Photo from Quamichan Watershed Management Plan, 2009

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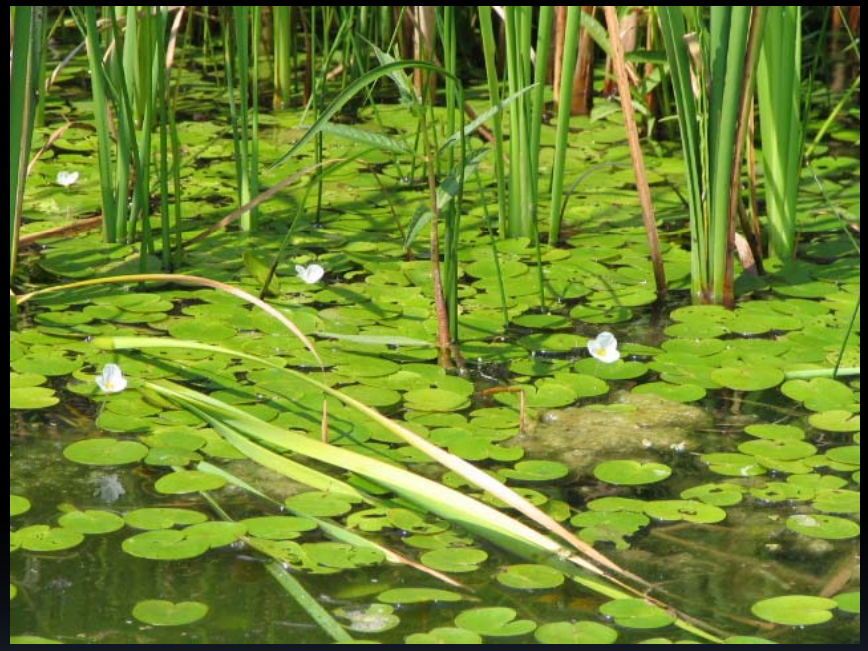
WHAT'S MY LAKE WORTH? VALUING THE ECOSYSTEM GOODS & SERVICES FROM A WATERSHED

What is Natural Capital?



- Our renewable and nonrenewable resources
- Ecosystems or environmental capital –
- Land – the space in which human activities take place.

Natural capital produces ecosystem goods & services (EGS)

Why Capital?

Photo from Quamichan Watershed Management Plan, 2009

- Components of natural capital (atmosphere, water) are essential for sustaining life
- Need to continue to invest in our capital or it will depreciate and yield decreasing services over time, or
- Will have to substitute other forms of capital that may be very costly

Why Natural Capital?

- Shows the importance of taking a long-term view and how decisions today will affect generations to come
- A framework that is evolving nationally and internationally
- Vital for land use and other government decisions: protection vs. development issues

Why Price EGS?

- Helps protects aesthetic & cultural benefits
- Helps ensure sustainable quality of life for current and future generations
- Helps protect and preserve ecosystems/biodiversity, reduce waste/pollution
- Make better decision about land and natural resource use

Examples of Economic Costs when do not Value EGS

When destroy/degrade natural capital $\Rightarrow$ need to employ **substitutes** for its EGS that may cost more than what they must replace:

- Flood protection by dikes rather than use wetlands
- Swimming pools, instead of swimming holes
- Travel to distant locales for recreation, not in home community
- Sewage treatment infrastructure in place of water bodies, wetlands, grassland & forests or clean up costs to restore contaminated lands & water

EGS essential to good policy

- Objective is to incorporate public values of EGS in land & resource use decisions

  If ignore EGS, may lead to choices that are more expensive if EGS are depleted

- In the absence of public valuations, the land use decisions tend to be based on `private' or market values which can be substantially less than the public values that reflect the benefits to our communities

EGS in BC

ECOSYSTEM GOODS AND SERVICES		FORESTS	GRASSLANDS	WETLANDS	ALPINE
Provisioning Goods					
Timber	Harvestable timber bought and sold in international markets	X			
Food	Provision of food; harvest of wild species	X	X	X	X
Fuel wood	Wood and other biological materials used for energy	X	X		
Fibre	Materials such as wood and hemp		X		X
Medicines	Ecosystems produce a range of medicine and food additives	X			
Fresh water supply	Ecosystems filter, retain and store fresh water for human consumption	X		X	X

