

Greenbelts: Local Solutions for Global Challenges
March 22-24, 2011



**The Value of Ecological Goods and Services
in the Credit River Watershed:
The Implications for Greenbelt Restoration**

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and

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Presentation Outline

- Natural Capital and Ecological Goods and Services

- CVC EG&S initiative

- Valuing wetlands in the Credit River Watershed:
 - Key findings
 - Management implications

Ecological Goods and Services

- The benefits people obtain from ecosystems (Millennium Ecosystem Assessment):
 - produced by natural ecosystems;
 - valued by humans

Ecological Goods: Provision of food, fuel, building materials

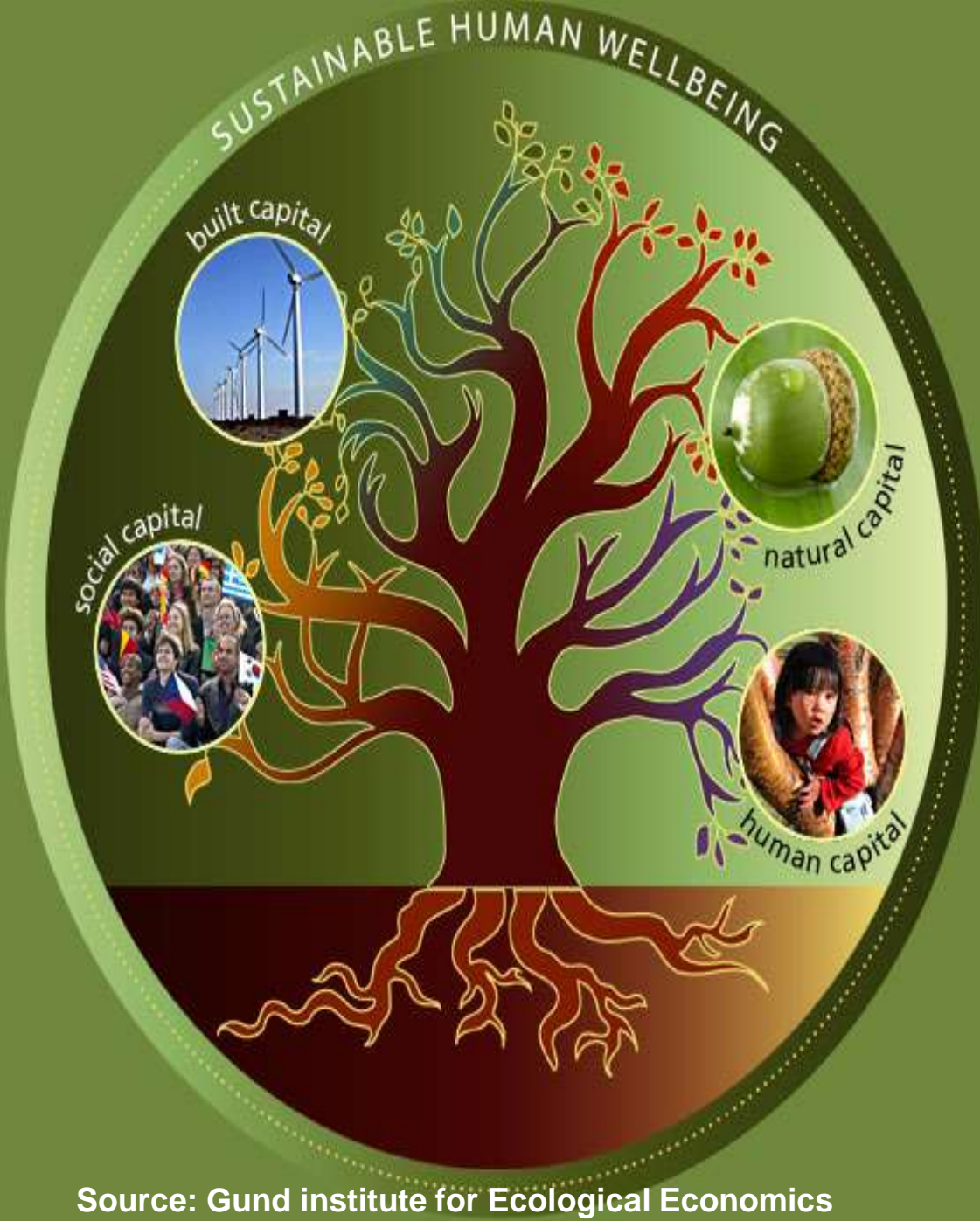
Ecological services: climate regulation, recreational opportunities, water quality regulation, flood and erosion prevention



What is nature's goods and services worth?



