AGENDA
Sustainability and Climate Action Advisory Committee
Saanich Municipal Hall, Committee Room No. 2.
Wednesday May 15, 2024, at 4:00 p.m.

The District of Saanich lies within the territories of the ləkʷəŋən peoples represented by the Songhees and Esquimalt Nations and the W̱SÁNEĆ peoples represented by the Tsartlip, Pauquachin, Tsawout, Tseycum and Malahat Nations.

We are committed to celebrating the rich diversity of people in our community. We are guided by the principle that embracing diversity enriches the lives of all people. We all share the responsibility for creating an equitable and inclusive community and for addressing discrimination in all forms.

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1. **CHAIR'S REMARKS**

2. **ADOPTION OF MINUTES**
   - April 17, 2024

3. **BIODIVERSITY CONSERVATION STRATEGY (30 Min)**
   - Eva Riccius, Senior Manager, Parks

4. **URBAN FOREST STRATEGY (30 min)**
   - Eva Riccius, Senior Manager, Parks

5. **DRAFT NATURAL ASSETS INVENTORY**
   - Jaqueline Weston, Asset Management Program Manager, Engineering Department

* Adjournment *
Next Meeting: June 19, 2024 at 4:00 pm
In order to ensure quorum, please contact Angela Hawkshaw at 250-475-5494 ext. 3505 or
angela.hawkshaw@saanich.ca if you are unable to attend.

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MINUTES
SUSTAINABILITY AND CLIMATE ACTION ADVISORY COMMITTEE
Held at Saanich Municipal Hall, Committee Room 2 and via MS Teams
770 Vernon Avenue
Wednesday, April 17, 2024, at 4:00 p.m.

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Present: Councillor Nathalie Chambers (Chair), Timio Colistro (via Teams), Ronald Jeffries, Kurban Keshvani (4:06 p.m.), George Klima, Leslie Miller-Brooks, Karin Nelson and Mattias Spalteholz

Staff: Mitchell Edgar, Economic Development Manager, (4:18 p.m.); Rebecca Newlove, Manager of Sustainability (via Teams, 4:05 p.m.); Glenys Verhulst, Sustainability Specialist and Angela Hawkshaw, Committee Clerk

Guests: Claire Remington, Compost Education Centre

Regrets: Diya Court-Stephens

ADOPTION OF THE MINUTES

MOVED by R. Jeffries and Seconded by K. Keshvani: "That the Minutes of the Sustainability and Climate Action Advisory Committee meeting held February 27, 2024 minutes be adopted as circulated."

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CARRIED

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MOVED by M. Spalteholz and Seconded by K. Nelson: "That the Minutes of the Sustainability and Climate Action Advisory Committee meeting held on March 20, 2024 minutes be adopted as circulated."

<div align="right">

CARRIED

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CHAIR'S REMARKS

The Chair made the following comments:
- Farm stands hold significant importance in my family's heritage.
- Saanich and Victoria have some of the best soil in Canada. Continuing to care for the soil is vital.
- On Monday, April 15th, 2024 Council approved a bylaw to allow roadside stands to operate within the urban areas.
- The 51st anniversary of the Agricultural Land Reserve was on April 18th.
- A pamphlet or book detailing the locations and information about local pocket farms could be a project for this committee. A designated page on the Saanich website could be considered.

COMPOSTING EDUCATION

The representative from the Compost Education Centre gave a presentation on Composting Education. The following was noted in response to questions and during committee discussion:
- The Saanich yard and Hartland Landfill Facility are locations for yard and organic waste drop off. Some waste is outside of Victoria. A future plan to handle all waste locally is being explored.
- A local facility could be explored to assist in processing industrial and commercial waste.

- In 2020, Nelson BC purchased a FoodCycler and piloted a program to explore options for diverting food waste and volume from the landfill.
- A presentation to Council from the Composting Education Centre could be achieved through a delegation.

ECONOMIC DEVELOPMENT AND CLIMATE ACTION PLAN

The Economic Development Manager gave a presentation on Economic Development and Climate Action Plan. The following was noted in response to questions and during committee discussion:
- Current projects are underway to work with local economy and businesses to have a healthy and thriving local business climate. Sustainable options are a high priority.
- Aligning with the Agriculture and Food Security Plan and the Climate Action Plan is vital.
- In 2023, a study on a food hub business plan, emphasizing Indigenous food options, took place at Camosun College. The project received funding from the province.
- Supporting tourism and the hospitality sector is crucial.
- The Circular Economy Accelerator Program provides hands-on support to businesses on Vancouver Island who seek to adopt circular economy principles. Some of these principles include reducing waste, increasing revenue, and developing innovative practices. This program is the first of its kind in Canada. Funding by Saanich has been approved for 7 businesses in 2024 and 7 more in 2025. The program will be overseen by the Synergy Foundation.
- Flavour trails promote and organizes opportunities for the community to experience local harvesters, farmers, fishers, food producers, chefs, vintners, cider makers, brewers and distillers.
- Sustainability tours could be offered to visitors and bring in revenue.

E-BIKES PROJECT

The Sustainability Specialist gave the following presentation (PowerPoint on file). The following was noted in response to questions and during committee discussion:
- This program required a minimum e-bike purchase of $1800.00.
- Regular maintenance for e-bikes is similar to traditional bikes. Using local vendors is encouraged.
- Saanich Hall serves as a drop-off location for electric and mobility batteries.
- Students were included in this study.
- This incentive encouraged residents to adopt low-carbon, renewable energy, and active transportation options.

MOVED by T. Colistro and Seconded by R. Jeffries: "That the Sustainability and Climate Action Advisory Committee recommend that Council request the Union of BC Municipalities (UBCM) lobby the Province of BC to provide additional funding for continuation of the BC Electric Bike Incentive Program."

CARRIED

ROUND TABLE DISCUSSION

The following was noted during a roundtable discussion:
- A bylaw banning outdoor balloons and lantern releases could be considered.
- It was suggested that a working group be established to consider creating a booklet with maps and information about pocket farms and vegetable stands within Saanich, to broaden

the outreach on social media to engage the community regarding sustainability efforts in Saanich, and to consider banning balloons and lantern releases due to the threat they pose to animals and biodiversity. M. Spalteholz, K. Nelson, and R. Jeffries will discuss these topics and bring forward information at a future meeting.

ADJOURNMENT

On a motion from R. Jeffries the meeting adjourned at 6:16 p.m.

NEXT MEETING

The next meeting is scheduled for Wednesday, May 15, 2024, at 4:00 p.m.

_____
Nathalie Chambers, Chair

I hereby certify these Minutes are accurate.

_____
Angela Hawkshaw, Committee Secretary

Memo

To: Natural Areas, Parks & Trails Advisory Committee

     Sustainability & Climate Action Advisory Committee

From: Jacqueline Weston, Asset Management Program Manager

Date: April 30, 2024

Subject: Draft Natural Assets Inventory Report

Purpose

The draft *Natural Assets Inventory* report is attached for information and feedback from the Natural Areas, Parks & Trails Advisory Committee and the Sustainability & Climate Action Advisory Committee.

Background

Saanich's Asset Management (AM) Strategy includes the development of a natural assets inventory (Strategy 3, Project 3.1) followed by a natural asset management plan (Strategy 4, Project 4.7).

As reported to Council on December 11, 2023, Saanich received grant funding for the *Natural Assets Inventory* project through UBCM under the Canada Community-Building Fund – 2022 Strategic Priorities Fund.

In accordance with the grant agreement, the *Natural Assets Inventory* project scope includes the following:

- Basic natural assets inventory
- Preliminary condition assessment
- Preliminary services and performance measures identification
- Preliminary risk identification
- Preliminary valuation of natural assets
- Collaboration with external stakeholders
- Final report

Staff retained Natural Assets Initiative (NAI), a not-for-profit organization specializing in natural asset management, and work on the project began in fall 2023. NAI has now submitted the draft report, entitled "*Toward natural asset management in the District of Saanich, British Columbia: Summary of enhanced inventory results and recommendations (Draft April 2024)*", and a brief summary is provided below.

Report Summary

<u>Basic Inventory</u>

Natural assets, or municipal natural assets, are defined as 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.

Saanich's natural asset hierarchy is shown in Figure 6, and the draft report also provides the quantities of each asset group.

As part of the project, NAI also created an online natural assets dashboard and it is found at https://go.greenanalytics.ca/Saanich.
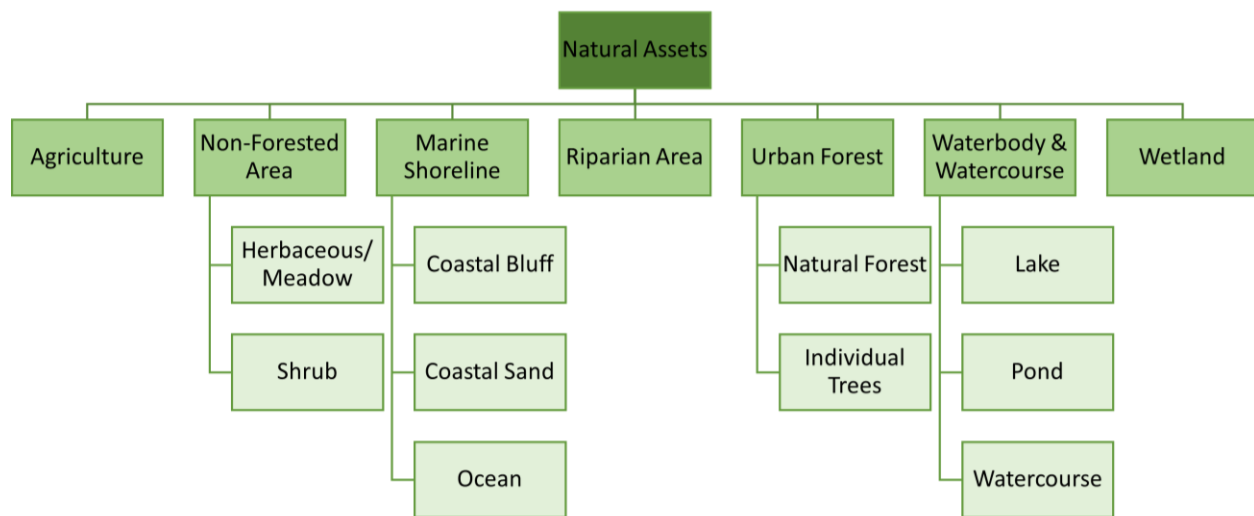
Figure 6: Natural Asset Hierarchy

<u>Preliminary Condition Assessment</u>

The draft report summarizes the results of a preliminary desktop condition assessment.

<u>Preliminary Risk Assessment</u>

The draft report identifies various hazards facing natural assets, assesses the risk of occurrence, and then highlights potential priorities for focusing natural asset management efforts.

<u>Preliminary Services and Performance Measures Identification</u>

The draft report summarizes the results of the preliminary identification of the municipal services supported by natural assets in Saanich, and identifies that natural assets may also provide one or more co-benefits. It also includes preliminary identification of potential community and technical levels of service for further consideration as part of the *Natural Asset Management Plan* project.

<u>Preliminary Valuation</u>

The draft report includes a preliminary valuation of natural assets from two perspectives:

- Annual Service Value ($/year)
  - The annual economic value that the community gains from natural assets as measured by changes in human well-being (i.e., the benefit outcome of services supported by natural assets).
- Replacement Value ($)
  - The economic value of natural assets that represents the cost of replacing the levels of service provided by natural assets with engineered infrastructure or the cost of rehabilitating natural assets to their optimal natural functioning.

<u>Collaboration With External Stakeholders</u>

The draft report provides the results of a preliminary collaboration workshop held with external stakeholders regarding natural asset management. The workshop identified several natural areas of shared interest. For example, shared watersheds that overlap municipal boundaries were identified as being of particular interest, and the CRD's Integrated Watershed Management (IWM) Committee provides opportunity for collaboration.

Next Steps

We are bringing the draft *Natural Assets Inventory* report to the Natural Areas, Parks & Trails Advisory Committee and the Sustainability & Climate Action Advisory Committee for information and feedback.

We are also including information about the *Natural Assets Inventory* project in the public open house for the Biodiversity Conservation Strategy/Urban Forest Strategy on May 14, 2024.

Then, NAI will incorporate the feedback and finalize the report to include full copy edit, design and layout. The final report is planned to be presented to Committee of the Whole for information on July 8, 2024.

The next step in Saanich's natural asset management planning process will be the development of a *Natural Asset Management Plan* project starting in 2025.

Prepared by

Jacqueline Weston

Asset Management Program Manager

Toward natural asset management in the

District of Saanich, British Columbia

Summary of enhanced inventory results and recommendations

DRAFT

April 2024

Land Acknowledgement

The District of Saanich lies within the territories of the lək̓ʷəŋən peoples represented by the Songhees and Esquimalt Nations and the W̱SÁNEĆ peoples represented by the W̱JOȽEȽP (Tsartlip), BOḰEĆEN (Pauquachin), SȾÁUTW̱ (Tsawout), W̱SIḴEM (Tseycum) and MÁLEXEȽ (Malahat) Nations. The First Peoples have been here since time immemorial and their history in this area is long and rich.

Disclaimer
While reasonable efforts have been made to ensure the accuracy of the report's content, any statements made are made only as of the date of the report and such information and data are subject to uncertainties, inaccuracies, limitations and to changes based on future events.

Please cite as: Natural Assets Initiative (NAI). (2024). *Toward natural asset management in the District of Saanich, British Columbia: Summary of inventory results and recommendations*. naturalassetsinitiative.ca

Glossary

Asset group	A classification of assets that are similar in nature and useful life; a subset of asset type. (edited version of AMBC definition)
Asset type	A major classification of assets made up of various related asset groups. (edited version of AMBC definition)
Co-benefits	Ecosystem services that enhance the livability and resilience of the community but are not managed as a direct municipal service
Indicator	A specific property of a service that can be objectively evaluated. An indicator may be evaluated by one or more performance measures.
Municipal service	Work done by the municipality to deliver a community need to the public or to the natural environment.
Service characteristic	A general characteristic or attribute used to describe a service, such as: **Regulatory** - Does the service comply with applicable laws? **Capacity/availability** – Does the service meet the needs of users? **Quality** - Does the service meet quality standards? How good is it? **Reliability** – Is the service reliable? How often is it interrupted? **Safety** – Is the service safe for workers and the public? **Sustainability** – How does the service provide for environmental, social, and financial sustainability?
Service delivery objectives	Community goals or strategic objectives for delivery of the service.
Levels of service (LOS)	Specific parameters that describe the extent and quality of services that the municipality provides to users. LOS support service delivery objectives and are described using indicators and performance measures. LOS are broken down into the following categories: **Legal Requirements -** Statutory, regulatory, and contractual requirements are the minimum levels of service that must be provided. **Community LOS** – The level at which the customer is receiving the service, from an experiential, non-technical perspective. **Technical LOS** – The adequacy of assets to provide services to the community, from a physical characteristics' perspective. This is also known as the operational/asset level of service.
Performance measure	The means used by the municipality to assess a level of service. Example performance measures include O&M data, complaints, expert assessment, service contract, OH&S records, program data. Performance measures may be a single measures or comparative metrics.

Acronyms

ALR	Agriculture Land Reserve
AM	Asset Management
CDF	Coniferous Douglas Fir
CRD	Capital Region District
EMA	Emergency Management Act
FRPA	Forest and Range Practices Act
GIS	Geographic Information System
ha	hectare
LOS	Levels of Service
MBCA	Migratory Birds Convention Act
MNRF	Ministry of Natural Resources and Forestry
n/a	not applicable
NAI	Natural Assets Initiative
NRN	National Road Network
OSM	Open Street Map
RAPA	Riparian Areas Protection Act
SARA	Species at Risk Act
SEI	Sensitive Ecosystem Inventory
UCB	Urban Containment Boundary
VRI	Vegetation Resource Inventory
WSA	Water Sustainability Act

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1.0 Purpose

This report summarizes the results of a project to develop an enhanced natural asset inventory and related activities (hereafter, "the Inventory Project") in the District of Saanich, and documents steps it can take to continue making progress with its natural asset management efforts. In July 2023, the Asset Management Strategy was approved, which provides a roadmap for a structured approach to asset management that embraces continuous improvement.

The AM Program establishes the formal framework and system for implementing Saanich's AM Policy. Saanich has completed asset inventories for most of its assets, except for its natural assets. This is the final report for the Asset Management Strategy, Strategy 3, Project 3.1 - Develop a natural assets inventory.

The Inventory Project reflects the integration of numerous initiatives related to natural asset management (see Figure 1 below and Annex A: Saanich documents related to natural assets).

Figure 1: Current Natural Asset Management Initiatives (Source: NAI)

In 2023, the District of Saanich developed an asset management strategy with an implementation plan 2023-2027 that includes the development of a natural asset *inventory* which will inform the creation of a natural asset management *plan*.

The scope of this Council-approved Inventory Project is to develop an enhanced natural assets inventory, which focuses on building an understanding of the natural assets the District relies on, the extent of that reliance, and provides a foundation for the development of the natural asset management plan. The natural asset inventory was developed in accordance with CSA standard W218:23[1], and addresses the following:

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[1] It is important to note that the CSA W218 standard does not require a risk assessment or condition assessment but does include information on how an organization should pursue them if desired.

- Basic natural assets inventory
- Preliminary condition assessment
- Preliminary services and performance measures identification
- Preliminary risk identification
- Preliminary valuation of natural assets
- Collaboration with external stakeholders
- Final report

2.0   Introduction

What are natural assets?

'N*atural assets'*, or municipal natural assets, are the stock 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.[2]

Saanich's AM Program scope includes engineered and natural assets. Natural assets are one of nine asset types.[3] They are a component of the broader category of green infrastructure, which includes designed and engineered elements that have been created to mimic natural functions (see Figure 2).

Green Infrastructure		Grey Infrastructure
Natural Assets	**Other Green Infrastructure**	
Agriculture Non-Forested Area Marine Shoreline Riparian Area Urban Forest Waterbody & Watercourse Wetland	Bioswales Ditches Green Roofs Rain Gardens Permeable Pavement Soil Cells Stormwater Ponds	**Drainage Facilities Information Technology Park & Trail Structures Transportation Vehicles & Equipment Wastewater Collection Water Distribution**

Figure 2: Green Infrastructure Diagram

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[2] As defined in the District of Saanich's Asset Management Policy (2019) and Asset Management Strategy (2023)

[3] Nine asset groups include drainage, facilities, information technology, park and trail services, transportation, vehicles and equipment, wastewater (collection), water (distribution), and natural assets.

Why manage natural assets

A growing number of entities, including local governments, recognize that it is as important to understand, measure, manage, and account for natural assets as it is for engineered assets. Doing so can enable local governments and others to better provide *core* services such as stormwater management, water filtration, and protection from flooding and erosion, as well as *additional* services such as those related to recreation, health, and culture. Outcomes of *effective natural asset management* include cost-effective and reliable delivery of municipal services, support for climate change adaptation and mitigation, and enhanced biodiversity.

Asset Management Process

Asset management is an on-going, iterative process. The framework is based on standard asset management practices that local governments are increasingly required to adopt in Canada, and which are articulated by organizations such as Asset Management BC, based on global norms. To achieve sustainable service delivery, asset management should assess the current state of assets, including their condition, value and risks they face (i.e., the 'Assess' phase), develop asset management policies, strategies, and financial plans, (i.e., the 'Plan' phase) and implement practices, systems, and monitoring to measure progress (i.e., the 'Implement' phase). Figure 3 below describes this process and has been adapted from Asset Management BC's asset management wheel. The figure has been amended to reflect natural asset management considerations. As shown, inventories are an essential first step to long-term natural asset management efforts.
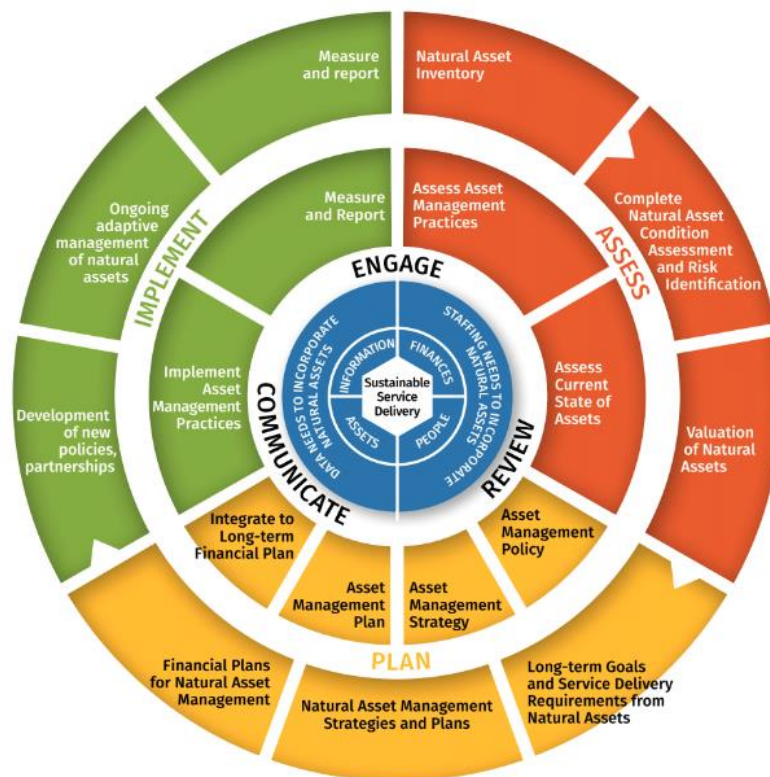
Figure 3: The Natural Asset Management Process (Source: NAI 2017, adapted from Asset Management BC)

What is a natural asset management plan?

a natural asset management plan is a plan for managing a local government's assets to deliver agreed standards of service that recognize natural assets alongside engineered assets. The purpose of such a plan is to make explicit the costs and benefits associated with service delivery and to manage those costs appropriately, while also adequately managing associated risks. A natural asset management plan is distinct from a biodiversity conservation plan, which addresses some of the same natural areas and a portion of the services provided by natural assets.

What is a natural asset inventory?

Natural asset inventories provide information on the types of natural assets a local government relies upon[4], their condition, and the risks they face. As depicted in Figure 3, a natural asset inventory is the task of asset management. Although by itself, an inventory will not give a sense of asset capacity or comprehensive/detailed service values, it is an essential first step towards a full natural asset management project.

