

## **An Ontario policy framework for Ecosystem Services**

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A *policy framework* is a document that provides a rationale and approach to guide more specific policy, which in turn guides more specific decision-making and planning. Policy includes public policy (set by government) and private policy; because ecosystem services suffer from “market failure” there is a need for public policy to inspire or compel private policy.

This policy framework is intended to inform current and future acts, plans, and approaches to policy, planning, and decision-making, at any level of government and at various scales of public and private governance. It is informed by my experiences within Ontario but could be applied within other provinces and jurisdictions that have similar property rights regimes.

I am not proposing an act. I see success as the *integration* of this concept into all sorts of existing acts and (even more importantly) in all sorts of ways of thinking and doing in the public and private sectors, whether required by law or inspired by best practices that show leadership.

I hope these thoughts will clarify thinking and to inspire specific applications, which might include green building practices, calculation of environmental profit-loss statements, permitting decisions by Conservation Authorities, the Official Plans of cities, the Provincial Policy Statement, site-specific planning acts (such as the Niagara Escarpment, Greenbelt, and Oak Ridges Moraine), approaches to infrastructure planning and spending at all levels, restoration of degraded natural areas, and (public) economic / statistical accounts.

This is written for policy-wonks familiar with the concept of ecosystem services, many of whom are challenged by conflicting claims about the dos and don'ts of ecosystem services valuation. These are draft thoughts inspired by two years of engagement with Ontarians on the topic of ecosystem services, from Ministerial board-rooms to kitchen tables. Please send me feedback.

- Eric (Independent Consultant)

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Vision: **No net loss of ecosystem services in Ontario by 2020** (as per EU)

Mission: **The concept and measurement of ecosystem services informs planning & decisions**

8 Principles could help to achieve this mission:

1. Differentiate Ecosystem Services from Goods (don't blend them into “EG&S”)
2. Account for Ecosystem Services as a sum-of-the-bundled-services (not as TEV)
3. ES should be valued in monetary and biophysical metrics (these are not substitutes)
4. Sustainability should be price-determining (not price-determined)
5. Use monetary valuation to inform business cases (not to inform offsets)
6. Use biophysical valuation to inform offsets (not to inform business cases)
7. Account for ecosystem services as a flow (not as a discounted stock)
8. Consider payments as just one tool to reward leadership (not regulatory compliance)

## 1. Differentiate Ecosystem Services from Goods (don't blend them into "EG&S")

Ecosystem *goods and services* are nature's benefits *to humans*.

*Ecosystem goods* include timber, fuel, and agricultural products; these are bought and sold in the marketplace, so they have a price.

Their policy issues include global trade/competitiveness issues, standards / certification / labeling, perceived imbalances between the amount of competition among sellers vs buyers either domestically or abroad (and what to do about this market imbalance), etc.

*Ecosystem services* include water and air filtration, erosion mitigation, and storm-water management; these benefits are not traded in the marketplace, so they do not have a price. Even though these benefits are price-less, they have an economic value which can be revealed by various valuation techniques.

Their policy issues include: ways of accounting for them, how we should measure their value, what we should (should not) do with this info, the when/where/how/why of offsets, what type and mix of carrots and sticks will encourage their protection or rehabilitation.

The policy issues of the services are mostly independent of the services, as are their solutions.

## 2. Account for Ecosystem Services as a sum-of-the-bundled-services (not as TEV)

Functioning ecosystems provide a bundle of services; we should account for their *economic* value as an inventory of the non-double-counted benefits that they provide to humans.

We should not use the older approach of "Total Economic Value" because it confuses more than it clarifies. It splits hairs between the concepts of "bequest" vs "existence" values; it challenges intuition about whether something is useful or not, it is called a *total* whereas it is *marginal*. It is hard to communicate its categories; e.g. it labels "recreational opportunities" as "non-consumptive direct-use benefits." Most challenging of all, the TEV concept blends goods and services into a single number, thus contradicting Principle 1.

## 3. ES should be valued in monetary and biophysical metrics (these are not substitutes)

Monetary metrics value nature's price-less benefits in a way that can be compared to anything else that is bought and sold in the marketplace. This is calculated by a suite of statistical economic techniques that have been refined over the last few decades.

Biophysical metrics reflect the value of benefits in non-dollar units. Ecology reveals these values, not economics. This can include Kilograms of Phosphorous assimilated by riparian buffers, Litres of water held by vegetation, Newtons of stormwater energy that are dissipated by vegetation, the Tonnes of carbon sequestered by a unit of landscape, etc.

#### 4. Sustainability should be price-determining (not price-determined)

Sustainability at a landscape level requires a minimum of *natural capital* to sustain a specific population (and its built heritage) with ecosystem services and non-renewable resources.

In Ontario, the best bet to figure this out is through a planning process that establishes a “Natural Heritage System” (NHS).

To plan a natural heritage system, you need to account for where nature exists, where it does not and would not exist, and the places where it could exist but is currently compromised. You do this in relation to the people and their build environments that will depend upon these benefits, and affect them.

Ideally a NHS is informed by a biophysical valuation of the ecosystem services that exist and would exist under various scenarios of the future. This tells you how much natural landscape is needed (for example, to assimilate the population’s wastewater) and of what type, relative to how much currently exists.

Once you have assessed this, you’ll know which portions of the landscape out to be protected, which portions ought to be rehabilitated, and which portions ought to be prioritized for (re)development, all to support sustainability.

Only *after* this step should you assess the *monetary* value of gains or losses in ecosystem services, because that *monetary* value will be a function of the scarcity of the ecosystem services that would be gained or given up.

