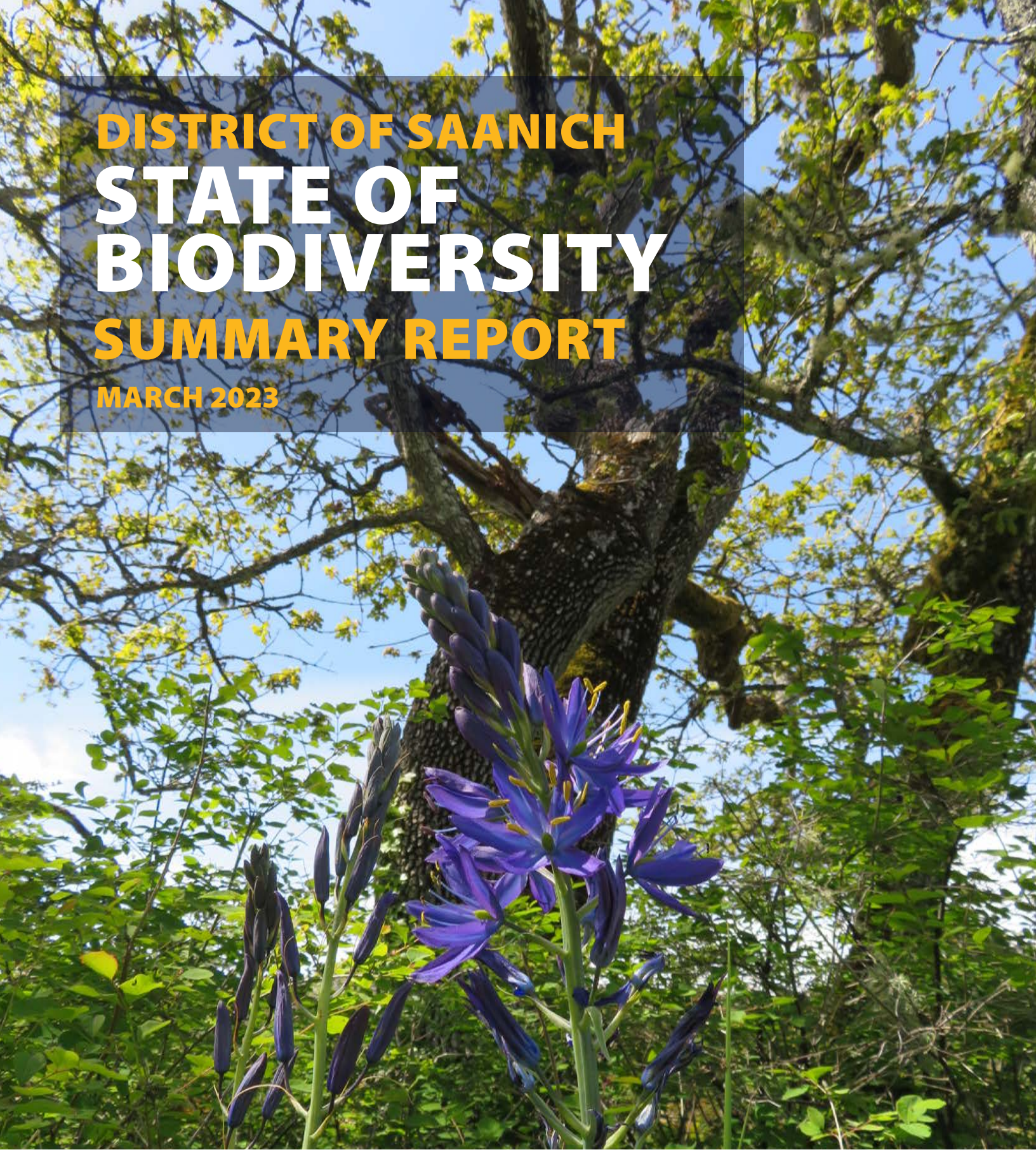

DISTRICT OF SAANICH

STATE OF BIODIVERSITY

SUMMARY REPORT

MARCH 2023

DIAMOND HEAD

Saanich

LAND ACKNOWLEDGMENT

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 W̱JOŁEŁP (Tsartlip), BOḴEĆEN (Pauquachin), STÁUTW (Tsawout), W̱SIḴEM (Tseycum) and MÁLEXEŁ (Malahat) Nations. The First Peoples have been here since time immemorial and their history in this area is long and rich.

The District of Saanich is proud that our name is derived from the W̱SÁNEĆ peoples. Saanich Council is committed to taking a leadership role in the process of healing wounds of the past and becoming a more just, fair, and caring society.

ACKNOWLEDGMENTS

The District of Saanich would like to thank all involved in the process of developing the State of Biodiversity Report. This includes community members who volunteered their time to participate in the online StoryMap, technical experts for reviewing preliminary mapping layers, and volunteers on the Resilient Saanich Technical Committee (RSTC).

