Making Nature Count

DEFINING AND SCOPING MUNICIPAL NATURAL ASSETS

SEPTEMBER 2017

MAKING NATURE COUNT

REPORT

INVEST IN NATURE

The Municipal Natural Assets Initiative (MNAI) is changing the way municipalities deliver everyday services, increasing the quality and resilience of infrastructure at lower costs and reduced risk. The MNAI team provides scientific, economic and municipal expertise to support and guide local governments in identifying, valuing and accounting for natural assets in their financial planning and asset management programs, and in developing leading-edge, sustainable and climate resilient infrastructure.

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1 Introduction

Local governments[1] across Canada are faced with significant asset management challenges. Many of the services they provide—including water and wastewater, waste removal, transportation, and environmental services—depend, in large part, on engineered infrastructure assets that are in need of renewal. Meanwhile, the effects of climate change are expected to put even more strain on these assets and on local government budgets.

To provide community services in a cost effective and sustainable manner now and in to the future, local governments are looking for ways to improve management of the critical assets that supply these services. Asset management—the process of inventorying a community's existing assets, determining the current state of those assets, and preparing and implementing a plan to maintain or replace those assets—allows municipalities to make informed decisions regarding a community's assets and finances.

Unfortunately, local governments lack policies to measure and manage one class of assets: natural assets. Natural assets are ecosystem features that provide, or could be restored to provide, services just like the other engineered assets, but historically have not been considered on equal footing or included in asset management plans.

As the municipal infrastructure asset management process evolves, it will be critical to ensure that all community assets that may provide municipal services—lakes, wetlands, green spaces and trees as well as roads, bridges and buildings—are appropriately identified and managed.

Local governments lack policies and methods to measure one class of assets: natural assets.

2 Defining municipal natural assets

2.1 Why do we need a definition for municipal natural assets?

Municipal natural asset management (MNAM) is one of many approaches being developed to advance the recognition of natural assets in decisions about the management of municipal infrastructure assets. Because this is an emerging approach, a clear definition for "municipal natural assets" is needed to differentiate MNAM from other approaches to municipal infrastructure asset management, and to establish a common basis of understanding where the MNAM practice can bring value to decision-making.

1 Use of the term "local government" or "municipality" throughout this document refers to all authorities that have municipal responsibilities (i.e. local administrations, metropolitan and regional municipalities, First Nation communities, and sectoral organizations). Each province uses its own terminology. For more information, see https://www.fcm.ca/Documents/tools/International/Your_Guide_to_Municipal_Institutions_in_Canada_EN.pdf

2.2 What is a natural asset?

Natural assets to date have been more commonly referred to as *natural capital*, though the meaning is the same. The concept of *natural capital* is used as an economic metaphor for the limited stocks of physical and biological resources found on earth. A complex web of biological, chemical, and physical processes produce *ecosystem goods and services* that flow like interest or dividends from those stocks, supporting all life on earth and deeply influencing the quality of human life.

Ecosystem goods are the products from natural capital such as food, fibre, clean air, and water; *ecosystem services* are the less tangible but no less significant benefits from ecosystem processes such as nutrient cycling, water purification and climate regulation, and non-material benefits such as recreation, aesthetic and cultural benefits.

There are many varying definitions of natural capital, but all revolve around the main theme of the stock of renewable and non-renewable natural resources that includes land, water, atmosphere, minerals, plant and animal species, and all living things. For example,

