sustain life, such as fresh drinking water, food and clean air. Nature directly affects human well-being through its ability to meet a wide variety of human needs, whether from tangible ecological services or from more abstract, psychological connections to nature.

Unfortunately, current accounting systems rarely, if ever, account for nature. In fact, we often assume nature provides unlimited resources, such as fisheries, forests and clean drinking water. We act as if the bank of nature has unlimited assets, and we keep making withdrawals as if there is no tomorrow.

By accounting for natural capital we can start to align our economic ambitions with our ethical environmental responsibility—to provide future generations with at least the same benefits from nature we enjoy. This is the foundation of sustainability.

The Pembina Institute worked with Credit Valley Conservation (CVC) to assess the value of natural capital in the Credit River Watershed. This work is an important component of the information CVC needs to effectively manage ecological resources in the watershed. Given its proximity to the major urban centres of Toronto and Mississauga, the Credit River Watershed faces threats to its natural heritage from resource use and land-use change.

About the Credit River Watershed

The Credit River flows from its origins in Orangeville to Lake Ontario at Port Credit in the City of Mississauga. The watershed covers an area of almost 1,000 square kilometres and has a population of 757,600. The Credit River Watershed is also an important sub-component of the Great Lakes Basin. Its most notable natural capital resources include wetlands, upland forests and water.

Natural Capital

Natural capital consists of the assets of natural ecosystems whose very presence yields a flow of ecological services. This concept was derived from the same notion that we use to treat other forms of capital in our society (financial and human).

Ecological Services

Ecological services are the benefits that society enjoys from the presence of functioning natural ecosystems. Ecological services provide, for free, many of the functions that we currently substitute with man-made processes, such as waste treatment, carbon sequestration and air purification.



Natural capital saves watershed taxpayers \$100 million in water supply costs every year

Natural capital builds on the notion that Mother Nature does for free what we would otherwise have to pay millions of dollars to do through technology and infrastructure. When we allow growth, pollution or other impacts to compromise these valuable services, that lost value is ultimately borne by taxpayers. Those costs are not accounted for in the way we do business today. This study helps demonstrate that it is possible to come up with real numbers that can inform discussions about land use and development. For example, this study estimated that if we were to compromise our groundwater supply it would cost more than \$100 million per year to pump water from Lake Ontario. And that is just to maintain current water use.

Wetlands provide natural waste treatment, climate regulation and water supply services for free—remove the wetlands and you lose the services.

Value of Natural Capital in the Credit River Watershed

LAND COVER	UPLAND FOREST	RIPARIAN FOREST	WETLAND	WATER	URBAN FOREST	MEADOWS	AGRICULTURE	TOTAL
Ecological Services	Atmospheric Regulation Climate Regulation Disturbance Avoidance Water Regulation Water Supply Pollination Habitat Recreation	Atmospheric Regulation Climate Regulation Water Supply Waste Treatment Pollination Biological Control Habitat Biodiversity Recreation Culture	Climate Regulation Water Regulation Water Supply Soil Formation Nutrient Cycling Waste Treatment	Water Regulation Water Supply Soil Formation Waste Treatment Habitat Biodiversity Recreation	Atmospheric Regulation Climate Regulation Water Regulation Water Supply Recreation Culture	Climate Regulation Pollination Habitat Recreation	Climate Regulation Pollination Habitat	
Estimated value (\$) per capita per year	94	67	247	19	25	10	28	490
Estimated annual value (\$ millions)	70.9	51.0	186.8	14.5	18.7	7.8	21.4	371.1



How changes in land cover affect the flow of nature's services

The natural capital of the Credit River Watershed is extremely valuable. But we would have to do a serious study of incremental changes in the value of natural capital to create a precise decision-making tool. To demonstrate the value of natural capital, we created two simple scenarios to test how natural capital might change in value.

To assess how natural capital would be affected by changes in land-use we compared the existing natural capital to the expected natural capital under two land-use scenarios: urban development and reforestation and naturalization.

We arrived at a value for the existing natural capital by comparing the existence of a particular ecological service to its absence. This approach has been used in a number of instances in Canada. The approach taken in this study is important for demonstrating that our natural environment has significant value, but its usefulness for decision-making is limited. Policy decisions are usually made on what economists call the "margin," which refers to incremental changes rather than the absence or presence of an ecological entity.

Our findings demonstrate that Canada needs to establish a national framework to conduct this type of work. Without this information decision-makers are often left to consider only the information before them. In many cases this would be economic information related to industrial benefits and not ecological benefits.

URBAN DEVELOPMENT: In a recent study conducted by CVC some future urban development scenarios were defined. The scenario explored here includes increasing the urban land cover from 15% to 25% of the watershed, while using current best management practices.

REFORESTATION AND NATURALIZATION: In 2007, CVC articulated a 10-year capital plan, in which it set aggressive reforestation and naturalization goals. CVC expects to plant 2.5 million seedlings (reforestation), and 317,000 trees and shrubs (naturalization) by 2017 as part of a climate change strategy.



The Credit River flows from its origins in Orangeville to its mouth at Port Credit on Lake Ontario.