- Priceless (∞) \neq Worthless (0)
- Ecological Goods (have market value) vs. Ecological Services (no market value)



Natural Capital should be accounted for along with other forms of capital used by people

CVC Ecological Goods & Services Project Objectives:

To value key ecosystem goods and services in the watershed to:



- Educate and build awareness
- Inform decision making
- Ecosystem health → human well-being

CVC Ecological Goods & Services Projects*

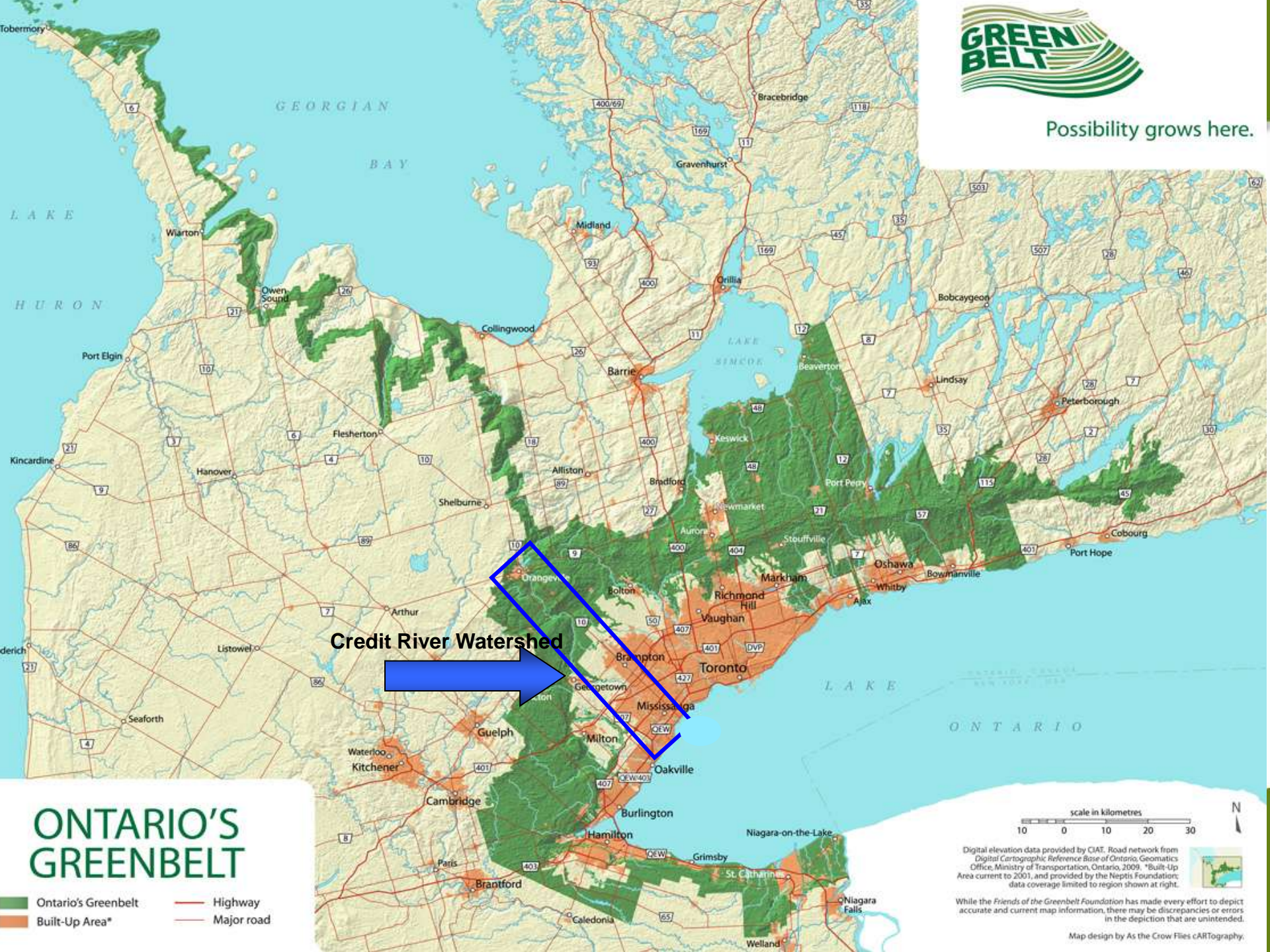
Studies	Key Findings
Recreational value of angling on Credit River	Annual value \$1.2 million, total net present value in the range of \$48 million
Amenity value of natural features in Mississauga	Natural features in north and south Mississauga increase property values by over \$255 mil
Carbon storage assessment	Forests in the CRW: hold 6.5 million t and sequester more than 13,000 t of C annually.
Watershed natural capital assessment	The CRW provides EG&S worth more than \$371 million to area residents annually
Value of wetland restoration	Households willing to pay a significant amount for wetland retention/restoration programs in the CRW (the total current value WTP estimate was \$221-250 million)

* Completed in 2008-2010

For more information: <http://www.creditvalleyca.ca/bulletin/resources.htm>



Possibility grows here.