2.1 Local Government Context   DRAFT

General

The District of Saanich is a member municipality of the Capital Region District (CRD), British Columbia. It is the largest of the thirteen member municipalities and three electoral areas in the CRD. The District of Saanich has a population of 117,735 (as of 2021, Statistics Canada) and an area of 10,344 hectares[5]. About half of the District is within the urban containment boundary; the remainder is rural/ agricultural (see Figure 4). It is centrally located within the capital region and shares its boundaries with the City of Victoria, the District of Highlands, the Town of View Royal, the Township of Esquimalt, the District of Oak Bay, and District of Central Saanich, and the Juan de Fuca Electoral Area.
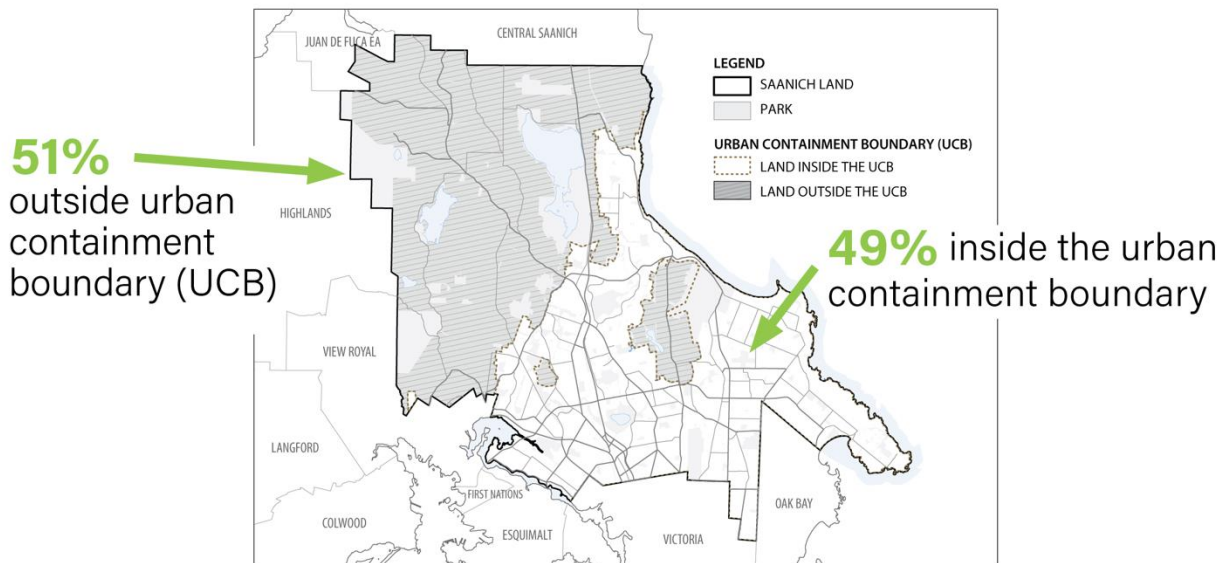
Figure 4: Sustainable Saanich: Official Community Plan DRAFT (May 2023)

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[4] Note that many local governments rely on services from natural assets they do not own.
[5] Statistics Canada, 2021 Census of Population. Retrieved December 27, 2023.

Governance

The District of Saanich's Official Community Plan (2008) recognizes the importance of ecosystem functions, and that climate change puts more pressure on natural assets such as forests, wetlands, coastal areas, and waterways. An updated plan is forthcoming. Natural assets support the provision of municipal services to the community as well as additional services known as co-benefits. Success in natural asset management would also support the District's Official Community Plan vision of 'a sustainable community where a healthy natural environment is recognized as paramount for ensuring social well-being and economic vibrancy, for current and future.' The District's natural asset management initiatives also align well with other strategic policies and plans as shown in Figure 5.
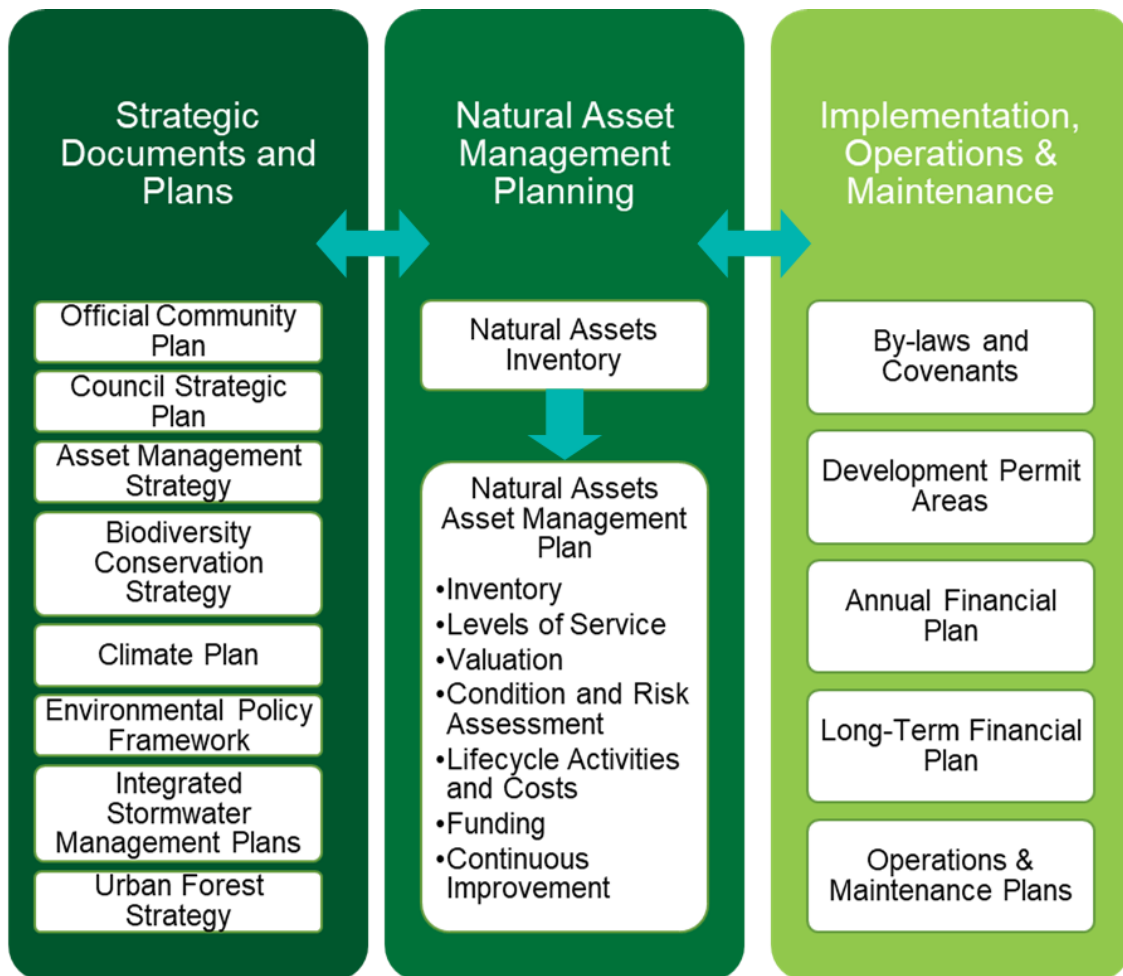
Figure 5: Diagram of Alignment Between the District of Saanich's Natural Asset Management Efforts, the Official Community Plan and Other Strategic Plans (Source: Saanich Council Report, 2023)

3.0 Basic Natural Assets Inventory

3.1 Inventory Overview

Natural asset inventories have two main components: an asset registry (which is a tabular representation of the data) and an online dashboard. The registry was provided to the District of Saanich in an Excel file and the dashboard as a website address. Information on the condition of the assets is a subset of the inventory and is depicted in both the registry and dashboard. The scope of the inventory is all natural assets within Saanich's boundary, whether they are managed by Saanich or not. This includes natural assets on public and private lands. Note that Saanich's urban trees are considered part of Saanich's Urban Forest, and therefore are included as part of the scope of Saanich's natural assets.

Inventory Data

To establish the inventory, data was obtained from the District of Saanich, the Province of British Columbia, Open Street Map, and the federal government. These spatial data layers were combined to establish a comprehensive depiction of natural assets. Table 1 describes the data sources used to develop the inventory and complete the condition assessment.

Table 1: Summary of Data Sources

Dataset	File Name	Source	Purpose
Building	Buildings	Saanich	Saanich Municipal Building footprints, used to distinguish buildings from natural land cover.
National Road Network (NRN) BC Roads	NRN_BC_14_0_RO ADSEG.shp	Government of Canada	Used to account for locations and extents of roads through study area.
BC Parcel Fabric	parcelmapbc	ParcelMap BC	Delineating parcels for land ownership.
Open Street Map (OSM) Traffic Dataset	gis_osm_traffic_a_ free_1.shp	© OpenStreetMap , Available with Open Database license	Open Street Map parking data, from which parking lot features were pulled and used to distinguish these structures from other land cover.
Sensitive Ecosystem Inventory (SEI)	SensitiveEcosyste mInventory	Saanich	Mapped areas of sensitive ecosystems, used to identify natural areas for asset delineation.
Diamondhead Biodiversity	DiamondheadBidiv ersityPolygons	Saanich	Supplementary data for forest assets as well as delineation of marine shoreline areas
Waterbody	Waterbody	Saanich	Area of ponds and lakes at higher level of detail than Coniferous

			Douglas Fir dataset. Used to delineate water areas of the inventory.
Ocean Boundary	OceanCache[6]	Saanich	A high-resolution file accounting for ocean location and boundary. Used to account for ocean assets and polish the boundaries of areas along the ocean front.
Coniferous Douglas Fir (CDF)	CoastalDouglasFirAreas	Saanich	Areas of natural ecosystems, focused on Coniferous Douglas Fir biogeoclimatic areas used to identify natural areas for asset delineation.
OSM POIS Dataset	gis_osm_pois_a_free_1.shp	© OpenStreetMap, Available with Open Database license	Open Street Map data of various points of interest in the study. For this study, Golf Courses, Schools (for school fields not captured by parks), pitches, and graveyards were pulled from this data to be distinguished from other types of land cover. These features are considered to be "built-up pervious" and are not included as natural assets in the inventory.
Parks	Park	Saanich	Dataset detailing park boundaries. They are considered built up pervious areas. This classification was used to delineate them from natural assets.
Agriculture Land Reserve (ALR) Boundary	ALRBoundary	Saanich	Agricultural land reserve boundary within the study area. Used to reclassify areas as agricultural that are not classified according to other criteria.

DRAFT

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[6] This is composed of (i) coastal bluff (25ha), which was from SEI's Coastal Bluffs, (ii) coastal sands (37ha), which was sourced from Diamondhead Biodiversity Polygons where RSTC Targets = Coastal Sand Ecosystems (where data for Coastal Bluffs was available) (iii) Ocean (638ha), sourced from provided data "SaanichNAIP.gdb", both the "MunipcialBoundary" and "OceanCache" layer were utilized to establish Ocean area [**NOTE**: The Municipal Boundary layer extends into the ocean, and was used as the cut-off point); (iv) Bedrock (0.6ha), sourced from VRA and merged with Coastal Bluff as requested.

Urban Containment Boundary	UrbanContainment Boundary	Saanich	Area detailing urban boundaries, used to reclassify sections of VRI.
Vegetation Resource Inventory (VRI) 2022	VEG_COMP_POLY_AND_LAYER_2022.gdb	Province of BC	Used to provide a starting point for land cover in the study area. As a final cleaning process, the Urban containment boundary file was buffered by 15 m and all VRI herb areas within are reclassified to Mixed Urban, to prevent private lawns counting towards natural assets.
Watercourse	Watercourse	Saanich	Used to estimate watercourse proximity condition.
Zoning	Zoning	Saanich	Used to sub-divide areas by zoning.
First Nation Reserve Boundaries	FirstNationReserve	Saanich	Used to subdivide areas by First Nation Reserve boundaries.
Drainage Basin Boundaries	DrainageBasinBoundary	Saanich	Used to subdivide areas by drainage boundaries.

Figure 6 demonstrates how the assets are organized into a hierarchy in the inventory. The natural asset type is comprised of seven asset groups, some of which are further divided into sub-groups of assets. The asset hierarchy was developed based on how the assets are managed. Although urban trees are normally considered as other green infrastructure (enhanced), they have been included in Saanich's natural assets inventory because they are part of Saanich's Urban Forest Strategy and will be managed as part of the urban forest.
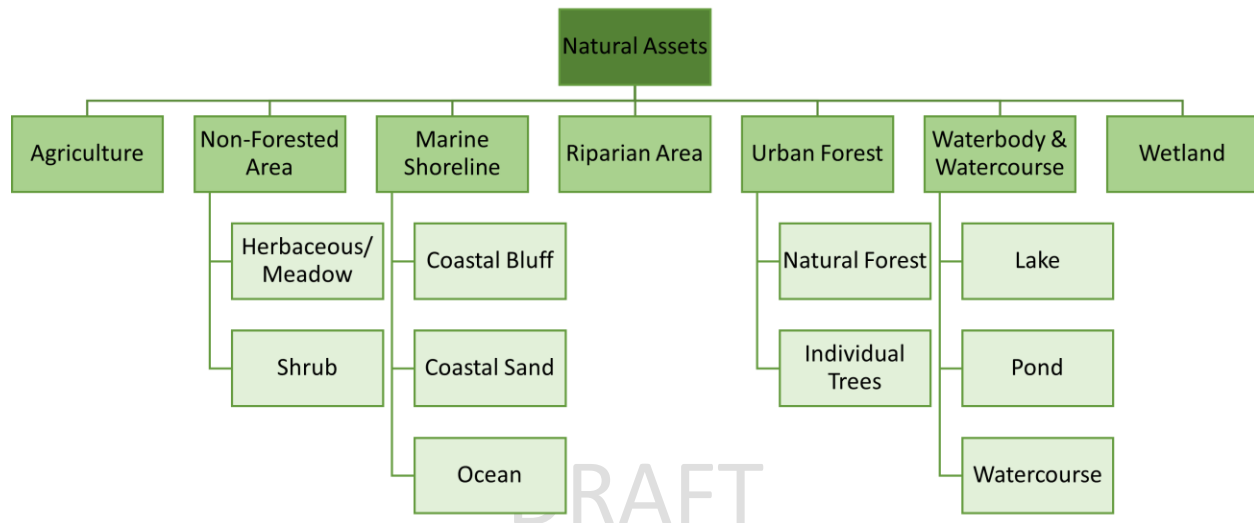
Figure 6: Natural Asset Hierarchy

The majority of the assets are represented as polygons, or areas measured in hectares in the inventory. Exceptions to this are the tree inventory (which is represented as point data — one point for each tree) and the watercourse assets (which are represented as line data that is measured in length).

The area-based inventory defined a total of 10,846 individual assets, covering 6,375 hectares (ha), as noted in Table 2, and the number of individual trees and kilometres of watercourses as noted in Table 3. An asset is defined as a continuous area of the same land cover type. For example, an intact forested area would be defined as one asset, but a forested area that is bisected by a road would constitute two assets. The majority of this area was forest cover, followed by agriculture, marine shoreline, and non-forested area.

Natural assets cover approximately 62% of Saanich's land cover, exceeding the Kunming-Montreal Global Biodiversity Framework Target 2 Goal to conserve and manage 30% of natural areas.[7] While these areas are not 'conserved', Saanich's efforts towards natural asset management will contribute toward protection of the natural environment and its associated functions and processes. While the focus of this report (i.e., the condition and risk assessments) is on the area-based natural assets, Table 3 summarizes the linear and point assets by type.

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[7] Convention on Biological Diversity, 2024.

Table 2: Summary of Polygon Natural Assets by Type

Asset Group	Number of Assets	Total Area (ha)
Agriculture	422	910
Non-forested Area	924	478
Marine Shoreline	769	700
Riparian Area	1,780	207
Urban Forest	5,895	3,481
Waterbody and Watercourse	587	360
Wetland	469	239
Total	**10,846**	**6,375**

Table 3: Summary of Point and Linear Natural Assets by Type

Asset Group	Asset Subgroup	Quantity
Urban Forest	Individual Trees (outside Natural Forest areas)	377,712
Waterbody and Watercourse	Watercourse	142 km

Figure 7 shows the spatial distribution of the natural assets (area or polygon-based assets).
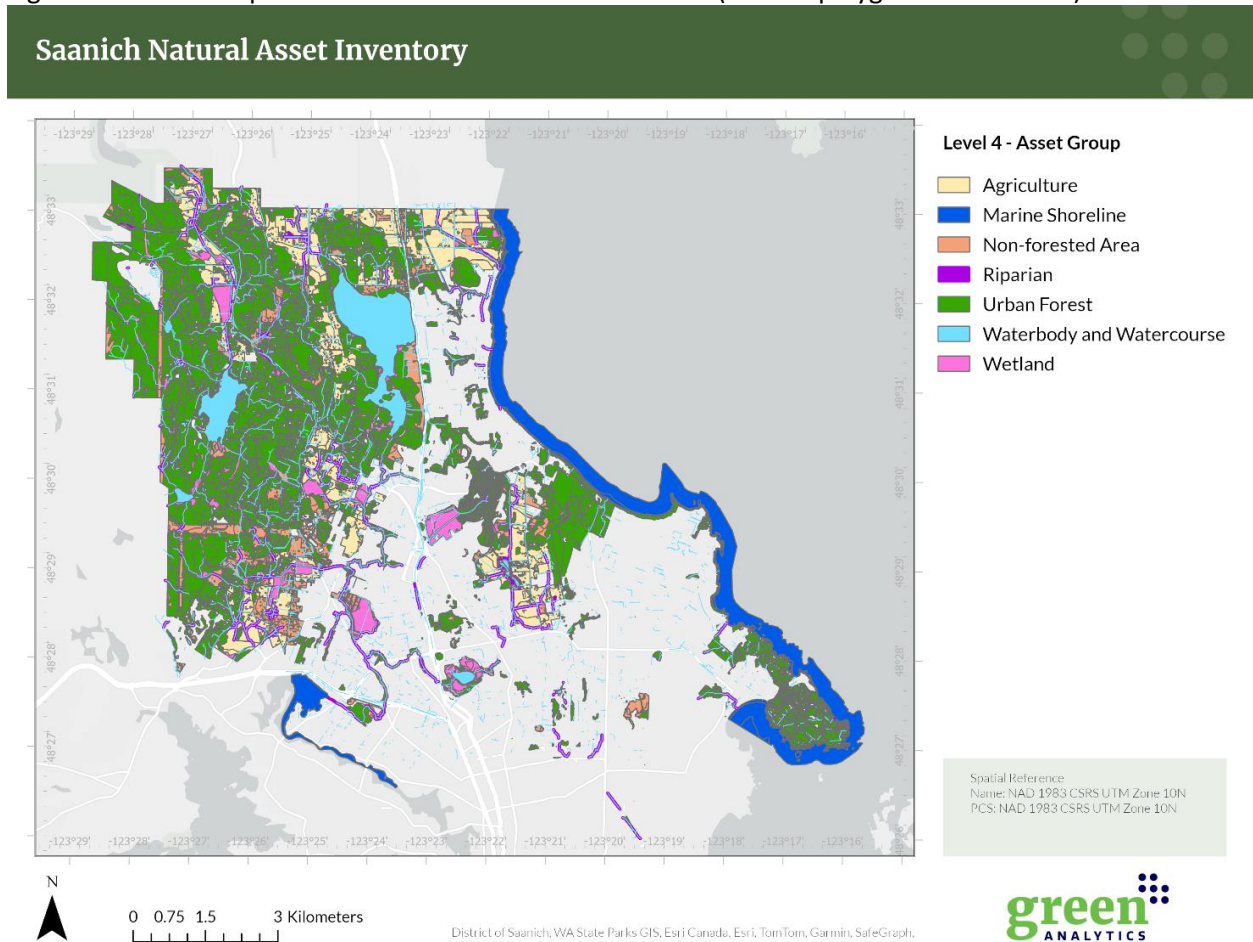
Figure 7: Saanich Natural Asset Inventory as Shown in Online Dashboard

3.2 Asset Registry

Each natural asset within the inventory has a unique identification number that allows users to select and analyze individual assets and manipulate the corresponding data as required. For example, changes in condition can be noted for individual assets. Information on each asset is housed in an asset registry. Figure 8 is an excerpt from Saanich's online registry showing natural asset characteristics and details. Additional detail is provided in the online dashboard (e.g., a series of attributes for each asset contained within the inventory).

3.3 Online Dashboard

Inventories may provide more insights when characterized visually in a dashboard, which enables users to explore different aspects of the data. For instance, natural asset information can be quickly summarized by watershed area, or, if users want to explore the specifics of forest assets, they can quickly filter the data to focus on that particular asset. Figure 9 is a screenshot from the dashboard. The full version can be accessed at https://go.greenanalytics.ca/Saanich.

