

Supporting Information

1) The Financial Value of Natural Assets

The term "natural assets" refers to the stock of natural resources and ecosystems.¹ Examples of natural assets include wetlands, rivers, lakes, forests, fields, coastal marshes, dunes and soils.

Economists refer to natural assets as **natural capital** whose services and goods support human and produced capital (Fig. 1).

Benefits from natural assets are termed **ecosystem goods and services**, and may be divided into provisioning, regulation and cultural services.

Overall, ecosystems and the services they provide underpin all economic activity, as has been amply documented nationally and internationally, most recently for example in the landmark report produced for the U.K. government, "The Economics of Biodiversity: The Dasgupta Review."² Such reports note that the climate change and biodiversity crises are compounding the urgent need to overcome the institutional, economic and accounting failures to recognize nature.

At the municipal level, natural assets are increasingly being included in the definition of "infrastructure" in Canada, since many ecosystem services either contribute directly to the municipal mandate (e.g., to provide stormwater conveyance, erosion control, air quality) or are strongly influenced by local decision-making (e.g., about community well-being or climate regulation). Yet, overall, natural assets are not routinely inventoried and valued, and are explicitly excluded in public-sector financial reporting.

The Government of Canada's Budget 2021³ notably reflects the importance of natural infrastructure, with the creation of a Natural Infrastructure Fund that is slated to receive \$200-million over the next three years. The budget also emphasizes initiatives to strengthen public climate-related disclosures, observing that "... to ensure a stable and predictable transition to a low-carbon economy, markets, insurers, policy makers, and the public require standardized information about the climate-related risks and opportunities organizations face."

Crown corporations are required to meet milestones for climate-related financial disclosures by 2022 or 2024, depending on the value of assets held. The budget says "Canada's Crown corporations will demonstrate climate leadership by adopting the Task Force on Climate-related Financial Disclosures (TCFD) standards, or [by adopting] **more rigorous, acceptable standards ... applicable to the public sector** at time of disclosure, as an element of their corporate reporting." The Public Sector Accounting Board has a principal role to play in the development of these more rigorous standards.

Natural assets bring direct financial benefits to public sector entities, including those associated with addressing climate change and biodiversity.

The effective management of natural assets by public-sector entities can contribute twofold to addressing climate change by: a) contributing to reduction of climate-related risks (climate adaptation) and b) by increasing carbon sequestration thereby reducing greenhouse gases in the atmosphere (climate mitigation). These specific ecosystem services, as well as the value of biodiversity, are incorporated in the overall value of natural capital.



Figure 1: Links From Biodiversity to the Economy, Source: "The Economics of Biodiversity: The Dasgupta Review."⁴

The significant financial value of natural assets in reducing the damages from flooding was highlighted in a framework established in 2016 by the Insurance Bureau of Canada, the International Institute for Sustainable Development and the Intact Centre on Climate Adaptation.⁴ Natural assets also play an important role in reducing the impact of extreme heat created by the "urban heat island effect;" several major cities are planting trees on a large scale to counteract such heat.

Natural assets also play a key role in carbon storage and sequestration. Vegetation extracts carbon from the atmosphere, while the Earth's soils hold about 2,500 gigatons of carbon— more than three times the amount of carbon in the atmosphere and four times the amount stored in all living plants and animals.⁵ According to the Geological Survey of Canada, the peat in Canada's wetlands holds almost 60 per cent of all the carbon stored in soils across the country.⁶ Carbon storage and sequestration is receiving increasing attention as countries and businesses adopt more aggressive "net-zero" targets, and look to nature-based solutions as a means to offset greenhouse gas emissions. Carbon credits are likely to appreciate in value driven by increased demand, although their pricing within the carbon market will likely not reflect the full range of services provided by natural assets. In relation to the proposed federal Greenhouse Gas Offset Credit System Regulations⁷, public sector entities could potentially play a role designing and implementing projects that could be registered by project proponents. In Quebec, the cap-and-trade system for greenhouse gas emission allowances has been in place since 2013 and already includes an offset credit component administered by the provincial government.

