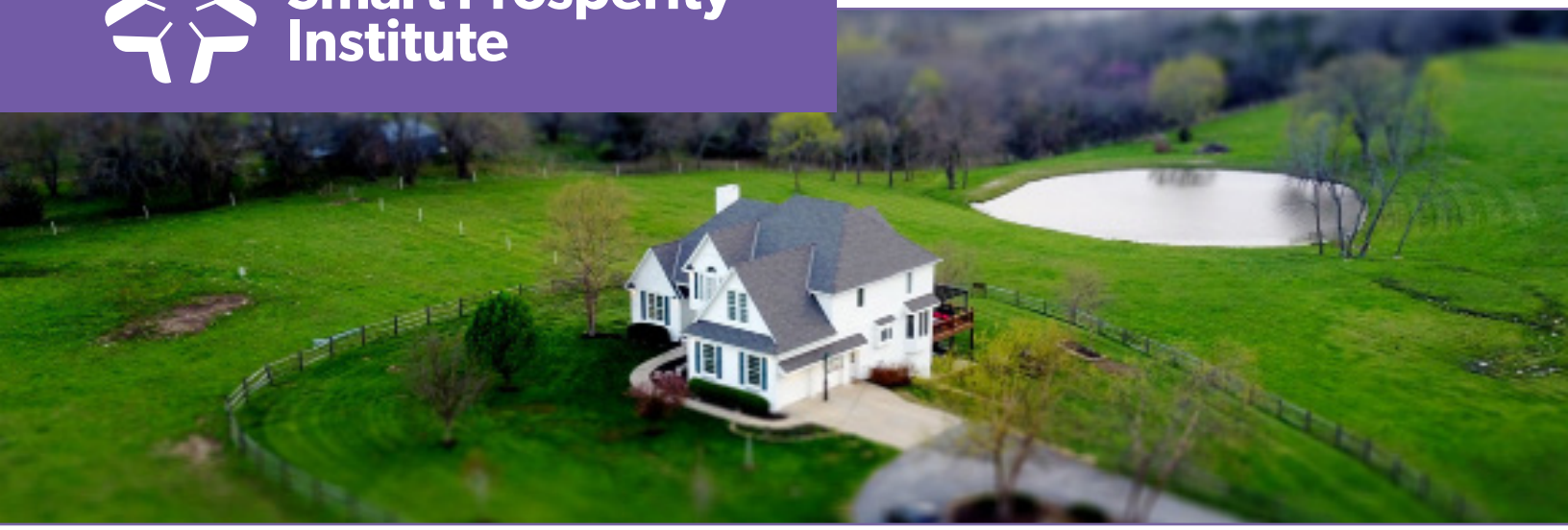
Smart Prosperity Institute

Policy Brief | JULY 2018



ECONOMIC TOOLS FOR INCREASING NATURE CONSERVATION ON PRIVATE LAND

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Smart Prosperity Institute is a national research network and policy think tank based at the University of Ottawa. We deliver world-class research and work with public and private partners – all to advance practical policies and market solutions for a stronger, cleaner economy.

Key Messages

- Nature provides important ecosystem services, such as crop pollination by wild birds and insects, air and water pollution mitigation, carbon sequestration, and the preservation of biodiversity.
- Many ecosystem services are delivered on private lands, such as agricultural land, private wetlands and grasslands, and privately-owned forests. This makes private land owners a critical partner in the conservation of nature.
- Short-term drivers such as land conversion for urban expansion and agricultural intensification, and long-term drivers such as climate change will increasingly strain ecosystem services, including those provided by private lands. Public policy is needed to incentivize private land owners to manage these pressures and make informed trade-offs.
- Policymakers could significantly increase the supply of ecosystem services on private land with the right set of policies and incentives. Rewarding nature conservation on private land provides policymakers with a golden opportunity to enhance nature's services for the public benefit while ensuring viable livelihoods for private landowners.
- Economic instruments can compensate landowners for the benefits they are producing for the public and ensure that the full costs and benefits of ecosystem services to society are incorporated into landowners' decision-making.

Acknowledgments
This brief synthesizes two previous publications, *Towards a Collaborative Strategy for Municipal Natural Asset Management: Private Lands*, and *Economic Instruments for Protecting Species at Risk on Private Land*, as well as unpublished research. The author thanks Sara-Jane O'Neill, Stephanie Cairns, and Aran O'Carroll for their contributions. He also thanks Katherine Monahan, Mike Wilson, and Eric Campbell for their comments on earlier versions of this brief.

Responsibility for the final product and its conclusions are the author's alone, and should not be assigned to the contributing researchers.