Asset_ID	Sub-Asset ID	Area (ha)	Level 1 - Owner	Level 2 - Asset Type	Level 3 - Asset Location	Level 4 - Asset Group	Level 5 - Asset Subgroup 1	Level 6 - Asset Subgroup 2	Majority Terrestrial Habitat Type	Majority TEM Leading Structure
OCN7	OCN7-2	551	Private/Other	Natural Assets		Marine Shoreline	Ocean			
WAT436	WAT436-1	226	Private/Other	Natural Assets		Waterbody and Watercourse	Lake			MF
WAT318	WAT318-2	71	Private/Other	Natural Assets		Waterbody and Watercourse	Lake			YF
FOR730	FOR730-26	49	Municipal	Natural Assets		Urban Forest	Forest			YF
OCN6	OCN6-1	44	Private/Other	Natural Assets		Marine Shoreline	Ocean			
AGR124	AGR124-2	33	Private/Other	Natural Assets		Agriculture				
FOR485	FOR485-129	25	Municipal	Natural Assets		Urban Forest	Forest	Mature Forest	Mature Forest	YF
FOR631	FOR631-108	25	Private/Other	Natural Assets		Urban Forest	Forest	Mature Forest	Mature Forest	YF
FOR485	FOR485-105	24	Municipal	Natural Assets		Urban Forest	Forest	Mature Forest	Mature Forest	YF
WET13	WET13-15	23	Municipal	Natural Assets		Wetland				
FOR729	FOR729-12	21	Private/Other	Natural Assets		Urban Forest	Forest			YF
AGR132	AGR132-10	20	Private/Other	Natural Assets		Agriculture				
FOR730	FOR730-12	19	Municipal	Natural Assets		Urban Forest	Forest	Young Forest	Young Forest Tall	YF
FOR617	FOR617-43	19	Private/Other	Natural Assets		Urban Forest	Forest	Mature Forest	Mature Forest	MF
WET121	WET121-1	19	Private/Other	Natural Assets		Wetland				
AGR125	AGR125-3	19	Private/Other	Natural Assets		Agriculture				
FOR597	FOR597-15	18	Municipal	Natural Assets		Urban Forest	Forest	Mature Forest	Mature Forest	OF
AGR139	AGR139-5	18	Private/Other	Natural Assets		Agriculture				
AGR52	AGR52-16	18	Private/Other	Natural Assets		Agriculture				
AGR19	AGR19-1	17	Private/Other	Natural Assets		Agriculture				
AGR137	AGR137-6	17	Private/Other	Natural Assets		Agriculture				
FOR730	FOR730-23	16	Municipal	Natural Assets		Urban Forest	Forest			YF
NBAR45	NBAR45-58	16	Private/Other	Natural Assets		Marine Shoreline	Coastal Sands			
AGR14	AGR14-6	16	Private/Other	Natural Assets		Agriculture				

Figure 8: Excerpt from the Registry, which is a Tabular Representation of Inventory Data
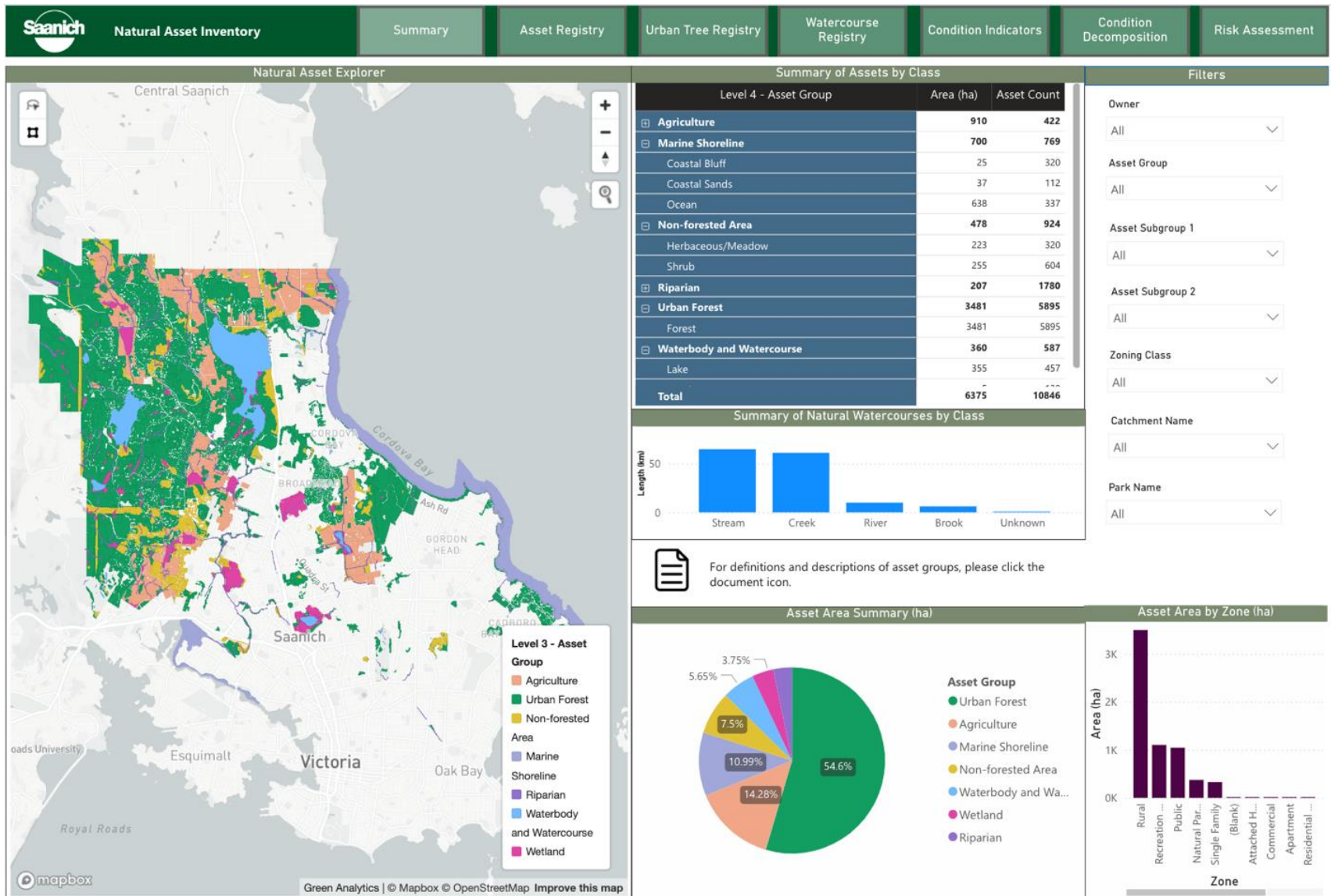
Figure 9: Screenshot of Main Inventory Summary from the Online Dashboard

4.0   Preliminary Condition Assessment

Documenting the condition of natural assets is a key aspect of natural asset inventories. A natural asset condition assessment provides an understanding of both the ecological health of natural assets, and the ability of natural assets to provide services. This information, in turn, can support the effective management of natural assets, be reflected in the registry and the dashboard, and updated over time.

A desktop-based condition assessment was completed for all natural assets except agriculture, urban trees, or watercourses (due to data constraints) and built into the inventory to provide an initial understanding of the status of the natural assets for the District of Saanich. This level of detail is a reasonable first step in assessing condition and can be used as a foundation for future work in this area.

The condition indicators are noted below and categorized into three criteria to align with the CSA standard for natural asset inventories. These include physical context to consider the physical attributes of the asset (e.g., topology, soil type), landscape context to consider the asset as a whole and how it is influenced by surrounding areas (e.g., landscape connectivity, fragmentation), and ecological context which considers the ecological attributes of the asset (e.g., forest composition, presence of native species).

CRITERIA FOR PHYSICAL CONTEXT

1. Natural Area Patch Size and Shape
2. Natural Asset Proximity to Watercourses
3. Forest Proximity to other Natural Assets
4. Wetland Proximity to other Natural Assets

CRITERIA FOR LANDSCAPE CONTEXT

5. Extent of Adjacent Complementary Land Uses

CRITERIA FOR ECOLOGICAL CONDITION

6. Biodiversity Condition

The indicators employed in the desktop assessment are proxy metrics for broader ecological condition considerations. The underlying assumption for natural asset condition assessments is that an asset that is assessed as being in a "good" condition from an ecological perspective, is anticipated to be able to provide a "good" level of ecological services. For example, larger asset size implies more connectivity of natural areas, while higher road density implies more fragmentation and higher hydrologic impairment of water flows, and more permeability implies greater ability to store water which means more effective stormwater management. The indicators are described in Annex B along with detailed results for each indicator.

4.1   Condition Results

Overall, about 1,977 ha (36% of the natural assets assessed for condition, or 31% of the total natural assets mapped) were assessed in very good condition and 3,030 ha (55% of the natural assets assessed for condition, or 47% of the total natural assets mapped were assessed in good condition (Table 4).

Table 4: Breakdown of Condition Ratings by Area and Number of Assets

Condition Rating	Number of Assets	Area (ha)
Very Good	2,881	1,977
Good	5,458	3,030
Fair	1,598	408
Poor	459	50
Very Poor	28	1
Total	**10,424**	**5,465**
Not rated	422	910

Figure 10 shows the results of the spatial distribution of the condition ratings. Results by condition indicator are provided in Annex B.
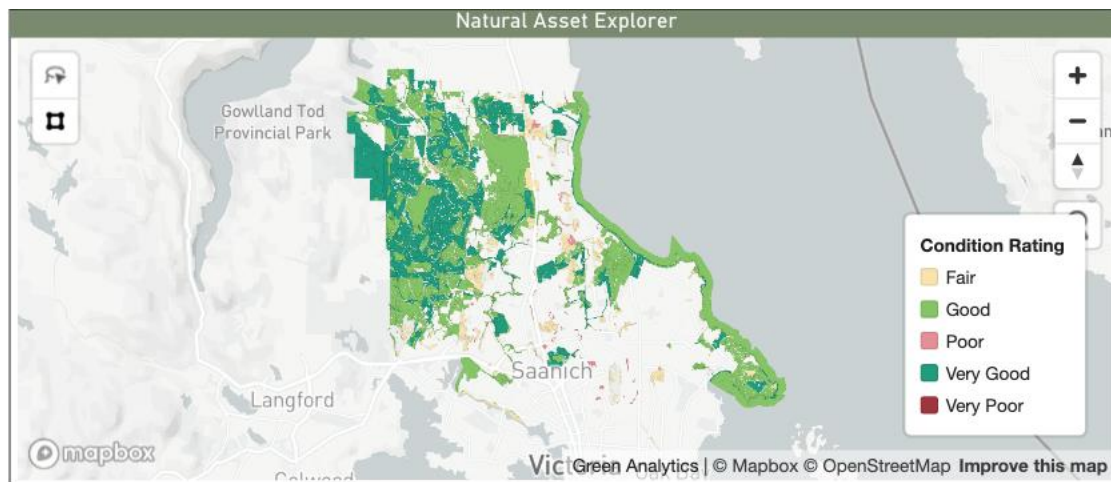
Figure 10: Saanich Natural Asset Inventory Mapped by Overall Condition Rating

Figure 11 presents condition results by asset type and rating.
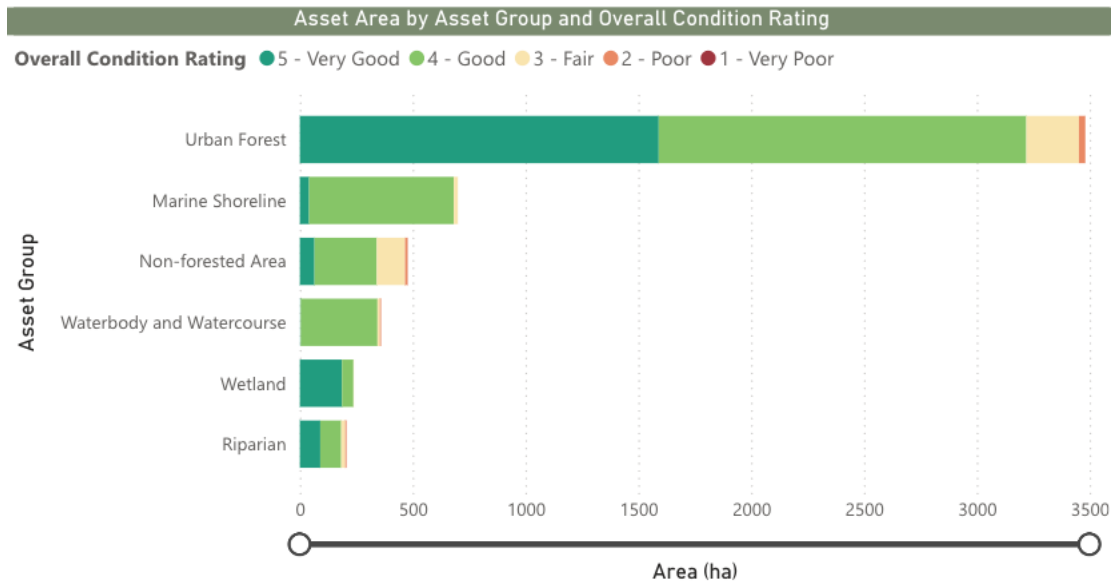
Figure 11: Summary of Condition Rating by Natural Asset Type

4.2   Maintaining the Inventory

Inventories are not static. Both the registry and the dashboard can be expanded and/or updated as new information becomes available. For example, asset condition might improve as a result of restoration efforts, or new studies may add insights on the condition of the assets. New data can be reflected in the asset registry and subsequently in the online dashboard as it becomes available. Furthermore, the level of desired detail may evolve as asset management readiness increases or as areas of natural asset management focus emerge. That said, inventories should grow in detail and sophistication only insofar as they remain aligned with the capacity of the communities to maintain them and the uses to which they will be put. Their evolution and development should be a function of the monitoring, reporting and lessons of the asset management cycle and be driven by the imperative of ensuring sustainable, cost-effective delivery of services to the community, which is the core of asset management.

5.0   Preliminary Risk Identification

5.1 Risk Identification Overview

Identifying risks facing natural assets is a means to help local governments prioritize management actions for natural assets. Risk management for natural assets is a four-stage process that includes hazard identification, analysis of likelihood and impact, development of risk mitigation strategies, and control and documentation. Risk identification informs the first and second stages of risk management by identifying the top risks to natural assets and their associated services, plus a high-level analysis of likelihood and impact.

$$Risk\ score = \ Likelihood\ of\ occurence\ \times Impact\ of\ occurence$$

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Risk types relevant to natural asset management typically include:

- **Service risk**: the risk of an asset failure that directly affects service delivery.
- **Strategic risk**: the risk of an event occurring that impacts the ability to achieve organizational goals.
- **Operations and maintenance risk**: risks related to poor asset controls and oversight, which can lead to poor record-keeping and poor monitoring of asset.
- **Financial risk**: risks related to the financial capacity of the District of Saanich to maintain municipal services.
- **Political risk**: risks related to the nature of municipal politics.

5.2 Risk Rating Methodology Used for the Project

The following process was followed to arrive at preliminary risk ratings for natural assets for the District of Saanich:

1. Inventory hazards and affected natural asset groups
2. Assign identified hazards to relevant natural asset groups and services
3. Identify priority stressors using risk ratings
4. Map risk across the District

In October 2023, District staff participated in a risk management workshop led by the Natural Assets Initiative (NAI) to identify hazards to natural assets and their associated services. Staff started by exploring common hazards to consider the likelihood and impact severity of hazards and to group hazard categories by their primary drivers. A follow-up meeting was held in December 2023 to review results and consider additional hazards identified in previous NAI projects.

A total of seventeen hazards were identified and were grouped into categories, organized by three over-arching drivers – climate change, development pressure and lack of capacity. Each of these risk drivers can result in cascading and systematic hazards, which are discussed briefly below.

Climate change
Coupled weather events are becoming more common, of longer duration and severity as the earth warms. Droughts and heatwaves are a coupled result of global warming. Drought stricken areas become more vulnerable to forest fire, susceptible erosion, invasive species, and pests. The relevant cascading hazards of climate change in Saanich include:

- o Forest fire (including wildfire & urban interface)
- o Flooding / more frequent and intense rainfall events
- o Pollutant loading
- o Invasive species
- o Erosion
- o Storm surge
- o Rising sea levels

Development pressure

Increasing development pressure can bring about a range of cascading impacts *if* the areas identified for development fragment and degrade priority natural assets and/or the connectivity of natural assets, and ultimately degrade hydrological connections, impair climate resilience and damage biodiversity. The environment doesn't need to be pitted against development, however. Where environmental and community objectives can be articulated, solutions that minimize environmental harm and maximize community well-being can be identified. The relevant cascading hazards of development pressure in Saanich include:

- o Development pressure – urban
- o Development pressure - rural
- o Habitat Conversion and Fragmentation
- o Overuse of trails
- o Illegal dumping

Lack of capacity

The lack of capacity to address natural asset risks can lead to lost opportunities (where natural asset management can mitigate risks) and deepening risks over time. This may be due to a range of challenges including lack of knowledge or expertise within the District, the absence of over-arching policies related to natural assets, staff and council turnover and competing interests for use of time. The relevant cascading hazards in Saanich include:

- o Lack of legislated protection
- o Lack of dedicated resources / formalized maintenance programs
- o Lack of education / understanding
- o Lack of policy tools
- o Lack of integrated planning

For each hazard, natural asset groups at risk and services that could be impacted were documented. Each hazard was then ranked from 0-25 according to the probability of an impact occurring (see Table 5 below for likelihood ratings followed) and the relative magnitude of its negative consequences (see Table 6 for impact ratings used), with 0 being the lowest and 25 being the highest risk.

Table 5: Likelihood of Impact from Hazards – Rating Scale

Likelihood Rating	Event Type	
	Recurrent Impact	Single Event (only occurs once)
Almost certain (5)	Could occur several times per year	>90% chance of occurring by 2050
Likely (4)	May arise about once per year	51 – 90% chance of occurring by 2050
Possible (3)	May arise once in ~ 10 years	21-50% chance of occurring by 2050
Unlikely (2)	May arise once in 10 years to 25 years	1-20% chance of occurring by 2050
Rare (1)	Unlikely during next 25 years	< 1% chance of occurring by 2050

Source: District of Saanich

Table 6: Hazard Impact Rating Scale

Impact Rating	Description of rating
Catastrophic (5)	Irrecoverable damage/irreversible impacts to the asset and/or major loss of functions.
Major (4)	Major, widespread impacts to the asset in the medium / long-term and/or severe and widespread loss of ecological functions. Damage that could be reversed with intensive efforts (e.g., introduction of tree disease)
Moderate (3)	Moderate impacts on the asset in the short/medium-term. Isolated but moderate instances of damage to the ecosystem functions that could be reversed with intensive efforts.
Minor (2)	Minor, localized impacts on the asset in the short-term. Isolated but minor instances of damage to the ecosystem functions that could be reversed.
Negligible (1)	Appearance of threat but no real impacts on the asset or its functions.

Source: NAI & Green Analytics

To assess impact and consequence, the District of Saanich considered four questions:

i/ What impact is likely to happen?
ii/ What is the consequence of that impact happening?
iii/ What can be done to mitigate the probability of impact and/or consequence?
iv/ What cues will signal the need for mitigation?

The total risk score was then converted into a rating scale:

- High: assets with a score between 16 and 20
- Medium-high: assets with a score between 15 and 16
- Moderate: assets with a score between 11 and 15
- Medium-low: assets with a score between 10 and 11
- Low: assets with a score between 6 and 10

5.3 Results of the Hazard Identification Process

The risk identification process revealed:

- 8 high-level hazards
    - Invasive species,
    - Development pressure - urban,
    - Development pressure – rural
    - Habitat conversion and fragmentation,
    - Flooding / more frequent & intense rainfall events,
    - Lack of dedicated resources / formalized maintenance programs
    - Lack of policy tools,
    - Lack of legislated protection of natural assets
- 3 medium-high level hazards
    - Erosion,

- o Storm surge,
- o Rising sea levels
  - ▪ 3 medium-level hazards
    - o Pollutant loading,
    - o Lack of education / understanding
    - o Lack of integrated planning
  - ▪ 3 low-level hazards
    - o Forest fire,
    - o Overuse of trails,
    - o Illegal dumping

Table 7: Summary of Natural Asset Risk Ratings

Risk Rating	Number of Assets	Asset Area (ha)
Low	796	926
Medium-Low	1955	1542
Medium	5380	4259
Medium-High	2977	1452
High	5105	2628
	16213	10,804

Note: Area of at-risk natural assets may not align with the number or area of natural assets.

5.4 Mapping Risk

Through collaboration between the NAI project team and Saanich staff, the spatial extent of each risk was defined. Table 8 below provides a summary of risk rankings organized by risk driver and addresses how the spatial extent was determined and mapped in the Inventory Dashboard.

Table 8: Simplified Risk Results

Risk driver	Hazard	Risk score	Natural Assets Groups Affected
Climate Change	Forest fire	L	Urban Forest
Climate Change	Flooding /more frequent & intense rainfall events	H	Agriculture, Non-forested area, Urban forest, Waterbody, and Watercourse, Wetland
Climate Change	Pollutant loading	M-L	All
Climate Change	Invasive species	H	All
Climate Change	Erosion	M-H	All
Climate Change	Storm surge	M-H	Agriculture, Marine Shoreline, Non-forested Area, Riparian, Urban Forest, Waterbody and Watercourse
Climate Change	Rising Sea Levels	M-H	Agriculture, Marine Shoreline, Non-forested Area, Riparian, Urban Forest, Waterbody and Watercourse

Development Pressure	Development pressure (urban)	H	All
Development Pressure	Development pressure (rural)	H	All
Development Pressure	Overuse of trails	L	Non-forested areas, Urban forest
Development Pressure	Illegal dumping	L	All
Development Pressure	Habitat Conversion/ Fragmentation	H	
Lack of capacity	Lack of legislated protection	H	n/a (non-GIS)
Lack of capacity	Lack of resources / maintenance programs	H	n/a (non-GIS)
Lack of capacity	Lack of education / understanding	M	n/a (non-GIS)
Lack of capacity	Lack of policy tools	H	n/a (non-GIS)
Lack of capacity	Lack of integrated planning	M	n/a (non-GIS)

Note: n/a = not applicable

In terms of scope, the identified risks affect natural assets across the District of Saanich, with numerous risks potentially affecting all natural asset groups. The identified risks also have the potential to negatively impact engineered assets, property, and personal health and safety. See Figure 12 for a visual representation of risk impact and likelihood.
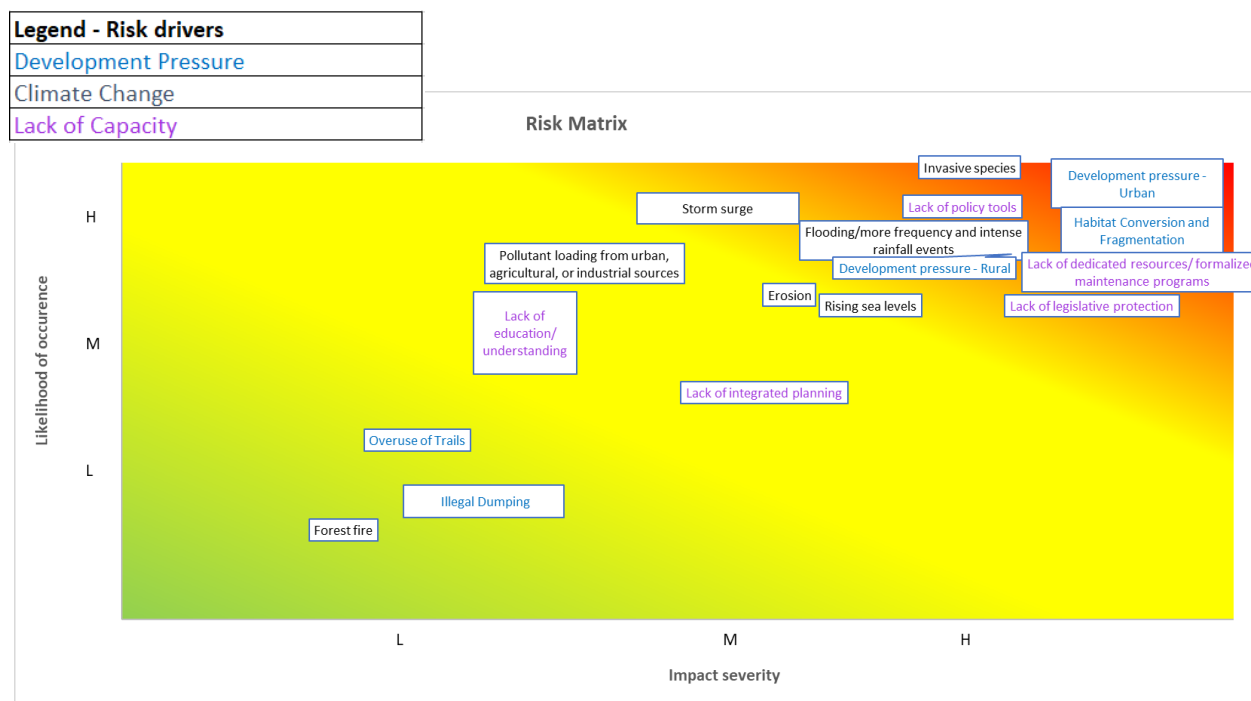

Figure 12: Draft Results of Risk Identification Process

5.5 Priority Risks for Saanich

The outcomes of the risk identification process highlight potential priorities (high risk score hazards) which the District of Saanich could focus its natural asset management efforts. Where possible, these are also informed by the condition assessment and mapped to show the distribution of risks across the District (see Annex C for further details on mapping). These are:

- **Invasive Species:** Invasive species can degrade wildlife habitat, displace native species, increase wildfire hazards, and impair terrestrial and aquatic ecological services. The District of Saanich administers an Invasive Species Management Strategy[8].
- **Development Pressure:** Both urban and rural development primarily has an adverse impact on the health and current state of natural assets. Development policies play a major role in regulating and enabling the protection and conservation of predetermined areas.
- **Habitat Fragmentation**: Habitat fragmentation may result in the destruction or degradation of ecosystems and lead to declines in municipal services, as well as co-benefits. Saanich's Urban Containment Boundary plays a key role in limiting habitat fragmentation and can be complemented by policies and by-laws to target areas of concern.
- **Flooding/ more frequent & intense rainfall events**: Storm events can impact natural assets throughout the municipality such as compromising capacity of ecosystem services to deliver services. Given the climate change projections of increased frequency and intensity of winter storms, the District has strategies and initiatives identified in the climate plan that includes the role of natural ecosystems. Maintaining the land's absorptive capacity through retention of forest cover and restoration of floodplains and wetlands will help mitigate the impacts of storm events.
- **Lack of Legislated Protection:** The management actions are time constrained as bylaws may not apply to all areas (e.g., Agricultural Land Reserve), lack compliance and enforcement, or come into force too late. To advance the protection of natural assets, the District of Saanich could explore, in addition to bylaw measures: partnerships to increase community support and access specialized skillsets and planning tools to ensure natural assets are considered at early development process stages.
- **Lack of Dedicated Resources/ Formalized Maintenance Programs**: The lack of dedicated resources can be caused by a range of factors, including internal competition for resources within a municipality, a lack of understanding or a lack of capacity.
- **Lack of policy tools**: A lack of policy tools can result from a lack of policy and legislative direction in the legislation governing local governments.