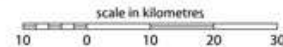


Credit River Watershed



ONTARIO'S GREENBELT

- Ontario's Greenbelt
- Built-Up Area*
- Highway
- Major road

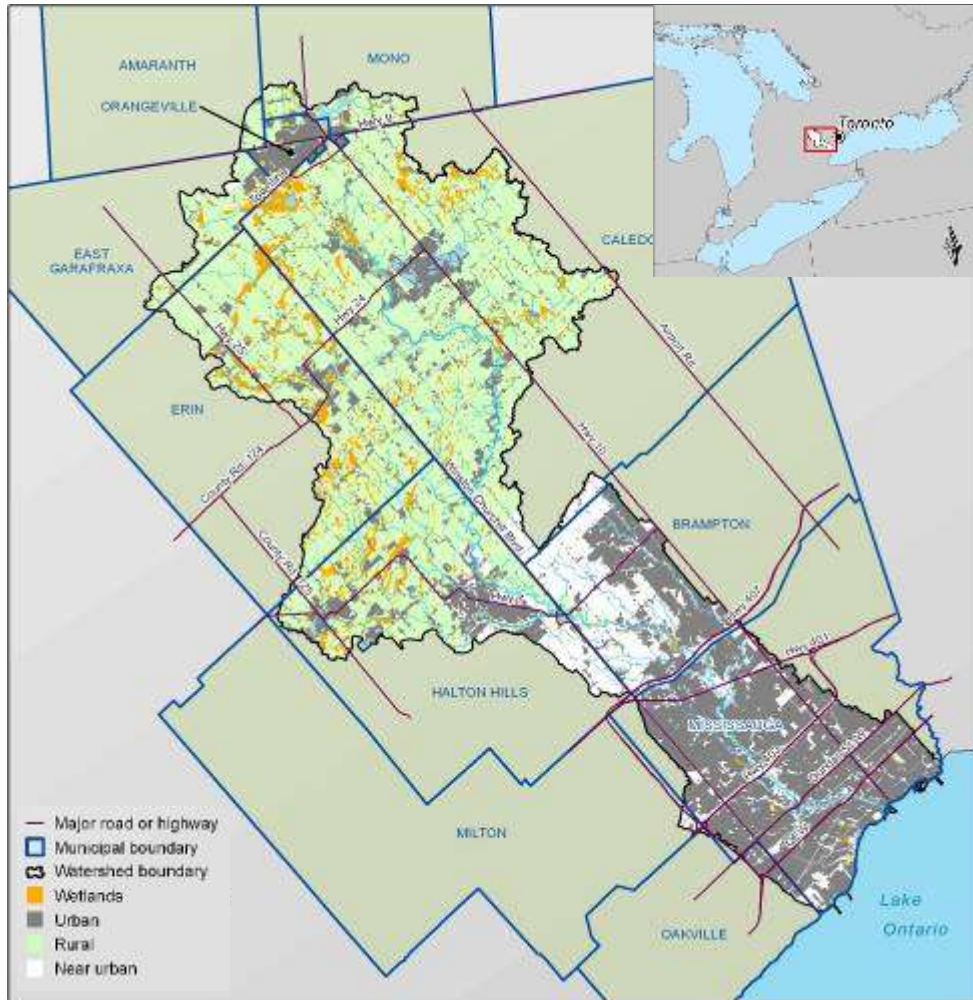


Digital elevation data provided by CIAE. Road network from Digital Cartographic Reference Base of Ontario, Geomatics Office, Ministry of Transportation, Ontario, 2009. *Built-Up Area current to 2001, and provided by the Neptis Foundation; data coverage limited to region shown at right.

While the Friends of the Greenbelt Foundation has made every effort to depict accurate and current map information, there may be discrepancies or errors in the depiction that are unintended.