- The type of policy instrument to use for nature conservation on private land should be informed by the extent to which the chosen conservation measure generates public and private benefits. In particular, economic instruments should be used for practices which generate significant net benefits to the public, but which impose net costs to private landowners.

- There is a host of incentives that governments, environmental non-government organizations (ENGOs) and private companies can harness to increase nature conservation on private land, including conservation easements, payment for ecosystem service schemes, and tax incentives. We review some key examples from Canada and highlight lessons learned.

- Implications for policymakers include prioritizing the services and places with the potential for the highest impact, fostering collaboration among all parties to tackle shared priorities, obtaining better information on ecosystem functions, services and stakeholder preferences, selecting the appropriate tool for incentivizing ecosystem services delivery, implementing a critical mass of incentive schemes as experiments and learning-by-doing, and engaging in early outreach and support to build landowners' trust.

THE IMPORTANCE OF ECOSYSTEM SERVICES ON PRIVATE LAND

Healthy ecosystems provide vital services to society at multiple scales ranging from local to global. For instance, bird and insect habitats provide pollination and pest control services to nearby landowners. Riparian vegetation provides water purification services for watersheds, and wetlands provide a host of services for local municipalities, including water storage, water purification and flood mitigation. And agricultural lands, forests and other areas provide carbon sequestration and biodiversity services which benefit people worldwide.

Private land plays an important role in providing many of these services, although less than 11% of Canada's total landmass is privately owned (41% is federal crown land and 48% is provincial crown land).[1] Around 7% of Canada's total land area is under agricultural use,[2] and approximately 11% of Canada's managed forests are privately owned[3] – with private land supplying roughly 10% of Canada's harvested timber.[4]

To give a sense of the importance of ecosystem services on private land, consider the following:

- Canada's croplands sequestered approximately 11 million tonnes of carbon dioxide equivalent in 2016,[5] and private forest land sequestered roughly 16 million tonnes of carbon dioxide equivalent in 2016.*

* Canada's National Inventory Report 1990–2016 estimates that Canada's managed forests sequestered approximately 150 Mt of carbon dioxide equivalent in 2016. Assuming a proportional distribution of carbon sequestration services across public and private forest lands (approximately 11% of Canada's forests are under private ownership), this amounts to 16.3 Mt of carbon dioxide equivalent, since 150,000,000 X 0.109 = 16,304,000 (rounded to the nearest thousand). Note that the National Inventory report's carbon sequestration estimate only pertains to managed forests, and removes impacts from natural disturbances (e.g., fires) and associated net fluxes.

- Private farmland provides habitat for bird and insect pollinators, which play an important role in our food supply. Over one-third of North America's fruit and nut production is estimated to be vulnerable to pollinator service losses.[6]

- Private land in Canada contributes to biodiversity conservation in a number of ways, such as by providing wildlife habitat. For instance, an analysis of digitized range maps for 513 imperilled species found that approximately 90% of them occur within Canada's agricultural extent.[7]

However, these ecosystem services are becoming increasingly threatened on private land (especially in the case of agricultural land), and some of the environmental externalities generated by agriculture are increasing. From 1996-2016, Canada's total farm area declined by approximately 5.6%.[8] Although Canada managed to increase its cropland area during the same period, this was achieved in part by converting pastures (which have high habitat value for wildlife).[9] Although Canada's overall water quality is still considered "good" (scoring 74 out of 100 on Agriculture and Agri-food Canada's water quality compound index), Canada's score on this index declined by 18 points from 1981-2011, due to an increase in pesticide and nutrient applications (nitrogen and phosphorous in manure and fertilizers).[10] Data for deforestation rates on private land are not available, but based on national trends for all forest land, they are probably modest (the national deforestation rate from 1990-2015 was around 0.33% per year).[11]

However, these broad trends can obscure important, place-specific challenges. For instance, metropolitan areas in southern Ontario have mostly expanded their settled areas by converting the highest quality farmland ("dependable agricultural land").[12] And 13% of Canada's farmland has seen a net decrease in wildlife habitat capacity from 1996-2011, largely due to "loss of natural and semi-natural land and the intensification of farming".[13]

Public policy is needed to manage these pressures and make informed trade-offs.

The good news is that many landowners are motivated to engage in nature conservation – but they need the right information and support, as well as the appropriate incentives.[14] Rewarding nature conservation on private land provides policymakers with a golden opportunity to enhance nature's services for the public benefit while ensuring viable livelihoods for private landowners.

If left unchecked, agricultural intensification, land conversion for urban expansion, climate change, and other drivers will increasingly strain the ecosystem services provided by private lands.

