

*Natural. Valued. Protected.*

# Revealing Nature's Hidden Economic Benefits

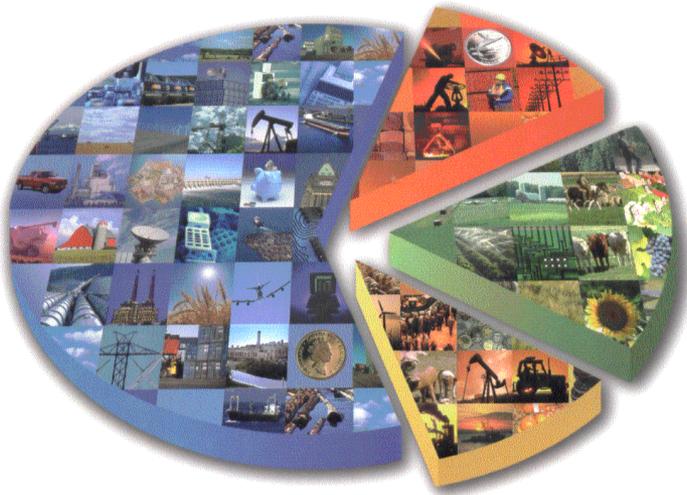
Presented by Eric Miller  
Team Leader, Socio-Economic Analysis Unit  
Ontario Ministry of Natural Resources

Muskoka Heritage Foundation Lecture Series  
May 19, 2011 in Bracebridge

# Why are nature's economic benefits hidden?

## Macroeconomics

FIFTH CANADIAN EDITION



DORNBUSCH • FISCHER  
STARTZ • ATKINS • SPARKS

Production uses up natural resources, in particular energy. Is it true, as is sometimes alleged, that exponential growth in the economy will eventually use up the fixed stock of resources? Well yes, it is true in the limited sense that current theories suggest the universe will one day run down. However, this seems more of a concern for a course in astrophysics, or perhaps theology, than for a course in economics. Over any interesting horizon, the economy is protected from resource-depletion disasters by two factors. First, technical progress permits us to produce more using fewer resources. For example, the energy efficiency of room lighting has increased by a factor of 4,500 since Neolithic times.<sup>12</sup> Second, as specific resources come into short supply, their prices rise, leading producers to shift toward substitutes.

Environmental protection is important, however. Even here, technology can be directed to assist us. For example, the conversion of urban transportation systems from horses to internal combustion engines has eliminated most of the pollution associated with transportation.<sup>13</sup> As incomes rise and populations move away from the edge of survival, people and governments choose to spend more on protecting the environment. Unlike other consumption choices, environmental protection is often “bought” through political choices rather than in the marketplace. Because the benefits of environmental protection flow across property boundaries, there is greater reason for the government to intervene on environmental issues than there is with respect to purely private goods.

