



Natural Assets & Ecosystem Services

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Introduction: The Challenge

The changing climate is, by far, the biggest existential challenge that the human race has had to face. And we need to look at ALL potential options in our collective efforts to address the challenge, including bravely examining and boldly revising the human concept of value and how we protect / manage these values.





Natural assets are not generally recognized as valued (\$\$) assets – they are largely undervalued, and therefore, negatively impacted by the very species that relies upon the ecosystem services provided.

The **changing climate** has introduced significant challenges to humans – requiring that we, as humans, step back, rethink BAU, and collectively reconfigure in order to enable our continued existence with natural asset recognition and strategic incorporation contributing to this goal of continued existence.



Resilience

What is resilience?

Resilience is the **sustained ability** of an ecosystem to utilize available resources to **respond to, withstand, and recover from** adverse situations **while continuing to maintain ecological integrity.**

What is an asset?



Assets provide services that contribute to our quality of life

Replace this box with your logo



Natural Assets - Basically

'Natural assets refer to the stock of natural resources or ecosystems that is relied upon, managed, or could be managed by a municipality, regional district, or other form of ... government for the sustainable provision of one or more municipal services.'

O'Neill, Sara Jane. *Results from the First National Cohort: Decision-Maker Summary*. Municipal Natural Asset Initiative, July 26, 2018; the Municipal Natural Assets Initiative (MNAI), www.mnai.ca.



Why Invest in Asset Management?



Assets – the Fabric of our Society



Meeting the social & recreational needs of our communities



Enabling economic development

Public health & safety



Sustainable communities



Green Infrastructure

Natural Assets

- Wetlands
- Forests
- Parks
- Lakes/Rivers/
Creeks
- Fields
- Soil

Enhanced Assets

- Rain Gardens
- Bioswales
- Urban Trees
- Urban Parks
- Biomimicry
- Stormwater
pond

Engineered Assets

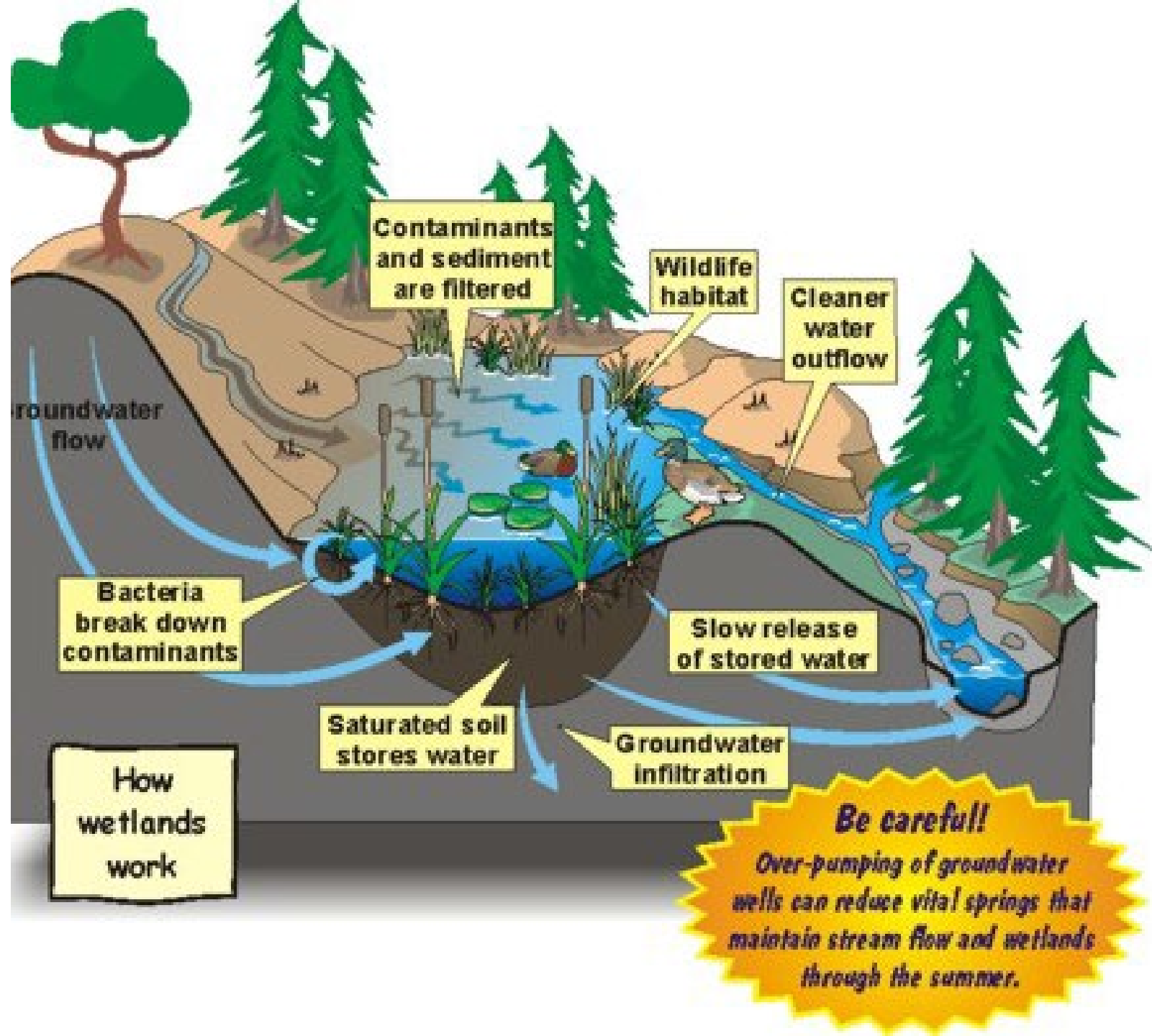
- Permeable pavement
- Green Roofs
- Rain Barrels
- Green Walls
- Cisterns

‘Green infrastructure’ is a broad category that includes natural assets and designed and engineered elements that have been created to mimic natural functions and processes in the service of human interests.