Regulating and Supporting Services					
Air quality maintenance	Ecosystems contribute and extract chemicals in the atmosphere	X			
Regulate global climate patterns	Ecosystems emit or sequester carbon	X		X	X
Regulate regional climate patterns	Land uses may affect local temperature and precipitation patterns	X	X		
Storm and flood protection	Ecosystems reduce the damage caused by storm surges, heavy precipitation events and rapid water runoff			X	
Erosion control	Vegetation cover stabilizes slopes, and reduces soil erosion and sediment transport	X	X	X	X
Pest regulation	Ecosystems change the prevalence of crop and livestock pests and diseases	X	X		

ECOSYSTEM GOODS AND SERVICES		FORESTS	GRASSLANDS	WETLANDS	ALPINE
Process waste	Ecosystems may filter out and decompose organic waste and excessive nutrients			X	
Sediment retention	Ecosystems retain sediment from soil erosion and alternative land uses	X	X	X	
Cycle nutrients	Ecosystems store and recycle nutrients which maintain healthy soils and productive ecosystems	X	X		
Cultural Services					
Recreational amenities	Ecosystems provide natural habitat which supports a variety of human activities (e.g. skiing)	X	X	X	X
Spiritual, cultural, and aesthetic values	Natural landscapes and features provide aesthetics, cultural and spiritual fulfilment, scientific knowledge	X	X	X	X

Source: Eric Kimmel (2009). Economic Value of BC's Natural Capital: *an economic argument for the transition to an ecosystem management approach*

Challenges for Measurement & Use of EGS

- How to specify the EGS: regions, ecosystem, by type of natural capital
- Measuring quantities
- Estimating economic values
- Integration of EGS into decision making – how to pay for EGS

All of which is complex & needs combined expertise of scientists & economists & policy makers

Methods of Valuing EGS

- Economic damages/costs avoided
- Ask people what they'd be willing to pay or how much to compensate them for losses
- Figure out what they implicitly paid for EGS
  - Travel to recreation sites
  - Bought property/house on the lake or with view
- Look at what other studies have estimated = "benefit transfer"

NEXT STEP….ONCE KNOW WHAT TO PAY, QUESTION IS HOW TO PAY!

Payments for Ecosystem Services (PES)

- PES is the idea that resource users need to incorporate non-priced EGS into decisions by having users of EGS pay providers of EGS

- Ways to introduce PES
  - Voluntary
  - Regulations that require actions to protect EGS
  - Explicit pricing through:
    - Creation of markets
    - Taxes/subsidies

Potential Policies that introduce PES: How to Protect Water Quality

- Prescription (implicit pricing)
  - Regulations requiring riparian fencing on agricultural lands
- Penalties
  - Fines per metre of unfenced stream bank
- Property rights/markets
  - Tradable water right s
- Persuasion
  - Pilot projects to protect wetlands - pay to enhance wetlands
- Pay landowners for protecting EGS
  - Conservation easements

Specific Examples of PES

- Markets
  - US Dept of Agriculture – program to create voluntary market in EGS
    - Incentive to participate = cheaper way to meet regulations to protect ecosystems
  - Bush tender market in Australia
  - Carbon offset markets
- Canada's Eco-gifts program
- Property Tax Credits (pilot programs)

US Market for EGS for agriculture

Today, I am announcing that USDA will seek to broaden the use of markets for ecosystem services through voluntary market mechanisms. I see a future where credits for clean water, greenhouse gases, or wetlands can be traded as easily as corn or soybeans.

Mike Johanns, Sec'y of Agriculture, 8/30/05

Environmental Credit Trading Scenario (agriculture or carbon)

Market Drivers:
Laws, Regulations or policies that set limits on emissions or environmental damage

Payments

Buyers (Industry):
Need to purchase environmental credits to meet regulatory obligations (Permits)

Credits

Brokers:
Facilitates payments between buyers and sellers. Can also serve as an aggregator.

Credits

Credits

Sellers (Landowners):
Through implementation of conservation practices can provide environmental credits

Aggregators:
Bundles environmental credits from many landowners making them available for trading. Can work through a Broker or sell directly to the buyer.