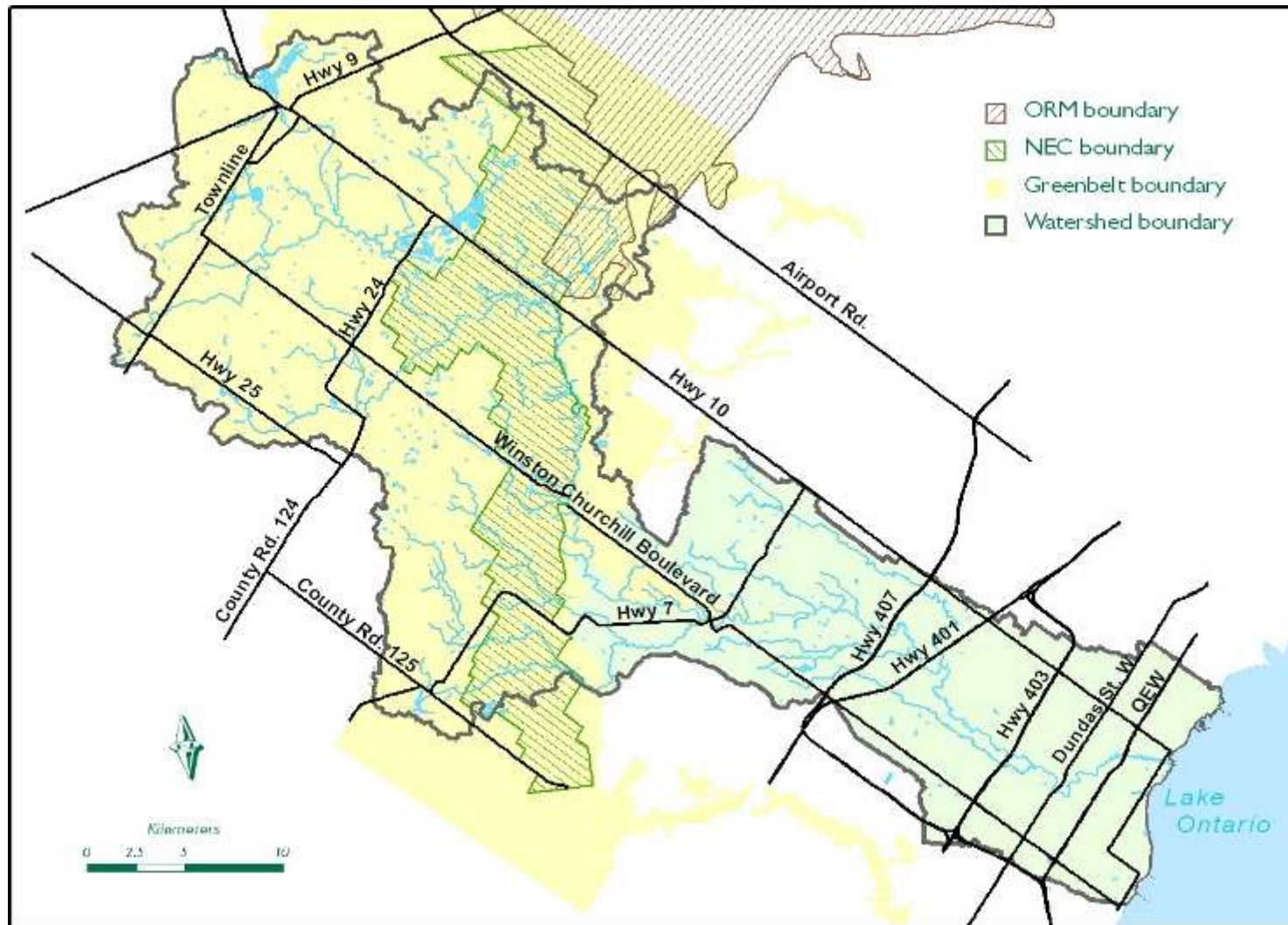
Map design by As the Crow Files CARTography.

The Credit River Watershed



- Population ~ 750,000
- Area ~ 1,000 km²
- Land use in the watershed:
 - 33% urban
 - 29% agriculture
 - 23% natural (wetlands and forest)