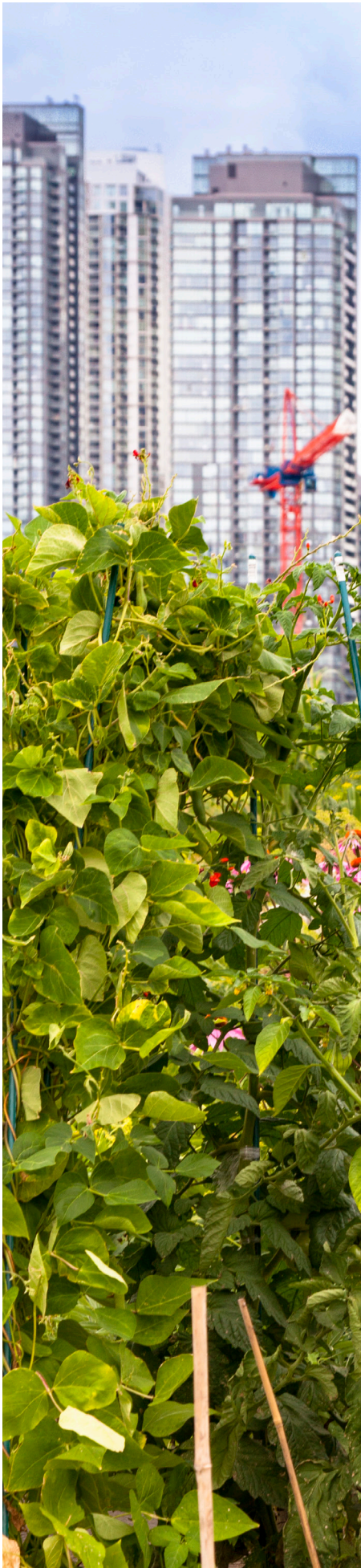
> "Natural Capital can be defined as the world's stocks of natural assets which include geology, soil, air, water and all living things."
>
> ~World Forum on Natural Capital[2]

Many definitions also reference the flow of goods and services that come from natural capital (see Figure 1):

> "Natural capital is another term for the stock of renewable and non-renewable resources (e.g. plants, animals, air, water, soils, minerals) that combine to yield a flow of benefits to people."
>
> ~ Natural Capital Coalition[3]

The concept of natural capital intentionally references the familiar economic notion of financial capital:

> "The term 'capital' has been borrowed from the financial sector to describe the value of the resources and ability of ecosystems to provide flows of goods and services such as water, medicines and food. Flows of goods and services that benefit people are called 'ecosystem services'. Much as an investor will use financial capital to generate profits, a stock of forest or fish will provide a future flow of timber or food, which if used sustainably will provide long-term benefits to people."
>
> ~The Natural Capital Declaration[4]



2 World Forum on Natural Capital held in Edinburg in 2015; source: http://naturalcapitalforum.com/
3 Natural Capital Coalition definition of natural capital as found at: http://naturalcapitalcoalition.org/
4 The Natural Capital Declaration document retrieved from: http://www.naturalcapitaldeclaration.org/wp-content/uploads/2012/04/NaturalCapitalDeclaration.pdf

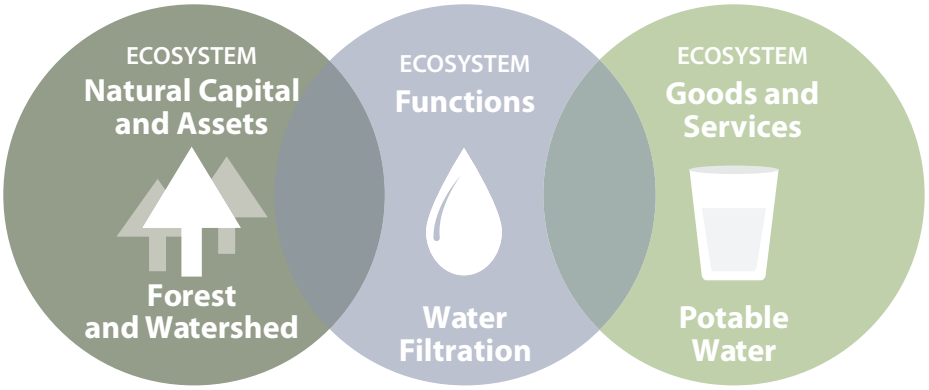


Figure 1: Illustration of the link between the stock (i.e., natural capital) and the service (e.g., potable water). Image adapted from Earth Economics (http://www.eartheconomics.org/science-economics)

2.3 Natural Asset vs. Green Infrastructure

The terms natural asset and green infrastructure are often used interchangeably, but one is broader than the other. Whereas natural assets refers to the stock of natural resources and ecosystems that yield a flow of benefits to people, green infrastructure also includes designed and engineered elements that have been created to mimic natural functions and processes in the service of human interests (see Figure 2).