Current and former RSTC members include:

Kevin Brown, Terrestrial ecology

Brian Emmett, Marine Ecology

Tim Ennis, Conservation Planning and Management

Purnima Govindarajulu, Conservation and Restoration Ecology

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Jeremy Gye, Urban Forestry

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Tory Stevens, Terrestrial Ecology

Brian Wilkes, Aquatic Ecology

Bev Windjack, Landscape Architecture

In addition, District staff & council played an invaluable role in working with committee members and the project consultants. Council Liaisons included Rebecca Mersereau (2020-2022) and Zac De Vries (2023-ongoing).

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CONTENTS

Photo 1: Marine shorelines are some of the most popular natural places in Saanich.

1. INTRODUCTION

The District of Saanich is within the territory of the Lək̓ʷəŋən peoples, known today as Songhees and Esquimalt Nations, and the W̱SÁNEĆ peoples. Collectively, these First Peoples have been caring for the land since time immemorial. Their role as protectors of the land continues to be vital today. The District of Saanich recognizes that importance, entering into a Memorandum of Understanding (ÁTOL,NEUEL, "Respecting One Another") with the W̱SÁNEĆ Leadership Council formalizing their commitment to reconciliation and pursuing opportunities for collaboration.

The District of Saanich is home to some of the rarest ecosystems in Canada. These include a long and rich marine foreshore, large productive lakes and wetlands, long river systems and a diversity of plant communities that support healthy wildlife populations. The natural areas in Saanich provide unique ecological characteristics and are home to many rare and threatened species. Saanich is characterized by these natural areas and its citizens are committed to protecting them for future generations.

Biodiversity is a term used to describe the variety and variability of life on Earth. It encompasses every living thing on the planet, ranging from microorganisms to plants, animals, fungi, and even entire ecosystems. Biodiversity is typically interpreted as the number of species that inhabit an area and their abundance. This can be used as an indicator of ecosystem health and integrity. The natural areas in and surrounding the communities of Saanich are complex and provide many ecosystem services that benefit both humans and the broader community of living organisms.

The Resilient Saanich program was initiated by council in 2017 and will develop a policy framework for environmental protection in Saanich. This process will also result in a Climate Plan, Biodiversity Conservation Strategy, and an Enhanced Stewardship Program. This State of Biodiversity report provides an understanding of the current state of the District's natural areas and the elements that threaten their integrity and will be the foundation of the Biodiversity Conservation Strategy. Natural areas and their characteristics have been mapped and analyzed using existing spatial layers and current technologies which will be shared with the public on SaanichMap and should be updated regularly.

Photo 2: View of the District of Saanich from Mount Tolmie.

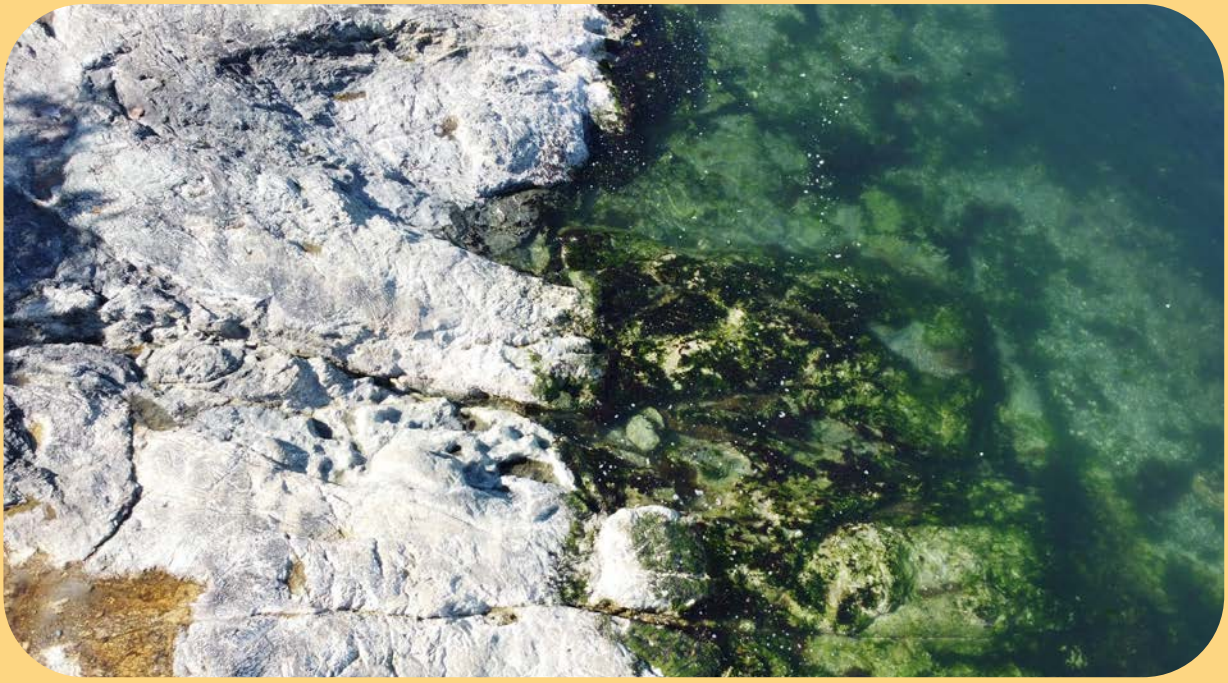


Photo 3: The District of Saanich is situated along the Pacific Ocean with a long marine foreshore.