Credit River Watershed: Greenbelt and other protected areas



The value of natural capital in the CRW and the Ontario's Greenbelt

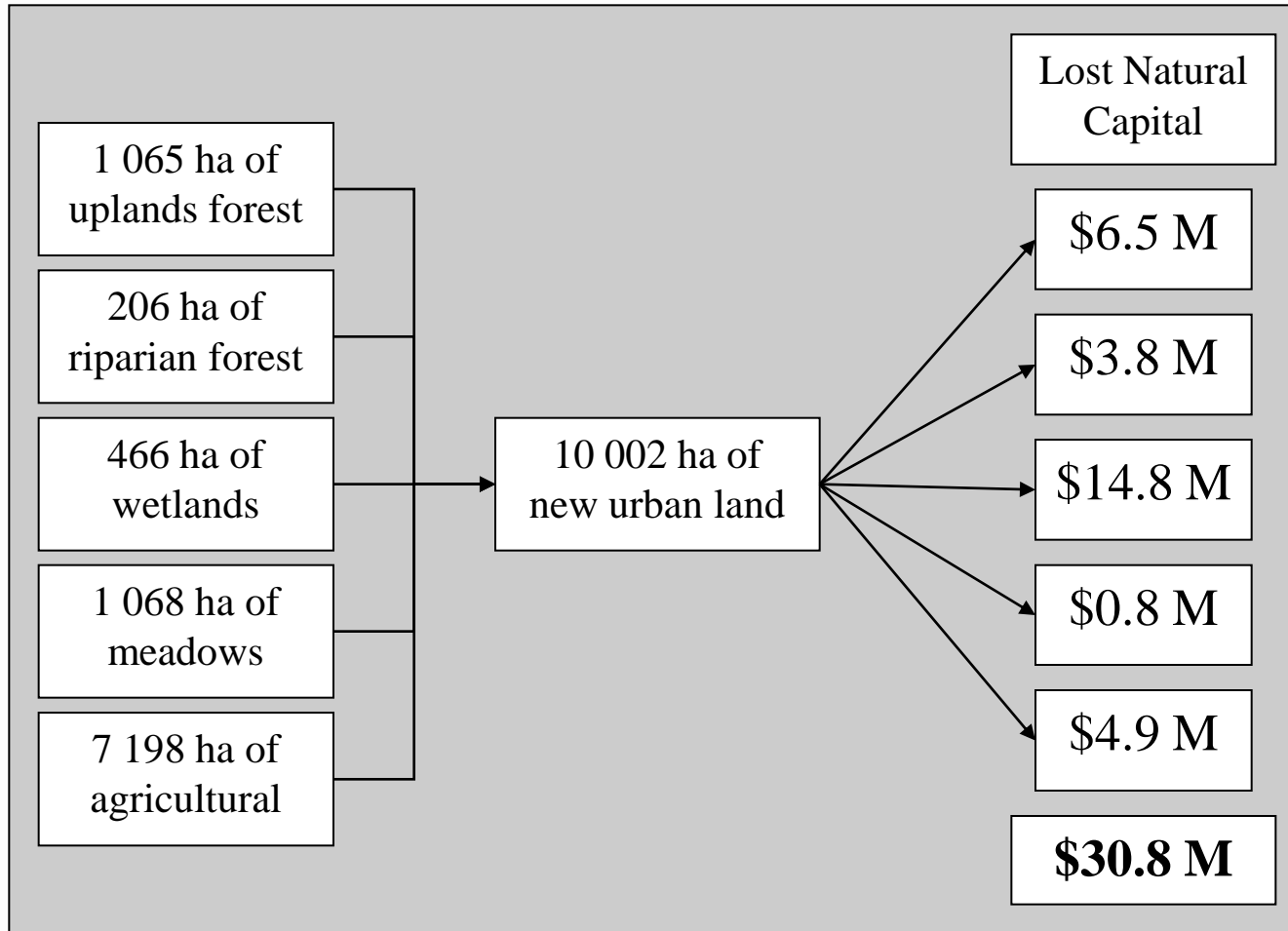
	Credit River Watershed	Lake Simcoe Watershed	Ontario's Greenbelt
Total Annual Natural Capital Value	\$371.1 M	\$975 M	\$2.6 B
Average Natural Capital Value (per ha per year)	\$3,911	\$2,948	\$3,487

- Natural Credit: Estimating the Value of Natural Capital in the Credit River Watershed (2009)
- Lake Simcoe Basin's Natural Capital: The Value of the Watershed's Ecosystem Services (2008)
- Ontario's Wealth, Canada's Future: Appreciating the Value of the Greenbelt's Ecosystem Services (2008)