Figure 13 demonstrates the total risk score for assets within the asset inventory. The total risk score accounts for all applicable risks. The total score was calculated using the formula: *(sum of all risks identified for the asset / total potential risk score) * 100*. The higher the risk score, the more risks that any given asset is subject to.

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[8] District of Saanich. Retrieved January 5, 2024 at
https://www.saanich.ca/assets/Parks~Recreation~and~Community~Services/Documents/InvasiveSpeciesManagementStrategy.pdf
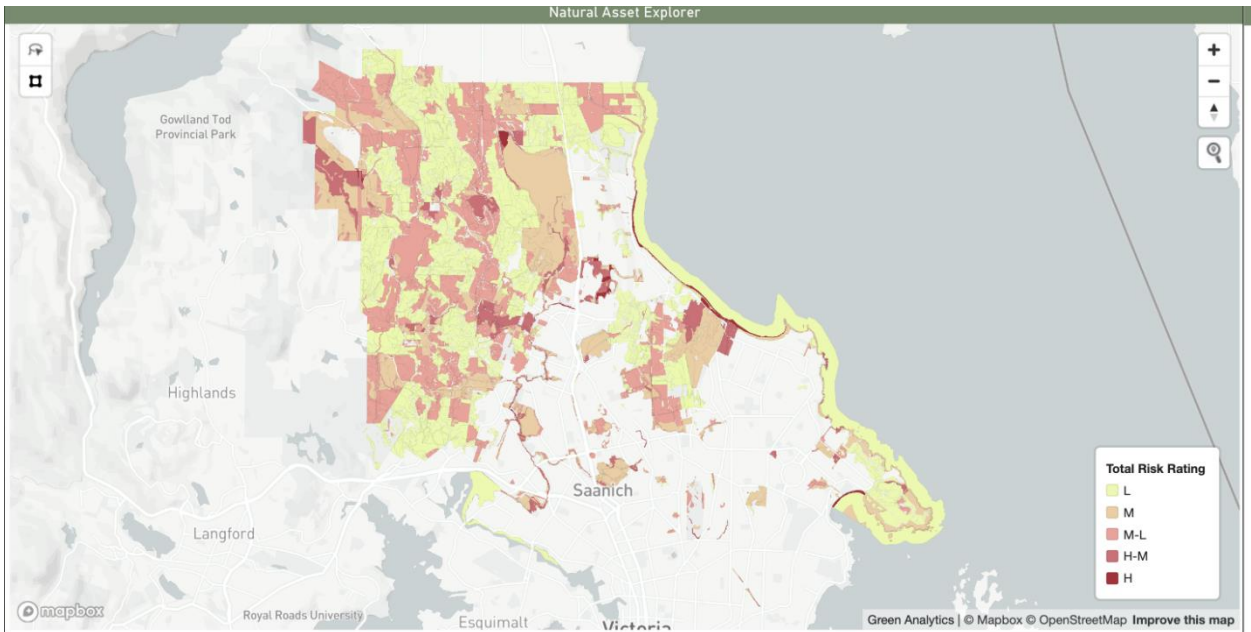
Figure 13: Map of Overall Risk Areas

Table 9 lists and provides brief descriptions of risk mitigation strategies. These will be considered as part of the development of the natural asset management plan.

Table 9: Risk Mitigation Strategies

Accept	Risk may be acceptable if probability and consequences are small
Minimize	Risk under local government's control that warrants exposure reduction
Share	Partners in a project permit the sharing of larger risks to reduce it for each
Transfer	Insurance, fixed price contracts, and other risk transfer tools

6.0   Preliminary Services and Performance Measures Identification

6.1 Overview

The municipal services an9d co-benefits supported by natural assets were identified, along with a preliminary identification of potential levels of service (LOS) for natural assets, including indicators and performance measures.

Levels of service (LOS) represent the service delivery commitments of a local government, inform asset management and financial plans, and help local governments prioritize capital and operational

budgeting decisions. Defining LOS enables local governments to link strategic objectives with the technical and operational requirements for infrastructure. It enables local governments to make the best possible investments towards sustainable service delivery.

It is the responsibility of a local government's council to approve and monitor progress on LOS. Doing so enables them to be transparent and accountable for their decisions about service delivery. When councils share information about LOS and associated costs with the public and other stakeholders, they are better able to communicate the social, environmental, and financial impacts of changing service levels and engage the community on their "willingness to pay" for alterations in service levels.[9]

It should be noted that few local governments in Canada have developed levels of service for natural assets, and there are currently no standards for levels of service; however, there are emerging studies and strong examples in this sector to draw from.

This report includes a preliminary identification of the municipal services and co-benefits supported by natural assets, a preliminary identification of how the performance may be measured, and documentation of current levels of service where known. Performance measures will be finalized in Saanich's Natural Asset Management Plan.

6.1.1 Levels of Service Hierarchy

The preliminary levels of service hierarchy is shown in Figure 14, and definitions are provided in the Glossary.

Figure 14: Levels of Service Hierarchy (Source: NAI, Developing Levels of Service for Natural Assets, 2022)

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[9] From page 6 of *Developing Levels of Service for Natural Assets: A Guidebook for Local Governments*

6.2 Preliminary Identification of Services

Strategic Objectives

As outlined in the *AM Strategy*, there is strategic alignment between Saanich's vision (see Figure 15) established in the *Sustainable Saanich Official Community Plan* (OCP)[10] and the goals of the AM Program. The OCP is the principal legislative tool for guiding future growth and change in Saanich, and all other Saanich plans and strategies must comply with the principles and policies of the OCP.

Figure 15: Saanich Vision (Source: Saanich Official Community Plan 2008)

The OCP identifies a number of focus areas, and includes objectives and policies for each. Table 10 shows the objectives that are related to natural assets. For the purposes of this report, these are the strategic objectives for natural asset management. Other Saanich documents that relate to natural asset management are listed in Annex A.

Table 10: Strategic Objectives Related to Natural Assets

OCP Section	OCP Focus Area	OCP Objectives Related to Natural Assets
5	Climate Change Response	A. Transition Saanich to be a 100% renewable energy, zero carbon community by 2050 or before.
		B. Incorporate adaptation strategies into land use, building and infrastructure planning and design, emergency response, natural areas management, and other services to create a more resilient community.
6	Natural Environment	A. Incorporate and retain Saanich's unique natural features, biodiversity, and ecosystem services.
		B. Improve the health of watersheds and freshwater/marine shoreline habitat.
		C. Enhance the urban forest and increase equitable access.

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[10] *Sustainable Saanich Official Community Plan – Draft February 2024,* District of Saanich (2024).

		D. Recognize the vital importance of a healthy natural environment to supporting community health and well-being and climate resilience.
		E. Support environmental stewardship, public education, awareness, and participation.
		F. Enhance meaningful community connection with nature in ways that foster the well-being of both people and the natural environment.
7	Land Use	A. Maintain the Urban Containment Boundary as the principal growth management tool to protect agricultural land, natural areas, and rural character while also supporting efficient service and infrastructure provision and climate resilient communities.
		B. Plan for most new housing and employment growth to be accommodated in Primary Growth Areas.
9	Transportation & Mobility	A. Integrate land use with transit and other forms of sustainable transportation.
		B. Prioritize walking, cycling, public transit, and the movement of goods and services in transportation planning and implementation.
10	Utilities & Service Infrastructure	A. Apply a coordinated sustainable service delivery approach to infrastructure.
		B. Consider the latest climate projections in the design, upgrade, operations, and maintenance of new and existing infrastructure.
		C. Integrate natural assets and ecosystem services into the District's broader approach to infrastructure management.
11	Parks, Trails and Open Space	A. Provide residents with a range of safe parks, trails, open spaces, and recreational opportunities to support active living, health, well-being and community cohesion.
		B. Work towards equitable and walkable access to parks and open spaces for all urban residents.
		C. Protect, restore and enhance natural areas, ecological function and biological diversity.
12	Agriculture and Food Security	A. Protect agricultural land for farming by current and future generations.
		B. Support access to a safe and nutritious food supply.
		C. Create opportunities for local food production in both rural and urban areas.
13	Community Well-being	A. Foster a diverse, equitable and inclusive community where all residents are engaged and feel a sense of belonging.
		B. Provide a range of recreation, arts, and culture opportunities for people of all ages, cultural backgrounds and abilities.
		C. Recognize First Nations heritage and the community's colonial past as part of Saanich's path towards reconciliation. D. Create a healthy, safe, and resilient community.
		E. Incorporate heritage resources and values into planning and placemaking.

| 14 | Economic Vibrancy | B. Enhance economic vitality through sustainable, supportive community infrastructure. |
| | | C. Align economic development with a sustainable and equitable community. |

6.2.2 Preliminary Services and Service Delivery Objectives

The District of Saanich is responsible for the delivery of a wide range of services to the community, and delivery of these services is enabled by its physical assets, including engineered (i.e., built) and natural assets.

The Asset Manage Strategy includes a summary of the municipal services that Saanich provides to the community and the asset types supporting the delivery of each service.[11] Building on this work, Table 11 provides a preliminary identification of Saanich's municipal services that are supported by natural assets. Note that drinking water supply is not included because this service is the responsibility of the Capital Regional District.

Table 11: Preliminary Services and Service Delivery Objectives

Municipal Services Supported by Natural Assets	Service Delivery Objectives for Natural Asset Management	Natural Asset Groups
General Government Services		
Provide a wide variety of general administrative, communications and legislative services, including but not limited to climate change mitigation and adaptation	Enhance agriculture and food security	Agriculture
	Leverage natural assets to support climate change mitigation and adaptation	Agriculture, Non-forested Area, Marine Shoreline, Riparian Area, Urban Forest, Waterbody and Watercourse, Wetland
Parks, Recreation and Community Services		
Protect, restore and enhance biodiversity, natural areas and the urban forest, as well as riparian areas, waterbodies and watercourses, and wetlands, which together provide a wide variety of stormwater management and ecosystem services	Protect, maintain and enhance natural areas to support mental and physical health	Agriculture, Non-forested Areas, Marine Shoreline, Riparian Areas, Urban Forest, Waterbodies and Watercourses, Wetlands
	Protect, enhance, connect and manage habitat for biodiversity conservation	
	Protect, enhance and manage the Urban Forest	Urban Forest
Stormwater Management Services		
Manage stormwater to protect buildings and transportation network from flooding	Leverage natural assets to manage stormwater quantity and mitigate flood risk	Agriculture, Non-forested Areas, Marine Shoreline, Riparian Areas,

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[11] *Asset Management Strategy*, District of Saanich (2023), Table 4.

Treat stormwater to protect the natural environment	Leverage natural assets to improve the quality of stormwater discharges	Urban Forest, Waterbodies and Watercourses, Wetlands
Transportation Services		
Provide active transportation network	Provide high value boulevard trees for climate change mitigation (e.g. shading and urban heat mitigation)	Urban Forest

In addition to supporting municipal service provision, natural assets may also provide one or more co-benefits, such as:

- Air quality regulation
- Amenity and enjoyment
- Biological control (regulating pests/diseases)
- Food production
- Historical/heritage
- Indigenous values
- Pollination
- Sea level risk mitigation
- Soil retention and erosion control
- Tourism
- Urban heat reduction

6.3 Preliminary Identification of Performance Measures

Legal Requirements

Legal requirements are the minimum levels of service that must be provided, and these are typically documented as a regulatory attribute of Technical Levels of Service. Legal requirements for natural assets in Saanich include one of more of the following:

- **Federal**
  - Fisheries Act
  - Migratory Birds Convention Act (MBCA)
  - Species at Risk Act (SARA)
- **Provincial**
  - Community Charter
  - Ecological Reserves Act
    - Victoria Harbour Migratory Bird Sanctuary
    - 10 Mile Point Ecological Reserve
  - Environmental Management Act (EMA)
    - Spill Preparedness, Response and Recovery Regulation
    - Spill Contingency Planning Regulation
    - Spill Reporting Regulation
  - Fish Protection Act
    - Streamside Protection Regulation

- o Forest and Range Practices Act (FRPA)
- o Land Act
- o Local Government Act
- o Riparian Areas Protection Act (RAPA)
- o Water Sustainability Act (WSA)
- o Wildlife Act
- **Capital Regional District**
  - o CRD Parks Regulation Bylaw No. 1
  - o Core Area Liquid Waste Management Plan
- **District of Saanich**
  - o Official Community Plan By-law 8940 (Dec 2023 Draft)
  - o Environmental Policy Framework (in development)
  - o Streamside Development Permit Area (2008) (under review)
  - o Floodplain Development Permit Area (2008)
  - o Stormwater Development Permit
  - o Watercourse and Drainage Bylaw (1996) (under review - 2024 Draft)
  - o Bylaws (see Annex A)
  - o Council Policies (see Annex A)

Preliminary Community Levels of Service

Preliminary identification of Community LOS for the municipal services supported by Saanich's natural assets are shown in Table 12. Further identification of Community LOS will be undertaken as part of the *Natural Asset Management Plan* project, including confirmation of the Community LOS to be tracked, identification of the current LOS, committed/desired LOS, LOS gaps, and strategies to address the gaps.

Table 12: Preliminary Community Levels of Service

Service Delivery Objective	Service Characteristic	Indicators (Preliminary)	Performance Measures (Preliminary)	LOS (Current)
General Government Services				
Enhance agriculture and food security	Capacity/ availability	Food production opportunities	% of Saanich land area that is outside of the Urban Containment Boundary	51%[12]
Leverage natural assets to support climate change mitigation	Sustainability	Climate change mitigation	% reduction of community-wide GHG emissions from 2007 baseline	2022: 16%[13]
	Sustainability	Climate change adaptation	% of households prepared for a seven-day emergency disaster event	2022: 42%[14]

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[12] Source: *Sustainable Saanich Official Community Plan*, District of Saanich (Draft February 2024)
[13] Source: *Saanich Climate Plan Annual Report Card 2023*, District of Saanich (2024)
[14] Source: *Annual Report 2022*, District of Saanich (2023)

and adaptation				
Parks, Recreation and Community Services				
Protect, maintain and enhance natural areas to support mental and physical health	Capacity/ availability	Access to parks	% of residents who have access to a Saanich park within 0.5km (5-10 min walk)	2022: 97%[15]
			% of residents who have access to a Saanich park, regional park, or publicly accessible greenspace within 0.5km (5-10 min walk)	2022:100%[16]
Protect, enhance, connect, and manage habitat for biodiversity conservation	Quality	Protection of habitat	% of Saanich land area that is designated as protected	To be determined
			# of parks with natural areas that have stewardship programs (i.e. Pulling Together Program for removal of invasive species and ecological restoration)	2022: 45[17]
			# of volunteers' hours for the Pulling Together Program per year	2022: 16,313+[18]
			# of Parks included in the Park Ambassador Program	To be determined
			# of private properties participating in Saanich's Naturescape Program	To be determined
Protect, enhance, and manage the Urban Forest	Capacity/ availability	Tree canopy cover	% of District land area with tree canopy cover	43%[19]
	Capacity/ availability	Tree canopy cover	# of residents who live in a location that meets the 3:30:300 principle (everyone should be able to see 3 trees from their home, all neighbourhoods where people live should have at least 30% canopy cover, and all homes should be within 300m of a park or greenspace)	To be determined
	Reliability	Citizen satisfaction	# of calls for service per year related to the Urban Forest	To be determined
Stormwater Management Services				
Leverage natural assets to manage stormwater	Reliability	Protection from flooding	# citizen complaints related to stormwater flooding per year	To be determined

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[15] Ibid.

[16] Ibid.

[17] Ibid.

[18] Ibid.

[19] *Source: District of Saanich, State of Urban Forest Report (2013)*

quantity and mitigate flood risk				
Leverage natural assets to improve the quality of stormwater discharges	Sustainability	Outfall discharge quality	Number of discharges per year with a high Public Health Concern Rating (i.e. exceeds contamination limits)	2022: 2[20]
Transportation Services				
Provide high value boulevard trees for climate change mitigation (e.g., shading and urban heat mitigation)	Capacity/ availability	Shading from boulevard trees	# citizen requests per year for new boulevard trees for shading	To be determined

6.3.3 Preliminary Technical Levels of Service

Preliminary identification of Technical LOS for the municipal services supported by Saanich's natural assets are shown in Table 13. The technical LOS measures below follow good practices related to emerging natural asset management work and most are being applied in a small number of communities that NAI has worked with to develop levels of service frameworks, including the City of Saskatoon, the Resort Municipality of Whistler, the Regional District of Nanaimo, the Town of Pelham, and Halifax Regional Municipality. Some Technical LOS relate to more than one Community LOS because natural assets support the delivery of more than one municipal service.

Further identification of Technical LOS will be undertaken as part of the *Natural Asset Management Plan* project, including confirmation of the Technical LOS to be tracked, identification of the current LOS, committed/desired LOS, LOS gaps, and strategies to address the gaps. Technical LOS will be further refined over time as industry standards emerge.[21]

Table 13: Preliminary Technical Levels of Service

Service Delivery Objective	**Service Characteristic**	**Indicators (Preliminary**	**Performance Measures (Preliminary)**	**LOS (Current)**
General Government Services				

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[20] Source: *Core Area Stormwater Quality Program 2022 Report*, Capital Regional District (2023)

[21] See NAI's guidance on developing natural asset management plans, which was developed through a participatory process with several local governments and industry leaders: https://mnai.ca/nature-is-infrastructure-how-to-include-natural-assets-in-asset-management-plans/

Enhance agriculture and food security	Capacity/ availability	Local food production	# of properties in ALR and A+ zoned lands claiming farm status	2022: 281[22]
			% of citizens who have a vegetable garden or keep poultry	2022: 47% vegetable, 0% poultry[23]
			% of neighbourhoods (local areas) that have a community garden	25% (3 out of 12)[24]
Leverage natural assets to support climate change mitigation and adaptation	Sustainability	Climate change mitigation	# of trees planted per year (target is 10,000 trees per year)	2023: 3,035 trees planted (target is 10,000 trees per year)[25]
	Sustainability	Climate change adaptation	To be determined	To be determined
Parks, Recreation and Community Services				
Provide natural areas to support mental and physical health	Capacity/ availability	Access to parks	# ha of parkland per 1000 population	2022:7.4[26]
			% of Saanich parkland that is natural area	202: 62%[27]
Protect, enhance, connect, and manage habitat for biodiversity conservation	To be determined	To be determined	To be determined	To be determined
Protect, enhance, and manage the Urban Forest	To be determined	To be determined	To be determined	To be determined
Stormwater Management Services				
Leverage natural assets to manage stormwater quantity and mitigate flood risk	Reliability	Protection from flooding	% of Saanich land area with pervious (and impervious) surface	Impervious surfaces = 15.8% of District's land area (inside UCB: 29.5%, outside UCB: 4.8%)[28]

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[22] Source: *Annual Report 2022*, District of Saanich (2023)
[23] Ibid.
[24] Ibid.
[25] Source: *Saanich Climate Plan Annual Report Card 2023*, District of Saanich (2024)
[26] Source: *The Canadian City Parks Report: Nurturing Relationships & Reciprocity 2022*, ParksPeople (2022)
[27] Source: *Annual Report 2022*, District of Saanich (2023)
[28] Source: *State of Biodiversity Report*, District of Saanich (2023)

			Volume (m3) storage capacity of wetlands	To be determined
Leverage natural assets to improve the quality of stormwater discharges	Regulatory	Ocean discharge quality	% compliance with regulatory requirements	100%
Transportation Services				
Provide boulevard trees for shading	Capacity/ availability	Shading from boulevard trees	% of available space on boulevards occupied by boulevard trees	To be determined
			# of boulevard trees planted per year	To be determined

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7.0 Preliminary Valuation

7.1 Valuation of Natural Assets

This project included a high-level preliminary valuation of natural assets. The purpose of undertaking valuation of natural assets is to provide information to support decision making, for example:

- Communication - Communicate the importance of natural assets to Council and the public.
- Education - Provide information to Council to inform decision-making.
- Funding - Support grant applications.
- Policy Development - Provide information to support policies to protect natural assets.
- Land Use Decisions - Inform decisions on land conservation and natural area protection in the land use planning.
- Development Permits - Inform decisions on development permits by communicating the service value per hectare gained from natural assets.
- Design Projects - Use service values of a natural asset to inform decision making during capital project design phase (i.e., support cost-benefit analysis of natural assets vs engineered assets).