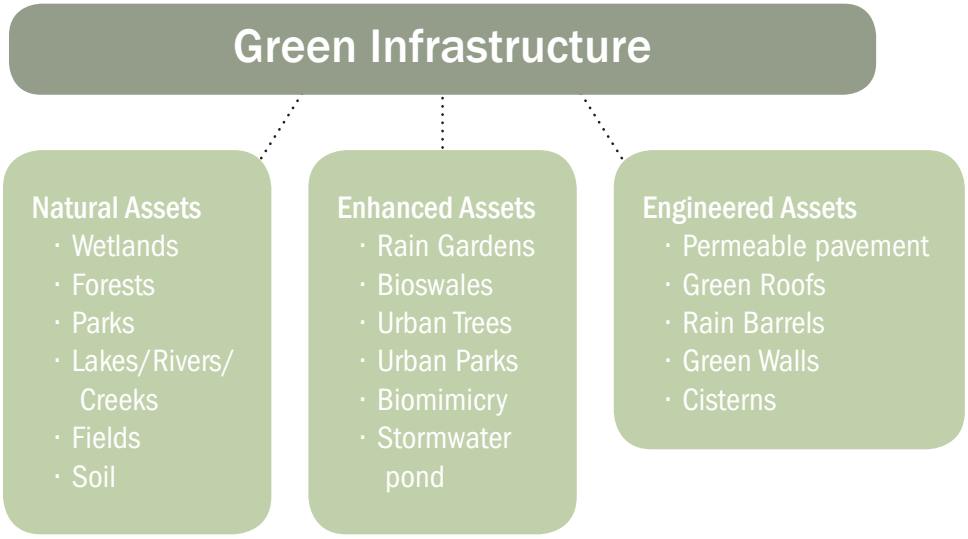


Figure 2: Relationship between various terms used to describe green infrastructure and natural assets.

Although green infrastructure can provide many ecosystem services, such as temperature moderation and air filtration, much of the emphasis in current discourse is on those elements that provide ecological and hydrological functions and processes for managing water.[5] These green infrastructure

5 See West Coast Environmental Law, 2007, The Green Infrastructure Guide (available at: http://www.waterbucket.ca/gi/sites/wbcgi/documents/media/336.pdf) for a slightly different definition that includes "design with nature" principles

elements include natural heritage features and systems, parklands, stormwater management systems, street trees, urban forests, natural channels, permeable surfaces, and green roofs.[6,7] The US EPA, for example, states that "green infrastructure uses vegetation, soils, and other elements and practices to restore some of the natural processes required to manage water and create healthier urban environments."[8] In the *Ontario Provincial Policy Statement 2014*, green infrastructure is defined as "natural and human- made elements that provide ecological and hydrological functions and processes."[9] Other terms related to green infrastructure include low impact development, rainwater management, or natural stormwater management. In Canada, there are additional variations: the Government of Canada, for example, has included clean energy in the definition of green infrastructure,[10] and often uses the term "living green infrastructure" for the more common definition of green infrastructure.

For the purposes of this report, we are focusing only on the natural asset portion of green infrastructure.

2.4 What are Municipal Natural Assets?

Although the term natural capital or natural asset is relatively well known in environmental research and policy, applying it in a municipal context is a new and emerging concept.

Nature provides many services that our communities rely on for our long-term health and well-being. Vegetation and soil soak up rainwater and recharge the aquifers, rivers, and lakes that provide many of us our drinking water sources. Wetlands store excess rainwater that is slowly released over time; pollutants are removed from the water and peak flood volumes are decreased. Bees provide critical pollinating services that our local farmers rely on for food production. Forests cool our urban areas and remove air pollutants, helping us breathe better and reducing our energy consumption. At the local level, we all rely heavily on nature's services for our day-to-day well-being.

