Natural Assets Initiative

MAKING NATURE COUNT

CNAM Canadian Network of Asset Managers

Canada FCM FEDERATION OF CANADIAN MUNICIPALITIES FÉDÉRATION CANADIENNE DES MUNICIPALITÉS

This initiative is offered through the Municipal Asset Management Program, which is delivered by the Federation of Canadian Municipalities and funded by the Government of Canada.

WELCOME!

CLIMATE ACTION COHORT
NATURAL ASSET MANAGEMENT

JANUARY 16, 2024

TODAY'S LEARNING OBJECTIVES

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By the end of this workshop, you will be able to:

1) **Define natural assets and their role in service delivery**

2) **Describe at a high level how natural assets can be managed as part of your organization's asset management practices:**

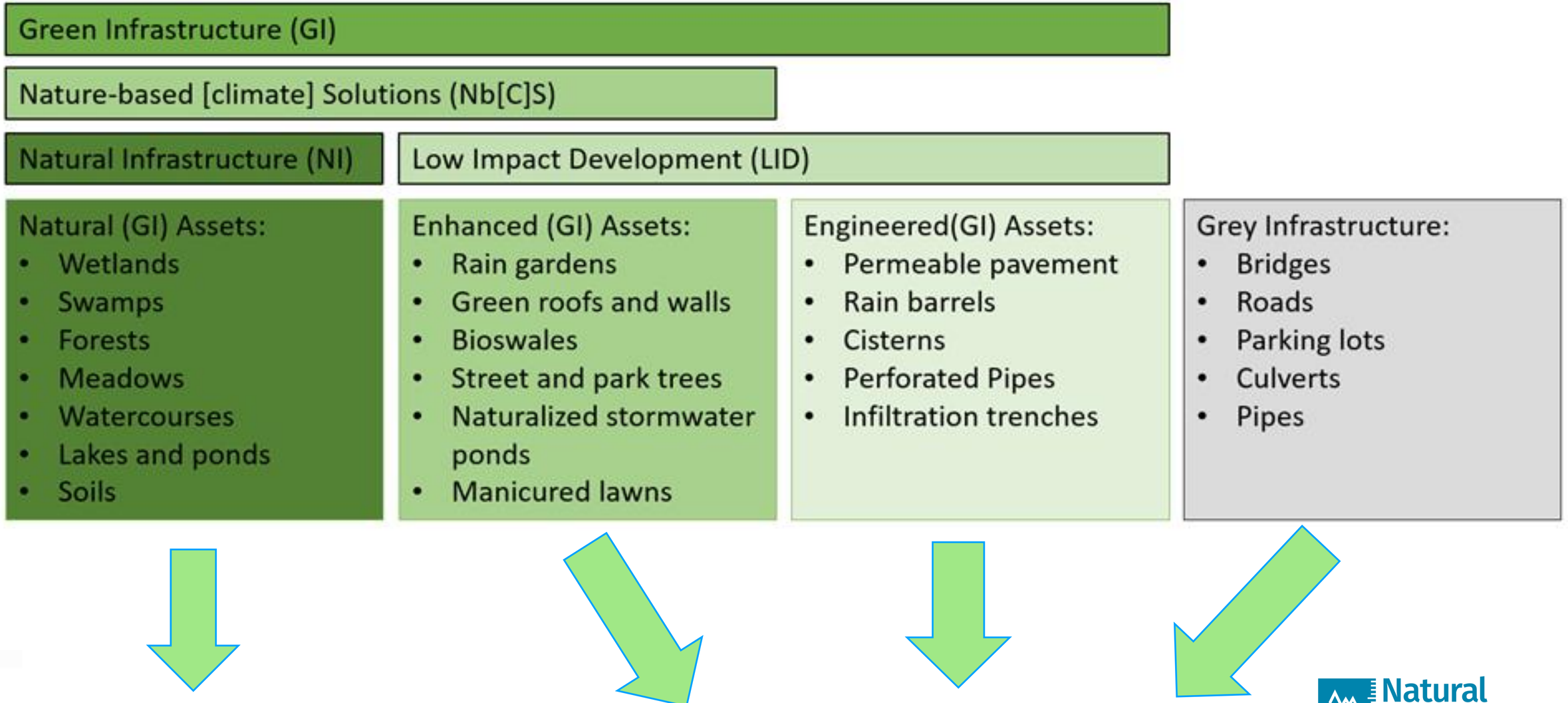
    A) **Assessing the state of natural infrastructure (inventory, condition, risks and valuation)**

    B) **Service delivery planning (levels of service)**

    C) **Lifecycle management and financial planning**

3) Explore how natural assets can help your organization better manage the costs and risks of service delivery.

Definition: Natural Assets are part of a continuum of green infrastructure assets



Intact natural areas & ecosystems

Constructed Infrastructure

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Why Consider Natural Assets?

Deliver Core Services (e.g. stormwater conveyance, water supply)

Can be managed

When not proactively managed: prone to over-use, degradation or can be lost entirely

Support low carbon resilience (climate mitigation + adaptation + co-benefits

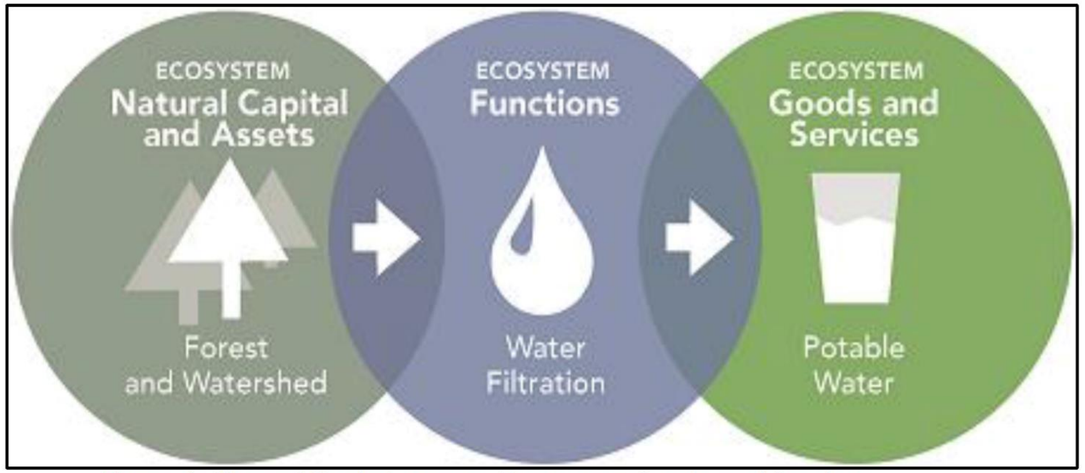
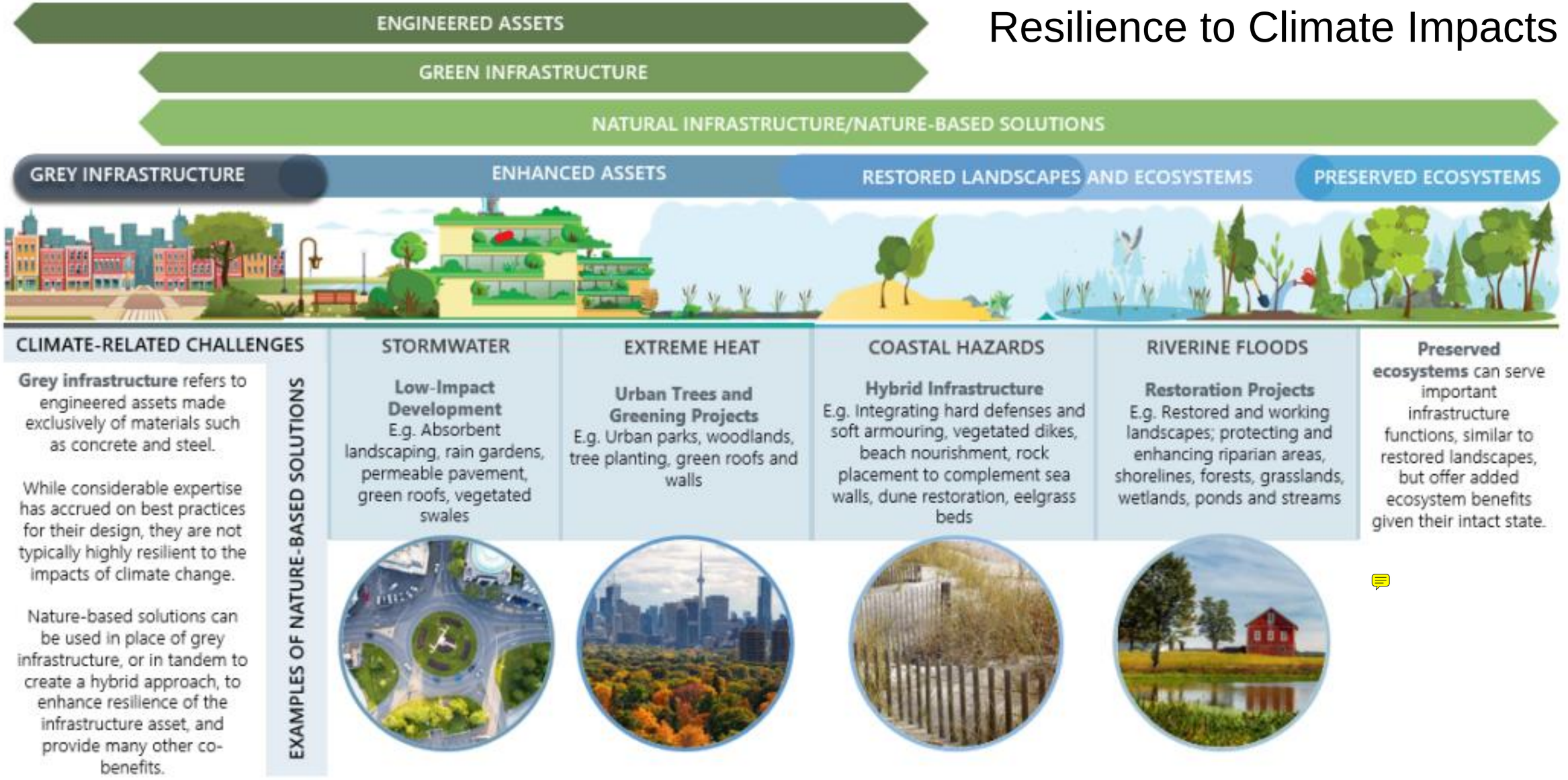


Figure 1: Natural Capital creates Ecosystem Goods and Services
(image source: Earth Economics http://www.eartheconomics.org/science-economics/)

Green Infrastructure Builds Resilience to Climate Impacts



Source: Canadian Council of Ministers of the Environment (2021), *Natural Infrastructure Framework: Key Concepts, Definitions and Terms*, page 5.