2) The Valuation of Natural Assets is Increasingly Undertaken in Canada

Since 2016, municipalities across Canada have been conducting inventories, modeling, valuing and managing natural assets, (Box 1) and the rate of such activities is increasing. The value of the services provided by natural assets has been calculated in economic terms through the work of the Municipal Natural Assets Initiative (MNAI), the Greenbelt Foundation, the Toronto Region Conservation Authority (TRCA), Credit Valley Conservation (CVC), Ouranos, the University of Quebec in Outaouais (Research Chair in Ecological Economics) and ALUS, among others.

The examples below illustrate the **significance of natural assets for stormwater management and flood resilience**, based on MNAI's assessments⁸, which use the same detailed modeling as for many engineered assets:

- A seven-kilometre riverbank in the Oshawa Creek watershed in Ontario provides \$18.9-million worth of stormwater conveyance /drainage annually to nearby communities based on replacement cost;
- Naturally occurring ponds in White Tower Park in Gibsons, B.C. provide between \$3.5-million and \$4-million in stormwater storage to the local government based on replacement cost;
- Widening and naturalizing 1,292 metres of the Courtenay River riverbank in Courtenay, B.C. provides \$2.4-million in flood-damage reduction to downstream properties during a 1-in-200-year flood event; and
- Protecting four wetlands that comprise 13,791 square metres in the Mill Creek Watershed in New Brunswick delivers \$1.4-million in benefits during a 1-in-100 year flood event.

Box 1: Municipalities across Canada where natural asset management efforts including inventorying, modelling, valuation and management efforts have already been undertaken

Town of Logy Bay-Middle Cove-Outer-Cove, NL

Town of Riverview, NB

Town of Florenceville-Bristol, NB

Village of Riverside-Albert, NB

Greater Montreal, QC

Greater Quebec City, QC

Rivière Chaudière, QC

Compton, QC

National Capital Region, ON/QC

City of Oshawa, ON

Region of Peel, ON

Town of Oakville, ON

City of London, ON

York Region, ON

City of Richmond Hill, ON

Town of Gibsons, BC

District of Sparwood, BC

City of Courtenay, BC

District of West Vancouver, BC

City of Grand Forks, BC

City of Nanaimo, BC

Regional District of Central Kootenay, BC

Regional District of East Kootenay, BC

Regional District of Kootenay Boundary, BC

City of Cranbrook, BC

Town of Golden, BC

City of Rossland, BC

The findings of numerous other organizations in Canada similarly document the significant monetary value of natural assets for flood-risk reduction and other services:

- The ability of wetlands to slow down, store and enable the evaporation of excess rainwater helps to reduce flood damages in the metropolitan area of Quebec City, a service worth \$49.8-million annually.⁹
- In the National Capital Region, which contains the cities of Ottawa, Ont. and Gatineau, Que., urban and rural forests provide erosion control services worth an estimated \$327,500 and \$5.2-million annually, respectively.¹⁰
- In the City of Hamilton, a restored wetland complex costing approximately \$15.3-million (compared with \$28.5-million for an engineered solution) will reduce floods and provide recreation and other services valued at up to \$44.2-million.¹¹

In relation specifically to climate regulation through carbon storage and sequestration:

- Within the metropolitan area of Quebec City, rural and urban forests have been estimated to provide carbon storage services to a value of \$11 595 million per year, and carbon sequestration services of \$ 9.3 million per year¹¹. Wetlands have been estimated to provide carbon storage services to a value of \$ 4 666 million per year, and carbon sequestration services of \$ 0.9 million per year¹¹.
- Wetlands within the National Capital Region were estimated to provide climate regulation services to a value of \$ 2.9 million per year¹²

3) Methods of Valuing Natural Assets

The value of the services provided by natural assets can be determined with a high degree of accuracy, using a combination of modeling and monitoring to determine the extent of the services provided, and well-defined economic approaches to determine the value of the services.