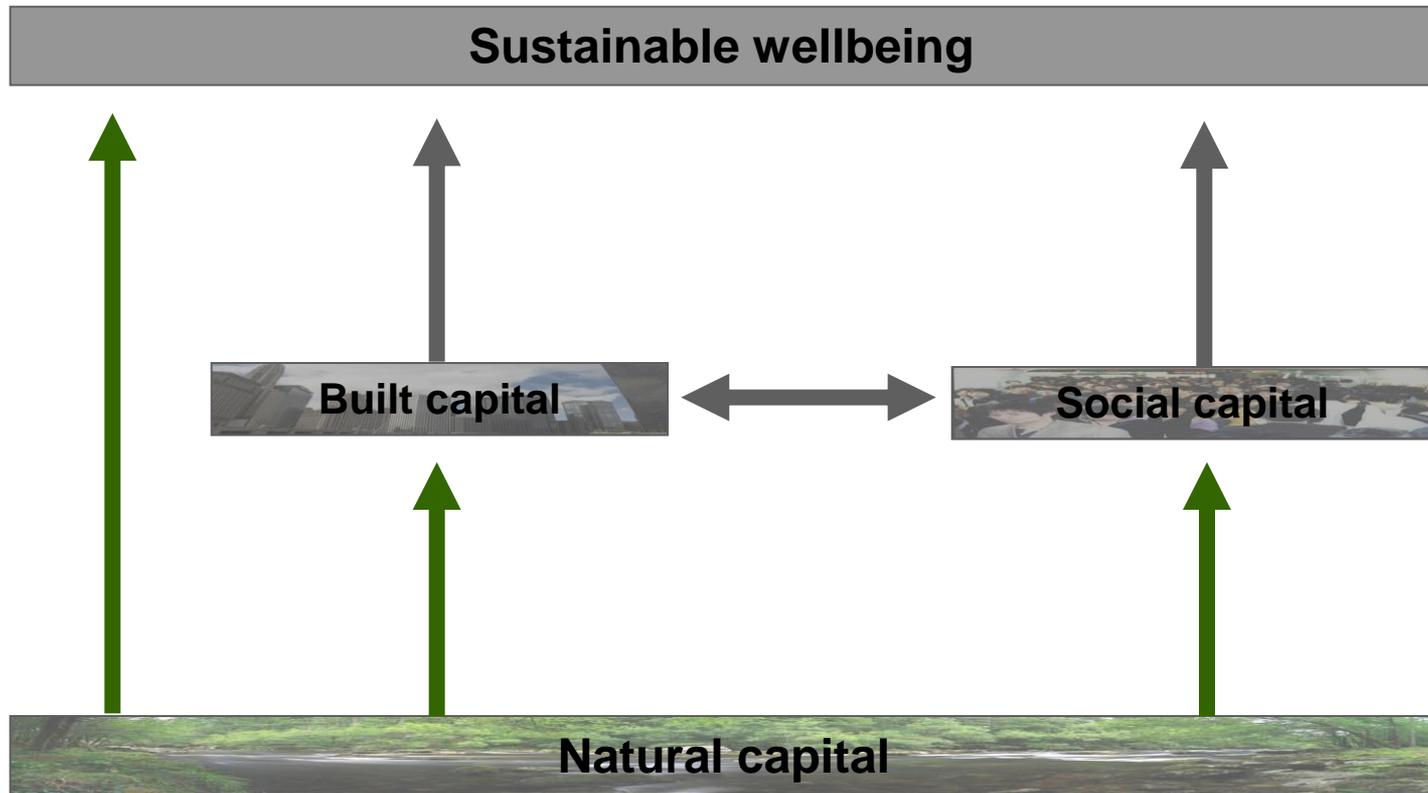
<sup>11</sup>Barro and Sala-i-Martin, *Economic Growth*, table 10.1.

<sup>12</sup>Actually, people in Neolithic times probably didn't have “rooms” per se. For a more recent benchmark, the energy efficiency of room lighting has improved by a factor of 20 since 1900. See William D. Nordhaus, “Do Real Output and Real Wage Measures Capture Reality? The History of Lighting Suggests Not,” Cowles Foundation Discussion Paper 1078, 1994.

<sup>13</sup>Think about it for a minute.

# The Recipe for *Sustainable* Economic Success?

---



# What are nature's economic benefits?



		Value to GDP	ESV: Ecosystem Service Value
<i>ecosystem goods</i>	Food	\$ # ### / yr	
	Building materials	\$ # ### / yr	
	Fuel	\$ # ### / yr	
<i>ecosystem services</i>	Local disturbance prevention	\$ 0 / yr	\$ # ### / yr
	Local water quality regulation	\$ 0 / yr	\$ # ### / yr
	Regional aesthetic/recreational	\$ 0 / yr	\$ # ### / yr
	Global gas & climate regulation	\$ 0 / yr	\$ # ### / yr
	Continental wildlife benefits	\$ 0 / yr	\$ # ### / yr
	(Plus others)		
		\$ ## ### / yr	\$ ## ### / yr

Ecosystem Service Values (ESV) reveal the *economic value* of nature's *price-less* benefits