From a local government perspective, the term asset typically refers to engineered infrastructure that provides municipal services, such as roads, bridges, water treatment plants and drainage pipes. Yet, as just discussed, nature also provides many services that fall within the realm of municipal services, such as water storage and filtration or rainwater management. In this capacity, from a service perspective, nature, or natural assets, is a municipal asset no different from other forms of infrastructure.

The Government of Canada often uses the term *living green infrastructure* for the more common definition of green infrastructure.

6 Ontario Provincial Policy Statement 2014; retrieved from: http://www.mah.gov.on.ca/AssetFactory.aspx?did=10463
7 For additional explanation of green infrastructure elements see US EPA Green Infrastructure website; retrieved from: http://www2.epa.gov/green-infrastructure/what-green-infrastructure
8 See US EPA website, What is Green Infrastructure?; retrieved from: https://www.epa.gov/green-infrastructure/what-green-infrastructure
9 Ontario Provincial Policy Statement, 2014; available at www.mah.gov.on.ca/Page10679.aspx
10 The Government of Canada's 2016 Budget included a full section on Green Infrastructure that lists a much wider range of infrastructure for clean energy, asset management, and water and wastewater systems. See Government of Canada, Budget 2016: Growing the Middle Class (March 2016); retrieved from: http://www.budget.gc.ca/2016/docs/plan/budget2016-en.pdf. Infrastructure Canada also recently issued a statement via social media explaining that green infrastructure includes climate resilient infrastructure, clean energy, cleaning-up contaminated sites, and water/wastewater infrastructure. See Infrastructure Canada, Twitter Feed; retrieved from: https://twitter.com/INFC_eng/status/705121953749864448

Given this perspective, the proposed definition for municipal natural assets is:

The term Municipal[11] Natural Assets refers to the stocks of natural resources or ecosystems that contribute to the provision of one or more services required for the health, well-being, and long-term sustainability of a community and its residents.

Municipal Natural Assets include all natural assets that support our communities but the MNAM approach only considers those assets that fall directly within the mandate of a local government. Section 3 attempts to refine this definition for application within MNAM.

3 Scoping the Municipal Natural Asset Management Approach

Natural assets provide a wide range of services that benefit our communities and all levels of government have a role to play in ensuring the protection of those assets. At the municipal level, there are certain tools at our disposal that can be effective in ensuring that core municipal services are provided in a sustainable manner, while at the same time ensuring that other co-benefits provided by our natural assets are also protected.

The purpose of this section is to outline the Municipal Natural Asset Management (MNAM) Approach, which aims to measure and manage natural assets through existing asset management frameworks, but also to highlight the other ways in which natural assets can be managed by a local government.

MUNICIPAL NATURAL ASSETS

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3.1 Municipal Natural Asset Toolkit

There are a number of ways in which a municipality or local government can influence the management of municipal natural assets: through direct asset management, through shared natural asset management, and indirectly through supporting policies, bylaws, plans and guidelines.

3.1.1 Municipal Natural Asset Management (MNAM)

Many municipalities are developing asset management strategies to more systematically manage their infrastructure assets. The impetus towards developing asset management strategies is being driven by changes to public sector accounting guidelines, eligibility criteria for federal Gas Tax grants, certain provincial legislative requirements, as well as program support and funding.

11 Use of the term "local government" or "municipality" refers to all authorities that have municipal responsibilities (i.e. local administrations, metropolitan and regional municipalities, First Nation communities, and sectoral organizations). Each province uses its own terminology. For more information, see https://www.fcm.ca/Documents/tools/International/Your_Guide_to_Municipal_Institutions_in_Canada_EN.pdf

In 2009, the Public Sector Accounting Board (PSAB) implemented PS 3150,[12] which requires municipalities to not only account for tangible capital assets but also to amortize them. This has forced municipalities to develop asset management plans in order to comply with the new standard.