This is an important step and distinction because it mandates appropriate versus inappropriate roles for using monetary vs. biophysical valuation (the next two principles).

#### 5. Use monetary valuation to inform business cases (not to inform offsets)

Tell the economic story of landscape protection in \$ of ESV per year.

If it is already protected, then this will serve as a sort of “defensive communications” against those who think that protection is entirely an economic sacrifice.

For the landscape that is currently not protected, you’ll need to assess its ESV to make a business case for securing the land.

For the landscape that ought to be rehabilitated: the costs of doing this will be known in dollar terms, so you’ll have to provide the benefits in dollar terms as well, otherwise you won’t be able to make a business case for action.

So expect to see the monetary value of ecosystem services supporting afforestation programs, the remediation of contaminated areas, the rehabilitation of wetlands, etc.

## 6. Use biophysical valuation to inform offsets (not to inform business cases)

For those parts of your NHS where (re)development ought to be focussed, you should aim for a minimum of no net loss of ecosystem services. To put this into practice, you'll need to assess the gross loss of ecosystem services in biophysical terms. To the extent that the development cannot reduce these losses on-site, then you'll want to evaluate the off-site gains in ecosystem services that could be used as an offset.

For example, this allows you to compare the stormwater-holding benefits of a unit of Greenfield vs. a unit of green-roof vs a unit of rehabilitating impermeable pavement with permeable substitutes, etc.

You do not want to evaluate the potential loss of ES in \$ terms and then ask for that \$ as payment in-lieu of an offset, because when you convert that money into an offset, you'll be paying a price based on market values not based on ecosystem service values. In other words, you will have lost the equivalency – thus invalidating the point of an offset.

## 7. Account for ecosystem services as a flow (not as a discounted stock)

Expect the monetary and biophysical values to be in units as a function of time – not as a present value of a discounted future flow of values meant to represent infinite time.

In economics, annual monetary flows can be capitalized into a stock of money that is equivalent from a *present-value* perspective. A *discount rate* is needed to carry out the mathematical operation of discounting future values. Mathematically the same could be done (and has been done) to the monetary value of ecosystem services – but I advise against.

The (marginal) monetary value of ecosystem services is inversely related to its scarcity. The loss of one unit of a scarce service commands a higher economic sacrifice than the loss of one unit of a less-scarce service. This is one of the key reasons why values should only be transferred from studies undertaken within a similar ecological and socio-economic context – where, say, forest cover is similar, within an area of similar economic affluence.

Assuming that the current value of ecosystem services will persist in an infinite future annual flow, to be capitalized into present values, would require the strong (but unrealistic) assumption that their relative scarcity will not decline, in the face of ongoing population growth and increasing knowledge about the role and relevance that natural systems play in wellbeing – and a preference for their enjoyment. Present trends suggest an increasing scarcity of ecosystem services; the Millennium Ecosystem Assessment revealed a trend of increasing global scarcity, while the Canadian Ecosystem Status and Trends Report suspects a similar pattern within the mixed-wood plains area of Southern Ontario. These assessments do not analytically forecast future scarcity, so it is not clear how much of a scarcity premium to place upon their protection. In the absence of a scarcity premium to mathematically counteract a discount factor, a capitalization of ecosystem service values would imply that its scarcity is not expected to change. This would have been an unrealistic assumption for any urbanized and urbanizing context in Ontario.

Notwithstanding this issue about scarcity, the choice of an appropriate discount rate, and function form of the discount factor, is also problematic. The application of conventional (compound-rate) discounting to environmental benefits or costs over time faces many challenges from the ecological economics community. Hyperbolic approaches to discounting (discounting at declining rates over time) seem to accord better with human behaviour over the long time periods of decades or more, which is usually the temporal scope to environmental analysis rather than just a few years. But the normative question of whether discounting environmental attributes is consistent with sustainability is equally critical than the positive study of how people think about benefits and costs over time.

The theoretical and practical challenges of discounting can be avoided by keeping ecosystem service values as an annual flow. If their values are being compared to other capitalized values – say the value of built capital, then it is preferable to convert the capitalized value to a flow, and not vice-versa.

**8. Consider payments as just one tool to reward leadership (not regulatory compliance)**

(This principle is specific to Ontario with its Canadian / British property-rights regime, which differs from the regime of the USA and many other countries. Be attentive to this distinction when seeking inspiration from other jurisdictions about “Payment for Ecosystem Services”)

Do:	Do not:
Consider a broad range of tools to benefit ecosystem services, including regulations and various forms of monetary incentives and non-monetary recognition	Assume that “payments” are the primary tool to apply ecosystem services valuation
Limit financial incentives to support <i>voluntary</i> actions that benefit ecosystems but <i>would not have happened anyway</i>	Consider financial incentives for regulatory compliance; we do not “compensate” people in Canada for obeying regulations
Expect that financial incentives need not cover more than the <i>foregone</i> and <i>net</i> income from alternative use	Expect that the value of ecosystem services is equal to the “price to pay” for conservation; it is <i>much</i> lower!

There is a key need is to develop a market for ecosystem service offsets. Such a market would match developers—who have money and are looking for gains in ecosystem services, but have no idea how to accomplish them—with eco-entrepreneurs who have solutions but are seeking funds to accomplish their work. Such a market would not commodify the ecosystem services themselves, but rather would commodify actions that offset their loss.

Unlike other payment systems, there is no reason why private sector developers cannot be the funders to reward private-sector provision of ecosystem services. The role of government would be to act as the “market-maker” by legitimizing or compelling offsets in conservation policy, setting their metrics, and ideally setting up a matchmaking system to unite demanders with suppliers.