Payments

Slide from presentation by Jim Salzman, Institutions and Ecosystem Services, February 6, 2009

Procurement auction

BushTender/EcoTender

Auction

conservation contracts (PES)

Diffuse source

Pre-existing property rights (land)

Public goods

Connectivity

Multiple environmental outcomes

Slide from presentation by Jim Salzman, Institutions and Ecosystem Services, February 6, 2009

Examples of PES

- Canada's Eco-gifts program
  - Donation of land fee simple or conservation easement to conservation org or govt in return for charitable donation; land @ market value
- Property Tax Credits
  - Offer landowners tax reduction if participate in securing EGS on their lands
  - Agriculture pilot programs in Prairies

EGS in Local Watersheds

- Watershed degraded/eutrophication of Quamichan Lake ⇒ need mitigation of activities that reduce EGS

"A long-term water quality improvement strategy of watershed protection and management (influencing development, land use and environmental farming practices, septic field management, storm water management, riparian management, etc.) is required to minimize both point and non-point source nutrient loading. "

Quamichan Watershed Management Plan DRAFT V5- June 2009

How estimation of EGS may help restore the watershed

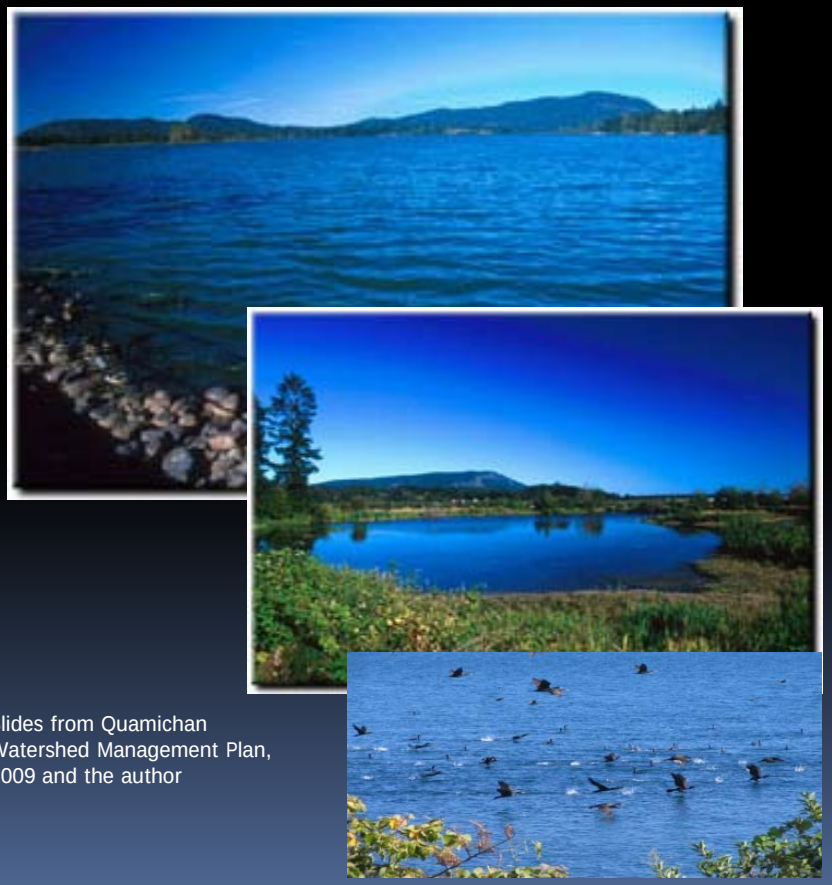
- Compute land value loss/lift due to EGS
- Use $ values from other studies to improve knowledge base & share information
  - Illustrate values of biodiversity, wetlands, etc.
- Survey residents willingness to restore water quality (pay or accept payment) – return to multiple uses rather than degraded values
- Estimate of cultural/heritage values

Is Valuation of EGS Part of a Watershed Restoration Strategy?

- Estimate value of EGS to inform and persuade
  - Challenges =
    - Translating values on paper into practice
    - Time consuming & costly to do, but may still be helpful complement to existing initiatives
- Lobby decision makers to pilot PES options
  - Challenges =
    - Getting their attention
    - Funding
- Look for opportunities (carbon markets)

What's my Lake Worth? Finding out may help….

- Protect



Slides from Quamichan Watershed Management Plan, 2009 and the author

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Slides from Quamichan Watershed Management Plan, 2009 and BC Agriculture Council, Planning for Biodiversity: A Guide for BC Farmers and Ranchers, 2008

Thank you!