Box 1: What are ecosystem services?[15]

"Ecosystem services" refer to the direct and indirect contributions of ecosystems to human wellbeing. They can be classified into four broad categories:

Provisioning services – the material or energy outputs from ecosystems. They include food, water, fibre and other resources.

Regulating services – services that ecosystems provide by acting as regulators e.g. regulating the quality of air and soil or by providing flood and disease control.

Habitat or supporting services – the importance of ecosystems to provide living space for resident and migratory species (thus maintaining the gene pool and nursery service).

Cultural services – The nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experience, including knowledge systems, social relations, and aesthetic values.

MAKING CONSERVATION PAY: THE FRAMEWORK

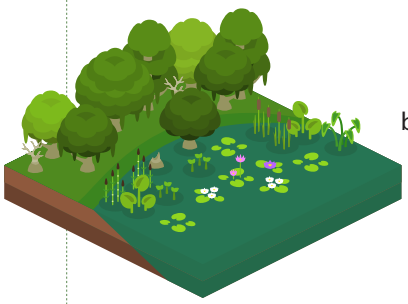
A collaborative and incentives-based approach is needed for delivering ecosystem services on private land. Many of the negative environmental impacts from economic activities on private land – such as agriculture – are so diffuse that direct regulation would be prohibitively costly to monitor and enforce.[16] Moreover, there is a serious risk that landowners will view such regulations as unfair and illegitimate.[17] Restrictive regulations also fail to provide positive incentives for continuous environmental improvements.[18]

Another key challenge with incentivizing the delivery of ecosystem services on private property is that although the land is under private ownership and providing private benefits, it is also providing services to the public.* But voluntary, unpaid programs for providing ecosystem services (such as maintaining habitat for species at risk) run the risk of low participation rates, leading to lower overall environmental benefits.[19] The challenge of this situation boils down to costs, benefits and beneficiaries (Figure 1).

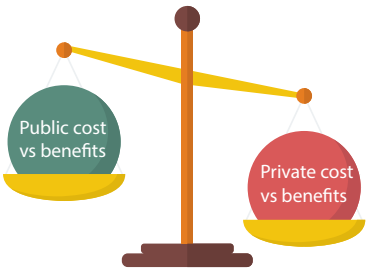
For example, a privately-owned forest provides a number of ecosystem services, such as carbon sequestration or water quality regulation. The private landowner of the forest property receives a certain benefit from leaving the forest intact (micro-climate regulation, private natural resources, aesthetics, etc.). However, they may receive a greater benefit from cutting down the forest to sell timber, converting the land to agriculture, or selling the property for real estate development. While the landowner and the community both enjoy the public benefits from having the forest remain intact, such as water quality and air pollution mitigation, these benefits would be lost (or severely diminished) if the landowner logged the land, converted it to agriculture, or sold it to a real estate developer. The private landowners would receive all of the financial benefits, while the community would bear the majority of the costs of that conversion, whether in the form of polluted waters and flooding or the costs of engineered infrastructure to provide equivalent services. From the viewpoint of the private landowner, they would receive all of the benefit of converting the forest to agriculture or to a residential property, but would only bear a small fraction of the lost ecosystem services. If the forest were to remain as a forest, the private landowner would lose out on the additional financial benefit (i.e. they would bear the opportunity cost of protecting that forest), but the community would receive the full benefit of the regulating, habitat and cultural ecosystem services. Incentive schemes such as payment for ecological services (PES) or conservation easements can help strike the right balance by ensuring that these external costs and benefits are factored into the landowner's decision-making.

* For the sake of brevity, this brief uses 'the public' as a catch-all term for third parties who are beneficiaries of the public goods (non-rival and non-excludable) and common pool resources (rival and non-excludable) provided by ecosystems. These vary in scale from local to global, depending on the ecosystem service considered. For a concise discussion of the rival and excludable nature of various ecosystem services and their respective spatial scales, see Costanza, R. (2008) Ecosystem services: Multiple classification systems are needed, *Biological Conservation*, 141: 350-352.

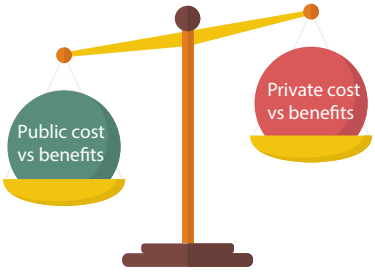
Figure 1: Balancing costs and benefits of private lands and public services

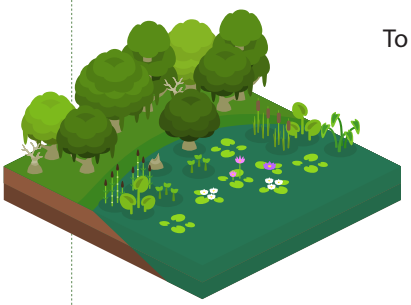


A natural area under private ownership provides both public and private benefits, however, the costs of maintaining the natural area (property tax, lost opportunity costs) rests solely with the private landowner.