Natural assets were valued from two perspectives:

1. Annual Service Value ($/year) - The annual economic value that the community gains from natural assets as measured by changes in human well-being (i.e., the benefit outcome of services supported by natural assets). Annual Service Value is typically an underestimate because it is not possible to determine the value of all services provided by a natural asset. Table 14 provides an overview of services for valuation. Services valued are in italics.
2. Replacement Value ($) - The economic value of natural assets that represents the cost of replacing the levels of service provided by natural assets with engineered infrastructure or the cost of rehabilitating natural assets to their optimal natural functioning. Considerations include:
   - Natural assets provide a range of services. As such, there is increased value from conserving and restoring natural assets as replacement typically does not provide full value compared to the undisturbed natural state.
   - Replacing the levels of service provided by natural assets can take a long time compared to what was delivered prior to the damage or loss.
   - While built assets depreciate over time, if properly managed, natural assets can maintain their value in perpetuity.
   - It is not always possible to completely replace a natural asset's structure, processes, and functionality, and therefore the services provided by those assets. For example, in some cases constructed wetlands may not delivery the same levels of service as natural occurring wetlands.

Annex D provides an overview of the methodology followed.

7.2 Benefit Transfer

To calculate total benefits, the following steps were completed: (1) annual per hectare values of the identified services were converted to 2023 CAD values using the Bank of Canada's Inflation Calculator[29]; (2) multiplied by the total area of the land class; and (3) totalled for the region. Values are provided in ranges to recognize differences resulting from the use of varying methodologies and geographies. Results are provided as both total values/year and value per hectare/year.

Table 14: Studies Referenced for Natural Asset Valuation

Studies Reviewed	C Seq	M&P	Hab	SWM Qu	AQR	P&D	FP	P	SR&EC	R
Natural Capital: The Economic Value of the National Commission's Green Network (2016)	X		X	X	X	X	X	X	X	X
City of Saskatoon: Natural Capital Asset Valuation: Pilot Project (2020)	X	X	X	X	X	X	X	X		
City of Calgary: Determining the value of natural assets report (2021)	X		X	X						X
Credit Valley Conservation: Estimating the Value of Natural Capital in the Credit River Watershed (2009)	X		X	X						X
Greenbelt: Ontario's Good Fortune: Appreciating the Greenbelt's Natural Capital (2016)				X						X
Howe Sound (2014)	X		X	X	X		X			X
Lower Mainland Nat Cap (2010)	X			X	X		X	X		X
Grindstone (2022)	X		X	X	X				X	X
Ecosystem Service Values of the City of Toronto Ravine System (2017)	X	X	X		X		X			X

Legend:
MUNICIPAL SERVICES
C Seq = Carbon sequestration
M&P = Mental & physical health
Hab = Habitat for biodiversity conservation
SWM Qu = Stormwater quantity regulation
CO-BENEFITS
AQR = Air quality regulation
P&D = Pest & disease regulation
FP = Food production
P = Pollination
SR&EC = Soil retention & erosion control
R = Recreation

7.3 Preliminary Services Identification

A workshop was held with Saanich staff to identify municipal services and co-benefits for valuation. These were divided between 'Municipal Services', which the District has responsibility for providing and 'Co-benefits' which do not fall within the District responsibilities, but which are deemed of importance to the community. Table 15 provides an overview of the results of the workshop.

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[29] https://www.bankofcanada.ca/rates/related/inflation-calculator/

Table 15: Service Identified for Valuation

Saanich Service Type	Service	Services Included in Preliminary Valuation or	Identified for Future Valuation
Municipal Services			
Climate Change Mitigation and Adaptation [General Government Services]	Carbon sequestration		
	Climate change adaptation		Identified for Future Valuation
Protect, restore and enhance natural assets [Parks Services]	*Mental and physical health*	Included in Preliminary Valuation	
	Habitat for biodiversity conservation	Included in Preliminary Valuation	
Stormwater Management Services	*Stormwater quantity regulation*	Included in Preliminary Valuation	
	Stormwater quality management		Identified for Future Valuation
Water Services	Water supply	Not included because service is provided by CRD	
Co-benefits			
	Air quality regulation	Included in Preliminary Valuation	
	Amenity and enjoyment		Identified for Future Valuation
	Biological control (regulation of pests and disease)	Included in Preliminary Valuation	
	Food production	Included in Preliminary Valuation	
	Historical / heritage		Identified for Future Valuation
	Indigenous values		Identified for Future Valuation

Saanich Service Type	Service	Services Included in Preliminary Valuation or	Identified for Future Valuation
	Pollination	Included in Preliminary Valuation	
	Soil retention and erosion control	Included in Preliminary Valuation	
	Provision of medicinal resources		Identified for Future Valuation
	Waste water treatment		Identified for Future Valuation
	Provision of science and educational opportunities		Identified for Future Valuation

Municipal Services

Carbon Sequestration

BC residents face multiple challenges related to climate change such as increased frequencies of flooding, wildfires, and drought.[30] Forests, wetlands, non-forest assets, riparian areas, wetlands and agricultural lands within Saanich mitigate climate change impacts by sequestering and storing greenhouse gases. The mitigation of climate change is likely to have a wide range of benefits and avoided impacts to humans and biodiversity.

Carbon storage values are not annual values. They are values at a point in time, dependent on the volume of carbon storage accumulated over time. Once ecosystems are disturbed, decades and centuries of stored carbon are released into the atmosphere. This calculation is rarely assessed since the period an ecosystem has remained undisturbed is rarely know.

Table 16 provides a summary of carbon *sequestration* benefits from natural assets in the project area. The high end of the value range represents studies that utilized Canada's Carbon Budget Model, whereas the low end of the range is drawn from benefit transfer analysis that utilized Canadian studies.

Table 16: Carbon Sequestration Annual Service Values

Natural Asset Grouping	Area (hectares)	Range of reported values ($/ha/year)	Range of Annual Service Value (rounded to million $/year)
Agriculture	910	$111 - $723	$0.1 - $0.7

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[30] BC Auditor General, 2018.

Non-forested area	478	$91 – $800	$0.04 - $0.4
Riparian	207	$1,288	$0.3
Urban Forest	3,481	$271 - $1,445	$0.9 - $5.0
Wetland	239	$137 - $1,432	$0.03 - $0.3
TOTAL			**$1.4 - $6.7**

Mental & Physical Health

The natural environment provides health benefits including opportunities for regular physical activity that lead to a reduced risk of obesity, coronary heart disease, diabetes, some cancers, mental illness,[31] and mortality[32]. Exposure to the natural environment can lower the pulse rates, reduce cortisol levels, and improve immune functioning[33]. It also improves the air quality which decreases the chances of respiratory illnesses[34]. This connection between people and nature is also important for everyday enjoyment and work productivity.[35] Estimated values of the mental and physical health benefits associated with time spent in nature often rely upon the avoided health care costs resulting from inactivity and mental illness and the foregone GDP due to ill health. Studies that used this approach were chosen for the preliminary valuation. This project followed the approach to estimate the percentage of the population spending the recommended time in nature (i.e., 150 minutes per week) in Table 17. That is, 50% of the population aged 15-69 years old.

Table 17: Physical & Mental Health Annual Service Values

Natural Asset Grouping	50% of population 15 – 69 years	Range of reported values ($/ha/year)	Total Value ($/year)
Marine Shoreline			
Non-forested area			
Urban Forest	5,820	$346	$1,239
Waterbody & watercourse			
Wetland			
Total (rounded to nearest million $/year)	**$2.1 - $7.2**		

Habitat for Biodiversity Conservation

Natural assets within the District of Saanich provide habitat for plants, animals, birds, and reptiles. The diversity of land cover enhances the biodiversity of the project area. Narrowly speaking, biodiversity is not generally considered an ecosystem service. However, without biodiversity there are no ecosystem services at all.

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[31] Capaldi et al., 2015; Haq, 2011

[32] White et al., 2016; Capaldi et al., 2015

[33] Capaldi et al., 2015

[34] Haq, 2011

[35] Ibid.

Furthermore, biodiversity is also inseparable from concepts such as healthy, diverse, and connected land cover. This can be seen as an asset value to the extent that individuals place value on the preservation of species and habitat. Estimating these values requires complex surveys to measure willingness to pay for habitat preservation. Since such values have not been measured for Saanich, research from other areas was used as a proxy. Of particular relevance, the City of Calgary study utilized a meta-analysis for more than 90 studies, which have here been included in the value range for urban forests, wetlands and non-forested areas.

Average habitat preservation values were estimated on a per hectare per year basis. Applying these average values to the area of natural assets in Saanich provides an indication of the value of services they generate. Table 18 summarizes these values by asset class in 2024 CAD.

Table 18: Habitat for Biodiversity Conservation Annual Service Values

Natural Asset Grouping	Area (ha)	Range of reported values ($/ha/year)	Total Value (rounded to million $/year)
Agriculture	910	$6 - $3,081	$0.005 - $2.8
Non-forested area	478	$6 - $3,081	$0.003 - $1.5
Riparian	207	$37 – $169	$0.008 - $0.03
Urban Forest	3,481	$234 - $3,313	$0.8 - $11.5
Waterbody & watercourse	359.95	$9.59 - $1,207.76	$0.004 - $0.4
Wetland	239	$111 - $34,487	$0.03 - $8.2
Total			$0.9 - $24.5

Stormwater Quantity Regulation

Natural assets support stormwater quantity regulation. For example, forests and wetlands intercept precipitation and impact the volume and timing of runoff and storage in surface and groundwater sources.[36] After a rainstorm occurs, several processes affect the amount and timing of water entering watercourses. Precipitation can either be intercepted by trees (and later evaporate) or reach the ground, where it will either generate fast surface runoff or infiltrate into the groundwater and later contribute to slow, shallow subsurface flow into watercourses. For pervious areas, runoff typically only occurs if the ground has poor infiltration potential (e.g., clay) or when the soil is saturated. Generally, the less precipitation intercepted by forest, and the larger the impervious area contributing to fast runoff, the higher the peak streamflow in receiving streams.

Detailed hydrological and hydraulic modeling is often used to value the contribution of natural assets to water quality management. Lacking such modeling, ranges associated with studies that measured the value of natural assets for disturbance regulation – primarily flood mitigation – were identified for transferring to Saanich. The results are in-line with Saanich's Urban Forest Strategy that estimated the value forests for stormwater quality regulation to range between $26,661.78 - $1,368,000,510.46 using the i-Tree model. Table 19 provides a summary of these values by natural asset grouping.

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[36] Calder et al., 2008; Dudley and Stolton, 2003

Table 19: Stormwater Quantity Regulation Annual Service Values

Natural Asset Grouping	Area (ha)	Range of reported values ($/ha/year)	Total Value (rounded to $/year)
Non-forested area	478	$8 - $700	$0.004 - $0.3
Riparian	207	$32 - $996	$0.007 - $0.2
Urban Forest	3,481	$720 - $6,201	$2.5 - $21.6
Wetland	239	$1,268 - $25,602	$0.3 - $6.1
Total			**$2.8 - $28.2**

Co-Benefits

Air Quality Regulation

The District of Saanich's natural assets play a role in regulating atmospheric gases and providing clean air. Specifically, trees and vegetation regulate gases and improve air quality by collecting particulate matter on the surface area of leaves and absorbing gaseous pollutants into leaves. Improved air quality benefits the surrounding population, for example through fewer visits to the hospital for respiratory and other illnesses.[37] This service value is often based on avoided healthcare costs resulting from the ability of natural assets to filter gases and particulate matter from the air. The results coincide with Saanich's Urban Forest Strategy that estimated the value of forests for clean air at $42,916.41 - $2,831,508.78 using the i-Tree model. Table 20 summarizes the annual service values for air quality regulation.

Table 20: Air Quality Regulation Annual Service Values

Natural Asset Grouping	Area (ha)	Range of reported values ($/ha/year)	Total Value ($/year)
Non-forested area	478	$19 - $29	$0.009 - $0.01
Urban Forest	3,481	$232 - $813	$0.8 - $2.8
Waterbody & watercourse	360	$814	$0.3
Wetland	239	$232 - $813	$0.06 - $0.2
Total			**$1.2 - $3.3**

Biological Control

Forests, meadows, and shrubland can provide biological control through the prevention of plant diseases and the insect pests. The level of biodiversity influences the presence of natural enemies, who perform biological control. In addition, pest control protects agricultural crops from being destroyed from pests and promotes the sustainability of the sector. Values are here attributed to the habitats of native species that are essential for biological control (see Table 21). Two studies reviewed provided estimates for biological control, both of which utilized a 2008 study that estimated the annual cost to replace pest control provided by birds with chemical pesticides or genetic engineering.[38]

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[37] Nowak et al. (2018)
[38] Wilson (2008)

Table 21: Biological Control Annual Service Values

Natural Asset Grouping	Area (ha)	Range of reported values ($/ha/year)	Total Value (rounded to million $/year)
Non-forested area	478	$12- $61	$0.006 - $0.03
Urban Forest	3,481	$12 - $52	$0.04 - $0.2
Total			**$0.05 - $0.2**

Food production

Food production is dependent upon healthy natural assets — particularly upon healthy soils. The non-market values of food production are represented here. The studies reviewed for this assessment reported on the benefits of urban agriculture and community gardens to participants (i.e., improved access to food, better nutrition, increased physical activity, improved community cohesion), and the estimated market value of urban agriculture. Annual service value of food production is summarized in Table 22.

Table 22: Food Production Annual Service Values

Natural Asset Grouping	Area (ha)	Range of reported values ($/ha/year)	Total Value (rounded to million $/year)
Agriculture	910	$155- $1,133	$0.1 - $1.0
Marine Shoreline	700	$1	$0.0007
Non-forested area	478	$8 - $491	$0.004 - $0.2
Total			**$0.1 - $1.3**

Pollination

Approximately one in every three bites of food you eat is supported by pollinators for ensuring crop quality and yield.[39] Birds, bats, bees, butterflies, insects, and other small mammals provide pollination services that are essential for the growth of fruits, nuts, vegetables, seeds, and grains. Across Canada, the total value of honeybees for crop production has been estimated at over $2 billion annually.[40] In the absence of pollinators, agricultural yields are significantly lower. The protection of natural assets within and adjacent to agricultural lands is therefore a key agricultural best management practice.

Table 23: Pollination Annual Service Values

Natural Asset Grouping	Area (ha)	Range of reported values ($/ha/year)	Total Value (rounded to million $/year)
Agriculture	910	$98	$0.09
Non-forested area	478	$66 - $1,669	$0.03 - $0.8
Urban Forest	3,481	$38 - $1,669	$0.1 - $5.8
Total			**$0.3 - $6.7**

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[39] University of California (2006).
[40] Canadian Honey Council (2024).

Soil retention & erosion control

Natural assets play an important role in the formation, protection, and decontamination of soils and sediments. This includes sediment retention and erosion control, soil formation and maintenance of soil structure, decomposition, and nutrient cycling. The studies reviewed for this project estimated average erosion control values on a per hectare, per year basis. Applying these average values to Saanich provides an indication of the erosion control services generated; annual service values are summarized in Table 24.

Table 24: Soil Retention and Erosion Control Annual Service Values

Natural Asset Grouping	Area (ha)	Range of reported values ($/ha/year)	Total Value (rounded to million $/year)
Agriculture	910	$95 - $131	$0.09 - $0.1
Non-forested area	478	$95 - $3,082	$0.05 - $1.5
Riparian	207	$134	$0.03
Urban Forest	3,481	$169 - $260	$0.6 - $0.90
Total			$0.7 - $2.5

7.4 Annual Service Value Summary

The preliminary valuation demonstrates that natural assets provide approximately **$9.45 - $80.6 million** in public benefits annually from the listed services (see Table 25). The list is by no means exhaustive and could be expanded in the future. These values are estimated using the benefit transfer method, not detailed modelling and should be understood as indicative estimates.

The results present a range, which is common in the benefit transfer literature. For example, the study that brought the valuation of nature-based services to prominence[41] reported on 17 ecosystem services across 16 biomes that were valued in the range of US$16–54 trillion per year in 1997 dollars. Notwithstanding the lack of precision, the estimates provide valuable insight into the magnitude of ecosystem values and can help guide natural asset management decisions.

Habitat for biodiversity conservation and stormwater quality regulation ranked amongst the highest-valued services assessed. In terms of natural asset classes, urban forests are of heightened importance, followed by wetlands. This finding reflects the state of research (i.e., forests and wetlands are the most common asset group valued) and the need for additional primary studies. Table 26 below provides results by natural asset group.

Table 25: Preliminary Valuation Results by Service (2023 CAD $/year in millions)

Service	Low value	High value
MUNICIPAL SERVICES		
Carbon Sequestration	$1.4	$6.7

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[41] Costanza et al., (2018)

Physical & Mental Health	$2	$7.2
Habitat for Biodiversity Conservation	$0.9	$24.5
Stormwater Quantity Regulation	$2.8	$28.2
CO-BENEFITS		
Air Quality Regulation	$1.2	$3.3
Biological Control	$0.05	$0.2
Food Production	$0.1	$1.3
Pollination	$0.3	$6.7
Soil Retention and Erosion Control	**$0.7**	**$2.5**
TOTAL	**$9.45**	**$80.6**

Table 26: Preliminary Valuation Results by Natural Asset Group (2023 CAD $/year in millions)

Natural asset group	Low value	High value
Agriculture	$0.4	$4.7
Non-Forested Area	$0.3	$5.3
Marine Shoreline	$0.2	$0.8
Riparian Area	$0.3	$0.5
Urban Forest	$6.9	$51.8
Waterbody & Watercourse	$0.4	$1.2
Wetland	$0.5	$15.2
TOTAL	**$9.1**	**$80**

Note: Total values little lower due to rounding

7.5 Replacement Value

Replacement values were estimated for several natural asset groups where there was available data. Replacement values provide an important component of lifecycle costing and can be based upon the cost to replicate the services of nature with engineered alternatives or the cost to restore natural asset processes and functions. The latter approach is used here to reflect order-of-magnitude estimates. Three studies were used to provide replacement value ranges. This included:

- Credit Valley Conservation (2009), Estimating the Value of Natural Capital in the Credit River Watershed.
- City of Calgary (2021), Determining the value of natural assets report.
- City of Edmonton (2021), Urban Forest Asset Management Plan.

The reported values in the above studies were based upon literature reviews, which were then refined for the study area through engaging municipal staff and contractors. Reviewed studies assessed identified activities to secure, create or establish natural assets, including:
- Site preparation
- Replanting

- Vegetation establishment
- Basic Maintenance (e.g., watering and mulching)

Table 27: Replacement Value (2023 CAD $ in millions)

Natural Asset Group	Natural Asset Sub-group	Area (ha)	Unit Cost ($/ha)	Replacement Value (rounded to million $)
Agriculture		Future assessment		
Marine Shoreline	Coastal Bluff	Future assessment		
	Coastal Sands	Future assessment		
	Ocean	Future assessment		
Non-forested Area	Shrub	255	$15,575 - $87,885	$4 - $95
	Herbaceous / Meadow	223	$16,005 - $630,228	$4 - $141
Riparian		Future assessment		
Urban Forest	Natural Forest	3,481	$6,860 - $330,279	$24 - $1,150
	Individual Trees	To be included in final report		
Waterbody & Watercourse		360	$883,383 - $1,929,090	$318 - $694
Wetland	Wetland	239	$123,473 - $983,832	$30 - $235
Total				**$379 - $2,315**

8.0   Collaboration with External Stakeholders

Natural asset management is an inherently interdisciplinary practice, requiring coordination across departments at the organization level, as well as engagement and considerations for Indigenous rightsholders, private landowners, and government stakeholders.

The District of Saanich is at a preliminary stage of engagement with external stakeholders regarding natural assets and future efforts. As part of the Inventory Project, the District identified neighbouring municipalities and First Nations with whom to engage and share project activities. The rationale is that these entities share natural assets, and their services, and as such may have interest and motivation in pursuing collaborative action to address potential risks to service delivery through natural asset management.

The District of Saanich and NAI hosted a virtual engagement workshop for neighbouring entities in April of 2024 (meeting notes are included in Annex E). The purpose of this workshop was to open a conversation on natural asset management in the region, highlight potential shared areas of interest along Saanich's jurisdictional boundary, and share the project approach.

Participants were also invited to speak to any relevant natural asset or nature conservation work that may align with the District of Saanich.

Staff from the following entities participated in the April workshop:
- City of Victoria
- Capital Regional District
- Township of Esquimalt
- District of Central Saanich
- Town of View Royal

Invitations were also extended to the District of Highlands, District of Oak Bay, the W̱SÁNEĆ Leadership Council Society, Songhees Nation, Esquimalt Nation, BOḰEĆEN (Pauquachin First Nation), SȾÁUTW̱ (Tsawout First Nation), W̱JOȽEȽP (Tsartlip First Nation), and W̱SIḴEM (Tseycum First Nation).

Overall, the workshop was received positively; while none of the participants have completed a formal natural asset inventory of their own, many noted their interest in pursuing related projects in the near-to-mid future. The workshop identified several natural areas of shared interest. Watersheds that overlap municipal boundaries were identified as being of particular interest (see Figure 17). For example, the Tod Creek Watershed spans four municipalities (Central Saanich, District of Highlands, District of Saanich, and View Royal). There is an opportunity for discussion of collective approach to watershed-level management and data collection through the CRD's Integrated Watershed Management (IWM) Committee.
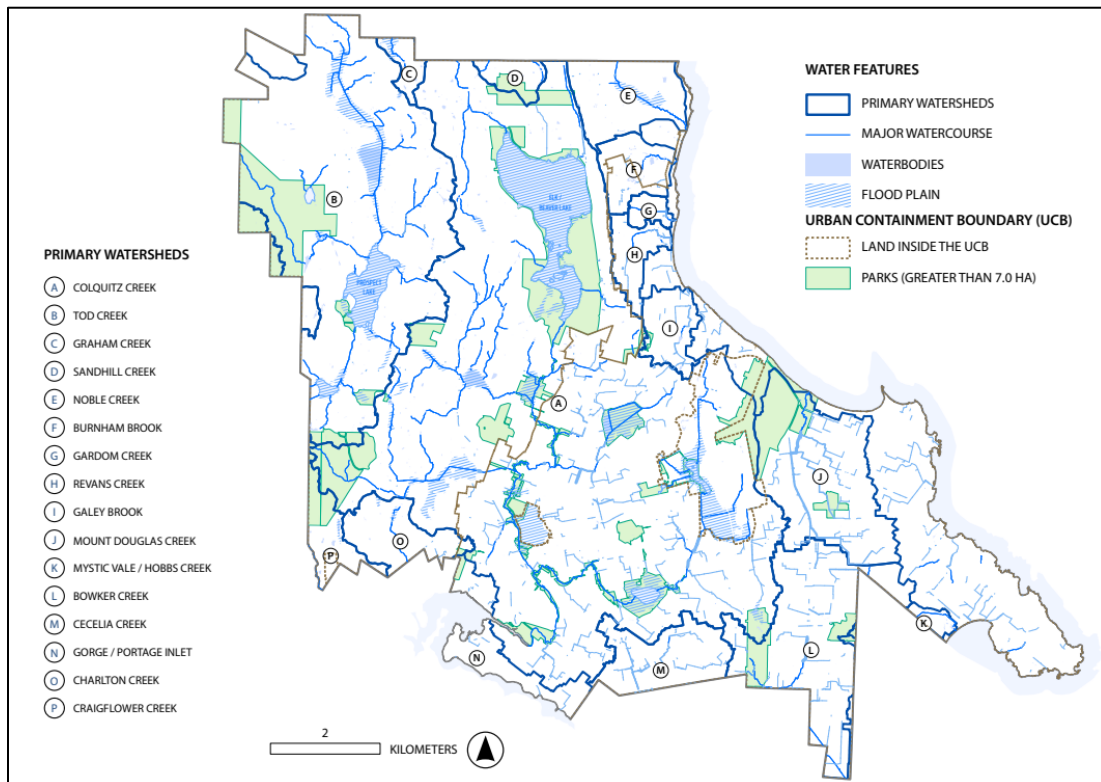

Figure 16: District of Saanich's Municipal Boundary Organized by Watershed Area (Source: Saanich 2023)

Regarding public engagement, the District maintains a public webpage with information and updates related to their natural asset management initiatives and the specific Inventory Project.[42]

With respect to collaboration and consultation with local First Nations on natural resource management, there are regional initiatives and engagement opportunities, including the W̱SÁNEĆ Territories Indigenous People's Forum (2021)[43] and the Saanich Peninsula Environmental Coalition, which developed a Bioregional Framework in 2018. The outcomes from these initiatives can inform future relationship building and identifying priority areas and services for equitable collaboration with Indigenous partners.