What are some unique features of natural assets that distinguish them from how grey (built) infrastructure assets are considered in an asset management plan?

Use the annotate feature to write down your ideas.

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Summary: Why consider natural assets as part of your local government's infrastructure system?

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✓Flexible & adaptable

✓Provide core services alongside engineered assets

✓Function can improve over time, with proper management

✓Provide multiple services/benefits

✓ Role in climate mitigation and adaptation

✓Can reduce costs of and risks to service delivery

Also:

✓Fewer energy inputs required

✓High employment to capital ratio

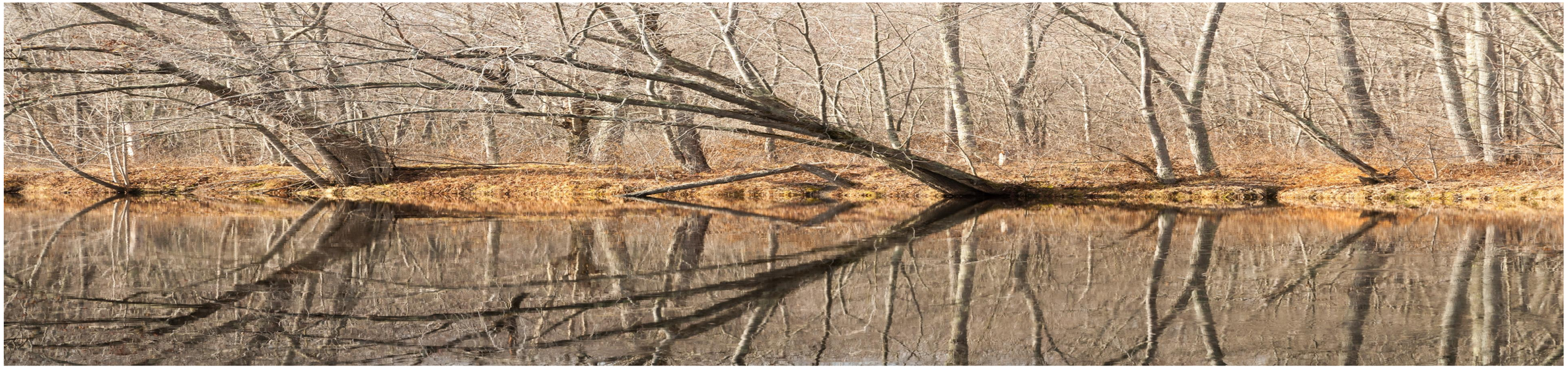
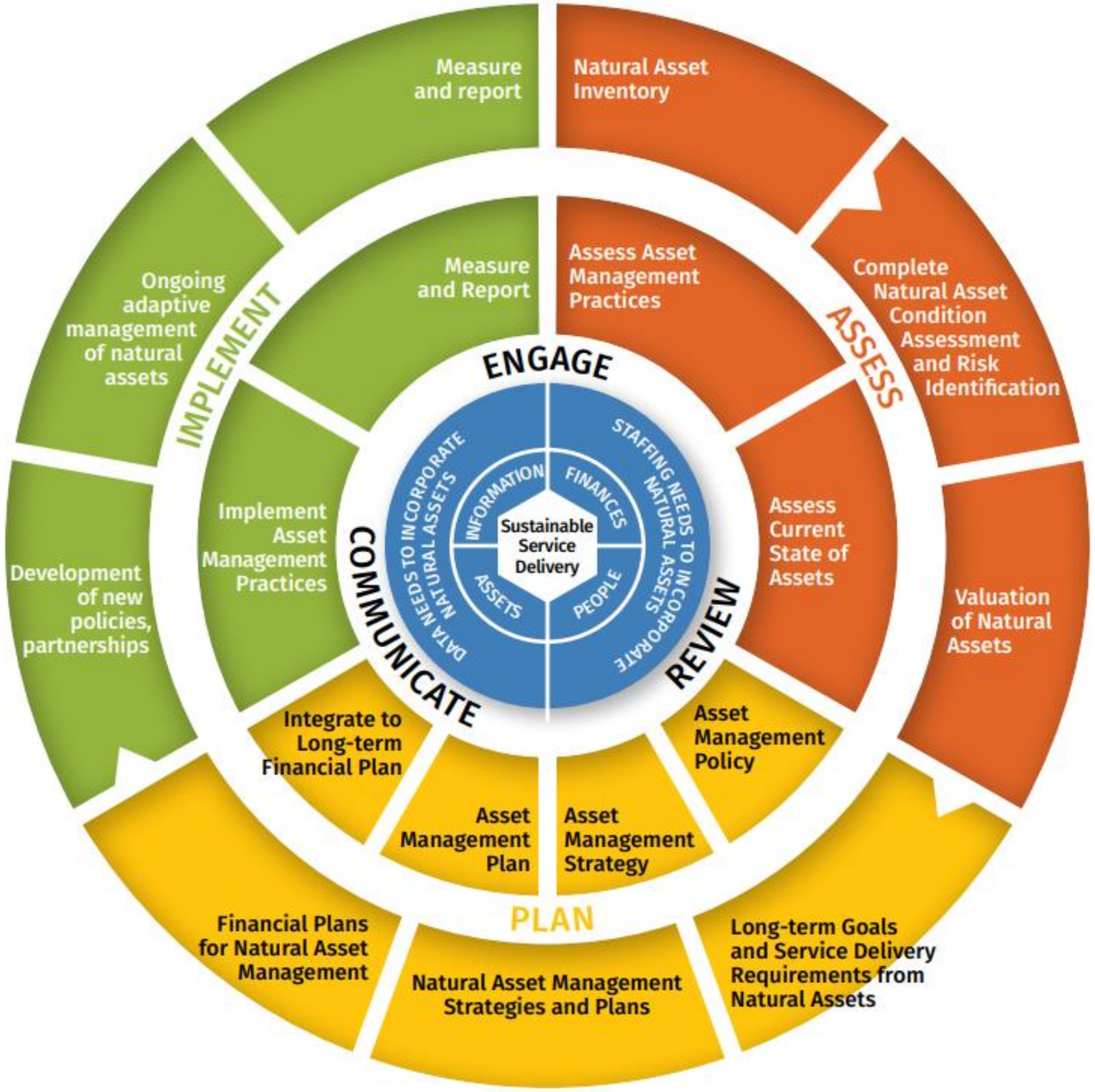


Photo by Sheena Woodhead on Unsplash



How do we start to build considerations for natural assets into decision making?

Source: Adapted from Asset Management BC Framework for Sustainable Service Delivery

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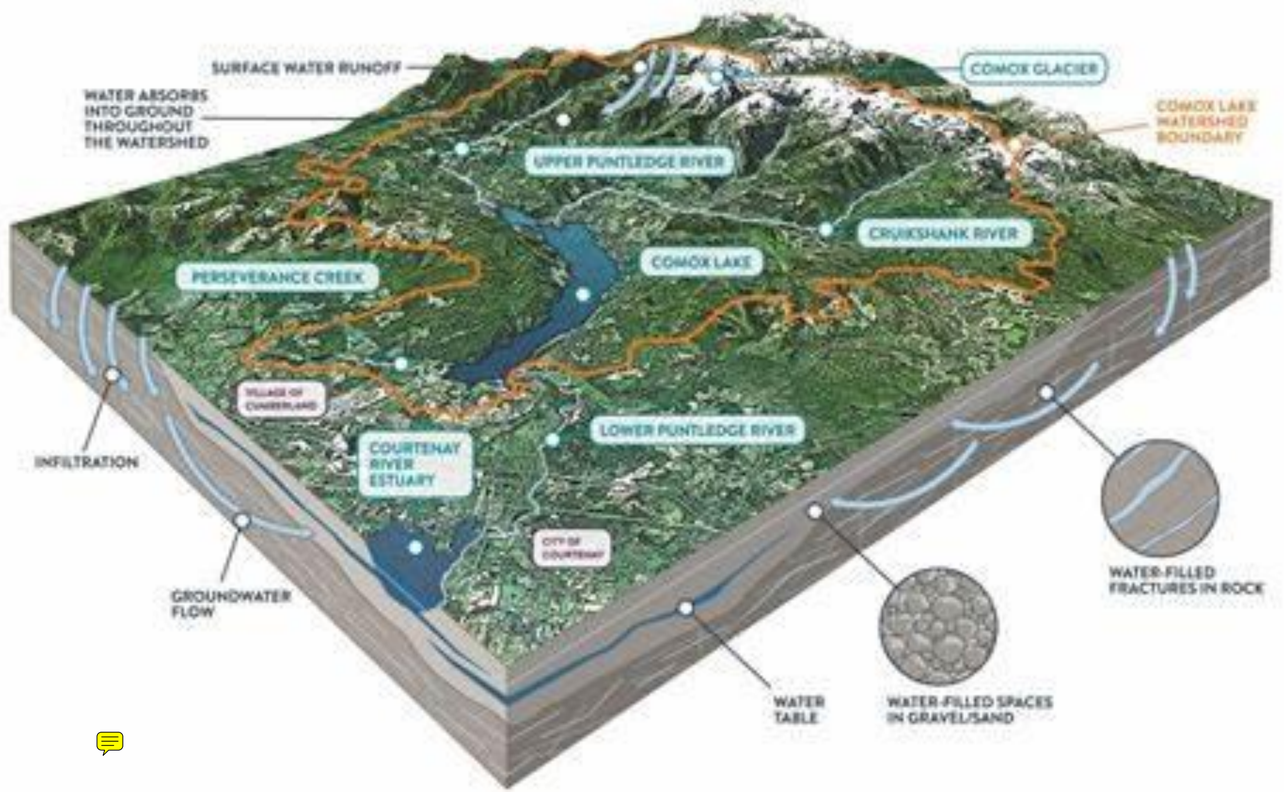
Natural Asset Management Consideration: Scale, Jurisdiction and Ownership Matter



Example: The Comox Lake Watershed. Source: Comox Valley Regional District. *Comox Lake Watershed Protection Plan*

Scale: because data & information is needed at a watershed scale for some natural asset services

Jurisdiction and Ownership: because effective natural asset management involves consultation, collaboration, partnerships, programs and policies (non-infrastructure solutions).