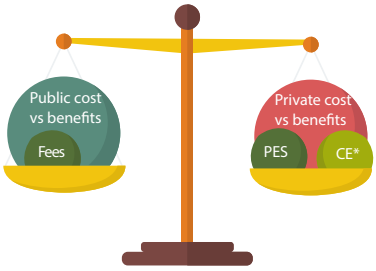


Converting a natural area to a different land use, such as agriculture, will provide the private landowner benefits. The costs of losing the natural area and ecosystem services are borne by the public, with the private landowner only incurring a small share of the public cost.





To create a situation in which the costs and benefits of maintaining the area in its natural state are balanced for the private landowner and the public, incentives, payments and pollution fees may be required.



Balancing Public and Private Costs and Benefits

* Conservation Easements

(Adapted from O'Neill and Cairns 2018)

It is important to note that the net costs and benefits to both the private landowner *and* the public need to be considered when deciding which policy tools are appropriate. As the above example suggests, economic instruments are most likely to be effective where there are net private costs to the landowner and net benefits to the public. By contrast, for measures that provide positive net benefits to both private landowners and the public – such as a farmer planting vegetation which enhances their net revenue through biological pest control services – it might be more cost-effective to simply provide landowners with information on the private benefits of adopting the practice, along with access to extension services.[20] In other cases, negative incentives such as fees, taxes, tradeable permits, or other financial penalties may be more appropriate (however, these are not the focus of this brief).[21]

TOOLS AND INCENTIVES FOR NATURE CONSERVATION ON PRIVATE LAND

This section of the brief reviews several policy instruments for delivering ecosystem services on private land, such as land acquisition, conservation easements, payment for ecosystem service schemes, and tax credits. The list is not exhaustive (for instance, it does not discuss carbon offset systems), but provides an overview of how the different tools have been used in Canada. Most of these tools are complementary and are meant to solve different kinds of problems in securing ecosystem services on private land. As such, this section also highlights some considerations for governments, environmental non-governmental organizations (ENGOs) and land trusts looking to identify which tool might be most effective given the particular context.

Box 2: Economic instruments for delivering ecosystem services[22]

Economic instruments use monetary values to internalize the social costs and benefits of economic activity. In the context of managing land for ecosystem services, economic instruments include:

- Regulatory price signals (e.g. direct or indirect taxes on point and nonpoint source pollution);
- Targeted environmental subsidies (such as payment for ecosystem service schemes or tax credits for conservation easements on ecologically significant land);
- Direct markets for ecologically significant land (e.g. conservation easements and land acquisition);
- Reverse auctions;
- Tradeable permits (e.g. biodiversity offsets, tradeable water quality permits).

Land Acquisition

Land acquisition* is arguably the most straightforward tool for safeguarding or enhancing the delivery of ecosystem services on private land, and is used by land trusts, ENGOs, and all levels of government. For instance, in its 2014 Biodiversity Conservation Strategy, the City of Surrey has identified 10,200 acres (4,130 hectares) of land that is required to maintain the City's biodiversity, ecosystems and functions that support wildlife and people.[23] The goal for the city is to manage 100% of this land, called the Green Infrastructure Network (GIN), through public ownership or stewardship programs on private land. Land purchase has also contributed to the

* Also known as "outright purchase" or "fee simple acquisition".

1,836 square kilometres of species at risk habitat secured (via purchase, easement or other means) from years 2000-2013 through the Government of Canada's Habitat Stewardship Program.[24]

Land Acquisition Considerations

A major challenge with land acquisition is the significant up-front funding needed for purchasing these lands. For example, the City of Edmonton established a Natural Areas Reserve Fund in 1999 for the purpose of purchasing and protecting natural areas within the City.[25] The fund was originally established at $250,000 a year then later increased to $1 million per year. However, with the value of land within the city increasing, the fund was not enough so in 2008 Council approved a strategy to borrow additional funds to purchase natural areas, using the Natural Areas Reserve Fund to make loan payments.[26]

Ensuring that outright purchase of the land is genuinely necessary to ensure the delivery of ecosystem services should be a key consideration for governments and land trusts. A recent report found that land acquisition is generally less cost-effective for securing ecosystem services than conservation easements or payment for ecosystem services schemes, but there are cases where land acquisition is justifiable.[27] This could include parcels of private land with high ecological significance (e.g. exceptional biodiversity value) and which require significant ongoing management,[28] or private land providing important services to municipalities that might not be easily obtained from other lands (whether public or private), or through engineered infrastructure.[29]