The Government of Ontario's Guide for Municipal Asset Management explains it as the "process of making the best possible decisions regarding the building, operating, maintaining, renewing, replacing and disposing of infrastructure assets. The objective is to maximize benefits, manage risk, and provide satisfactory levels of service to the public in a sustainable manner."[13] The focus on service, rather than engineered assets, is highlighted by the Canadian Network of Asset Managers' description of asset management as "the coordinated activities of an organization to realize value from its assets in the achievement of its organizational objectives."[14] It is also emphasized in the Asset Management BC Framework.[15] Asset management strategies embrace a lifecycle approach and strive for continuous improvement in asset management practices.

Municipal asset management is therefore focused on the "infrastructure assets" that are used by a municipality for the provision of a sustainable municipal service. Natural assets that are owned or managed by the municipality or that provide the same municipal service as other engineered infrastructure can therefore be considered as municipal infrastructure assets. From the perspective of a municipal asset management approach, we can therefore view municipal natural assets as those assets that provide municipal services:

The Municipal Natural Asset Management (MNAM) approach views municipal natural assets through an infrastructure asset management lens and generally considers those municipal natural assets that would otherwise need to be provided by a municipality, regional government, or other form of local government.

12 Public Sector Accounting Board PS 3150
(http://www.municipalaffairs.gov.ab.ca/documents/ms/PSAB_3150_4_toolkit_full_document.pdf)
13 Government of Ontario, Building Together – Guide for municipal asset management plans
(https://www.ontario.ca/page/building-together-guide-municipal-asset-management-plans#section-1)
14 The Canadian Infrastructure Report Card: Asset Management Primer (2014); retrieved from
http://cnam.ca/wordpress/wp-content/uploads/2015/05/CIRC-Asset-Management_EN_LR.pdf
15 Asset Management BC – Asset Management for Sustainable Service Delivery : A BC Framework
(http://www.assetmanagementbc.ca/framework/)

Table 1 provides an example of the types of municipal water services typically provided by engineered infrastructure that can also be provided by natural assets. This can conversely be viewed as natural infrastructure that, if lost, would need to be replaced by engineered infrastructure.

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

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

3.1.1.1 Municipal Natural Asset Management in Gibsons, B.C.

Gibsons, B.C. is the first local government to use infrastructure and financial management concepts already embedded in government processes to better manage their natural assets.[16] They started the process with the Gibsons Aquifer. The aquifer filters and stores water to supply the town and future projected populations with clean drinking water. Losing that aquifer to contamination or other degradation would impose a significant expense on the town, which currently spends only approximately $28,000 per year monitoring the aquifer. By identifying the aquifer as a critical infrastructure asset, the Town can better manage and protect the asset for the long-term. The Town has also identified their creeks, woodlands and the foreshore as critical assets for the community with the goal of including these assets in the asset management process in the near future.

16 See Town of Gibsons Eco-Asset Strategy (http://www.gibsons.ca/eco-assets)

3.1.2 Shared Management of Natural Assets

Unlike traditional infrastructure, such as roads, sewers, etc., which can easily be divided along jurisdictional lines, natural assets often extend beyond the boundaries of a single jurisdiction and may require collaboration between municipal departments, private property owners, and with adjacent municipalities and other orders of government (see Figure 3). For example, a creek can flow through two adjacent municipalities, providing services to each, but if the management of that creek is disjointed, the whole system will be impacted. If the downstream municipality protects the creek by maintaining vegetated buffers and controlling the amount of pollutants but the up-stream municipality does not protect the stream, the whole system will be impaired to the detriment of both municipalities. In these cases, shared responsibility for the asset will be required.