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Assessment Phase

What is the current state of natural infrastructure that is delivering services to our community?

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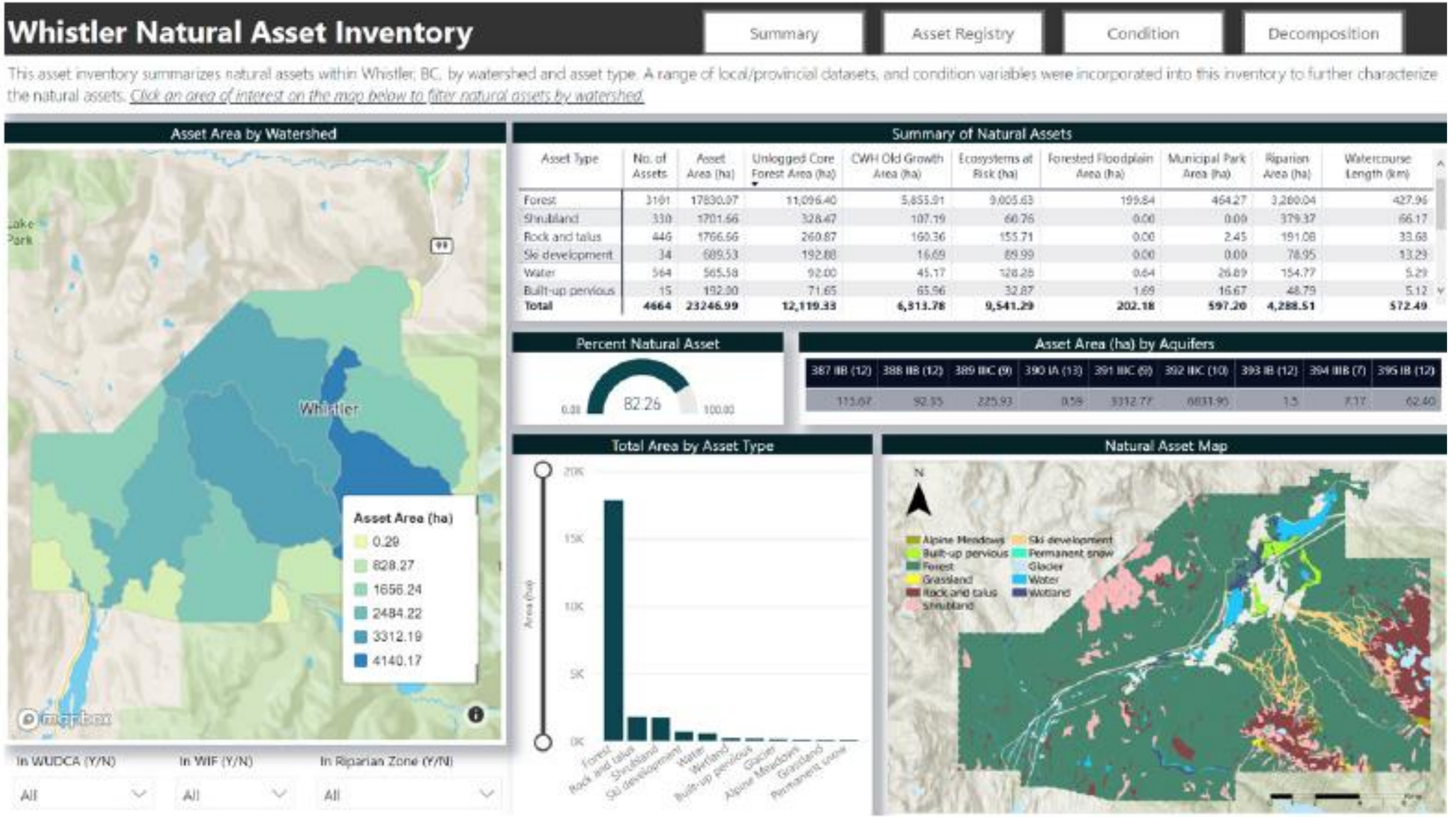

Includes:

Natural Asset Types

Location

Extent

Possibly: Condition and risk info

Natural Asset Inventory: What do you have? Where is it located? What condition is it in? What are the risks to them?

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Define the scope of assets to include in your inventory

Asset Class	Description
Natural Assets	This asset class captures the natural feature-based areas (e.g., woodlands, wetlands, meadows, etc.). Assets can be subdivided into more detailed classes that might further support the management of the asset or components of the asset (e.g., deciduous forest stand, mixed forest stand, coniferous forest stands).
Street and Park Tree Assets	This asset class captures the individual street trees that are owned and managed by a municipality.
Manicured Open Space Assets	This asset class captures pervious surfaces owned and managed by a municipality that typically require a higher degree of management and maintenance (e.g., mown turf or other landscape features). For instance: • Active use and sports field open space • Passive use open space • Other mown turf • Artificial beaches • City owned golf courses • Gardens
Watercourse Assets	This asset class captures linear natural aquatic features (e.g., rivers and streams).
Groundwater or Aquifer Assets	This asset class applies to municipalities that rely on groundwater as their source of drinking water supply.
Low-impact Development (LID) Assets	This asset class captures engineered and enhanced assets related to LID such as: rain gardens, bioswales, permeable pavement, infiltration trenches, etc.

Source: NAI, Natural Asset Management Plan Guidance, draft in development.

What are the minimum data requirements for a natural asset inventory?

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Use best available land use and land cover data, up to 5 years old. Where municipal data is limited, look to:

Dataset	Description	Spatial Coverage
Annual Crop Inventory	A remote sense LULC data set produced annually by Agricultural and Agri-food Canada (AAFC). Its primary purpose is to provide a national agricultural crop inventory. However, it does include other land cover features that could help establish a basic natural asset inventory.[2]	Covers most of Southern Canada.
Sentinel-2 10-Meter Land Use/Land Cover	High-resolution, open, and comparable land use provided by ESRI.[3]	Complete coverage across Canada.
Provincial or Territorial Land Use and Land Cover	Most provinces and territories maintain some form of land use and land cover data. Examples include: • ABMI Wall-to-Wall Land Cover Inventory of Alberta • Saskatchewan Prairie Landscape Inventory (PLI) • British Columbia Vegetation Resource Inventory (VRI)	Typically covers Provicial or Territorial boundaries, or strategic portions of the jurisdictional boundary.

Sample Asset Hierarchy

Asset Class	Asset Type	Component
Natural Assets	Forest	Coniferous Forest
		Deciduous Forest
		Mixed Forest
	Wetland	Swamp
		Marsh
		Bog
		Fen
	Grassland	Tallgrass Prairie
		Savanah
		Fescue Grasslands

Source: NAI, Natural Asset Management Plan Guidance, draft in development.

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Condition Assessment

Why should we assess condition of natural assets?

- Assumption: A natural asset assessed as being in “good” condition from an ecological perspective is assumed to provide a “good” level of ecological services, which are assumed to be of value to the community.

- Can you give some examples of how natural assets in poor condition might affect the costs and risks to service delivery?

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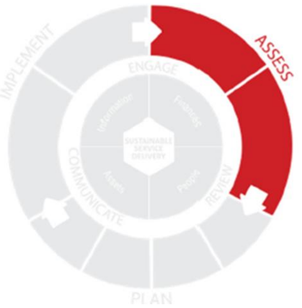
Natural asset	Criteria	Indicator	Measure	Metric
Forest (contiguous area, patch, or stand)	Landscape context	Relative asset size	Size of natural asset relative to other natural assets within the inventory	Percentile rank of natural asset area
		Landscape connectivity	Linear road density within a buffer around the natural asset	Kilometre of road per square kilometre of area
	Physical context	Patch size	Percent interior forest area	Interior area divided by total area of asset
		Fragmentation	Density of linear features within the natural asset, including roads and trails	Kilometre per square kilometre of linear features
	Ecological condition	Structural diversity	Tree species diversity	Total number of overstory tree species in a given stand
		Species diversity	Invasive species	Percentage of invasive species
			Native species	Percentage of native species



Examples of criteria, indicators, measures, and metrics for forest condition

Source: 2023 CSA standard for the natural asset inventories

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Risk Identification / Risk Assessment

Why do it for natural assets?

A simple qualitive assessment of key risks to natural assets, framed around your service delivery context, can guide investment decisions in lifecycle management of natural assets.

NOTE: ASSESSING RISKS TO NATURAL ASSETS THEMSELVES IS DIFFERENT FROM ASSESSING RISKS TO OTHER INFRASTRUCTURE AND SERVICES, WHERE NATURAL ASSETS MAY PLAY A ROLE IN MITIGATING THOSE RISKS.

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Two Approaches to Risk Assessment

Hazards Based Approach	Probability and Consequence of Failure
Examines the range of potential hazards (i.e., something that is dangerous or likely to cause damage) to natural assets. Hazards capture a range of issues that could damage natural assets and impact the flow of services over time (e.g., overuse, drought, pollution).	Standard of practice for asset management BUT Currently no published approaches or accepted norms on how to apply the PoF and CoF approach to natural assets.