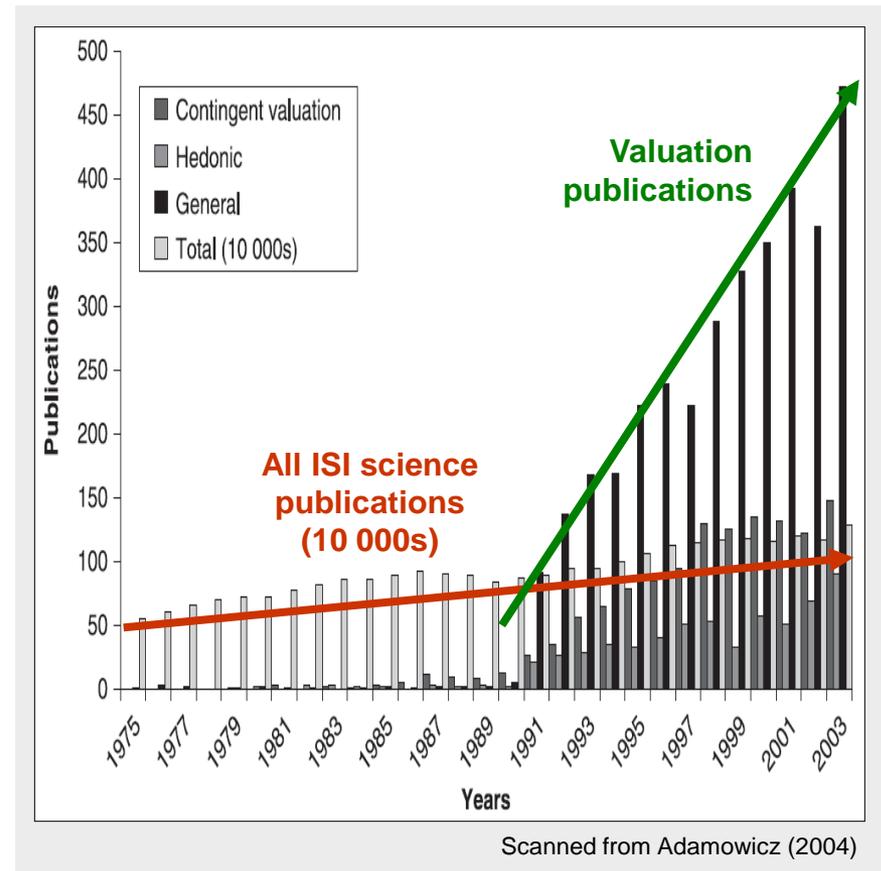
# How can we reveal the value of “price-less” benefits?

Depending on the type of benefit from nature:

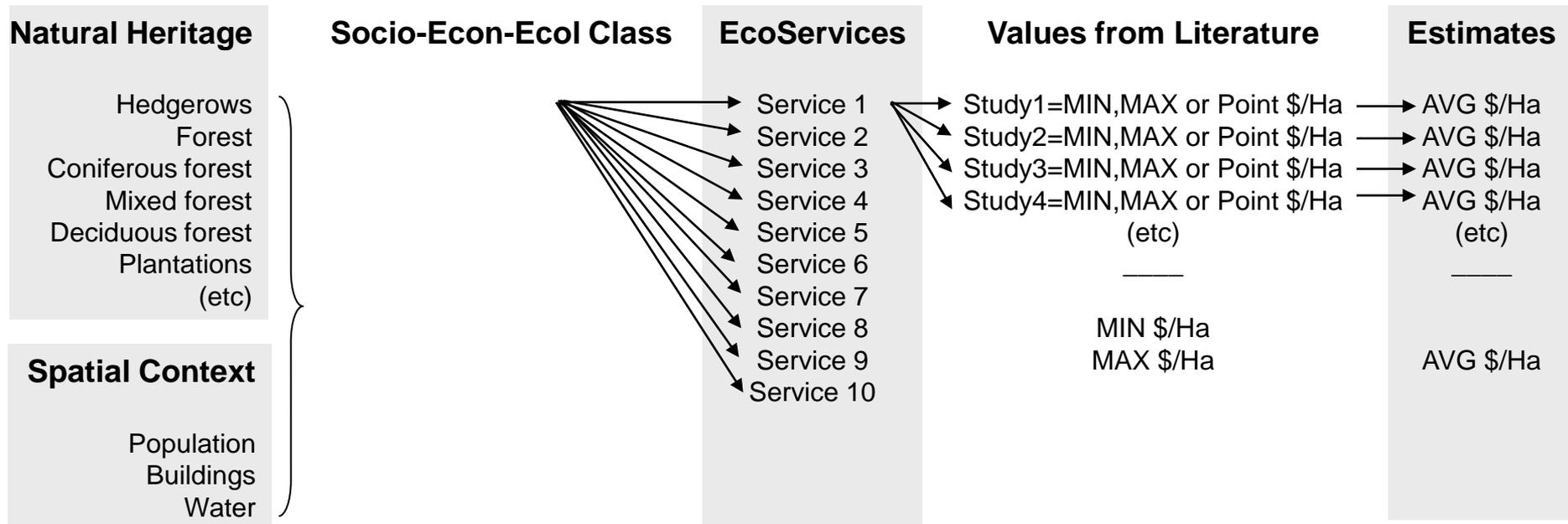
- **Replacement cost:** the price of a manufactured substitute, if one exists; or
- **Travel cost:** measures the benefit as the expense necessary to experience it; or
- **Hedonic valuation:** statistical analysis of a complementary market-priced service; or
- **Contingent valuation:** survey of willingness to pay (or trade) if an opportunity existed