9.0   Recommendations

This section provides recommendations for next steps in Saanich's natural asset management planning based on insights gained from considering Saanich's Natural Asset Strategy and the natural assets inventory results. It is divided into 9.1 Possible actions for the further development of the preliminary inventory, and 9.2 Steps the District can consider in developing a Natural Asset Management Plan.

9.1   Possible Actions for The Further Development of the Inventory

Based on the inventory, the District of Saanich could consider the following incremental measures for further development of the preliminary inventory:

- Refine the condition assessment to include:
  - agriculture, urban trees, and watercourses,
  - additional metrics related to condition (e.g., relative biodiversity, riparian and wetland health, soil condition, connectivity, and others) and employ site visits to confirm and verify the condition ratings.

- Progress from risk identification to the next stage of risk assessment – the development of risk mitigation strategies for natural assets.

- Further develop the condition assessment and risk assessment using local climate projections, land use modelling, and other data already at Saanich's disposal.

- Integrate the natural asset registry with Saanich's built asset management registry to ensure a single registry is being managed and maintained regularly.

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[42] See https://www.saanich.ca/EN/main/local-government/asset-management-program/natural-asset-management.html
[43] See https://wsanec.com/wp-content/uploads/2021/08/WSANEC-Forum-Notes.pdf

- Document the following information related to each Level of Service Saanich plans to track:
  - Current LOS (level that is currently being provided)
  - Desired Trend (increase or decrease)
  - Desired LOS (target)
  - Performance Gap (difference between current LOS and desired LOS)
  - Strategies to Address Gaps
  - Data Management Practices (where data is stored, and how it is updated)

- Identify natural asset valuation gaps (e.g., carbon storage estimates) and how values will be used to inform methodological approach.

- Refine preliminary natural asset valuation of municipal services through the application of primary studies that can be tailored to Saanich (e.g., primary studies that provide formulas for detailed results) or detailed modeling to identify capacity of natural assets to provide target service(s).

- Build awareness amongst staff of the role of natural assets in service delivery, and awareness amongst Councils of the value of natural assets in Saanich and the resources required to maintain and restore them.

- Develop communications plan for ongoing engagement, both to inform NAM and support 'willingness to pay', support for investments into long-term actions.

- Concentrate efforts towards relationship-building with First Nations and Indigenous governments for equitable stewardship and upholding Truth and Reconciliation.

9.2   Steps The District Can Consider to Advance to a Natural Asset Management Plan

Here are recommendations for future steps to develop a natural asset management plan:

1/ **Confirm scope, roles and responsibilities**. Undertake a meeting or workshop to confirm (a) assumptions (b) roles, responsibilities, and capacities (c) community capacity to undertake a larger project.

2/ **Fill essential knowledge gaps**. If discussions on scope and certainty and related data needs for modelling indicate the need for additional data, these could be filled.

3/ **Modelling**. Modelling the levels of service that natural assets currently provide and the levels of service under different potential management, local climate change projections, and rehabilitation or restoration scenarios, gives communities the ability to explore how different actions will affect the health and corresponding performance of natural assets.

4/ **Lifecycle Costing**. Complete a lifecycle economic assessment for the core municipal services of natural assets. For those assets under Saanich's jurisdiction, this includes considering:
- Maintenance and monitoring costs
- Disposal costs

5**/ Planning**. This step allows local governments to explore different scenarios such as "what happens to the services provided by the wetland if there is significant building upstream?" or "what happens to the services if the forest is restored?" Using modelling, changes in service levels can be understood and quantified. Corresponding values can also be determined through continued economic assessment. Based on the foregoing, local governments can begin to consider and prioritize actions ranging from status quo to planning, regulatory, financial operations, maintenance, acquisition, and monitoring interventions.

6/ **Ongoing monitoring**. It is essential to continue monitoring the project to learn whether interventions are working and to share lessons and learnings from other communities undertaking natural asset management.

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Annex A – Saanich Documents Related to Natural Assets

By-laws
- Boulevard Regulation Bylaw No. 9487 (2018)
- Noxious Weed Bylaw No. 8080 (2000)
- Park Management and Control Bylaw No. 7753 (1997)
- Pesticide Bylaw No. 9054 (2010)
- Subdivision Bylaw
- Tree Protection Bylaw, 2014, NO. 9272
- Watercourse and Drainage Regulation Bylaw No. 7501 (1996)
- Zoning Bylaw No. 8200 (2003)

Council Policies
- Asset Management Policy
- Boulevard Tree Policy
- Community Garden Policy
- Hazard Tree and Abatement Policy
- Integrated Pest Management Policy

Corporate Plans
- Agriculture and Food Security Plan (2018)
- Asset Management Strategy (2023)
- Biodiversity Conservation Strategy (under development)
- Climate Plan (2020)
- Council Strategic Plan (2023-2027)
- Environmental Best Management Practices
- Integrated Stormwater Management Plans (under development)
- Invasive Species Management Strategy
- Natural Areas Action Plan
- Natural Areas Management Guidelines
- Official Community Plan (update under development)
- Parks, Recreation and Community Services Directions and Actions Plan (under development)
- State of Biodiversity Report (2023)
- State of Urban Forest Report (2023)
- Urban Forest Strategy (under development)

Annex B: Additional Condition Results by Indicator

Natural Area Patch Size

INDICATOR: The relative size and shape of contiguous natural asset areas, with larger patches that are more round or square rather than linear being considered of higher quality than smaller patches that are more linear with little or no "interior" habitat (i.e., all edge).

RATIONALE: The objective of this indicator is to create a proxy for condition based on the relative size and shape of contiguous patches of natural assets. In general, larger blocks of habitat (whether they be meadow, forest, and/or wetland) tend to support a greater diversity of plants and wildlife, including habitat specialists that require or benefit from conditions only found somewhat removed from a non-natural land cover type (e.g., roads, residential, institutional, or commercial development). In an urban or urbanizing context, as the distance from the edge of a natural area to the interior of that area decreases, the penetration of noise and other human-related disturbances and encroachments that can negatively impact certain species associated with those habitats increases (Environment Canada 2013).

APPROACH: "Interior" habitat – at least in woodlands - is typically measured starting at 100 m inwards from the feature or "patch" edge (e.g., Environment Canada 2013). The first step was thus to establish the "patch" edge, which was defined at the edge of continuous areas of natural assets (regardless of asset type).

SCORING: Ratings were allocated as follows:

- Very Good: An asset within a habitat patch with an interior area measured 100 m from the feature edge.
- Good: An asset within a habitat patch with an interior area measured 75 m from the feature edge and not already captured as "very good."
- Fair: An asset within a habitat patch with an interior area measured 50 m from the feature edge and not already captured as "very good" or "good."
- Poor: An asset within a habitat patch with an interior area measured 25 m from the feature edge and not already captured as "very good", "good", or "fair."
- Very Poor: Any asset with no interior area measured at 25 m from the feature edge.

Natural Asset Proximity to Watercourses

INDICATOR: The distance between each asset and the nearest watercourse line was measured.

RATIONALE: In addition to a natural area's intrinsic size and shape, its location in relation to other natural assets and features within a given area also influences the types of ecological functions it can provide. Proximity of a terrestrial natural asset to water, or having a hydrologic feature within a terrestrial asset, is generally considered positive. Environmental Canada's habitat guidelines for southern Ontario (EC 2013) and the Province of Ontario's Natural Heritage Reference Manual (MNRF 2010) ascribe ecological significance to terrestrial habitats that contain or are close to hydrological features such as wetlands that occur within floodplains (which are associated with watercourses), woodlands with wetlands and/or watercourses within them, and grassland/meadow habitats adjacent or close to riparian and/or wetland habitats.

Specific distances / thresholds cited in these documents as heightening feature functions are as follows:

- Naturalized riparian habitat within at least 30 m of a watercourse edge (i.e., top of bank) (EC 2013), and
- Woodlands within 50 m of a watercourse (MNRF 2010)

In addition, 120 m is the standard distance used for considering adjacency to an identified natural asset in terms of the lands within which negative impacts to an asset may occur.

APPROACH: The closest distance between watercourse lines and natural assets was measured.

SCORING: Ratings were allocated as follows:

- Very Good: Asset directly intersects watercourse.
- Good: Asset is within 30 m of a watercourse but does not directly intersect it.
- Fair: Asset is within 30 - 120 m of a watercourse.
- Poor: Asset is within 120 – 240 m of a watercourse.
- Very Poor: Asset is greater than 240 m away from a watercourse.

Forest Proximity
INDICATOR: A measure of the proximity of forest assets to other forest or wetland assets.

RATIONALE: According to research documented by Environment Canada (2013):

- For forest birds, research has found that habitats near other natural areas support more species than isolated habitats of the same size, and that some species with large home ranges may use several patches instead of one large area.
- In landscapes with relatively low forest cover overall, species diversity and survivorship increase when the remaining habitat patches are larger and more clumped or aggregated.
- Based on the limited available science, the isolation between forest patches for forest birds generally occurs at about five kilometres, but for amphibians at between one and two kilometres. For forest plants, some level of immediate proximity is required.

APPROACH: Each forest asset was buffered by the condition rating thresholds noted below and the appropriate rating applied based on the closest buffer where another forest or wetland asset was found.

SCORING: Based on the research noted by Environment Canada (2013) and the associated proximities, condition rating are:
- Very good: Forest assets < 1 km from any other forest or wetland asset
- Good: Forest assets within 1 to 2km from any other forest or wetland asset
- Fair: Forest assets within 2 to 3km from any other forest or wetland asset
- Poor: Forest assets within 3 to 5km from any other forest or wetland asset
- Very poor: Forest are > 5km from any other forest or wetland asset

Wetland Proximity
INDICATOR: A measure of the proximity of wetland assets to other wetland or forest assets

RATIONALE: According to research documented by Environment Canada (2013):

- Fragmentation of wetland habitats degrades their functions by reducing habitat for species that are less tolerant of disturbances, that require more contiguous habitat, or both.
- Some of these negative impacts of fragmentation can be offset, at least for some species, by maintaining concentrations of natural habitat fragments in close proximity.
- The importance of adjacent natural areas, as well as proximity between patches of wetland, has been recognized for several wildlife species.
- Proximity distances range depending on the species from less than 500m for turtles and spotted salamanders to as large as 3km for birds.

APPROACH: Each wetland asset was buffered by the condition rating thresholds noted below and the appropriate rating applied based on the closest buffer where another forest or wetland asset was found.

SCORING: Based on the research noted by Environment Canada (2013) and the associated proximities, condition rating are:
- Very good: Wetland assets < 0.5 km from any other forest or wetland asset
- Good: Wetland assets within 0.5 to 1 km from any other forest or wetland asset
- Fair: Wetland assets within 1 to 2 km from any other forest or wetland asset
- Poor: Wetland assets within 2 to 3 km from any other forest or wetland asset
- Very poor: Wetlands are > 3 km from any other forest or wetland asset

Extent of Adjacent Complementary Land Uses
INDICATOR: The extent of complementary land uses within 120 m of an asset was measured.

RATIONALE: How and the extent to which a given natural area is influenced by drainage in the adjacent landscape varies depending on factors such as local topography and soils, where the feature "sits" in the landscape (e.g., upland versus lowland) and the size and nature of the feature itself. However, it is well-established that the condition of a terrestrial natural feature (including wetlands) in an urban context tends to be negatively impacted when more of the surrounding land uses are impervious (i.e., paved, concrete or buildings) as this tends to alter pre-existing drainage and infiltration pathways, which can cause a natural area to receive more, or less, drainage than prior to being in the urban context. Urban runoff also typically carries a host of sediments and contaminants, and when such runoff is directed to natural areas and not properly treated, it can also negatively impact the feature and its functions.

Increases in the extent of impervious surfaces within a given watershed or catchment area are generally known to have negative impacts to natural features in that watershed or catchment area, particularly for features downstream of the impervious areas, resulting in a push towards planning that limits impervious surfaces and incorporates low impact development measures that facilitate local infiltration (e.g., Government of Ontario 2006, Government of Ontario 2018). Environment Canada's (2013) guidance for streams/watercourses in urbanized watersheds in southern Ontario states that "*impairment in stream water quality and quantity is highly likely*

above 10% impervious land cover and can often begin before this threshold is reached. In urban systems that are already degraded, a second threshold is likely reached at the 25 to 30% level".

However, land cover types with extensive pervious surfaces that are not "natural" *per se* but occur in the lands adjacent to natural areas, such as manicured parks/open spaces and agricultural lands, are recognized as potentially supporting the functions of nearby natural areas in some regards by providing one or more of the following:

- permeable surfaces (and therefore potentially supporting hydrologic regimes),
- temporary or permanent vegetation (e.g., isolated or small groupings of trees/landscaped areas, agricultural crops), and/or
- intervening lands uses between natural areas and built areas that are used less frequently and/or less intensively by people.

Therefore, having, for example, a school ground between a wooded area and a high-density residential area is generally considered preferable to having the high-density residential area directly abutting the natural area.

APPROACH: A 120 m buffer (exclusive of asset area) was drawn around each natural asset "patch" in the inventory. The extent of landcover associated with complementary land uses and natural assets was estimated in hectares within each buffer. Areas of complementary uses include Agriculture, Built-up Pervious, and Golf Course land cover. These areas have vegetated cover but are not natural in the true sense of the definition. The area of the 120 m buffer was estimated in hectares (excluding the area of the asset itself from counting towards this estimate), and the percentage of each buffer that consists of these natural area/complementary land uses was estimated. A ranking was then applied to each buffer and linked to the relevant natural assets.

SCORING: A rank was assigned to each asset based on what percentage of the asset's adjacent lands (i.e., measured at 120 m) is composed of identified pervious and complementary land uses (e.g., passive parklands, golf courses, or agricultural lands) as per the following:

- Very Good: 51 to 100% complementary land uses
- Good: 31% to 50% complementary land uses
- Fair: 16% to 30% complementary land uses
- Poor: 1% to 15% complementary land uses
- Very Poor: 0% complementary land uses

Biodiversity Condition:
INDICATOR: A measure of the extent an asset that is suitable for supporting biodiversity.

RATIONALE: The biodiversity of an area is indicative of its overall ecological health, as healthier ecosystems will be better able to support a wide variety of species.

APPROACH: Biodiversity data provided by Saanich was used to estimate the area (in ha) of each asset classified as Moderate, High, or Very High. The area figures were converted to percentages

and a rating from Very Poor to Very Good was assigned according to the scoring provided below.

SCORING: A rank was assigned to each asset based on the percent of area suitable for supporting biodiversity, as per the following:

- Very Good: 80-100% of the area is composed of suitable biodiversity area.
- Good: 60-80% of the area is composed of suitable biodiversity area.
- Fair: 40-60% of the area is composed of suitable biodiversity area.
- Poor: 20-40% of the area is composed of suitable biodiversity area.
- Very Poor: 0-20% of the area is composed of suitable biodiversity area.

Table 28 shows condition results by condition indicator.

Table 28: Results by Condition Indicator

Condition Rating	Natural Area Patch Size Condition Area (ha)	Proximity to Watercourse Condition Area (ha)	Forest Proximity Condition Area (ha)	Wetland Proximity Condition Area (ha)	Adjacent Complementary Land Use Condition Area (ha)	Biodiversity Condition Ranking
Very Good	4974.67	2416.29	3480.65	239.07	5000.88	468.91
Good	100.11	1909.53	-	-	332.29	1173.83
Fair	122.35	558.56	-	-	81.94	1359.69
Poor	164.29	310.78	-	-	49.34	639.26
Very Poor	103.72	269.98	-	-	0.70	1823.45
Total	5464	5462	3481	239	5463	5462

The series of maps below show the spatial distribution of the results of the condition assessment by condition indicator (one map for each condition indicator).
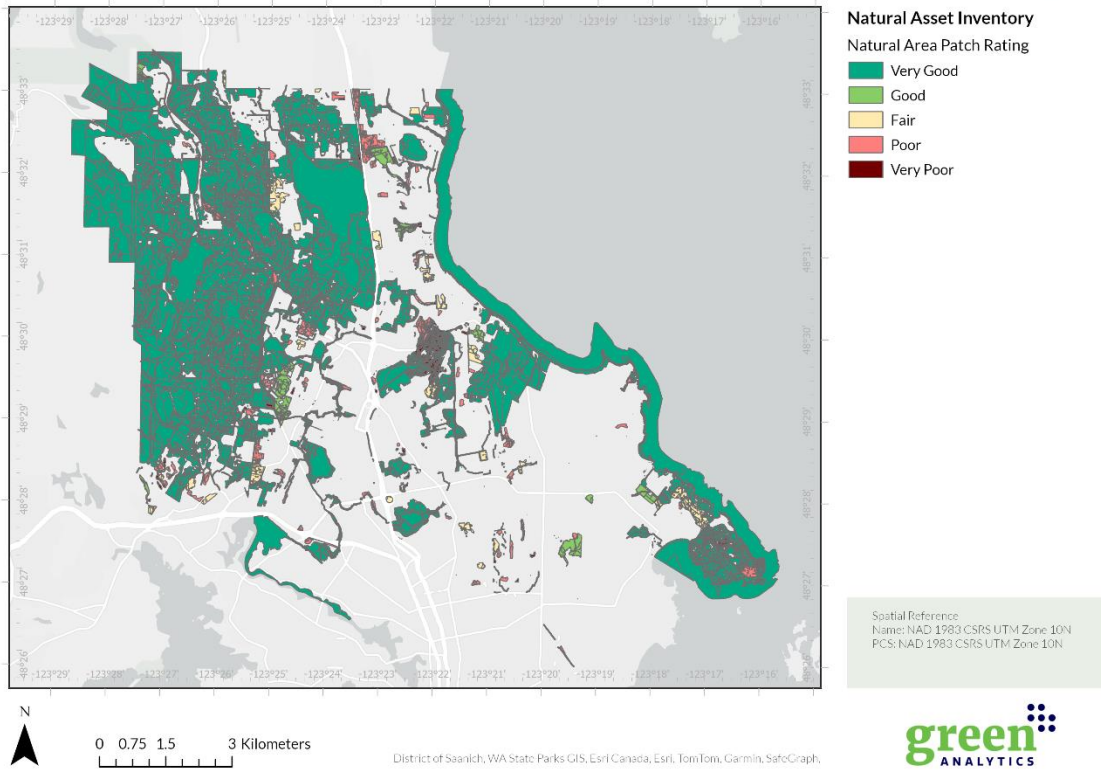
Figure 17: Saanich Natural Asset Inventory Mapped by Natural Patch Rating