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Hazards-based Approach

STEP 1. Identify Relevant Hazards

- Invasive plants / wildlife
- Native or invasive pests & diseases
- Construction impacts
- Encroachment
- Overuse / inappropriate use
- Development Pressure
- Flooding
- Erosion and sedimentation
- Extreme wind events
- Ice storm
- Drought
- Pollution / Contamination
- Fire

STEP 2. Assign Impact Rating to Each Hazard

STEP 3. Assign Likelihood Rating to Each Hazard

STEP 4. Calculate the Risk Score (IMPACT X LIKELIHOOD)

STEP 5. Allocate Risk Scores to Relevant Natural Assets

Example: City of Nanaimo Buttertubs Marsh

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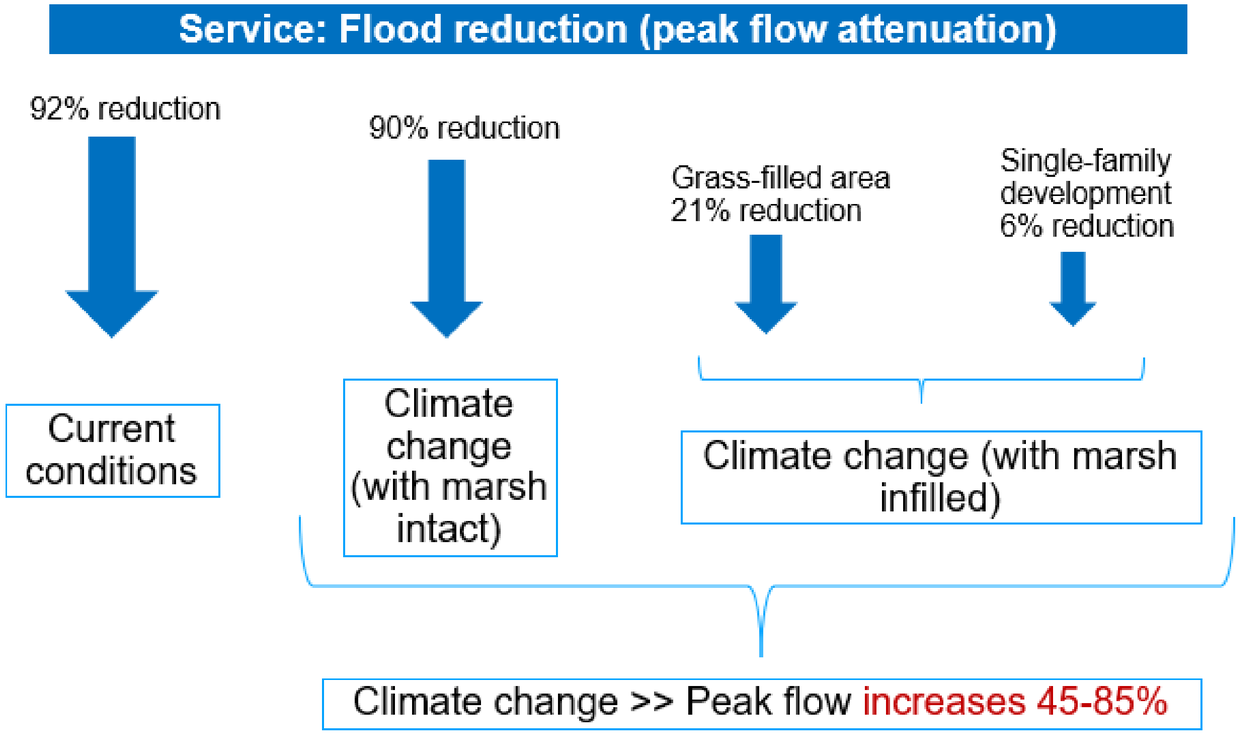
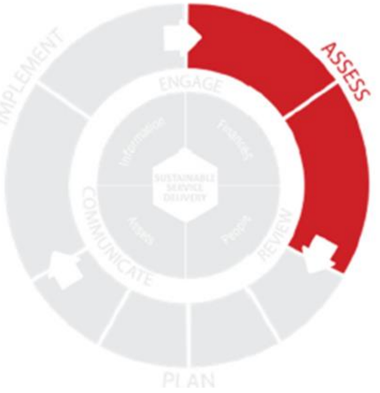
Vulnerability Assessment: the role of the marsh in managing stormwater under current and future climate scenarios

Source: NAI Nanaimo Case study, 2017 (picture taken by Urban Systems)



TOP NATURAL ASSET RISKS	NAM CAN HELP MANAGE THE COSTS OF AND RISKS TO SERVICE DELIVERY
POLLUTANT LOADING	Restoration & retrofit activities may be needed to clean up degraded water bodies.
* EROSION	Ecological restoration or retrofit activities may defer or eliminate the need for large scale grey infrastructure projects.
DEVELOPMENT PRESSURE	Policies, by-laws and other tools can appropriately protect high-risk, high service natural assets.
* FLOODING	Nature-based solutions can mitigate risks.
INVASIVE SPECIES	Proactive management of invasive species to protect biodiversity, ecological functions.
*DROUGHT	Critical to monitor and maintain the health of aquifers, riparian areas & wetlands to build resilience to drought.

Documenting Replacement Costs for Natural Assets vs. Valuation of Services Provided by Natural Assets



REPLACEMENT COSTS:

- Establishing a replacement cost for natural assets in an asset registry should be based on the anticipated best estimate of what it would cost to restore the natural asset (e.g., a forest stand, a wetland).

VALUATION OF <u>SERVICES PROVIDED BY</u> NATURAL ASSETS:

- Valuing *the services* nature provides helps to determine desired level of service and performance expected from natural assets and is a pathway to pro-actively protecting and managing them.

APPROACHES TO VALUATION INCLUDE:

Benefit transfer
Replacement cost of grey infrastructure alternative
Damage cost avoided

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Ecosystem Service Values of the City of Toronto Ravine System

Various methods including avoided cost, replacement costs, benefit transfer

Source: ECOSYSTEM SERVICE VALUES OF THE CITY OF TORONTO RAVINE SYSTEM, City of Toronto, 2018.

Table ES-1: Ecosystem service physical flows and monetary benefits for the City of Toronto ravine system

Ecosystem service physical flows and monetary benefits for the City of Toronto ravine system

Ecosystem Service	Indicator	Unit	Physical flow 2017	Indicator	Unit	Monetary flow benefit 2017 ($ Millions)
Recreation	Users of ravines for cycling and biking	# of users	398,240	Value of welfare benefit received by biking in ravines	$ per year	$111
	Users of ravines for walking and hiking	# of users	924,486	Value of welfare benefit received by walking and biking in ravines	$ per year	$473
Physical health	Population meeting physiscal health guidelines by accessing greenspace	# of people	753,812	Value of physical activity supported (avoided health care costs of dealing with ill health due to inactivity)	$ per year	$217
Mental health	Reduced number of people experiencing depression	# of people	5,297	Value of improved mental health, avoided foregone GDP due to depression	$ per year	$5
Gas regulation (air quality)	Air pollution removed (CO, NO_x, O_3, PM_{10}, SO_2)	metric tonnes	CO=3.2; NOx=94.3; O3=374.4; PM10=113.0; SO2=19.8	Value of cleaner air (avoided health care costs of visits to hospital for respiratory and other related health issues)	$ per year	$7
Carbon sequestration	CO2e sequestered	metric tonnes	14,542	Value of carbon sequestered (avoided social damages that are anticipated to result from climate change)	$ per year	$2
Food provision, urban agriculture	Fruit and vegetable production occuring in ravine area	metric tonnes	34.7	Value of food from urban agriculture sites in ravines (replacement cost of equivalent produce)	$ per year	$0.04
Aesthetic appreciation	Area of natural cover	hectares	6,000	Value people place on the aesthetic enjoyment of the area	$ per year	$2.67
Habitat and refugia	Area of natural cover	hectares	6,000	Value people place on knowing natural areas exist	$ per year	$2.47
						$822

EXAMPLES: Valuation of services assessed under climate change (using cost of grey infra replacement)

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Region of Peel

SERVICE: Attenuation of peak flows; enhanced water quality; stormwater retention

Value 2017: $704M

CC Scenario Value (2065): $764M

Grindstone Creek watershed

CORE SERVICE: Stormwater management

Value 2021: $2 billion

CC Scenario (2050): Not monetized but determined forests provide additional infiltration. Other NA's may have reached capacity

Co-benefits

$34 million

Town of Florenceville-Bristol, NB

SERVICE: Stormwater retention; erosion control

Value 2020: $3.5M

CC Scenario Value (1 in 100-yr event + 20%): $4.1M

Town of Riverview

SERVICE: Storage/stormwater retention; volume and peak flow reduction

Value 2020:

$1.07M

CC Scenario (RCP 8.5 2100): $2.3 million

***Study reinforced importance of connectivity**

You have an inventory – now what?

COLWOOD, BC: inventory data informing urban forest strategy & GHG inventory

KELOWNA, BC: assessing the role of natural assets in protecting species at risk

MARKHAM, ON: developing a NAM plan to meet O. Reg 588.17 requirements

TOWNSHIP OF LANGLEY, BC: moved forward with a NAM plan

WHISTLER: Council-approved full NAM program & integration with AM

HALIFAX RM: watershed scale project to value natural asset services

SASKATOON: developing a NAM framework; valuation project

REGIONAL DISTRICT OF NANAIMO: LOS and risk ID and prioritization

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What are your take-aways from this overview of the assess stage of natural asset management?

The Natural Asset Inventory

Condition

Risk Identification / Assessment

Valuation

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RECAP: KEY MESSAGES RELATED TO THE ASSESS STAGE

#1: Natural assets are complex: concepts of useful life, replacement costs and valuation pose challenges; however, an asset management approach has many benefits.

#2: Natural assets are part of an infrastructure system: integrated planning and a holistic perspective are essential.

#3: Scale, jurisdiction and ownership matter and will guide the lifecycle management strategy.

#4: Natural assets in good condition can help manage the costs and risks of service delivery.