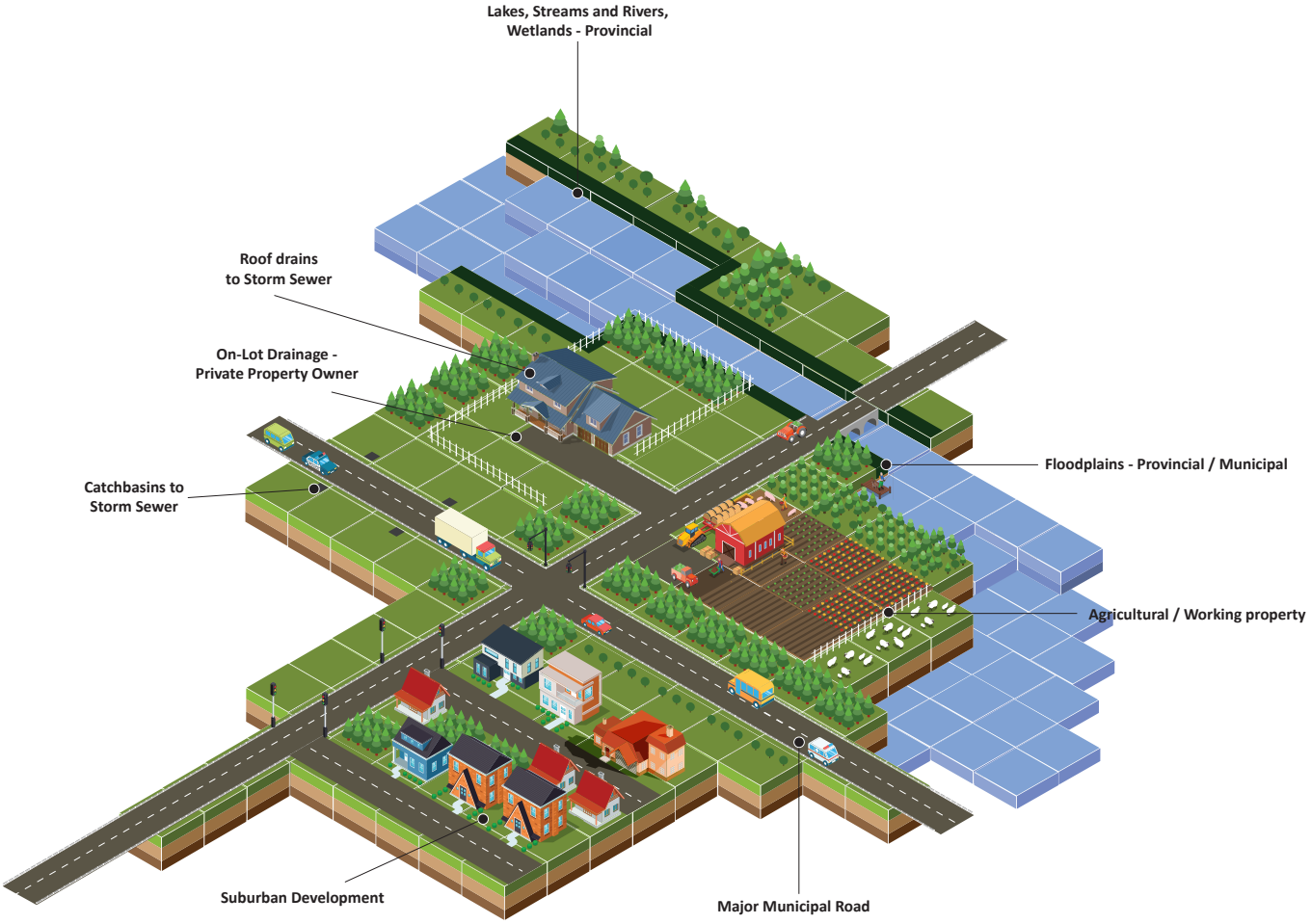

Figure 3: Example depiction of the multiple stakeholders and authorities involved in the management of a single natural asset (the river)

A good example of shared management of a natural asset is Still Creek, which flows through Vancouver and Burnaby, B.C., eventually draining into the Fraser River.[17] Still Creek provides a cooling effect to the highly urbanized area through which it flows, habitat for a number of species,