(or)

- **Value transfer:** re-assign results from another study performed under a similar socio-economic context



# How did MNR reveal them across Southern Ontario?



- 318 point estimates from 88 studies, classified within 19 classes x 10 services

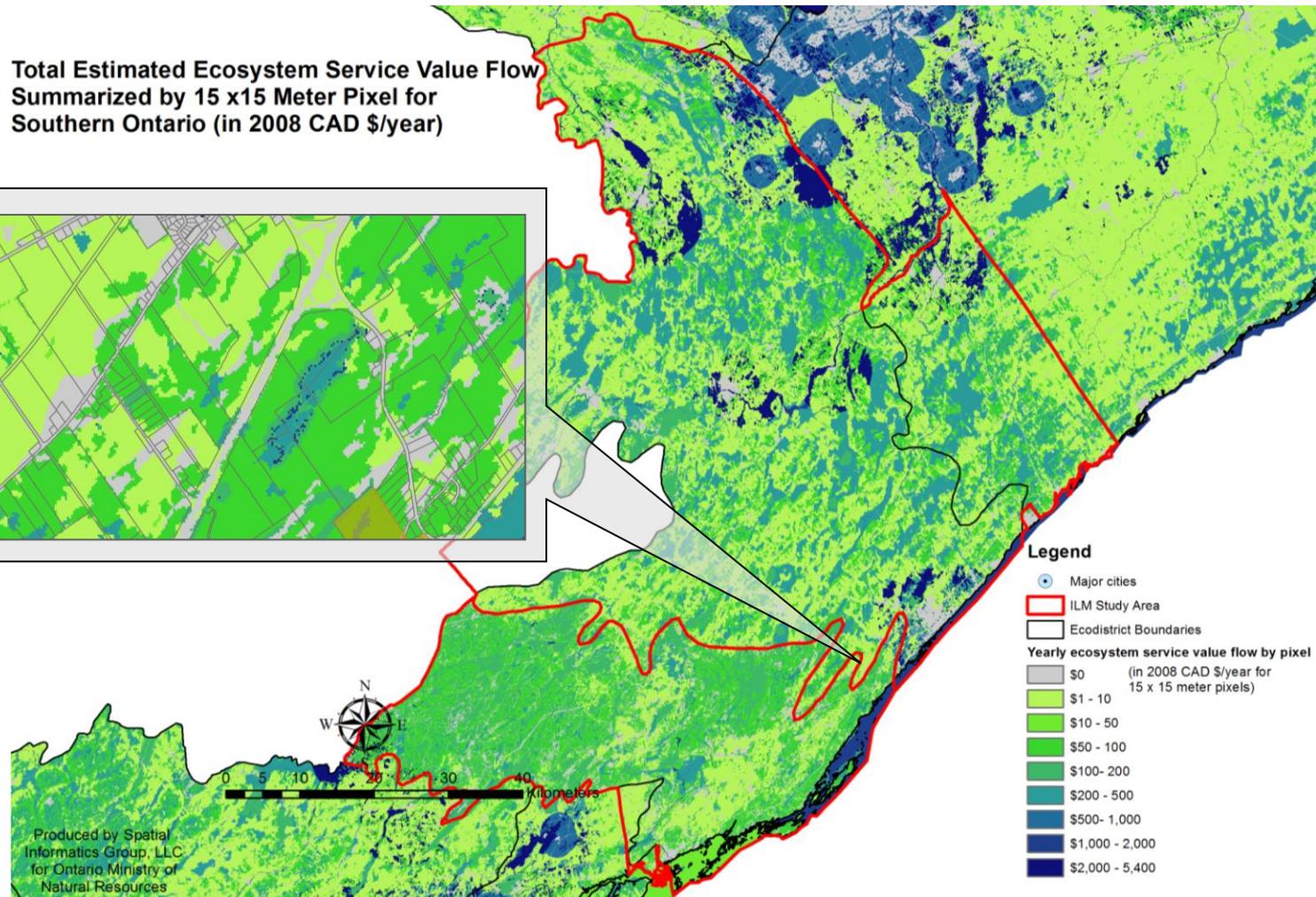
# What information was revealed? (Average ESV \$ / Ha / Yr)