Figure 18: Saanich Natural Asset Inventory Mapped by Watercourse Proximity Rating
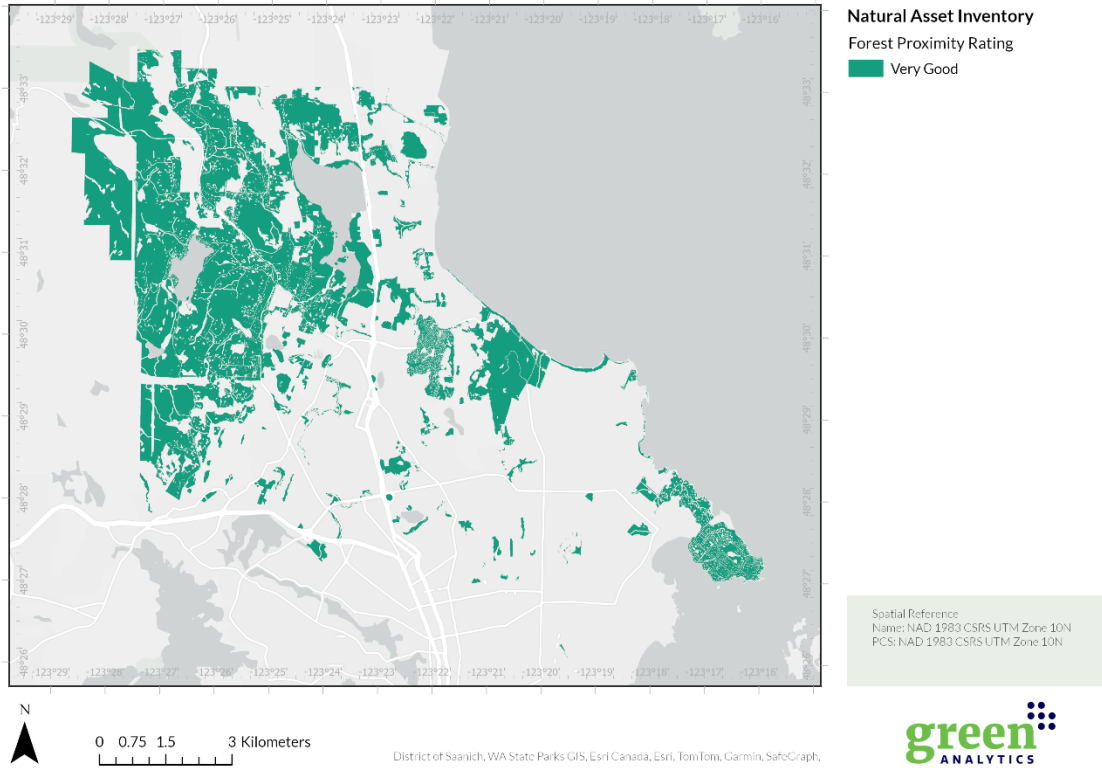
Figure 19: Saanich Natural Asset Inventory Mapped by Forest Proximity Rating
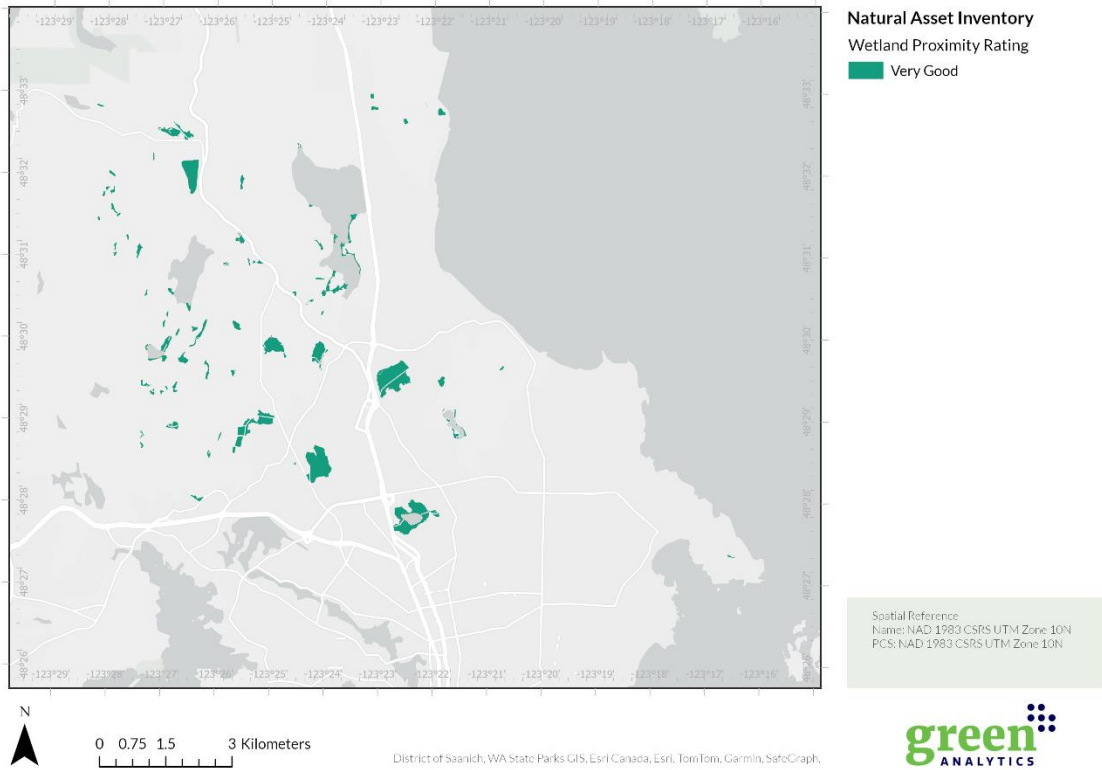
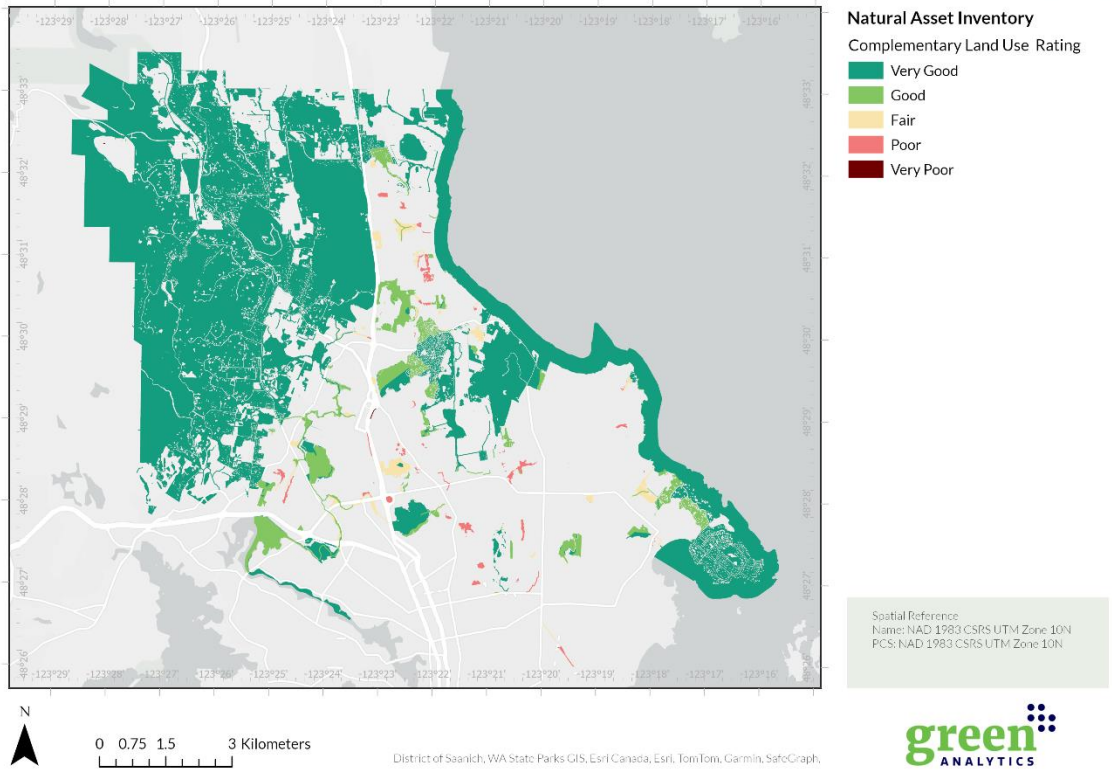*Figure 20: Saanich Natural Asset Inventory Mapped by Wetland Proximity Rating*

Figure 21: Saanich Natural Asset Inventory Mapped by Adjacent Complementary Land Use Rating

Figure 22: Saanich Natural Asset Inventory Mapped by Biodiversity Condition Rating

Annex C: Risk Mapping

Climate change risks were assessed for their potential to be assigned as attributes to the natural assets within the natural asset inventory. Six climate change risks were deemed suitable for mapping. These risks along with how they were allocated to the natural assets are outlined in Table 29. The allocation criteria were derived from Saanich subject matter experts. Other risks were not assigned as attributes within the natural asset inventory. These risks and the rationale for being excluded are outlined in Table 30.

Table 29: Allocation Criteria for Risks Assigned to Assets within the Inventory

Risk	Allocation Criteria
Erosion	Applied to assets bordering banks of major streams
Storm Surge	Applied to coastal areas (30m buffer from the coastline)
Sea Level Rise	Applied to coastal areas (30m buffer from the coastline)
Pollutant Loading	Applied to assets bordering roads and agriculture land
Invasive Species	Applied to all assets within parks
Forest Fire	Applied to rural forest assets as well as forest within Mount Douglas Park
Flooding	Applied to assets within flood mapping area
Overuse of Trails	Applied to Glendenning Trail in PKOLS, and the East side of Mount Tolmie Park
Illegal Dumping	Applied to Mount Tolmie, Grant Park, PKOLS
Development Pressure	Applied to assets within areas where development will or may take place

Table 30: Risks Not Applied Spatially within the Natural Asset Inventory

Risk	Rationale for Exclusion in GIS
Drought	Requires the identification of the impacted assets.
Heat Waves	Requires the identification of the impacted assets.
Increased Storm Events	Applies to all assets in NAI – artificially increases score in all assets.
Lack of legislative protection	A broader risk that may not apply directly to specific assets / areas.
Lack of resources / maintenance programs	A broader risk that may not apply directly to specific assets / areas.
Lack of education/understanding	A broader risk that may not apply directly to specific assets / areas.
Lack of political tools	A broader risk that may not apply directly to specific assets / areas.
Lack of integrated planning	A broader risk that may not apply directly to specific assets / areas.

Figure 23: Map of Natural Assets with Development Pressure Risk Areas

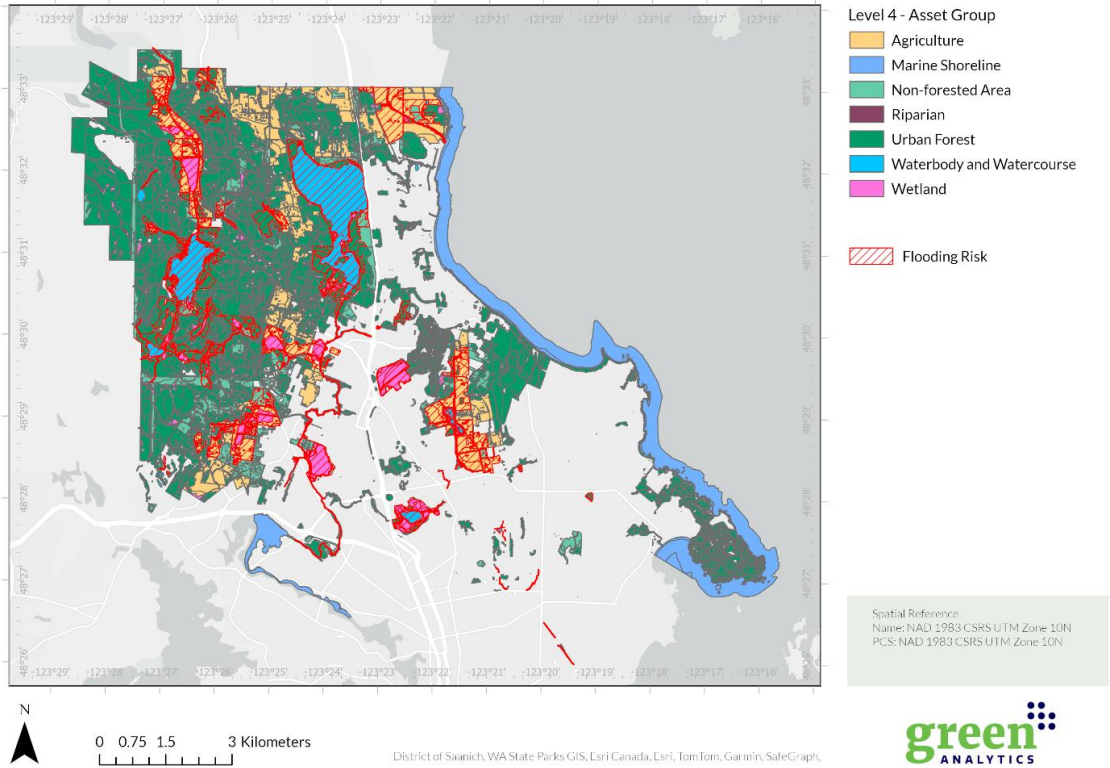*Figure 24: Map of Natural Assets with Illegal Dumping Risk Areas*

Figure 25: Map of Natural Assets with Flood Risk Areas

Annex D: Valuation Methodology

Within the past three decades, considerable progress has been made to systematically link functioning ecosystems with human well-being. Work completed by de Groot et al. (2002), the Millennium Ecosystem Assessment (MA, 2005) and The Economics of Ecosystems and Biodiversity (TEEB, 2010) have marked key advancements in this task. Although all recognize the linkages are a simplification of reality and consequently the need for further research and refinement, their studies have provided a conceptual framework for valuing natural capital and its related (ecosystem) goods and services.

Recognizing the lack of a standardized framework for the growing amount of information being collected on the value of ecosystem goods and services, de Groot, Wilson, and Boumans were among the first to present a conceptual framework and typology for describing, classifying, and valuing ecosystem functions, goods, and services in a consistent manner. As such, the authors took on the initial step of translating the complexity of ecological structures and processes into a limited number of ecosystem functions. From there, they identified how these functions provide goods and services of value to people (see Figure D1).
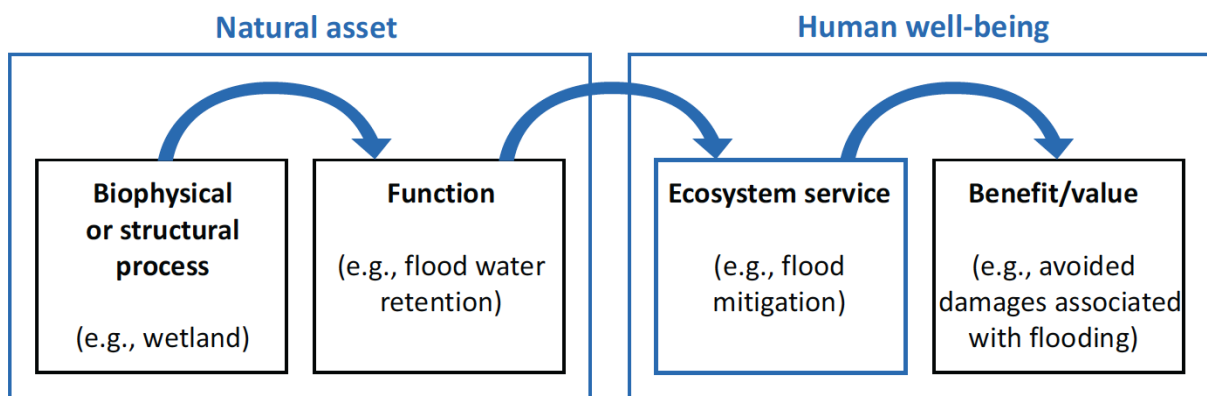

Figure 26: Illustration of the Linkages Between a Natural Asset, the Ecosystem Services Provided and the Benefits and Values that Flow to End Users

Economists have developed several techniques for putting dollar values on the non-market goods and services provided by ecosystems. These can be grouped into three broad categories: 1) direct market valuation approaches; 2) revealed preference approaches; and 3) stated preference approaches. These are described in Table 19.

- *Direct market valuation* methods derive estimates of ecosystem goods and services from related market data.
- *Revealed preference methods* estimate economic values for ecosystem goods and services that directly affect the market prices of some related goods.
- *Stated preference methods* obtain economic values by asking people to make trade-offs among sets of ecosystem or environmental services or characteristics.

Ideally, a valuation of services should involve detailed ecological and economic studies of each ecosystem of interest for each land cover type, utilizing one or more of the above valuation techniques. Unfortunately, undertaking such studies is expensive and time consuming. Therefore, a different approach - the benefit transfer method can be used to indicate an order-of-magnitude values for a range of services to prioritize natural asset management activities.

For the purposes of this project, the preliminary valuation uses the <u>benefit transfer method</u>, where the economic valuation of services from another location are transferred the to the target location. This approach can provide defensible, order-of-magnitude estimates when the geography, demographics and policy context between sites are very similar. Ecosystem values were derived from nine peer-reviewed natural capital valuations[44] targeted to Canadian geographies and therefore, provides credible values. Table 31 summarizes primary valuation methods used for non-market ecosystems services.

Table 31: Accepted Primary Valuation Methods Used to Value Non-Market Ecosystem Services

Valuation Method	*Description*
DIRECT MARKET VALUATION APPROACHES	
Market prices	Assigns value equal to the total market revenue of goods /services.
Replacement cost	Services can be replaced with man-made systems; for example, waste treatment provided by wetlands can be replaced with costly built treatment systems.
Avoided cost	Services allow society to avoid costs that would have been incurred in the absence of those services; for example, storm protection provided by barrier islands avoids property damages along the coast.
Production approaches	Services provide for the enhancement of incomes; for example, water quality improvements increase commercial fisheries catch and therefore fishing incomes.
REVEALED PREFERENCE APPROACHES	
Opportunity cost	Value of the next best alternative use of resources; for example, travel time is an opportunity cost of travel because this time cannot be spent on other pursuits. The travel cost method is a well-accepted application of the opportunity cost approach.
Travel cost	Service demand may require travel, which have costs that can reflect the implied value of the service; recreation areas can be valued at least by what visitors are willing to pay to travel to it, including the imputed value of their time.
Hedonic pricing	Service demand may be reflected in the prices people will pay for associated goods; for example, housing prices along the coastline tend to exceed the prices of inland homes.
STATED PREFERENCE APPROACHES	

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[44] Note: The West Vancouver valuation was not included due to lack of data to for benefit transfer.

Contingent valuation	Service demand may be elicited by posing hypothetical scenarios that involve some valuation of alternatives; for instance, people generally state that they are willing to pay for increased preservation of beaches and shoreline.
Contingent choice	Similar to contingent valuation, service demand is elicited by posing hypothetical alternatives. This approach does not ask people to state their values directly, but instead infers values based upon tradeoffs people are willing to accept.

Annex E: Notes from Engagement Workshop with Neighbouring Municipalities

District of Saanich Natural Asset Management Project
Engagement Workshop
April 9, 2024, 10am – 12pm | Online (Zoom)

Table 32: List of Workshop Attendees

Organization	
District of Saanich	Jacqueline Weston (host)
Natural Assets Initiative	Michelle Molnar (host)
	Emily Sharma (host)
City of Victoria	Trina Buhler
	Jeff Lynka
	Rory Tooke
	Kristie Signer
	Summer Formosa
	Mike Creighton
	Patrick Fingler
	Laura Berndt
	Nina Sutic-Bata
CRD	Kristy Wallace
	Laura Hardiman
	Jody Watson
	Alex Miklas
District of Central Saanich	Jennifer Lukianchuk
	Troy Ziegler
Township of Esquimalt	Robbie Young
Town of View Royal	Ben Lubberts

Invitations were also extended to representatives from the District of Highlands, District of Oak Bay, the W̱SÁNEĆ Leadership Council Society, Songhees Nation, Esquimalt Nation, BOḰEĆEN (Pauquachin First Nation), S̱ṮÁUTW̱ (Tsawout First Nation), W̱JOȽEȽP (Tsartlip First Nation), and W̱SIḴEM (Tseycum First Nation).

Project Overview
For the full presentation, please refer to the slide deck and meeting recording here.

The District of Saanich maintains a public webpage on their natural asset management initiatives, accessible at: www.saanich.ca/EN/main/local-government/asset-management-program/natural-asset-management.html

Discussion

Question 1:

Based on your own initiatives and/or today's presentation, are there potential shared areas that are of key relevance to your organization? Are there any that were not included?

Table 33: Feedback Provided by Participants

Jurisdiction	Suggested potential areas/assets of interest	Areas/assets added or emphasized during discussion
CRD	• Bear Hill Regional Park • Elk/Beaver Regional Park • Francis/King Regional Park • Mount Work Regional Park • Shared watersheds	• Tod Creek watershed – spans 4 municipalities (Central Saanich, Highlands, Saanich, View Royal) • There is an existing opportunity for discussion of collective approach to watershed-level management and data collection through the CRD's Integrated Watershed Management (IWM) Committee , • See shared monitoring program example from Grindstone Creek project • Oak Beaver Reservoir
City of Victoria	• Bowker Creek watershed • Cecelia Creek watershed • Marine shoreline (federal migratory bird sanctuary)	• Cecelia Ravine Creek watershed
District of Central Saanich	• Hagan-Graham Creek watershed • Tetayut Creek watershed • Tod Creek watershed • Marine shoreline (federal migratory bird sanctuary) • Forested area along boundary (north of Elk Lake)	• Hagan-Graham creek watershed – Maber Flats area
Township of Esquimalt	• Hospital Creek watershed • The Gorge waterway	• The Gorge Park
Town of View Royal	• Craigflower Creek watershed • Tod Creek watershed • The Gorge waterway	• Area north of Watkiss Way; acute flooding issue in subdivision bordering rural Saanich (in proximity to Highland Golf course) • Rural lands north of Thetis Lake – single access to neighbourhoods via Highland Rd., fire access at Munn Rd. • Stone Ridge wetlands – water lets out into Hospital Creek

District of Oak Bay	• Bowker Creek watershed • Hobbs Creek watershed • Marine shoreline (federal migratory bird sanctuary)	
District of Highlands	• Tod Creek watershed • Forested areas west of Prospect Lake	

Question 2:
Is your organization currently involved in any natural asset management, or natural infrastructure conservation work in these shared areas?

Feedback:
General conservation activities are carried out by CRD regional parks.

The Gorge Park — Township of Esquimalt is preparing for large riparian restoration project in Gorge Park in Fall 2024 (pending permit approval). Goal to build up riparian area and serve as an example project for homeowners and other landowners interested in similar work.

Hagan-Graham Creek — Central Saanich has property in the Maber Flats area and are currently collaborating with the W̱SÁNEĆ Land Trust Society on a restoration project for climate adaptation and flood control. Will be doing a hydrology study; there is potential interest in assessing the whole watershed (including areas in the District of Saanich).

Cecelia Ravine Creek watershed — CRD is seeking interest from local governments to address the watershed, which is experience a number of challenges, including: poor water quality, storm surges, heavily overrun with invasive species and poor riparian construct and impacts from misuse. Seeking to revitalize park area with collaborators, Cecelia Creek will likely be a future topic for the CRD Integrated Watershed Management (IWM) committee.

Stone Ridge wetland — Town of View Royal is currently carrying out the Stone Ridge wetland project to address flooding and runoff related to nearby subdivision. Project includes restoration work and efforts with volunteer groups to control invasive species in the area, which is proving successful. This wetland also lets out into Hospital Creek, which flows through the District of Saanich and View Royal.

Question 3:
Is your organization currently engaged in mitigating any risks in these shared natural areas? (e.g., erosion, illegal dumping, etc.)

Feedback:
Town of View Royal is monitoring the acute flooding situation in subdivision near Watkiss; currently engaged with Saanich public works to address excess water from rural area in Saanich.

Oak Beaver Reservoir — CRD has implemented a project to restabilize the water quality in the Oak Beaver Reservoir. There is currently a partnership with the province, who is funding water

quality efforts, and District of Saanich. CRD has proceeded with oxygenation system to support lake health and mitigate blue green algae blooms.

CRD working with a number of municipalities and some First Nations to collaborate on upcoming grant funding through Canada's 2 Billion Trees program to plant a number of native trees across the region.

Final announcements

- The next Regional Asset Management Community of Practice meeting is June 21st, 2024. If you/your organization is not on this community of practice list, you are still invited and encouraged to connect with Laura Hardiman (lhardiman@crd.bc.ca) for more information.

- Information gathered from this workshop will be included in the final project report for the District of Saanich's natural asset inventory — this report will be made public on the District's website when completed later this year.

- If you have further comments or would like to inquire further about planning for natural assets with the District of Saanich, please contact Jacqueline Weston (Jacqueline.Weston@Saanich.ca)

Service Awareness Exercise
General questions to gauge natural asset awareness across participants. Results taken from Mentimeter survey.