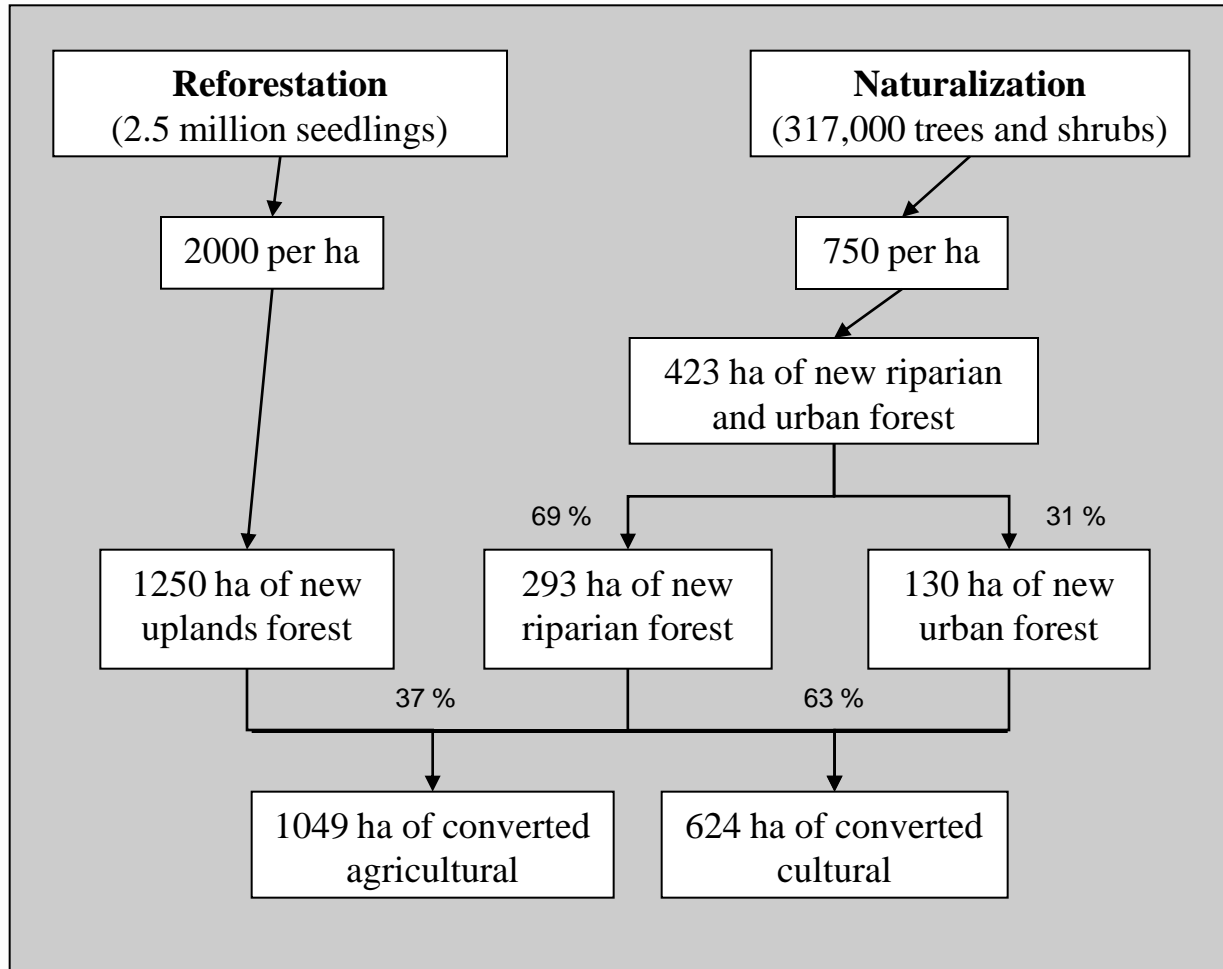
Value of natural capital by land cover type in the Credit River Watershed (2007 \$CAD)

Land cover	Average value per capita per year (\$)	Total annual value (\$ millions)
Water	19	14.5
Upland Forest	94	70.9
Riparian Forest	67	51.0
Urban Forest	25	18.7
Wetland	247	186.8
Meadows	10	7.8
Agriculture	28	21.4
Watershed Total	490	371.1

Cost of urban development



Benefits of reforestation



\$13.2 Million
(per year)

\$14.4 M
(per year)

\$1.2 M
(per year)

EG&S provided by wetlands



- **Key EG&S provided by wetlands in the CRW: water purification; flow regulation; flood, drought, and erosion control; wildlife habitat; carbon storage**
- **Habitat for wildlife species**
- **Helps to mitigate impacts of Climate Change (reduces spring flooding, increases summer stream flow)**
- **Rapidly declining locally and globally**

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The Credit River Watershed: major threats

Climate change

Decreases in seasonal water supply, increased flooding frequency, increased frequency and intensity of extreme rainfall events



Land use change

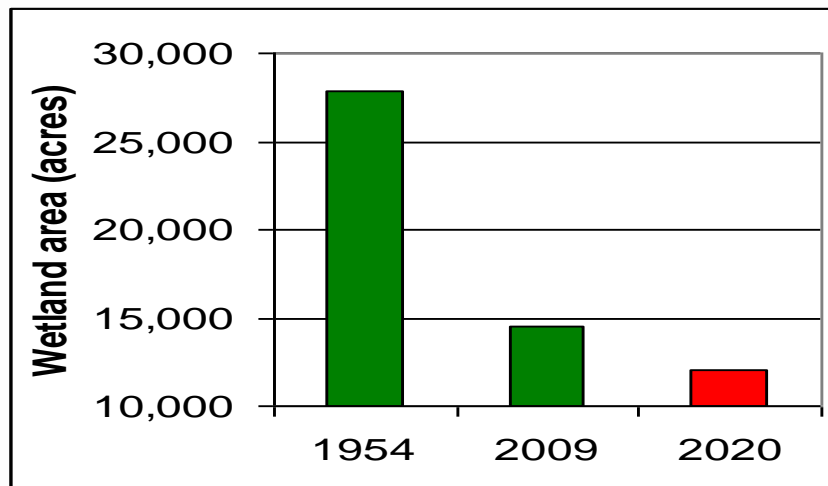
Continuing current development practices would significantly impair the watershed (CVC, 2007)