Natural assets that have not been purchased may be valued using several well-developed techniques, grouped into three approaches: 1) direct market valuation, 2) revealed preference and 3) stated preference. A fourth category, the benefit-transfer (or value-transfer) method, involves applying the results from prior studies of a specific ecosystem service to a new area of interest. Each of these methods has its strengths and weaknesses, and most can only be applied to a subset of ecosystem services, depending on the type of value that the service contributes.

A frequently recommended method for assessing the value of natural assets is the Replacement Cost method. This employs a direct market valuation, and can be readily calculated. It shows what it would cost to provide a natural asset's service by an engineered means. This valuation method is appropriate when the services being provided by a natural asset could be replaced by conventional infrastructure (e.g., engineered stormwater management). In this case, the cost of replacing the asset's capacity to provide a specific service can be estimated using the replacement cost of conventional infrastructure.

Revealed Preference may be an appropriate method when a local government would like to understand how a natural asset is affecting the market price of a related good (e.g., the travel cost incurred to visit the location).

Stated Preference is an appropriate method of valuation when municipalities would like to get a sense of what the community would be willing to pay (in taxes for instance) to ensure the continued health of a service (e.g., the cost of maintaining forest cover to promote desired air quality).

In situations where a natural asset contributes multiple services to a public entity (e.g., water filtration and recreation) it may be necessary to employ more than one valuation technique at the same time to arrive at the value of an asset.

The old argument that natural assets should be excluded from financial statements because it is not possible to reliably calculate their value is outdated, given the availability of the above methods of valuing natural assets, and their active use by local governments in Canada.

As has been well documented by MNAI and others, it is possible and indeed often straightforward to calculate the services and corresponding service values for many types of natural assets. For example, it is now routine to calculate the water-filtration and storage services provided by wetlands, using modeling to ensure accuracy, and also to determine with a high degree of precision the capital and operating costs of an engineered storage and filtration system required for the same task. There are ways to make direct market-value comparisons for many other services provided by natural assets that can be used to characterize service value.

Further discussions between PSAB and expert stakeholders may be required to determine how to calculate appropriate values of natural assets -- but not whether they exist, are tangible, and can be determined.

To foster a more rapid inclusion of natural assets in financial statements, we suggest that initial accounting efforts could focus on the ample array of natural assets and services for which valuation methods are the most developed.

It should also be noted that the valuation of assets that are already recognized does not necessarily yield a precise "correct" answer; asset values may vary significantly over time according to short-term market fluctuations. While a wetland's services and corresponding value will typically depend on its context and location, the same is equally true of, for example, a building whose value will vary according to its location, market conditions and other context-dependent factors.

Natural assets should not be held to a higher standard of accounting certainty than that demanded for other asset classes.

4) The Need for Public Sector Accounting to Evolve

Since the value of intact natural assets is excluded from public-sector entity financial statements, the costs of damage to natural infrastructure or the benefits of restoration are not appropriately factored into public-sector decision-making. Consequently, **short-term monetary gains that often drive the degradation of natural assets are frequently prioritized above the long-term economic value of services provided year-on-year by intact natural assets.**

The lack of disclosure of natural assets' values has historically led to their mismanagement and to the degradation of the associated services they provide to public-sector entities.

Degraded natural assets may also present otherwise undocumented liabilities. For example, a degraded aquifer can lead to substantial costs to find or build a suitable alternative.

Natural assets meet PSAB's characteristics of an asset

The PSA Handbook, Section PS 3210, names three essential characteristics that an asset must have to be considered a financial asset. These are outlined in Table 1, together with the way that these characteristics are reflected in *natural assets*. There appears to be no barrier to considering natural assets as recognizable "assets," and therefore no reason for their explicit exclusion from statements of financial position.