Photo: CVC

Urban forests provide water regulation and supply, waste treatment, and other services worth \$19 million every year in the Credit River Watershed.

Scenarios: Changes in Natural Capital Values

Change in Natural Capital Value (\$ millions per year)	LAND COVER	UPLAND FOREST	RIPARIAN FOREST	WETLAND	WATER	URBAN FOREST	MEADOWS	AGRICULTURE	TOTAL
Urban Development		-6.5	-3.9	-14.8	N/A*	N/A*	-0.8	-4.9	-30.8
Reforestation Naturalization		7.6	5.5	N/A*	N/A*	1.3	-0.7	-0.4	13.2



Urban development comes at a significant cost because valuable services provided by nature are lost.

* Not applicable because of the limitations of the scenario

Investments in reforestation and naturalization can increase the value of the natural capital in the Credit River Watershed, thereby providing significant benefits to residents.

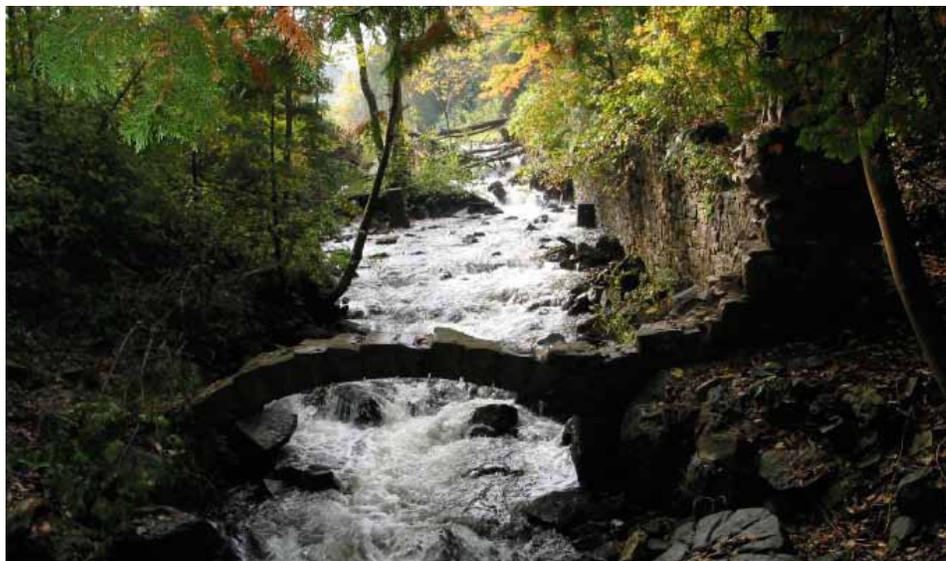


Photo: courtesy CVC

Investments in Forests Pay Dividends

As urban development proceeds there is a real cost to natural capital. The risk is that higher value land cover types, such as wetlands, which have an annual economic value of \$187 million, could be jeopardized. However, restoring natural landscapes can be shown to provide clear benefits to society. Based on the analysis done in this report, if CVC invests the \$8 million over 10 years to plant trees and shrubs on abandoned and degraded lands, the return to society is over \$13 million per year. An approach like the one used in this study can help measure the costs of urban development and the economic benefits of conservation initiatives such as reforestation and naturalization. Further, this type of work can turn the balance sheets around on how businesses and governments approach nature.

Bank of Nature Earns High Interest

The natural capital of the Credit River Watershed delivers a sustainable flow of services to society on the order of at least \$371 million per year.

- Wetland services were found to be the most valuable in the watershed, returning an annual flow of benefits worth a minimum of \$187 million per year.
- The current mix of forests in the watershed composed of upland forests, riparian forests and urban forests return a minimum of \$71 million per year, \$51 million per year and \$19 million per year, respectively.
- Water benefits in the Credit River Watershed are at least \$15 million per year.

There are a number of potential development patterns that could emerge in the Credit River Watershed. The results of our analysis indicate that if the residents of the watershed want to enhance the value of natural capital in the watershed then a focus on reforestation and naturalization can return some very big gains over the next 10 years. We estimate that a reforestation and naturalization plan will return more than \$13 million per year to the residents of the watershed. Conversely, if urban development progresses along current trajectories from 15% urbanization today to 25% urbanization, we can expect losses to natural capital of about \$31 million per year.

Conservative Estimates

The natural capital values reported in this study should be considered a lower bound for three main reasons:

- 1. Only values to watershed residents were considered. It is possible that some people outside the watershed value the Credit's natural capital.**
- 2. Existing data allowed for estimation of only a small selection of the ecological services.**
- 3. In cases where data limitations forced us to make assumptions, the most reasonable conservative assumption was applied.**

Want More Information

For more information on the analysis conducted by the authors please download the full technical report *Natural Credit: Estimating the Value of Natural Capital in the Credit River Watershed* from: www.greeneconomics.ca, www.pembina.org or www.creditvalleyca.ca.

Also, please feel free to contact the authors:

Mike Kennedy, Senior Resource Economist,
Pembina Institute: mikek@pembina.org

Jeff Wilson, Ecological Goods and Services
Project Coordinator, Credit Valley Conservation:
jwilson@creditvalleyca.ca