Conservation Easements

Conservation easements, covenants and agreements* are promising tools for securing ecosystem services on private land in cases where land acquisition is not possible or desirable (due to high costs, for instance). Conservation easements are legally binding agreements between a landowner and a third-party agency in which certain rights to the private property are transferred to the agency.[30] The agreement outlines the specific restrictions on the land and the process by which the restrictions will be enforced and monitored by the third-party agency. Many conservation easements are permanent and "run with the property", although some are temporary.[31] The agreement also outlines the rights the landowner maintains on the land and any financial compensation to the landowner.[32] Easements can be purchased, donated, or a combination of the two in which the land owner sells the easement for less than its fair market value ("split receipting").[33]

The transferred rights can include development rights or rights to subdivide but can also include other restrictions on future land use; each conservation easement is unique and designed for the specific objectives of the landowner and agency. The third-party agency holding the agreement can be a federal, provincial or municipal government body, an independent non-profit conservation organization, or a land trust.[34]

Transferring land rights through a conservation easement also has the potential to provide the landowner certain tax benefits. In Canada, the Ecological Gifts program provides income tax benefits to donors of land through sale or easement.[35] Individuals and corporations can make ecological gift donations and are eligible for a non–refundable tax credit (individuals) or a deduction from the taxable income (corporations).[36]

Conservation easements on agricultural lands are a distinct type of agreement especially important in many areas of Canada.

* For simplicity, we will refer to all three instruments as "easements" in this document.

Conservation easements are a widely used tool for nature conservation in North America. The Nature Conservancy of Canada (NCC) has protected more than 2.8 million acres coast to coast, including 332,000 acres through permanent conservation agreements (easement, servitudes or covenants).[37]

In the United States, The Nature Conservancy (TNC), is the largest non-profit easement holder. As of 2014, they have protected over 20 million acres of land in the US, 6.6 million of which has been through conservation easements.[38]

Box 3: Easements on Agricultural Lands

While each conservation easement is unique to the property and particular conservation goals as agreed to by the landowner and the organization holding the agreement, easements on agricultural lands are a distinct type of agreement especially important in many areas of Canada. A conservation easement placed on agricultural lands is regarded as a tool to ensure that the land is managed according to best practices for the long-term. It does not interfere with normal farming practices as it is an agreement negotiated by the landowner and the third party agency, which ensures that it does not overly restrict land use.[39]

In Alberta, conservation easements can be applied to agricultural land and practices or for other land that has significant value for biodiversity conservation or natural aesthetic values.[40] Ducks Unlimited Canada accepts conservation easements for wetland protection in Alberta, Saskatchewan, Manitoba and Ontario, many of which are for agricultural lands.[41]

Conservation Easement Considerations

Conservation easements are generally a cost-effective way of protecting land due to their lower costs compared to land acquisition.[42] To provide an illustrative example, between 1954 and 2003, the Nature Conservancy protected 3.1 million acres of land through conservation easements at a cost of $0.92 billion USD. During the same time period, 5.3 million acres of land was protected through direct purchase at a cost of $4.8 billion USD, three times the price of conservation through easements.[43] Easements also appear to scale more cost-effectively over large landscapes compared to payment for ecosystem service schemes.[44] Moreover, conservation easements have generally been found to target private land at greater risk of conversion or intensification (as proxied by land value), rather than economically marginal land, which suggests that most easements are genuinely protecting additional parcels of private land.[45]

A main challenge with conservation easements is that they are voluntary: the landowner chooses to enter into an agreement to transfer specific property rights. While the landowner may receive some financial gain if the property rights under the easement are purchased by the third-party agency, the financial benefits provided as a result of the easement may not be high enough to incent landowners to voluntarily choose this option if they were not intending to do so otherwise. The fact that landowners in some regions of Canada are reluctant to further adopt permanent conservation easements is potential evidence of this.[46] The upshot is that increasing the adoption of conservation easements will likely require a creative mix of approaches which: (i) harness landowners' pro-conservation attitudes and social norms;[47] (ii) increase payments based on the value of the ecosystem services delivered (including agglomeration bonuses for groups of landowners); (iii) use flexible mechanisms for lowering implementation costs (such as reverse auctions or revolving land conservation programs)[48] where appropriate. Policymakers could also further pilot the use of temporary conservation easements.[49]

Payment for Ecosystem Services

One of the best-known mechanisms for encouraging conservation among private landowners is through payment for ecosystem service schemes (PES). The basic premise for PES is that those who benefit from ecosystem services pay the private landowner for conserving or restoring the natural assets.[50] Given the constraints on easement adoption mentioned above, PES schemes may be particularly well-suited for landowners who wish to engage in conservation but who might otherwise be unwilling to sign permanent conservation easements.