Table 1: Characteristics of Assets and How Natural Assets Meet these Criteria

Characteristics of “assets”	Characteristics of natural assets
They embody future economic benefits that involve a capacity, singly or in combination with other assets, to provide goods and services, to provide future cash inflows, or to reduce cash outflows.	Public-sector entities derive distinct future economic benefits from natural assets. Forests provide tree cover that makes communities more livable and offer a recreation space to those living in the community. Wetlands and rivers mitigate flood risks. Such natural assets may contribute to future cash inflows, where a municipality sells passes for admission. They also reduce cash outflows, by reducing expenditures required to mitigate flood risks by investing in traditional infrastructure. The range of services and goods derived from natural assets, and the methods that can be used to value these services and goods in monetary terms have been presented in the preceding sections.
The public-sector entity can control the economic resource and access to the future economic benefits.	Public-sector entity decisions directly affect natural resources and community access to the benefits they provide, including their economic benefits, both now and in the future. For example, a decision to permit damage to a natural asset may remove long-term access to economic benefits for an entire community – a financial loss that is currently not reflected in financial statements. Public-sector entities may also regulate access to the services provided by natural resources using infrastructure or fees for service (e.g. stormwater management rates).
The transaction or event giving rise to the public-sector entity's control has already occurred.	The transaction or event giving rise to the public-sector entity's control is typically the inheritance or acquisition of rights to the natural asset. This can be demonstrated to have occurred through the rights of the Crown.

On the international stage, the way in which “value” is accounted for is changing -- PSAB standards must evolve to keep pace in Canada.

- In March 2021, the 52nd United Nations Statistical Commission adopted the System of Environmental-Economic Accounting—Ecosystem Accounting (SEEA EA).¹² This new statistical framework will enable countries to measure their natural capital, and understand the contributions of nature to prosperity and the importance of protecting it.
- In March 2020, the International Public Sector Accounting Standards Board (IPSASB) Natural Resources Project was established to address issues relating to the recognition, measurement, presentation and disclosure of natural resources. Its Project Brief notes that: "Items that are not recognized risk being mismanaged. Because natural resources are such a significant revenue source for many jurisdictions, the lack of recognition and measurement was highlighted as a public interest issue."¹³
- In September 2020, financial institutions, regulators and corporations established a working group to bring together a Taskforce on Nature-related Financial Disclosures (TNFD),¹⁴ similar to the established Taskforce on Climate-related Financial Disclosures (TCFD), which is gaining increasing momentum with both private and public-sector entities.

There are already moves in several countries to adopt natural capital accounting systems.

- In the U.K., at the Office for National Statistics (ONS), natural capital accounts are being compiled annually, in line with the guidelines recommended by the United Nations SEEA EA.
- In South Africa, the Accounting Standards Board's Standard of Generally Recognized Accounting Practice (GRAP) Standard for Living and Non-living Resources (GRAP 110) was published in 2017. This standard prescribes the requirements for the recognition, measurement, presentation and disclosure of living resources, and the disclosure requirements for non-living resources.¹⁵

- In the United States, the Federal Accounting Standards Advisory Board (FASAB) introduced guidance (which took effect in 2013) requiring federal entities to report the value of the federal government's estimated royalties and other revenue from federal natural resources that are under lease, contract or other long-term agreement, and are reasonably estimable.¹⁶

The focus on the importance of natural capital has also increased notably since the beginning of the COVID-19 pandemic. The value of natural assets to local communities and human well-being has been brought sharply into focus as a result of stay-at-home orders and restrictions on activities and travel.

The public sector -- international institutions and countries -- has recognized the monetary value of natural assets, and the private sector is rapidly following suit.

Asset managers, institutional investors, banks and insurance companies are also actively seeking opportunities to incorporate natural-capital considerations into investment decision-making and financial services. A key example is BlackRock, the world's biggest asset manager. In a report detailing its engagement priorities for 2021,¹⁷ BlackRock says: "All companies rely on natural capital in some way and, as the world transitions to a low-carbon economy, we ask companies to demonstrate how they are minimizing their negative impacts on, and ideally enhancing the stock of, the natural capital on which their long-term financial performance depends."