Natural Assets

Natural assets provide value, support community resilience and require effective and efficient management in line with other assets. There is growing evidence that natural assets provide, or could be restored to provide, services just like engineered assets, **often at a lower cost.**



Natural Assets

Key benefits to using natural assets is that often they serve several functions such as both flood and drought reduction and have a variety of additional ecological and societal benefits, whereas traditional grey infrastructure is generally designed to meet a limited set of purposes or one purpose.

Services Provided	Natural Asset	Grey Infrastructure
• Stormwater storage	X	X
• Water quality	X	
• Habitat creation / improvement	X	
• Microclimate stabilization (e.g., urban heat island reduction)	X	
• Air filtration	X	
• Recreational amenity and aesthetic services	X	
• Energy savings	X	
• Carbon savings	X	



	Year 2014
Total Value	£m
	21
	10
	12
	43
	(1)
	42

The Challenge: Incorporating Natural Assets

The question is **how**; how do we identify, value, incorporate into business as usual, and manage for natural assets?

- How do you place a monetary value on an inherent value? Or do you?
- If not a monetary value - that is able to span most knowledge levels and therefore communicate 'value' in most languages (\$) - how do we value natural assets?
- And how are these values impacted by the changing climate?



Valuing Natural Assets

Compare the service provided by the natural asset with the cost of providing that service through an engineered structure = **comparative costing?**

Table 1: Example of water specific municipal services that can be provided by natural assets and ecosystem services

Municipal Water Services	Ecosystem Service	Natural Asset	Engineered Replacement
Drinking Water Supply	Aquifer Recharge	Aquifer & Source Water Area	Pipes for bringing in water supply
	Lake Recharge	Lake Watershed	Water Treatment Plant
	River Headwaters	Headwater lands	Pipes for bringing in water supply
Drinking Water Treatment	Water purification	Wetlands, forests, vegetation	Water Treatment Plant
	Water Filtration	Wetlands, forests, vegetation	Water Treatment Plant
Stormwater Management	Rainwater Absorption	Wetlands, forests, vegetation	Stormwater pipes, culverts, storm drains, stormwater ponds
	Rainwater Filtration	Wetlands, forests, vegetation	Water Treatment Plant
Flood Mitigation	Rainwater Absorption	Wetlands, forests, vegetation	Dams, retaining walls, embankments



Is natural capital really valuable in financial terms?

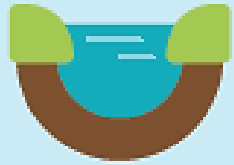
Ultimately, nature is priceless but for asset mgmt. we require valuation in financial terms:

- **Street trees** in California provide **\$1 billion per year** in ecosystem services, through atmospheric regulation and flood prevention
- Mexico's **mangrove forests** provide an **annual \$70 billion** to the economy through storm protection, fisheries support, and ecotourism
- Canadian **boreal forest's** contribution to global ecosystem services, if ecologically intact, has an estimated value of **US\$3.7 trillion - US\$93.2 billion of annual services** (2.5 greater than the annual value of resource extraction)

The total value of the world's ecosystem services amounted to twice as much as global aggregate GDP – as much as **\$124.8 trillion per year!**



NATURAL INFRASTRUCTURE IN ACTION



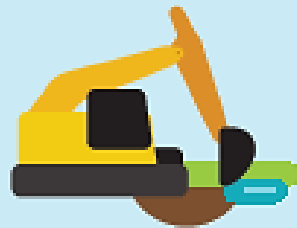
Naturally occurring ponds in the coastal town of Gibsons, British Columbia, provide **\$3.5 million** to **\$4 million** of stormwater storage services annually.



A 250-metre naturalized channel in the town of Oakville, Ontario, provides **\$1.24 million** to **\$1.44 million** of stormwater conveyance and storage annually.



Naturally occurring wetlands in southern Ontario reduce flood damage costs to buildings by **\$3.5 million** (or 29%) at a rural pilot site and by **\$51.1 million** (or 38%) at an urban pilot site.



A restored and engineered wetland in Manitoba is valued at **\$3.7 million** for the flood reduction, water quality improvement, carbon sequestration and other benefits it provides.



Highlights:

- ✓ **Natural assets can reduce service delivery costs:** managing areas such as aquifers, forests, and wetlands reduces service delivery costs and improves engineered assets efficiency.
- ✓ **Natural assets have a perpetual life span:** engineered assets must be replaced after their lifespan ends. Some natural assets, on the other hand, can provide services in perpetuity when properly managed. They can become more valuable over time with effective monitoring, maintenance and restoration.
- ✓ **Natural assets are carbon neutral or carbon positive** (i.e. carbon sequestration).
- ✓ **Natural assets support climate change adaptation:** some natural assets are resilient and can meet increased service delivery requirements under predicted climate change scenarios, meaning that their value can grow over time.



**Natural Assets & Ecosystem Services are
INVALUABLE ... so let's strategically value as if
our survival depended upon them ...**



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