Payment for ecosystem service schemes ensure that private landowners are compensated for preserving and restoring natural assets on their land.

Payment for ecosystem service schemes are being implemented by governments and ENGOs at multiple scales across Canada. ALUS Canada, for example, is a national non-profit organization that channels funding from various sources (governments, individuals, foundations) into local investments directly to farmers and ranchers who are protecting ecosystem services on working agricultural landscapes.[51] ALUS helps farmers to restore or protect natural assets but also provides annual payments for ongoing stewardship. They have active projects in Alberta, PEI, Manitoba, Ontario, Quebec and Saskatchewan.[52] To date, nearly 14,000 acres of land have been enrolled in the program, resulting in 15,000 acres of wetland ecosystems managed and conserved, 10,000 acres of pollinator habitat protected, and 3,600 acres of land reforested with native vegetation.[53]

Some PES schemes have been rolled out as broad-scale programs, rather than individual pilots or projects. Under the Ontario Land Stewardship and Habitat Restoration Program, landowners can receive up to $20,000 in matching funds for a project that maintains or restores habitats that benefit fish, animals and/or plants.[54] Projects can include stream restoration, upland improvements, wetland restoration, or invasive species control. B.C. has seen the emergence of the Farmland Advantage Program in recent years, a major PES program on agricultural lands (see Box 4).

Box 4: B.C.'s farmland advantage program[55]

Farmland Advantage is a five-year "proof of concept" project to assess the interest in and effective means of implementing, monitoring and verifying a payment for ecosystem services strategy in the farming communities of British Columbia. The program aims to conserve and enhance conservation values on British Columbia farms using such best management practices as water or stream setbacks, strategic fencing, reforestation, or rangeland enhancement. The program is working with the province's Environmental Farm Plan program to fund the implementation of prescribed best management practices. In the initial pilot phase of this program, one representative project saw a ranching operation construct a livestock fence to preserve the riparian area of Bunyan Lake, in the local community watershed. In addition to enhancing water quality, this measure contributed to habitat conservation for species at risk. The "proof of concept" phase aims to take this and other initial pilot successes and lessons learned and extend the program to the Kootenays, the Lower Mainland, and the Okanagan. In its first year, Farmland advantage had conserved 300 ha of terrestrial and aquatic habitats and restored and conserved 30 km of shoreline riparian habitat.

Payments for Ecosystem Services Considerations

Payment systems can be based on a single grant or fund that supports a particular project, such as the restoration of a natural asset, or it can be an ongoing payment for long-term management of a natural asset. While single payment systems are effective, a combination of upfront grants and long-term payments may have a greater impact on effective ecosystem service delivery on private land in the long-term.

Similar considerations also apply with regards to whether landowners should be paid for implementing prescribed managed practices ("action-based payments") or based on the environmental outcomes achieved ("performance-based payments"). Some organizations are hoping to target different sets of landowners by implementing both types of payments within the same program.[56] Policymakers should also consider creating a "two-tiered" payment scheme, which provides a basic payment for implementing the prescribed management actions, followed by a 'bonus' payment if the desired conservation outcomes are realized.[57]

In terms of value for money relative to other approaches, PES schemes might be an effective means for managing ecosystem services on smaller parcels of private land. One study estimated that PES schemes are generally more cost-effective than easements or land acquisition for managing ecosystem services on smaller properties (e.g. parcels less than or greater to 3 acres). Although the marginal cost of managing additional land increases more rapidly under PES schemes compared to easements, PES remained more cost-effective than land acquisition for both large and small parcels of land.[58]

Tax Incentives

Tax incentives are a type of payment for ecosystem services. Instead of a direct subsidy to a landowner for the protection or improved management of natural assets, the landowners receive a credit towards their tax payments. In Canada, the Federal Ecological Gifts program is a good example of a tax deduction PES program. It provides tax deductions for landowners who either donate ecologically sensitive land or donate the rights to land through conservation easements.[59] The value of the eco-gift is assessed in terms of the fair market value of the donation. Since the program's inception in 1995, 1260 ecological gifts valued at over $807 million have been donated.[60] This represents over 180,000 hectares of protected wildlife habitat.[61]

Tax programs can also be found in most provinces. For example, the province of Ontario also provides various tax incentives for private landowners providing ecosystem services. In some cases these programs have also been used in the context of municipal property taxes.

Ontario Conservation Land Tax Incentive Program[62]

The Conservation Land Tax Incentive Program (CLTIP) offers up to 100% property tax exemption for land that has important natural heritage features.