---

<b>CATEGORY</b>	<b>Recreation</b>	<b>Aesthetic/ amenity</b>	<b>Other cultural</b>	<b>Pollination &amp; dispersal</b>	<b>Habitat refugium/ biodiversity</b>	<b>Atmospheric regulation</b>	<b>Soil retention erosion control</b>	<b>Water quality/ nutrient &amp; waste regulation</b>	<b>Water supply/ regulation</b>	<b>Disturbance avoidance</b>	<b>TOTAL</b>
-----------------	-------------------	-------------------------------	---------------------------	--	---	-----------------------------------	---	---	---	----------------------------------	--------------

# What does it look like across the landscape?

Total Estimated Ecosystem Service Value Flow  
Summarized by 15 x15 Meter Pixel for  
Southern Ontario (in 2008 CAD \$/year)

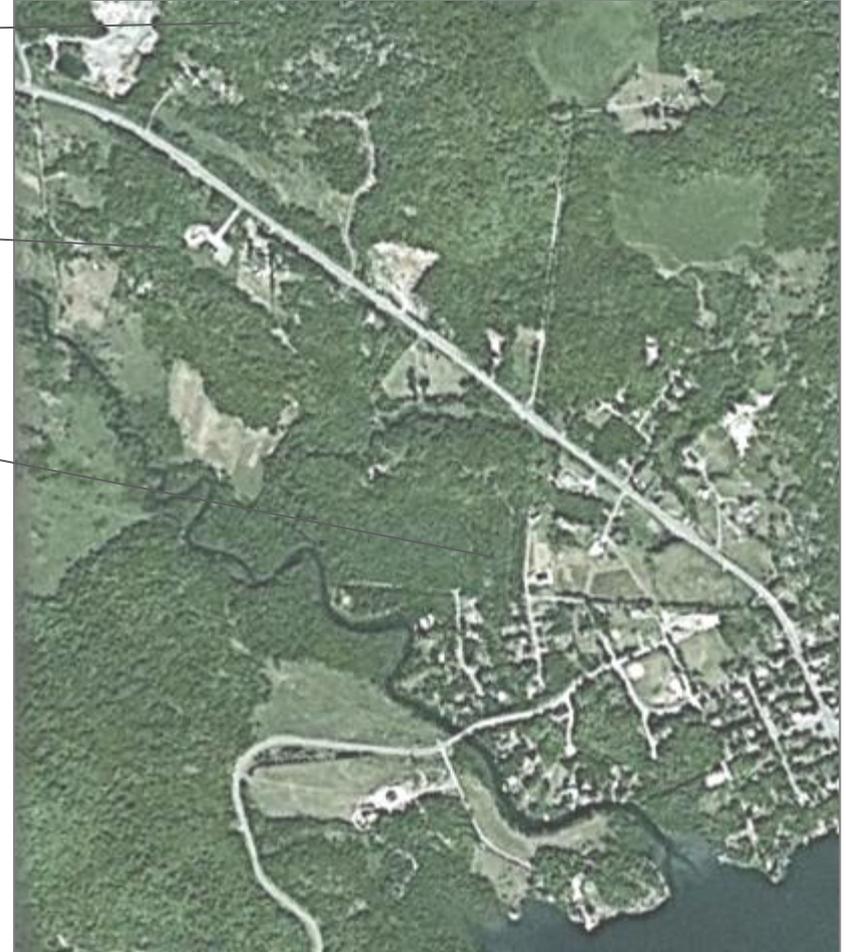


# What can we do with information?

*Protected area:*  
ESV communicates economic relevance

*Area for rehabilitation:*  
ESV builds benefits side of business case

*Developable area:*  
ESV reveals hidden costs of development  
to be minimized and / or mitigated



# Develop markets for ecosystem service offsets?



## Here's how Bay Bank works for...

Landowners

Service providers

Credit buyers

- 1 **Run a free LandServer property report** to determine your eligibility for programs and markets.
- 2 **Open a Bay Bank Account.**
- 3 **Browse the Market Education Guide** to learn all about your available opportunities.
- 4 **Post an "expression of interest" on the marketplace.**
- 5 **Choose a service provider to develop your project.**
- 6 **Buyers will contact you via email.**



### For landowners...

- Benefits and tools for landowners
- Add your project
- Get bids from service



### For service providers...

- Benefits and tools for service providers
- Add your company



### For buyers...

- Benefits and tools for buyers of ecosystem service credits
- Search the marketplace

## 3 Forest Conservation credits

**Price: \$12,000.00** (Negotiable)

Expression of interest  
Partial sale available

### Description:

Our farm has 0.36 acres of riparian area available for afforestation. We are located in the Little Elk Creek watershed in Cecil County, Maryland. We are interested in offsite mitigation or establishing a forest mitigation bank. Our farm also has multiple acres of existing forest that has potential to satisfy mitigation needs.