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Planning Stage:

Documenting the service delivery requirements for natural assets

Source: Municipal Natural Assets Initiative, diagram adapted from the BC Framework for Sustainable Service Delivery

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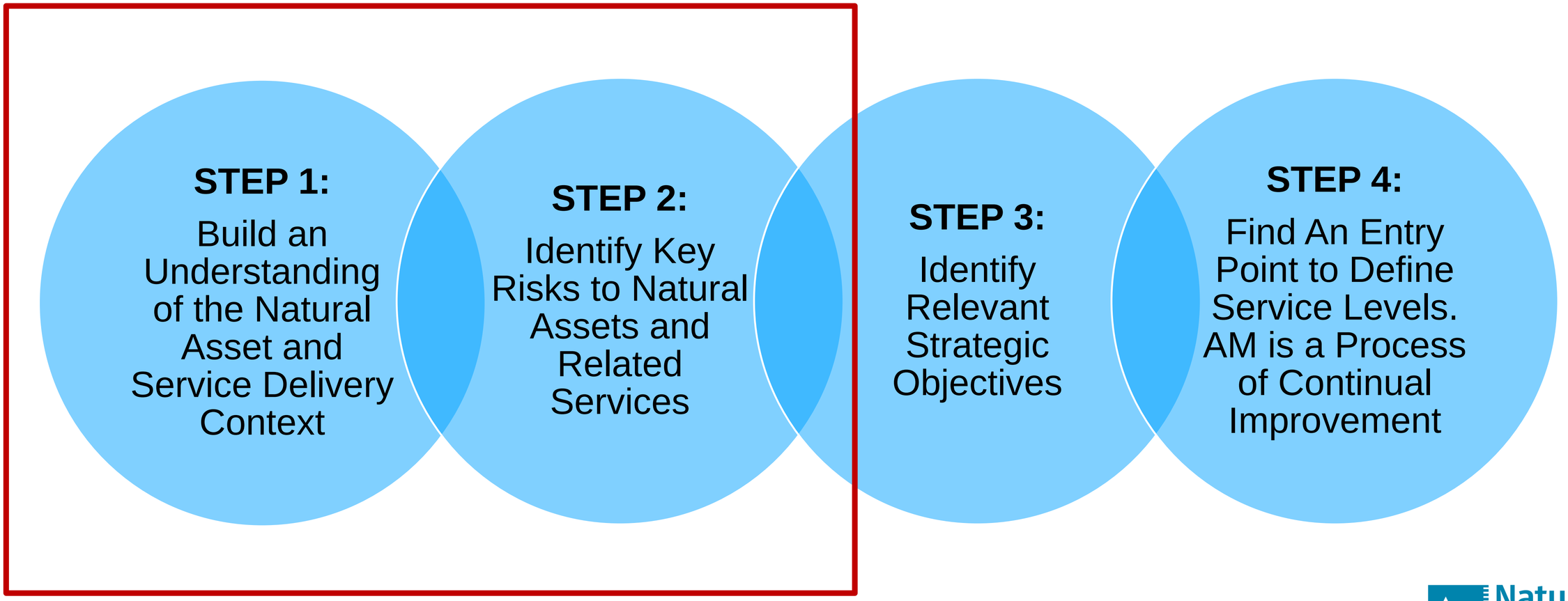
This is Complex -- Where to Start?



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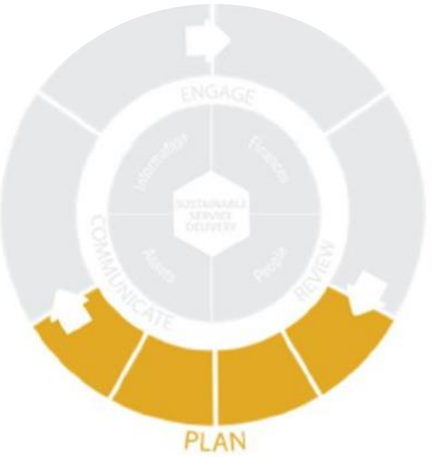
Build an understanding of key services and assets.

Natural Asset Type/ Service Objective	Water (Surface, Groundwater	Riparian Areas	Forest Assets	Green Open Spaces	Wetlands	Coastal Assets	Soils	Urban Green Infrastructure
Stormwater management	■	■	■	■	■		■	■
Drinking water	■	■	■	■			■	■
Wastewater		■			■			■
Transportation			■	■				
Recreation	■	■	■	■	■	■		■
Public Health	■	■	■	■	■	■	■	■
Biodiversity	■	■	■	■	■	■	■	■
Climate mitigation or adaptation	■	■	■	■	■	■	■	■
Local Economic Development	■	■	■	■	■	■	■	■
Culture and Heritage	■	■	■	■	■	■	■	■
Other?								



Start by mapping the asset and service combinations relevant for your organization.

Source: Developing Levels of Service for Natural Assets: A Guidebook for Local Governments, Natural Assets Initiative, page 17.

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See you in 10 minutes

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BREAK OUT SESSION

SERVICES ASSET CLASS	WATER SERVICES (Consider quality and quantity)	STORMWATER SERVICES / FLOOD MITIGATION	PARKS/ RECREATION	CLIMATE CHANGE Does priority change? Do risks change?
IN TACT NATURAL ASSETS (Forests, Wetlands, Grasslands)				
WATERCOURSE NATURAL ASSETS (Rivers, Creeks, Streams)				
GROUNDWATER OR AQUIFER NATURAL ASSETS (Consider agricultural land)				

1. Discuss how the assets contribute to providing services and decide whether their contribution to service delivery is a high, medium or low priority for your organization.

2. What are the key hazards that pose risks to the asset(s)? Do you estimate the overall risk to the assets to be high, medium or low?

3. Do you think the assets' contribution to service delivery will become more important with climate change? Will the risks to the assets change?

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REPORT BACK!

Your most important natural assets? Why?

The biggest risks you need to manage?

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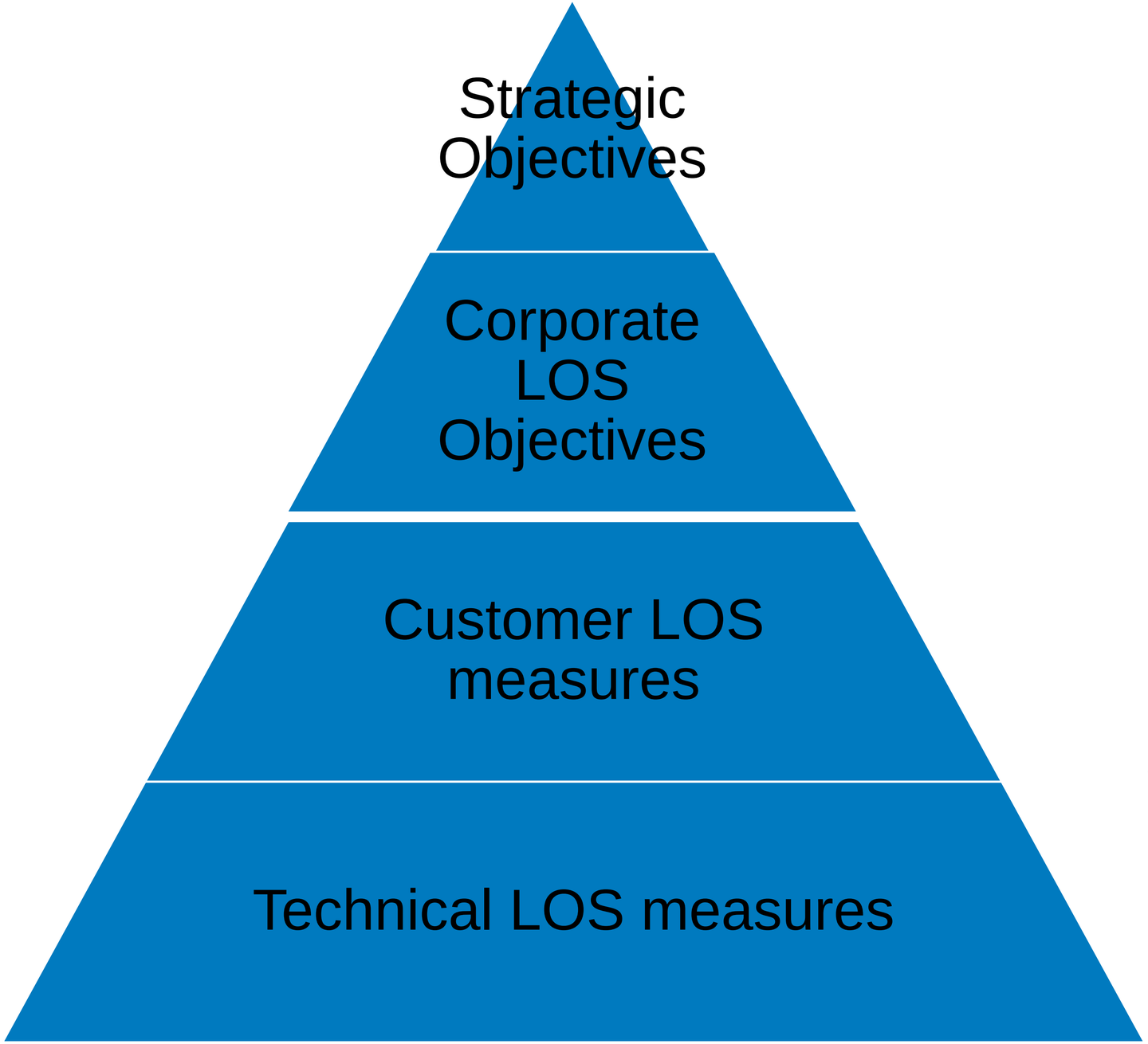

DEFINING LOS FOR NATURAL ASSETS

Why do it?

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STAKEHOLDER GROUP	NATURAL ASSETS EXAMPLE
Recipients: use the municipal services supported by assets	Pedestrians shaded by boulevard trees
Rightsholders: have Indigenous rights to the assets to practise traditional activities	Harvesting, hunting, fishing rights
Other service providers: require the municipal service/assets to provide their own services	Organizations offering recreational programs in natural areas.
Regulatory agencies: set standards, compliance regulations or other legislation that govern service delivery	Ministry of Environment and Parks
Wider community: wish to influence decision-making but may or may not be users of the service	Taxpayers funding services they may not use, City staff
Neighbouring municipalities: Adjacent communities affected by or have an interest in City services	Leduc County (adjacent to Edmonton)

Source: City of Edmonton Urban Forest Asset Management Plan (2022)

To define service delivery objectives and levels of service, build an understanding of stakeholder and rightsholder needs and interests related to relevant services and assets.