State of the wetlands in the Credit

Number of wetlands = 1,075

Area = 5,896 ha (6%)

	Wetland Cover			Total
	1954	Current	Change	
Area (in ha)	11,291	5,896	5,395	94,885
Percent of Total	11.9	6.2	5.7	100.0



If past trends continue, **18%** (or 1041.3 ha) of the remaining wetlands in the watershed could be lost by **2020**.

Valuing Wetlands in the Credit River Watershed

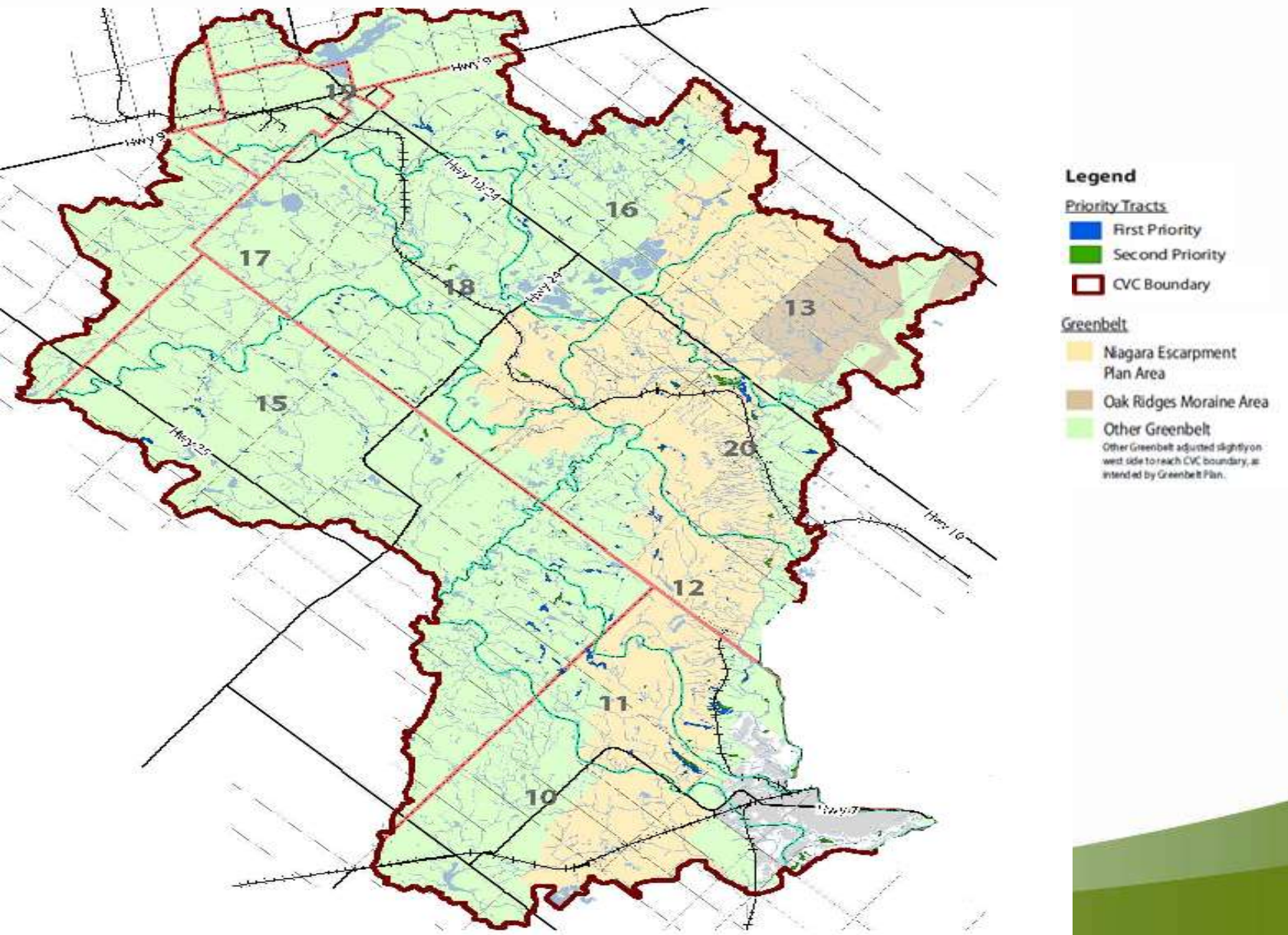
Goal:

Estimate the value of retaining and restoring wetland services in the Watershed to:

- Create awareness
- Inform restoration strategy and guide restoration decisions



Wetland Restoration Strategy



The need to inform trade-offs



Wetland restoration strategy:
priorities based on
hydrologic consideration

BUT...