17 See the following document for details: Greater Vancouver Regional District – Still Creek Integrated Stormwater Management Plan (https://www.evergreen.ca/downloads/pdfs/watershed-resources/Still-Creek-Stormwater-Management-Plan.pdf)

and stormwater management. Jurisdiction over the creek includes the Government of Canada (Fisheries Act), the Province of British Columbia (Water Sustainability Act, Environmental Management Act, and Riparian Areas Protection Act), Metro Vancouver (Liquid Waste Management Plans), and finally the Cities of Vancouver and Burnaby (land-use bylaws, zoning, and integrated stormwater management plans). In 2007, an Integrated Stormwater Management Plan (ISMP) was created for the Still Creek watershed, based on collaboration and joint decision-making. The cities of Vancouver and Burnaby both officially adopted their own version of the ISMP for implementation matters that are within their individual jurisdictions and the Greater Vancouver Regional District will work with both cities on issues that are overarching. In 2012, spawning salmon returned to the creek, something that has not happened in almost 80 years.[18]

3.1.3 Supporting Tools for Natural Asset Management

In addition to MNAM, local governments have a number of other tools at their disposal to protect natural assets and the benefits they provide to our communities. The City of Guelph, for example, created the first Pollination Park in Canada, with the goal of providing habitat protection for pollination species such as bees and hummingbirds.[19] The City of Montreal has also developed a suite of tools to increase urban biodiversity through protection of natural assets including: Municipal Tree Policy, The Greening Strategy, a Strategic Plan for Sustainable Development, and a Policy to Protect and Enhance Natural Habitats.[20]

These tools, while not specific to asset management frameworks, provide local governments with a number of ways to support and complement asset management.

3.2 Summary

Each municipality will have a different set of natural assets that support core municipal services. The inclusion of these assets into the existing asset management framework brings them to the same level of importance and awareness as other typical engineered assets. Awareness of the unique nature of natural assets that cross jurisdictional borders requires a greater level of collaboration amongst governments, but each local government will have to take responsibility for their management of the resource within their boundaries. Finally, to support natural asset management and the management of co-benefits provided by natural assets that do not necessarily match core infrastructure services, local governments can include other policies and plans to identify the assets, confirm their value to the community, and integrate their management into all municipal decisions.

18 See the City of Vancouver Still Creek Enhancement: http://vancouver.ca/home-property-development/still-creek-enhancement.aspx
19 ICLEI Canada, 2010, Cities and Biodiversity Case Studies – pg14 (http://icleicanada.org/programs/biodiversity/item/5-biodiversity-case-studies)
20 ICLEI Canada, 2010, Cities and Biodiversity Case Studies – pg22 (http://icleicanada.org/programs/biodiversity/item/5-biodiversity-case-studies)

4 Areas for further research/ refinement

The central goal of the Municipal Natural Asset Initiative is to provide scientific, economic and municipal policy expertise to support and guide local governments in identifying, valuing and accounting for natural assets in their financial planning and asset management programs and developing leading-edge, sustainable and climate resilient infrastructure. Given the innovative nature of the MNAM approach, many items will be refined through trial and error during implementation.

4.1 Feedback Questions

To continue to refine a common definition and scope for municipal natural assets and the Municipal Natural Asset Management approach, feedback on the following questions is invited:

1. Does the proposed working definition of Municipal Natural Assets make sense?
2. Does Figure 2 represent the different elements of Green Infrastructure as it is understood within your municipality? If not, what is different?
3. What ecosystem services, in addition to the water specific services outlined in Table 1, are providing municipal services in your municipality? (e.g., are vegetated shorelines providing erosion protection?)
4. How are these municipal natural assets currently being managed? And for what services? (e.g., if a green space is being managed, is it being managed for recreational services, stormwater management services, both, neither, or something else?)
5. In reference to Section 3.1.2, if there is shared management of a natural asset:
    a. How is that asset managed?
    b. How are natural assets that pass through/overlap private property managed?
    c. What aspects of that process can be adapted to managing municipal natural assets for municipal services?

4.2 Future Defining / Scoping Research Areas

As part of the ongoing process, additional questions related to defining and scoping municipal natural assets will inevitably arise. The identified next research phase of the project is to address the role of private landowners in the management of municipal natural assets. Questions related to policy barriers at the national and provincial levels and how natural assets fit in with existing professional standards and norms have also been identified for future research.

Is there an immediate research topic we are missing? Let us know!

GET INVOLVED

To learn more email **info.mnai@gmail.com**
or connect with us via **Municipal Natural Assets**

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