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Reflection

Think about a significant natural asset or natural area that is likely providing services to your community.

Use the chat box to name the asset(s) and some relevant stakeholders/rightsholders that may use or impact the assets and services.

Discussion: Provide an example of how you currently communicate or collaborate with these stakeholders or rightsholders to support these areas in being protected or managed sustainably.

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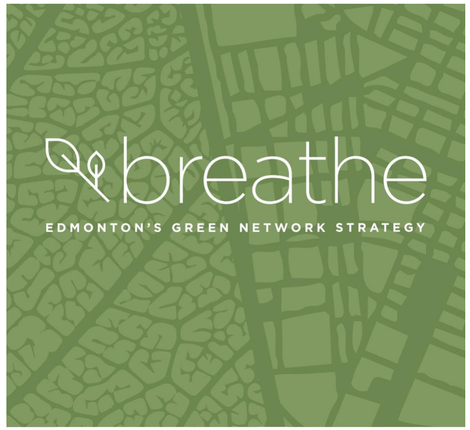
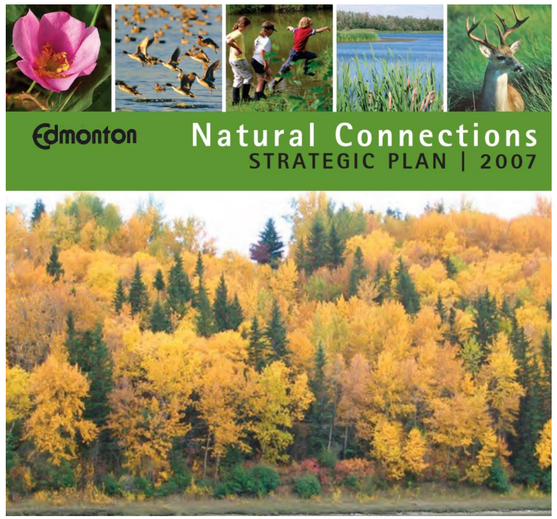
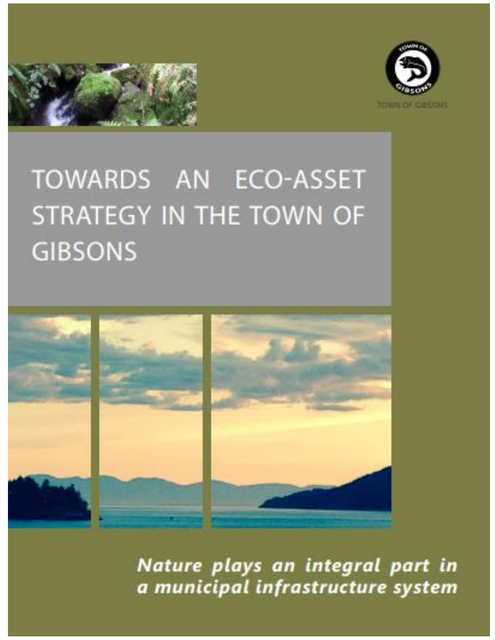
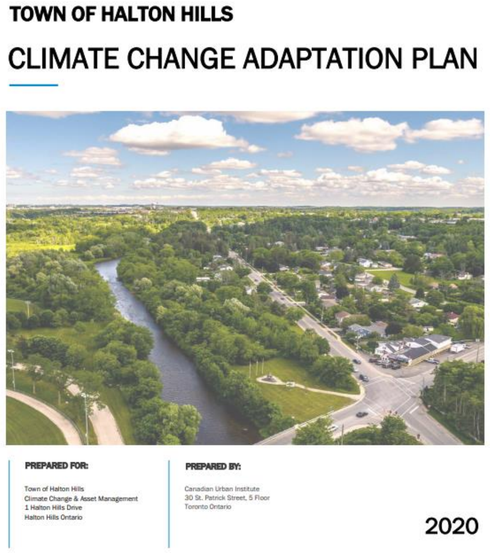
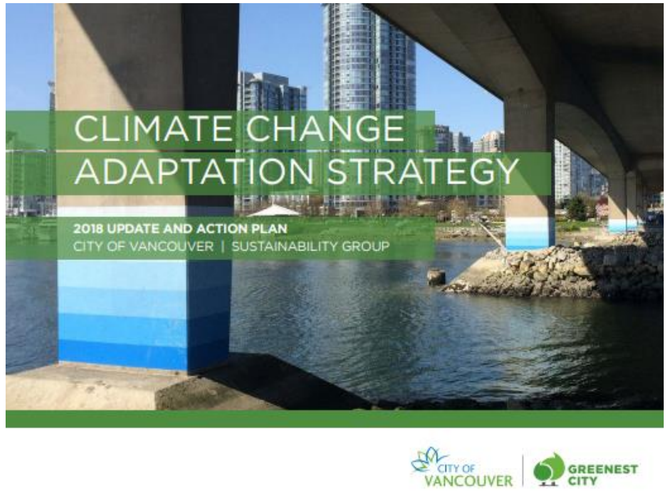
LOS objectives and measures flow from strategic objectives

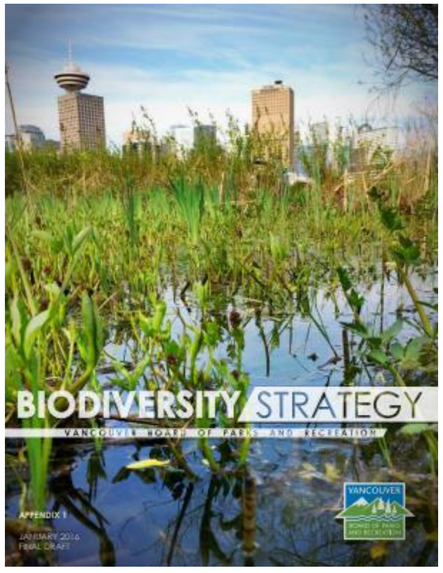


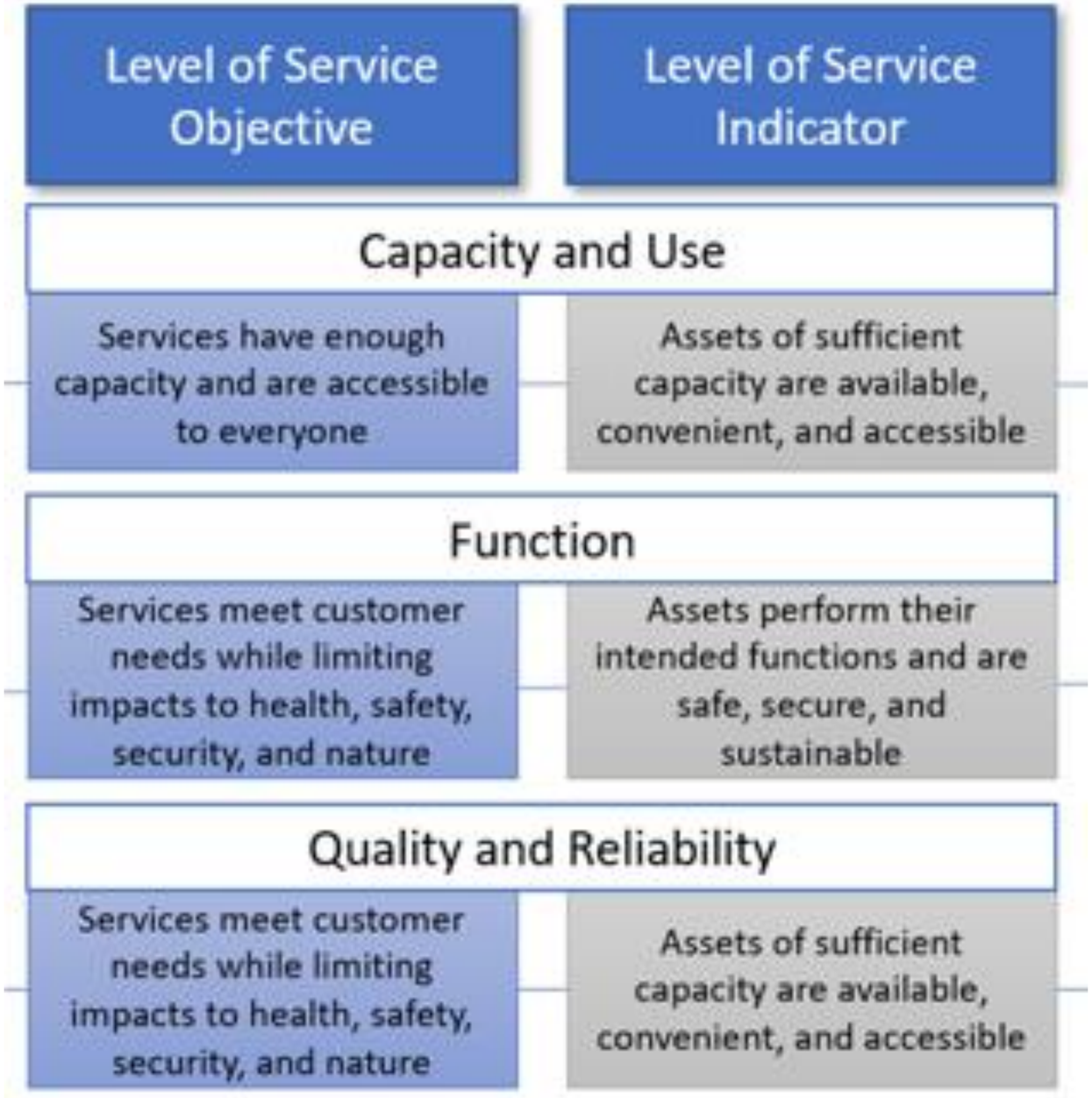












Capacity, function and quality are important service attributes to consider, particularly for technical LOS, which relate to the ecosystem services provided by natural assets