Find credits for sale by...

State:

Credit types:

Listing types:

[Search](#)

New marketplace listing

### Forest Conservation

Queen Anne's, Maryland

**\$64,000.00**  
(Negotiable)

### Forest Conservation

Cecil, Maryland

**\$12,000.00**  
(Negotiable)

→ [View all marketplace listings](#)

Credit prices are determined independently by sellers

# What are others doing with this information?

## Environmental Profit & Loss Account



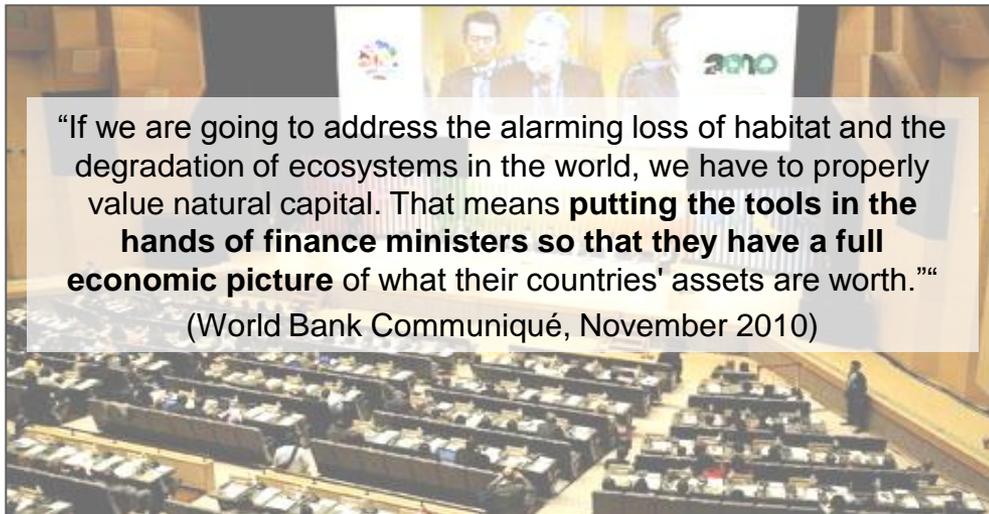
“...it provides a basis for embedding reliance on ecosystem services into [our] business strategy.”



MAH's and Planners Institute highlighting the use of wetlands to treat wastewater at lower cost to ratepayers (e.g. Cobalt, ON)



Transportation Planners in MN revealing that “living snow fences” next to roads provide \$17 in hidden benefits for each \$1 invested



“If we are going to address the alarming loss of habitat and the degradation of ecosystems in the world, we have to properly value natural capital. That means **putting the tools in the hands of finance ministers so that they have a full economic picture** of what their countries' assets are worth.”

(World Bank Communiqué, November 2010)

# The future of ecosystem services valuation?

---

- New tools to model benefits flowing across space and time
- Guidelines for the appropriate use of this information
- Markets to unite providers and demanders for ecosystem restoration and offsets
- ESV is likely to complement GDP

“It must be understood that statistics of this character are suggestive and indicative rather than strictly accurate; the concept is distinctly intangible and there are numerous elements of uncertainty in a calculation of this nature.”

# References

---

- Adamowicz, V. 2004. “What’s it worth? An examination of historical trends and future directions in environmental valuation.” *The Australian Journal of Agricultural and Resource Economics* 48(3)a; 419–443.
- Dornbusch, R. 1999. *Macroeconomics*. 5th Canadian Ed. Toronto, McGraw-Hill Ryerson.
- MAH and OPPI. 2009. Planning by Design: A healthy communities handbook. <http://www.mah.gov.on.ca/Page6737.aspx>
- MDOT (Minnesota Department of Transportation). 2009. Living Snow Fences. <http://www.dot.state.mn.us/environment/livingsnowfence/>
- Troy, Austin and Ken Bagstad. 2009. Estimating Ecosystem Services in Southern Ontario. Published by MNR. [[online](#)]

For additional reading and inspiration:

- The Economics of Ecosystems and Biodiversity (TEEB)
  - Willamette Partnership: Counting the Environment
-