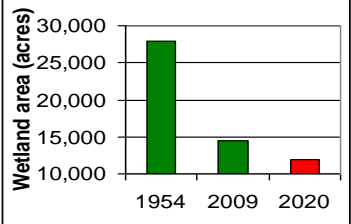
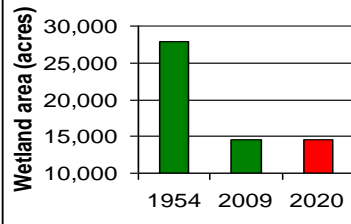


To what extent CVC should
engage in wetland programs
to maximize societal
benefits?

The Study: Valuing Wetland Retention & Restoration

- Contingent Valuation Method
- 1,400 households participated in the survey
- Willingness to pay for maintaining and restoring wetlands in the watershed
- By voting for/against increase in their property taxes over the next 5 years
- Scenarios: from retaining 2,500 acres to restoring over 13,500 acres (2009-2020)

Survey Wetland Restoration Scenarios

CURRENT TREND	PROPOSED PROGRAM																
<ul style="list-style-type: none"> •Wetlands continue to decline by 0.87% annually •18.3% of the remaining wetlands lost by 2020 	<ul style="list-style-type: none"> •Retain the existing wetlands at their current level through 2020 •No loss of wetlands in the watershed 																
 <table border="1"> <caption>Wetland Area (acres) - Current Trend</caption> <thead> <tr> <th>Year</th> <th>Wetland Area (acres)</th> </tr> </thead> <tbody> <tr> <td>1954</td> <td>~28,000</td> </tr> <tr> <td>2009</td> <td>~15,000</td> </tr> <tr> <td>2020</td> <td>~12,000</td> </tr> </tbody> </table>	Year	Wetland Area (acres)	1954	~28,000	2009	~15,000	2020	~12,000	 <table border="1"> <caption>Wetland Area (acres) - Proposed Program</caption> <thead> <tr> <th>Year</th> <th>Wetland Area (acres)</th> </tr> </thead> <tbody> <tr> <td>1954</td> <td>~28,000</td> </tr> <tr> <td>2009</td> <td>~15,000</td> </tr> <tr> <td>2020</td> <td>~15,000</td> </tr> </tbody> </table>	Year	Wetland Area (acres)	1954	~28,000	2009	~15,000	2020	~15,000
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Wetlands would...

Water Quality: Remove **X** semi-truck loads of fertilizer per year

Flood, Drought and Erosion Control: Control **X** m³ of water and **X** tonnes of soil erosion per year

Wildlife Habitat: Provide habitat for **X** breeding pairs of ducks per year

Carbon Storage: Store carbon equivalent to the emissions of **X** cars

Cost to you: \$ **X** annually for 5 years

Key Findings

- **70%** of respondents were not aware of the wetland loss prior to the study;
- **95%** were either very concerned (55%) or somewhat concerned (40%) about the wetland loss
- Majority (**64-91%**) indicated that environmental services provided by wetlands were important to them;
- **Water quality** was ranked first (over 90% found it very important)
- Indicated that the cost of restoration should be shared across **government, conservation groups and landowners**;
- **83%** of respondents supported paying for wetland protection and restoration (1,169 out of the 1,408 surveyed)

Key Findings



- WTP estimates: \$229-\$259 annually per household over the next 5 years;
- Total current value WTP \$221-\$250 million;
- Placed the same value on a wetland retention or restoration program

Management Implications

- Management question to be answered
 - To what extent should CVC engage in wetland restoration?
- The study:
 - Showed the importance of wetlands to watershed residents;
 - WTP estimates as perceived social benefits of wetland programs in the CRW;
 - Can be used in cost-benefit analyses
 - Wetland programs up to a cost of \$221-\$250 million can be justified
 - There may be a willingness with the public to support a Payment-For-Ecosystem-Services incentive program

Concluding Thoughts

- Biodiversity and healthy ecosystems = healthy people
- It's not just one good or service but the whole bundle of services/benefits
- Incorporating the value of ecosystem services into decision making will lead to more socially optimal decisions

Acknowledgements

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 - Jeff Wilson
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 - Ducks Unlimited Canada
 - Ministry of Natural Resources
 - Peter Boxall (University of Alberta)

Thank You!

Questions?

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