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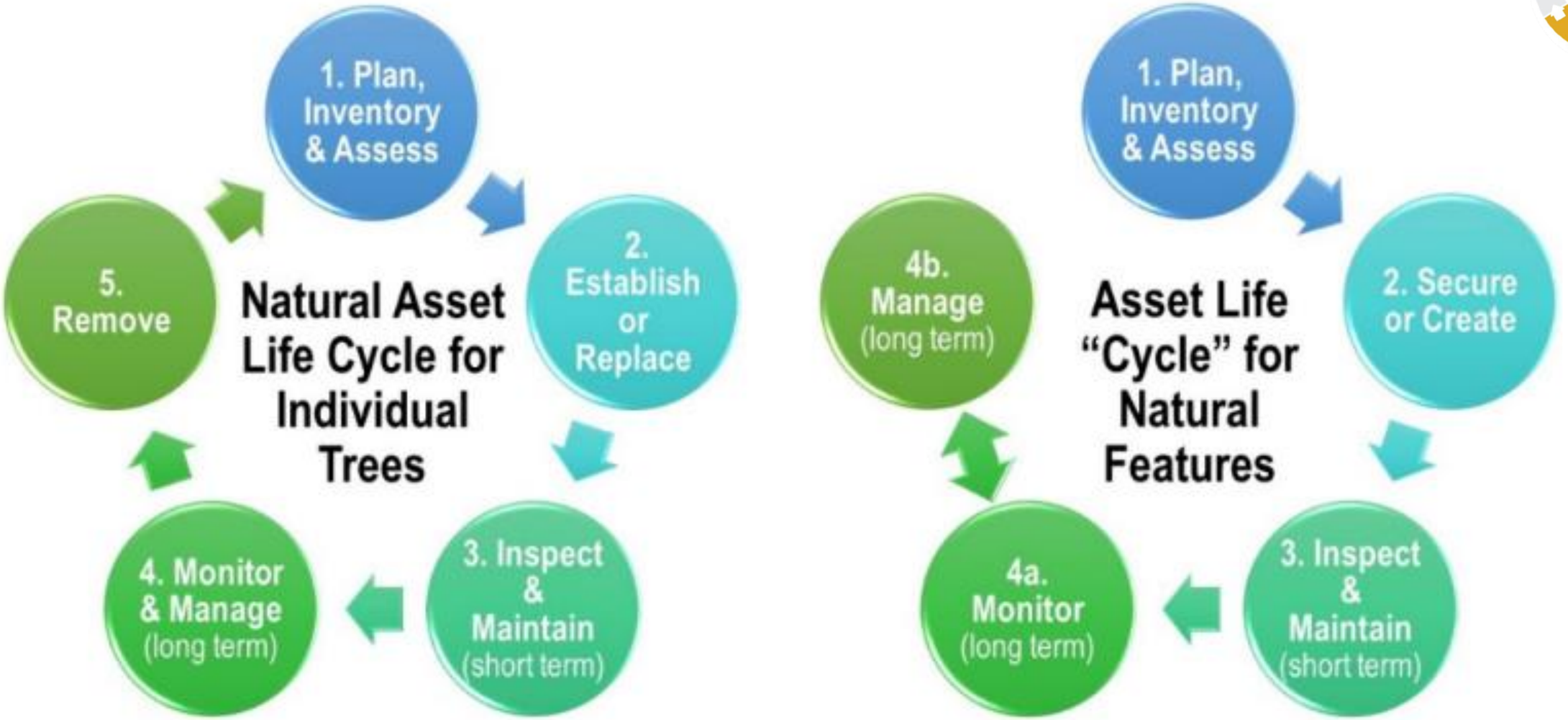
Type of Measure	Level of Service	Performance Measures	Customer/ Technical Metric
Quality	Ecological condition of the natural assets in the NHN	% of natural assets in very good or good condition, broken down by natural asset type	C
Quality	Biodiversity of native species	#amphibians and reptiles, #birds, #mammals, #plants - native and non-native noted for each	T
Function	Carbon sequestration provided by woodlands/forests	kg/m3 sequestered per year by woodlands in NHN	T
Capacity	Stormwater services delivered by natural assets	volume of avoided runoff/yr	T

Examples of LOS indicators that consider capacity, function and quality of natural assets

Lifecycle Management Strategies for Natural Assets



Municipal natural asset lifecycle for assets with limited life (left) and asset lifecycle for assets without a removal phase (right). Obtained from Credit Valley Conservation, 2020.

Lifecycle Management of Natural Assets Should Include Non-Infrastructure Solutions

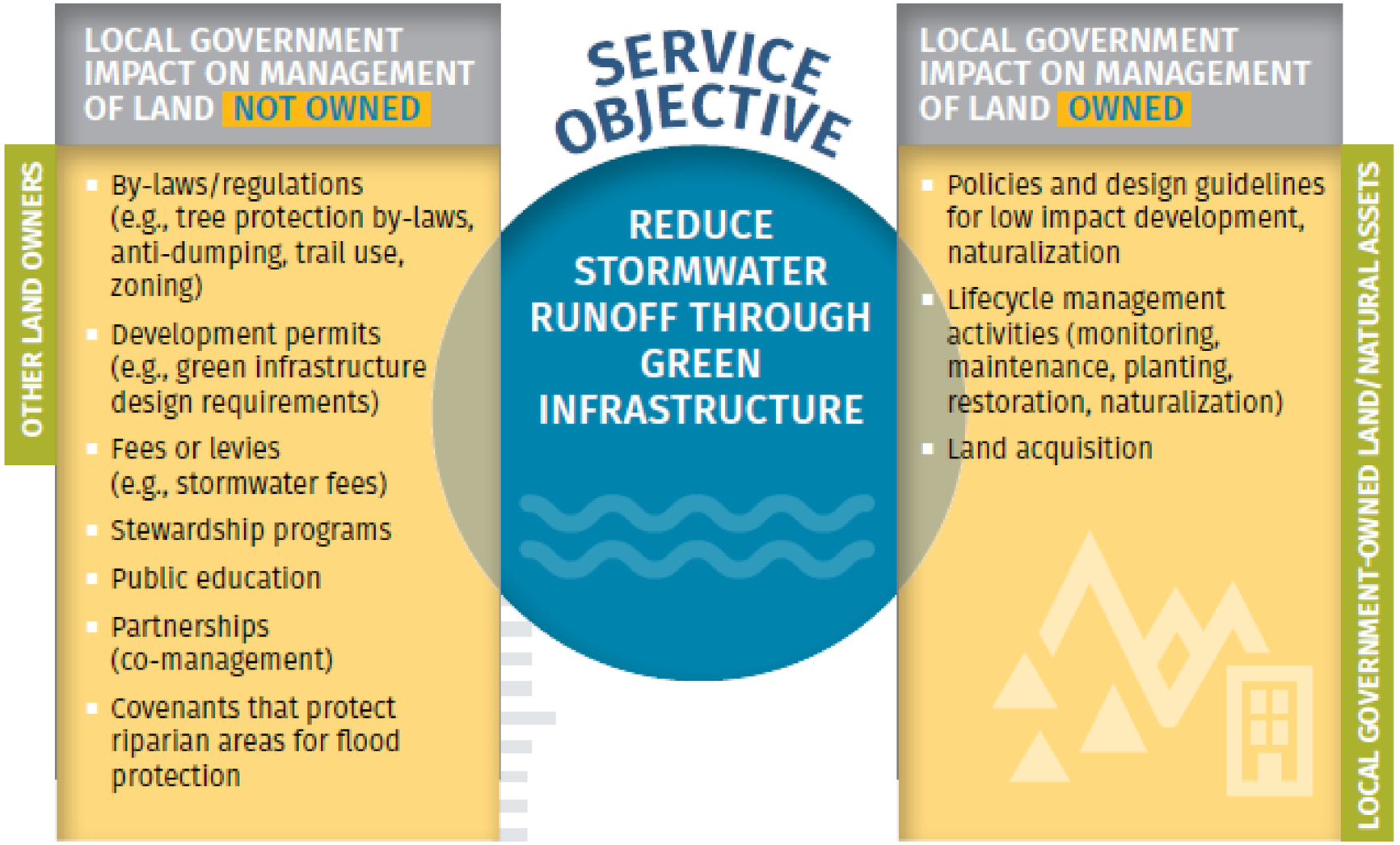


Figure 4: Stormwater management example

Source: Developing Levels of Service for Natural Assets: A Guidebook for Local Governments, Natural Assets Initiative, page 17.

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Financial Planning: Operations and Maintenance Forecast for the City of Edmonton's Urban Forest

Operations & Maintenance Activities/Programs	Average Past Budget	Forecast Annual Cost ($000)						
		2021	2022	2023	2024	2025	2026-2030	2031-2040
Maintained Trees	**$5,801**	**$7,465**	**$7,102**	**$7,293**	**$7,382**	**$7,349**	**$37,957**	**$88,443**
Pruning	$3,085	$4,392	$4,600	$4,825	$4,994	$5,039	$26,523	$63,203
Watering - Renewal	$1,190	$1,597	$982	$907	$790	$673	$2,707	$5,289
Tree Maintenance	$1,306	$1,263	$1,301	$1,336	$1,368	$1,401	$7,769	$17,075
Inspections and Inventory	$220	$213	$219	$225	$230	$236	$1,258	$2,876
Naturally Wooded Areas	**$1,033**	**$1,047**	**$1,063**	**$1,079**	**$1,094**	**$1,110**	**$5,789**	**$12,765**
Naturalization Areas	**$175**	**$203**	**$216**	**$230**	**$244**	**$258**	**$1,495**	**$4,023**
Total	**$7,009**	**$8,715**	**$8,381**	**$8,602**	**$8,720**	**$8,717**	**$45,241**	**$105,231**

Table 8.4 Operations and maintenance 20 year financial forecast ($2020)

Edmonton's Urban Forest AMP includes a 20-year forecast of operations and maintenance costs

Source: https://www.gov.edmonton.ab.ca/sites/default/files/public-files/assets/PDF/Urban-Forest-Asset-Management-Plan.pdf

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Financial Planning: Capital Investment Forecast for the City of Edmonton's Urban Forest