Figure 27: Survey Responses for Use of Natural Asset Management by Participants

Note: service categorization based on hierarchy implemented by the District of Saanich
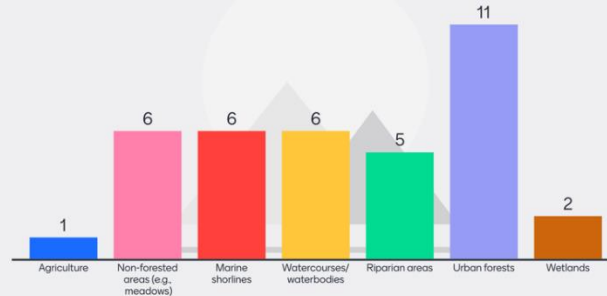
Figure 28: Survey of Management of Natural Areas for Service Delivery

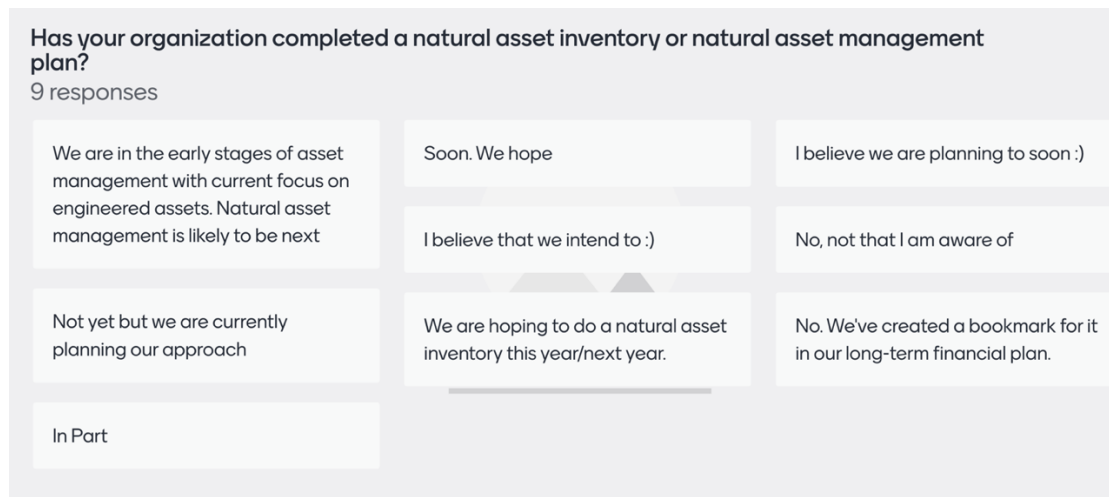Note: service categorization based on hierarchy implemented by the District of Saanich

Figure 29: Responses Regarding any Efforts in Natural Asset Management Planning

The Township of Esquimalt is currently working towards asset management considerations with focus on buildings & construction, likely followed by natural asset management (top left answer).

Central Saanich (bottom answer in centre column) is starting the process to begin a natural asset inventory, likely in 2025.

Natural Assets Inventory

Natural Areas, Parks & Trails Advisory Committee (May 9, 2024)

AND

Sustainability & Climate Action Advisory Committee (May 15, 2024)

Sustainable Service Delivery

Agenda

- Purpose
- Acknowledgements
- Natural Asset Management
- Report Summary
- Next Steps

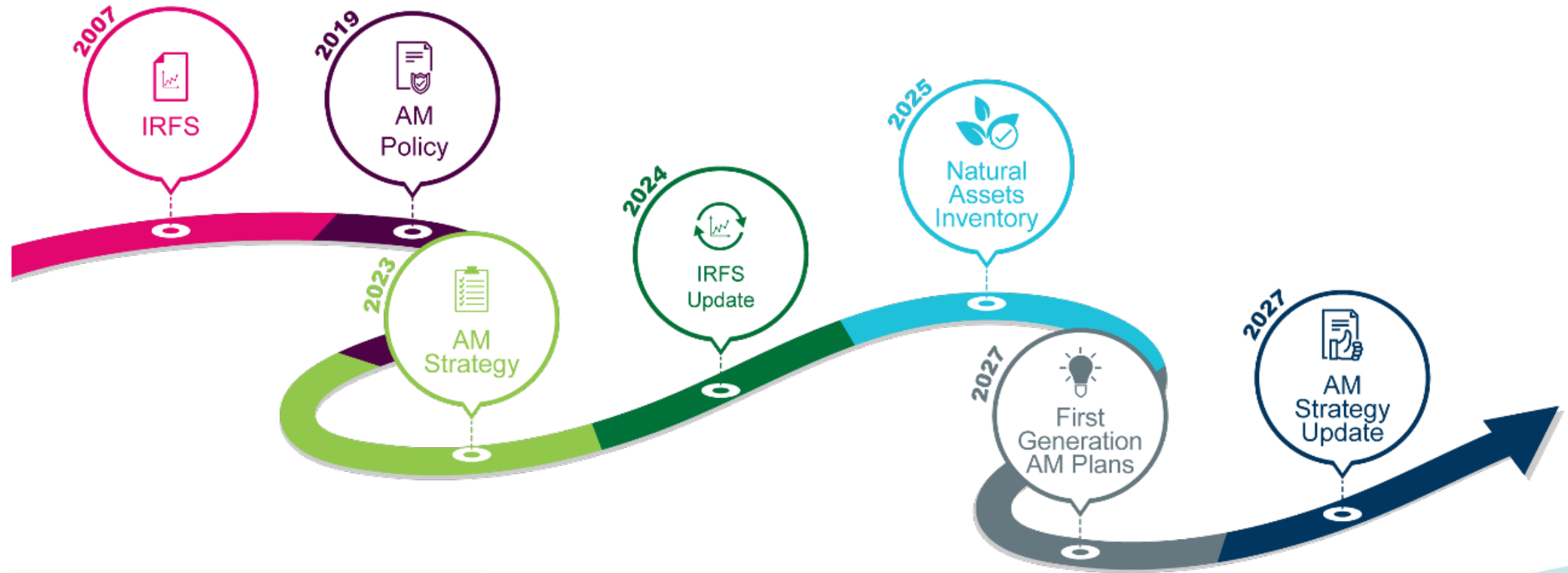**Asset Management Strategy**

District of Saanich

June 2023

Acknowledgements

- This project is supported by funding from the Government of Canada received through UBCM under the Canada Community-Building Fund – 2022 Strategic Priorities Fund

- The draft report was prepared by Natural Assets Initiative (NAI), a not-for-profit organization specializing in natural asset management

- Saanich project team

- Neighbouring municipalities

Natural Assets Inventory Project

(IRFS)
Infrastructure Replacement Funding Strategy
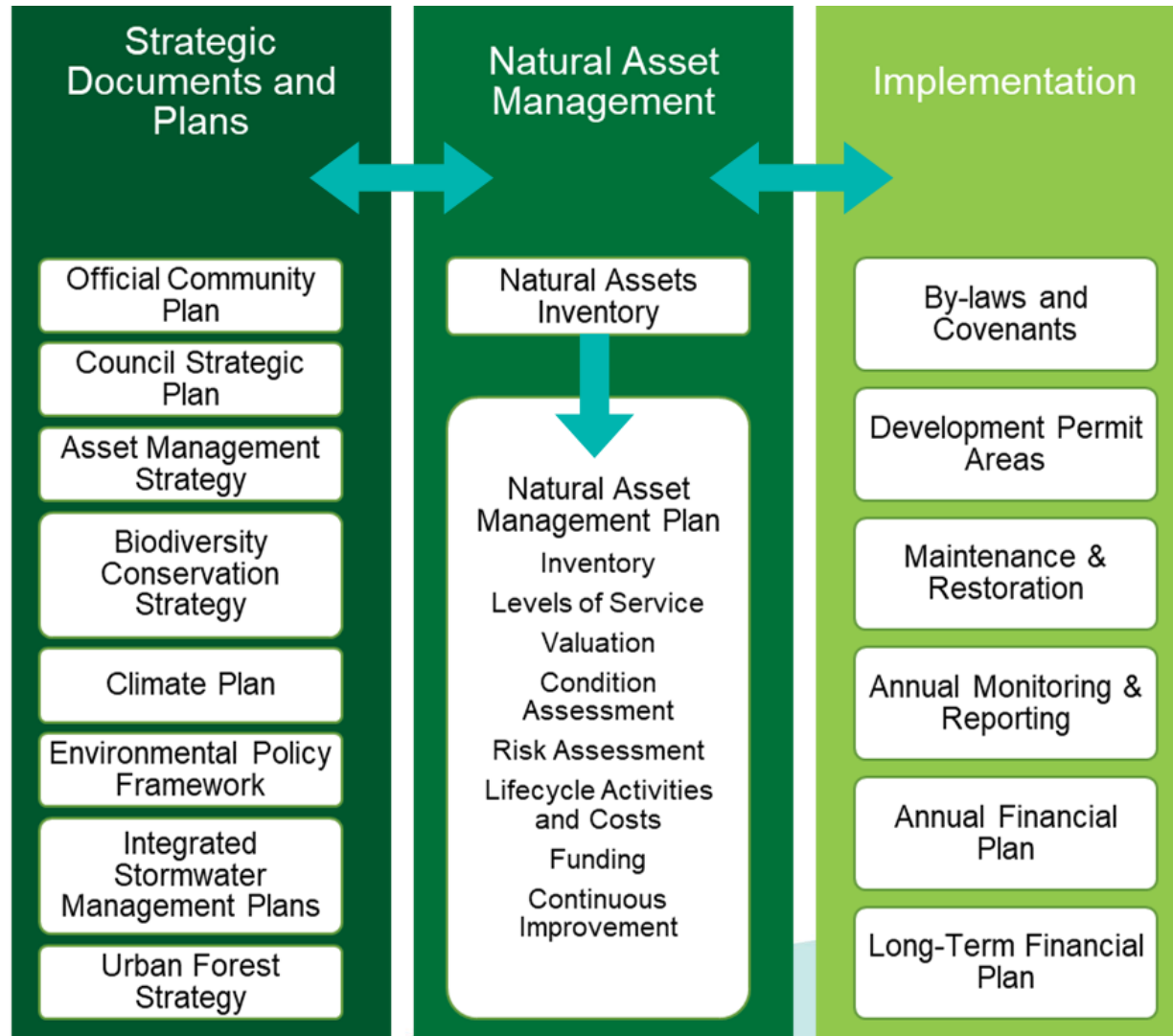
(AM)
Asset Management

Natural Asset Management

- Goal of asset management is sustainable service delivery

- Natural assets enable the provision of **municipal services**, and may provide one or more co-benefits
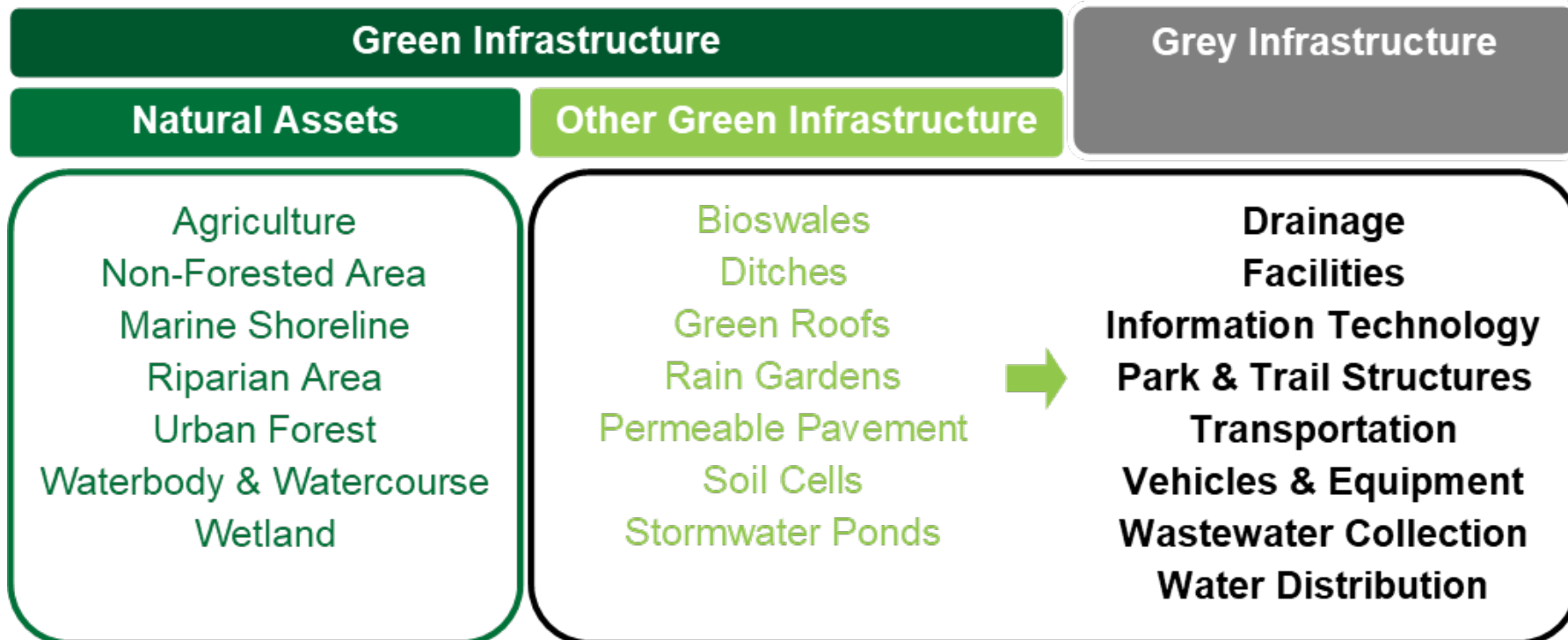
Ecosystem Services are "the many and varied benefits to humans provided by the natural environment"

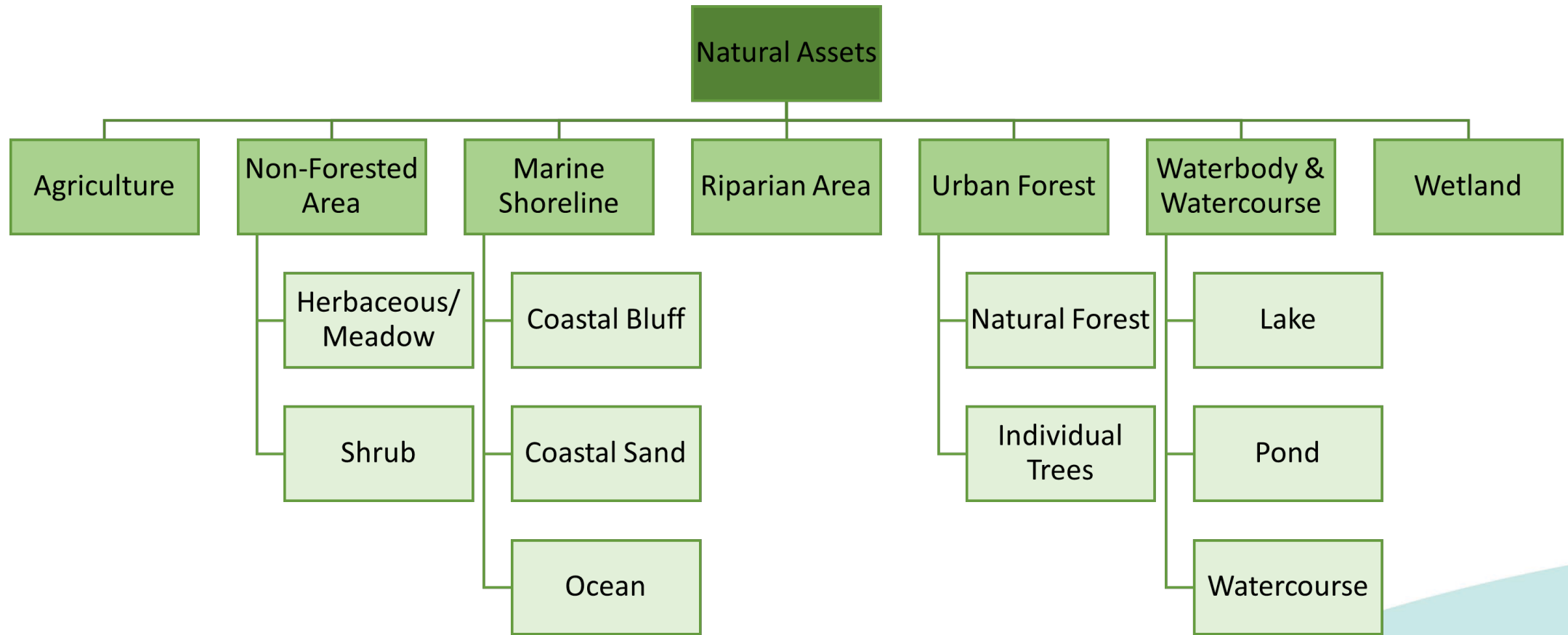# Integration of Saanich Initiatives

Natural Assets

Asset Hierarchy

Asset Quantity

Table 2: Summary of Polygon Natural Assets by Type

Asset Group	Number of Assets	Total Area (ha)
Agriculture	422	910
Non-forested Area	924	478
Marine Shoreline	769	700
Riparian Area	1,780	207
Urban Forest	5,895	3,481
Waterbody and Watercourse	587	360
Wetland	469	239
Total	10,846	6,375

Table 3: Summary of Point and Linear Natural Assets by Type

Asset Group	Asset Subgroup	Quantity
Urban Forest	Individual Trees (outside Natural Forest areas)	377,712
Waterbody and Watercourse	Watercourse	142 km

Preliminary condition assessment

Asset Area by Asset Group and Overall Condition Rating

Overall Condition Rating ● 5 - Very Good ● 4 - Good ● 3 - Fair ● 2 - Poor ● 1 - Very Poor

Preliminary risk identification

Preliminary services and performance measures

Objective or measure | Example

Strategic objectives — e.g., protection of biodiversity

Service delivery objectives — e.g., protect and enhance the urban forest

Community level of service measures and indicators — e.g., provide access to nature-based recreation; # km of trails; % residents within a 10-15 min walk of a park or natural area

Technical level of service measures and indicators — e.g., Ecosystem service LOS (asset performance): extent of natural assets providing ecosystem services; # ha of natural assets by asset type

Operational LOS (performance in managing natural assets): habitat creation/restoration; # ha restored annually

Preliminary Valuation ($2023)

- Annual Service Value
  - $9 to $81 M/year +
- Replacement Value
  - $379 to $2,315 M +

Water
16%
$791 M

Drainage
23%
$1,109 M

Vehicles and
Equipment
1%
$72 M

Facilities
6%
$293 M

Total
Replacement
Value
$4.9 B

Information
Technology
1%
$28 M

Wastewater
21%
$1,023 M

Transportation
30%
$1,433 M

Park and Trail Structures
2%
$119M
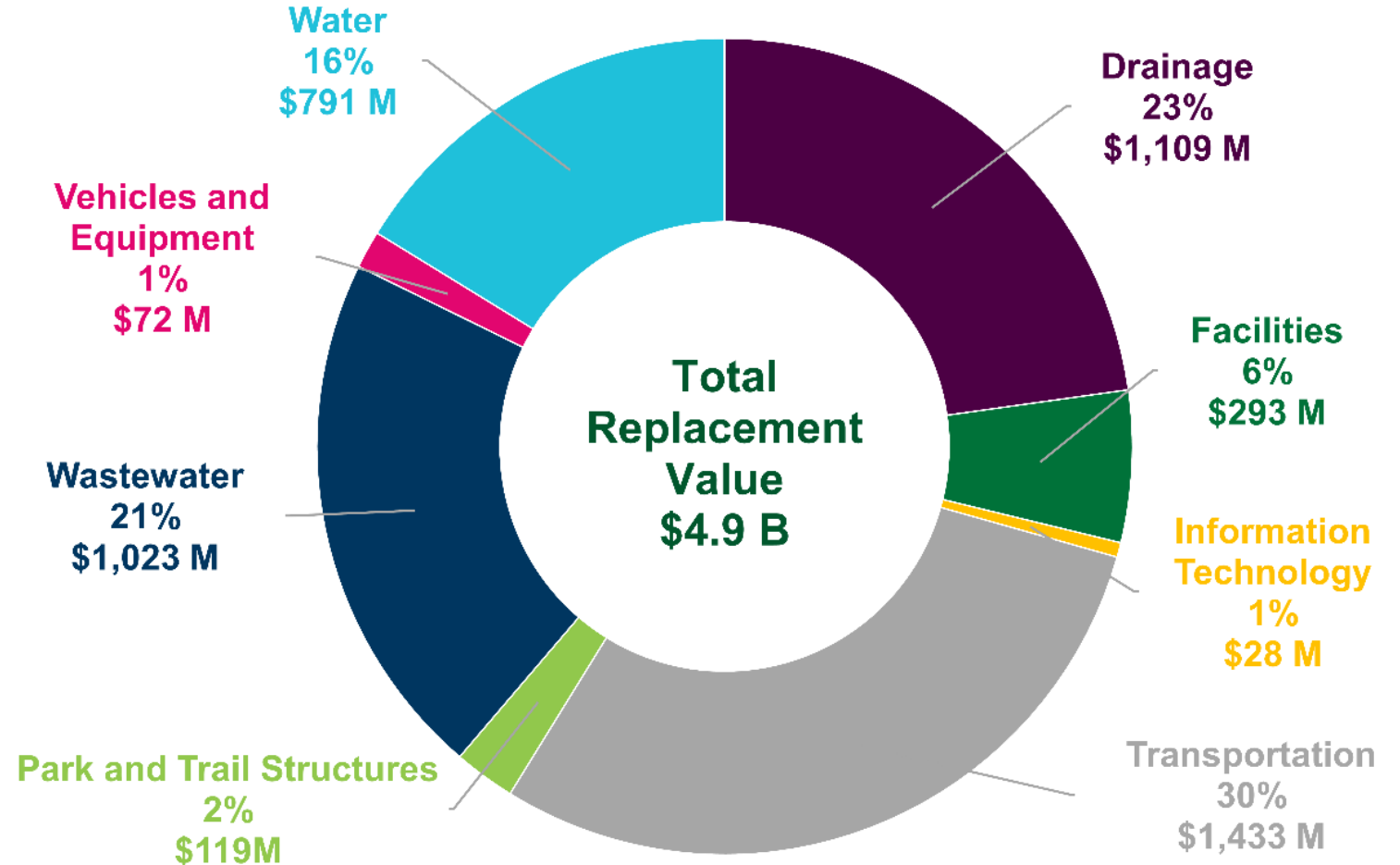
Collaboration with external stakeholders

- First Nations
- Neighbouring municipalities
- Public engagement

Next Steps

- *Natural Asset Inventory* project
  - Natural Areas, Parks & Trails Advisory Committee (May 9)
  - Sustainability Advisory Committee (May 15)
  - Committee of the Whole (July 8)
- *Natural Asset Management Plan*
  - Planned to start in 2025

Questions

"The best time to plant a tree was 20 years ago, the next best time is today"