While buildings and other improvements are not part of the exemption, land that has been evaluated by the Ministry of Natural Resources and Forestry to be provincially significant is eligible. This land can include:

- provincially significant wetlands
- provincially significant areas of natural and scientific interest
- Niagara Escarpment natural area
- habitats of endangered species, where specific guidelines for the CLTIP have been developed
- Community Conservation Lands (restricted to non-profit charitable conservation organizations and conservation authorities)

The land must be at least 1/5 hectare (1/2 acre) in size or larger to be eligible.

Ontario Managed Forest Land Tax Incentive Program[63]

Under the Managed Forest Land Tax Incentive Program, landowners with forests classified as 'Managed Forest' pay 25% of the municipal tax rate. To be classified as a Managed Forest, the land must be over 4 hectares (9.88 acres) in size and a 10-year Managed Forest Plan must be in place and approved by a Managed Forest Plan Approver, who is certified by the Ministry of Natural Resources and Forestry. A progress report must be submitted every 5 years.

Vancouver Island, BC - Natural Area Protection Tax Exemption Program (NAPTEP)

The picturesque Gulf Islands surrounding Vancouver Island, BC are mostly privately owned.[64] To protect the natural assets in this area there is a Natural Area Protection Tax Exemption Program (NAPTEP), which provides landowners with an annual 65% exemption on the property taxes for the portion of their property protected with a NAPTEP covenant. The exemption requires the landowner to enter into a conservation covenant and the Morrison Waxler Biodiversity Protection Legacy Fund offers grants to landowners to cover some of the costs of registering a conservation covenant or NAPTEP covenant.

Tax Incentive Considerations

There is a rich academic discussion of the effectiveness of tax incentive programs, and the conditions which might need to be satisfied to maximize their effectiveness.* One plausible hypothesis is that tax incentive programs are likely to be most effective in cases where the donated land (or easement) has a high environmental value and the landowner has a high taxable income, since the tax benefits of the easement will be highest in these cases.[65]

Two of the main challenges with tax incentive programs are the administrative burden and the level of funding. For many of these programs, the landowner must first be aware that their land qualifies for a tax incentive and then apply for the program. If the benefit of the tax credit is not great enough to overcome that initial effort/investment, it is unlikely that a large number of landowners will apply. Tax incentives, in that sense, are also voluntary, leaving the uptake of the incentive to external considerations.

Tax incentive programs for nature conservation are active at the federal level and in most provinces, as well as some municipalities.

* For a recent (and fairly positive) assessment drawing from several U.S. datasets, see Parker, D.P. and Thurman, W.N. (2018) Tax Incentives and the Price of Conservation, *Journal of the Association of Environmental and Resource Economists,* 5(2): 331-369. For a more critical assessment that is grounded in economic theory, see Vercammen, J. (2018) A Welfare Analysis of Conservation Easement Tax Credits, *accepted for publication at the Journal of the Association of Environmental and Resource Economists (forthcoming).*

Common challenges with economic instruments for conservation on private land

Many of these economic instruments encounter similar challenges: monitoring and measurement are essential but often lacking, the sustainability of the funding source for payments can impact the long-term effectiveness of the program, and there is the potential issue of additionality, where payments go towards protecting land that would have been protected voluntarily in the absence of the payment.[66] Setting up targeted projects or programs can also impose significant transaction, monitoring and enforcement costs for the third parties in charge of managing these lands.[67] In the case of Canadian conservation easements, these have ranged from several thousand dollars to tens of thousands of dollars per project.[68]

Sound program design, establishment of baseline conditions and implementing PES systems in combination with other policy tools have all been noted to help address many of these challenges.[69] And while monitoring and enforcement costs can pose a challenge for some ENGOs and land trusts, solutions do exist. Some land trusts have created specific endowment funds to help deal with these costs.[70] Federal, provincial and territorial governments could also consider providing ENGOs and land trusts with financial support for monitoring costs incurred by projects that meet certain baseline levels of environmental quality.