New Assets & Disposal Activities/Programs	Average Past Budget	Forecast Annual Cost ($000)						
		2021	2022	2023	2024	2025	2026-2030	2031-2040
Maintained Trees	**$86**	**$2,742**	**$3,078**	**$2,043**	**$1,875**	**$1,707**	**$8,535**	**$17,070**
Tree Planting - Infilling	$86	$2,406	$2,406	$1,203	$1,203	$1,203	$6,015	$12,030
Watering - New Trees	0	$336	$672	$840	$672	$504	$2,520	$5,040
Natural Areas	**$0**	**$0**	**$3**	**$3**	**$3**	**$3**	**$15**	**$30**
Naturalization Areas	**$1,467**	**$5,642**	**$5,885**	**$6,570**	**$6,578**	**$6,587**	**$33,385**	**$67,231**
Assessing New Areas	$327	$141	$69	$69	$69	$69	$346	$692
Establishing New Sites	$0	$844	$414	$414	$414	$414	$2,068	$4,136
Planting Planning	$218	$304	$304	$3,433	$3,433	$3,433	$17,165	$34,331
Planting New Trees	$288	$3,433	$3,433	$3,433	$3,433	$3,433	$17,165	$34,331
Infill Planting	$61	$0	$0	$0	$0	$0	$328	$487
Weed Control	$296	$123	$132	$140	$148	$157	$909	$2,447
Watering New Trees	$277	$797	$1,533	$2,210	$2,210	$2,210	$11,051	$22,103
Total	**$1,553**	**$8,387**	**$8,966**	**$8,616**	**$8,456**	**$8,297**	**$41,935**	**$84,331**

Table 8.6 New assets and disposal financial forecast

Edmonton's urban forest AMP includes a 20-year forecast of new capital investments required

(For new trees where no tree currently exists, new naturalization areas)

Source: https://www.gov.edmonton.ab.ca/sites/default/files/public-files/assets/PDF/Urban-Forest-Asset-Management-Plan.pdf

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What are your key take-aways for the plan stage?

SERVICE DELIVERY REQUIREMENTS AND LEVELS OF SERVICE

LIFECYCLE MANAGEMENT STRATEGIES

FINANCIAL PLANNING

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KEY MESSAGES: PLAN STAGE

#1: NAM is complex; start by understanding your key natural assets and risks related to your service delivery context.

#2: Non-infrastructure solutions can be impactful and will be necessary, since many of the natural assets that provide services to your community will not be under your direct control.

#3 Don’t wait for perfect data and information to get started. Find opportunities for integration of natural assets.

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Implementation is the stage when local governments manage the lifecycle needs of natural assets.

Source: Municipal Natural Assets Initiative, diagram adapted from the BC Framework for Sustainable Service Delivery

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Implementation involves many activities

Policy & strategy development	• **Natural asset management policy & strategy** (principles & objectives, accountability) • **By-laws** (e.g. development cost charges, tree protection, stormwater fees) • **Zoning** (specifies type and location of development permitted) • **Official Community Plan** updates or master plans • **Land covenants, conservation easements**
Financing & investments	• Develop and implement a funding strategy (budget & seek funding for activities defined in lifecycle management strategies and financial plans)
Engagement, awareness, programs & partnerships	• Communications activities & stakeholder engagement • Partnerships (e.g. Indigenous communities, research, insurance sector, community groups, schools, foundations, private land owners)
Ongoing adaptive management	• Monitoring, condition assessment, risk assessment, updates to natural asset inventory • Management/restoration of natural assets • Land acquisition
Capacity building & continuous improvement	• Human resources (define roles, responsibilities) • Capacity building (training & development) • Performance measurement of natural asset management practices

POLICY GOOD PRACTICES

- AM policies that explicitly include natural assets
- Natural areas policies, wetland policies, etc.

Edmonton

Natural Areas Systems Policy 2007)

- Procurement policies

CITY OF ROSSLAND

- By-laws

Ottawa

Tree Protection By-Law

Northumberland county

Forest Conservation By-Law

SQUAMISH
HARDWIRED for ADVENTURE

Invasive Species By-Law

TOWN OF GIBSONS

Development Cost Charges By-Law: (Drainage/stormwater management)

- NAM objectives in OCP policies

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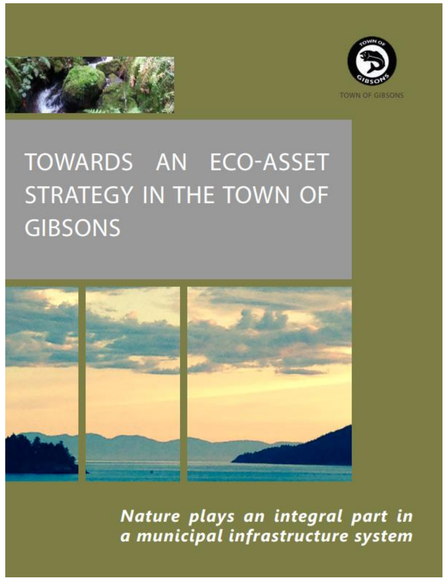
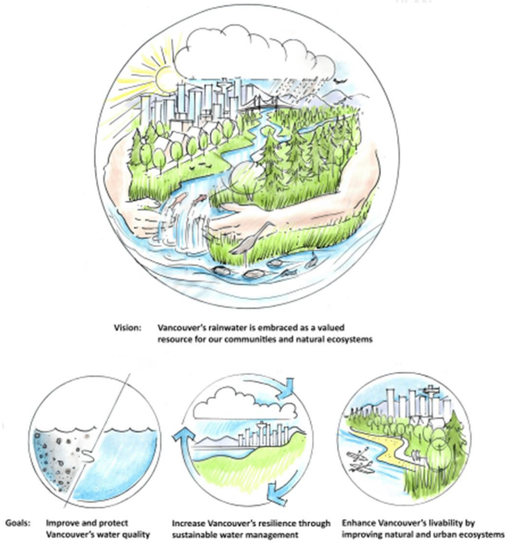
STRATEGY GOOD PRACTICES:



Town of Gibsons high-level natural assets strategy

Halifax Green Network Plan highlights ecosystem functions and benefits of its open space system, and outlines strategies to manage open space.

Surrey's Biodiversity and Conservation Strategy



Vancouver's Rain City Strategy

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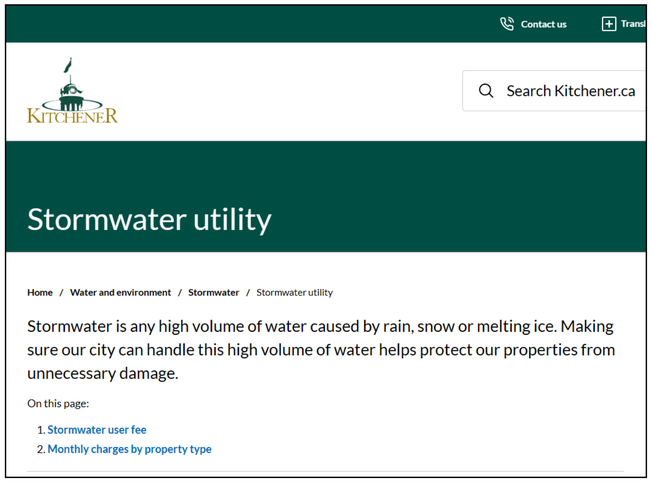
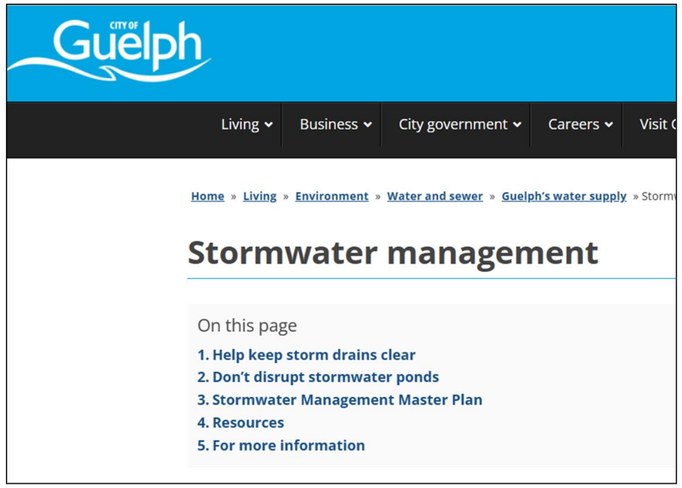
FUNDING STRATEGIES FOR NATURAL ASSET MANAGEMENT



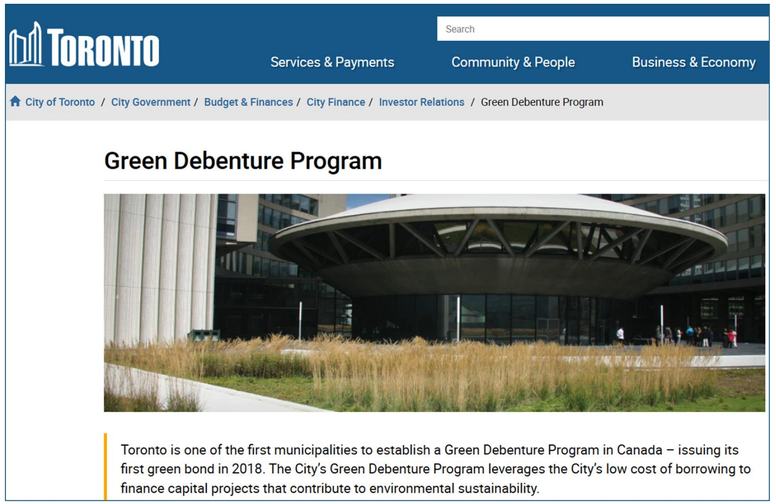
DEDICATED FUNDING STREAM:

City of Kitchener, Ontario: Dedicated funding for stormwater services



FINANCIAL INCENTIVE PROGRAMS:

City of Guelph: multiple programs to reduce stormwater quantity, improve water quality and increase use of green infrastructure



GREEN OR CONSERVATION BONDS:

City of Toronto raised $630M in capital, including for the Port Lands Flood Protection Project:

COLLABORATION & PARTNERSHIPS EXAMPLE

Cumberland Community Forest Society: Mission to purchase & protect the Cumberland Forest

-> 545 acres purchased & protected

Funders/partners include:

- Comox Valley Regional District
- Village of Cumberland
- Environment and Climate Change Canada
- Comox Valley Land Trust

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Thank you