Natural capital is an integral part of Environmental, Social and Governance (ESG) performance, the metrics of which are being used to determine credit ratings, including for public-sector entities. It is also an important factor for entities to consider when they set targets to meet the United Nations' Sustainable Development Goals, such as the protection and restoration of ecosystems and efforts to halt the loss of biodiversity (Goal 15, "Life on Land").¹⁸

In Canada, Swiss Re, the Insurance Bureau of Canada and MNAI are working on a pilot project to develop insurance products that would provide explicit coverage to protect natural assets against potential damage from natural disasters, such as earthquakes, hurricanes, floods, droughts and wildfires.¹⁹ These new insurance products highlight the significance of natural assets to community well-being – and demonstrate that their protection merits attention similar to that afforded to traditional/ grey infrastructure assets. Under this "parametric insurance," claim payouts are triggered by a predefined event such as a hurricane of a certain magnitude; the payout is almost immediate, in order to repair any damages to the natural asset so that it can continue to deliver its ecosystem benefits.

Institutional investors are also actively looking for investment opportunities to increase natural capital as part of their sustainable-finance initiatives. For example, Fondaction in Quebec has employees whose specific role is to develop these investment opportunities.

Major banks are also forecasting growth in the green-loan market in Canada, as an alternative financial instrument to green bonds. The preservation and restoration of natural capital projects could be funded by green loans, accessed by local governments.

Public-sector entities that want to take advantage of new green financing opportunities will have to measure and account for a baseline value for their natural capital, in order to demonstrate their return on investment (ROI), which would logically be reflected in their financial position statements.

5) The Role of the PSAB in Enabling Natural Asset Accounting in Canada

There is significant momentum in Canada in documenting and valuing natural assets

In Canada, efforts to assess and value natural assets in terms of the services they provide are already assisting local governments in the effective, long-term management of their municipal assets and services. By integrating natural assets into their asset management systems, several local governments have been able to craft more-robust plans to ensure continued service delivery, combining the benefits of built and natural assets. The inability to reflect all of these assets in financial statements effectively creates a significant discrepancy between true assets available to a municipality to provide services, and assets recognized in the Statement of Financial Position. Removal of the explicit exclusion of recognition would remove this discrepancy.

On the international front, Canada’s co-leadership of the Nature-Based Solutions Action Track of the Global Commission on Adaptation indicates support at the federal level for the recognition of the untapped potential of natural assets to reduce climate risks.

PSAB can build on this momentum and be a key enabler for the recognition and improved management of natural assets in Canada by undertaking the following steps:

- Remove the explicit exclusion of non-purchased natural resources from the proposed new Financial Statement Presentation standard (proposed Section PS 1202), understanding that this does not obligate public-sector entities to include natural resources in their financial position statements.
- Work with stakeholders to incorporate concrete steps towards the recognition and measurement of natural assets in public-sector financial statements as part of the PSAB's Strategic Plan for April 1, 2022 to March 31, 2027, rather than including this topic in the project priority survey after the Strategic Plan is finalized. Several stakeholders, including signatories to this response, are eager to contribute resources to work with PSAB to make this happen. This could include initial guidance on note disclosure of natural assets, providing time to build familiarity with such reporting and to develop guidance, prior to inclusion in audited sections of financial statements.

Steps toward the inclusion of natural assets in public-sector financial position statements could include working in partnership with subject matter experts and stakeholders. For example, the PSAB could:

- Provide public-sector entities with guidance for the inventory and valuation of natural assets – potentially working with the Standards Council of Canada, MNAI, the Canada Research Chair in Ecological Economics (University of Quebec in Outaouais), Ouranos, TRCA, CVC, the Greenbelt Foundation, Green Infrastructure Ontario and local governments that have already undertaken detailed studies in this area.
- Understand the need for, and uses of, natural-asset public-sector accounting data – potentially working with the Global Risk Institute, Finance Montreal's Sustainable Finance Initiative, Toronto Finance International's Resource Centre for Sustainable Finance, TNFD, TCFD, and the Insurance Bureau of Canada, together with their members: banks, credit ratings agencies, institutional investors and insurance companies.

Canada is rich in natural assets that deliver economic and social benefits to public-sector entities, including carbon sequestration and storage, flood protection and biodiversity. The PSAB can support public-sector entities in valuing, preserving and growing this wealth for the economic benefit of Canadians, by enabling it to be reflected in financial position statements.

Endnotes

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