Although transactions costs need to be factored into project and program design, well-designed conservation programs can secure benefits which easily outweigh these costs. The real issue lies in designing policies and programs which strike the right balance – implementing targeting or screening measures to ensure good value for money, while also ensuring that transaction costs are manageable for conservation organizations.[71]

CONSIDERATIONS FOR POLICYMAKERS

Ecosystem services are inherently place-based, meaning that local biophysical and ecological processes, and social and economic values, play a decisive role in prioritizing which services to invest in. But some general considerations can nonetheless guide local decision-making and help policymakers improve outcomes. These include:

- **Prioritizing services and places with the potential for the highest impact** – given the myriad of ecosystem services provided to society by private lands, not all of them will be equally important in terms of their benefits to landowners and to society. Beneficiaries need to prioritize amongst the services that are most important to them and negotiate trade-offs (e.g. between food provisioning services and wildlife habitat services). In some cases this information can be obtained through economic valuation methods. In cases where monetary valuation cannot be undertaken due to conceptual challenges, political considerations (e.g. strong opposition from project or program partners) or budget constraints, a variety of non-monetary valuation methods and project prioritization tools are available.[72] In all cases, projects should strive to maximize net benefits relative to the conservation budget.[73]

- **Improving the information ecosystem** – the quality and quantity of information on ecosystem functions and services – and how they link up with human preferences – needs to be increased. In addition to traditional data collection and economic valuation methods (e.g. choice experiments), stakeholders should consider innovative mechanisms and incentives for generating information, such as environmental securitization, environmental performance bonds[74], and leveraging "big data" (e.g. high-resolution satellite imagery, crowd-sourced citizen science, social media user activity).[75]

- **Ensuring collaboration to tackle shared priorities** – Each of the tools discussed in this brief requires collaboration among stakeholders – such as private landowners, industry, ENGOs and governments. Different actors need to come together to identify shared priorities. There are opportunities to leverage nature's services on private lands and provide solutions at multiple scales, for instance:

    - Through the Municipal Natural Assets Initiative, municipal policymakers are increasingly exploring the potential for natural assets to provide cost-effective services to their constituents. The first wave of pilot projects focused on the use of natural assets for storm water management services, and a second cohort of pilots is already underway. Other services, such as coastal services, will be considered in future projects. Collaboration with private landowners will be an important piece of the puzzle for securing many of these ecosystem services.[76]

    - The Canada-Ontario Lake Erie Action Plan emphasizes the need to engage farmers and other private landowners in ecological restoration and improved nutrient management.[77] Economic instruments (e.g. PES, or a market for water quality permits or offsets) could be used to provide private landowners with additional incentives for improving water quality through measures such as better manure management, and planting and restoring riparian vegetation.

    - There is a growing market for carbon offsets arising from Canada's land sector, as can be seen through the legislation and protocols enabling offset use within the carbon pricing systems in place in Quebec,[78] Alberta[79], and British Columbia.[80] Likewise, the federal government's backstop carbon pricing system will likely include offsets as a compliance option under the output-based pricing system (OBPS) for industrial facilities; offset protocols covering activities in the Agriculture, Waste, and Land Use Land-Use Change and Forestry sectors will be considered first.[81] This provides financial rewards for carbon sequestration or climate change mitigation activities, including on private land, financed through regulatory compliance by major emitters.

- **Choosing the right tool for the job** – as we noted in the previous section, economic instruments are not a one-size fits all tool. Land acquisition, easements, PES and tax incentives occupy different 'niches', and in many cases they are meant to address distinct (but related) conservation challenges. Some questions to consider when choosing the appropriate

There is an opportunity to leverage ecosystem services on private lands to provide solutions at multiple scales.

tool for economic instruments on private land include the private net benefits (or costs) to private landowners and the public, the type of ecosystem service being secured, the risk tolerance of the beneficiaries (what are the costs of failure?), the preferences and time horizons of the landowners (e.g. preference for short-term, long term or perpetual agreements), and possible impacts on social norms and social capital. In some cases, extension programs, technology development, or negative incentives (taxes and penalties) may be more appropriate than incentive payments.[82]

- **Implementing pilots and programs as experiments, and learning by doing** – in the same way that collecting additional information will help inform decision-making at the "front end", improving the quality of field data collection will also help inform decision making at the "back end". A critical mass of incentive schemes for nature conservation should be implemented as field experiments – or quasi-experiments – which clearly specify what would have happened in the absence of the project or program (ideally, through a control group).[83] This will help to continually refine projects and programs over time.

- **Ensuring that a little trust goes a long way** – landowners wish to be recognized and rewarded for their stewardship, but in some cases they are apprehensive about government involvement (since it raises the prospect of future regulations of their land use).[84] Cultivating a sense of trust among landowners through active discussion and outreach – ideally spearheaded by ENGOs with a strong local presence – can go a long way towards making landowners receptive to incentive schemes. Providing landowners with some control over program design might also help shore up trust and interest in participating.[85]

Ensuring the continued delivery of important ecosystem services is difficult under most circumstances, and securing these services on private lands only makes these challenges more acute. The issue will not resolve itself, and collaboration amongst all parties is essential. But with the right support and incentives to landowners, we can ensure that ecosystem services on private land bring the greatest benefit to landowners and society, now and in the future.

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