Photo 4: Biodiversity is the variety and variability of life on Earth and encompasses every living thing.

2. METHODS

The State of Biodiversity Report is built upon existing data from various levels of government, special interest groups, and citizen science programs. These sources include information collected by the District of Saanich (such as parcels, zoning and satellite imagery), the Capital Regional District (such as canopy cover and LiDAR data) and the Province (species at risk, terrestrial ecosystem mapping and sensitive ecosystem inventories). Digital models of Saanich's terrain were used to predict where water flows through the landscape. These data sources were combined into a single database which divided Saanich into polygons with similar environmental conditions, called ecosystem polygons.

Biologists completed fieldwork to confirm the accuracy of the database and to better understand the ecology in the District. This fieldwork included detailed assessments of approximately 8% of the ecosystem polygons created during the initial analysis. After all data was assembled and representative areas were ground truthed, District Staff, RSTC, and technical experts from the District of Saanich reviewed the spatial layers using an ArcGIS Online web application.

Once all data was collected and reviewed, a biodiversity ranking methodology was applied to understand which areas of the district support the most biodiveirsty, and which the least. This ranking incorporates habitat type, habitat patch size and connectivity, and access to freshwater. In general, areas which support the highest levels of biodiversity are large, connected and provide a variety of habitats for wildlife. Areas which limit biodiversity are generally those which are small, disconnected, disturbed, or have high coverage of invasive species.

Data collected by the public through citizen science programs such iNaturalist and the Christmas Bird Counts, were also used to describe what wildlife is present in Saanich and where it is observed, though this information was not included in the biodiversity analysis.

Photo 5: Natural areas throughout the District were visited by Registered Professional Biologists to confirm their site characteristics and to collect additional relevant information.

3. RESULTS

3.1. Climate and Topography

The District of Saanich is within an ecological area known as the Coastal Douglas-fir zone (CDF). This area has the mildest winters in all of Canada, is one of the driest climate in BC, and is also considered the most at-risk. This climate, coupled with productive soils and access to freshwater and marine environments, have made Saanich home to some of BC's most rare and unique plant communities.

Elevation in Saanich ranges from 449 m at the summit of Mt. Work to sea level along Saanich's 46.9 kilometres of coastline. In between, Saanich features a mix of rocky knolls, undulating hills and flat lowlands which have been left since glaciers have retreated over the last 14,000 years.

Photo 6: The retreat of glaciers over the last 15,000 years has created the distinct mix of scoured rocky knolls, undulating hills, and flat lowlands common across Saanich today.

Photo 7: Natural areas throughout the District were visited by Registered Professional Biologists to confirm their site characteristics and to collect additional relevant information.

3.2. Aquatic Ecosystems

Water is a critical element for all life on earth. Whether it is flowing through Beaver Lake or passing over a rocky outcrop on its way into the headwaters of the Colquitz River, water, or lack thereof, shapes our landscapes and the ecosystems that have evolved there.

3.2.1. Freshwater lakes and wetlands

Saanich has approximately 318 ha of lakes, ponds, and reservoirs, and 31 ha of wetlands. These water features provide habitat for aquatic and terrestrial species and are significant contributors to Saanich's overall biodiversity. The ecological significance of these aquatic habitats in Saanich shouldn't be underestimated. Up to 1/3 of all bird species ever recorded in British Columbia were observed over two years at Panama Flats, a unique old-field floodplain.

Photo 8: Wetlands are home to high levels of biodiversity.

Photo 9: Recent channel restoration in Cuthbert Holmes Park.

3.2.2. Watercourses

As a lowland coastal community, Saanich is home to a vast network of watercourses (Figure 1). **It has over 300 km of verified rivers, streams, ditches, creeks and brooks and another 93 km of unverified watercourses** identified using LiDAR (Table 1).

Table 1: Kilometres of watercourses in Saanich.

Class	Total length (km)
Brook (CRD data)	6.5
Creek (CRD data)	57.7
Ditch (CRD data)	170.8
River (CRD data)	10.5
Stream (CRD data)	65.6
LiDAR predicted	92.7
Total	**403.8**

3.2.3. Marine Shoreline

The District contains 46.9 km of marine shorelines. These shorelines are rich and dynamic areas that attract species from, terrestrial, marine, and freshwater environments. Saanich's marine shorelines are highly diverse, ranging from coastal sand ecosystems inhabited by silky beach pea (*Lathyrus littoralis*) and large-headed sedges (*Carex macrocephala*) to sparsely vegetated rocky bluffs populated by mosses and herbs. The complex interactions that occur over this ecological gradient make the marine shoreline one of the most biodiverse areas in Saanich.

Photo 10: A variety of terrestrial and marine species are found across the biodiverse gradients of shorelines.

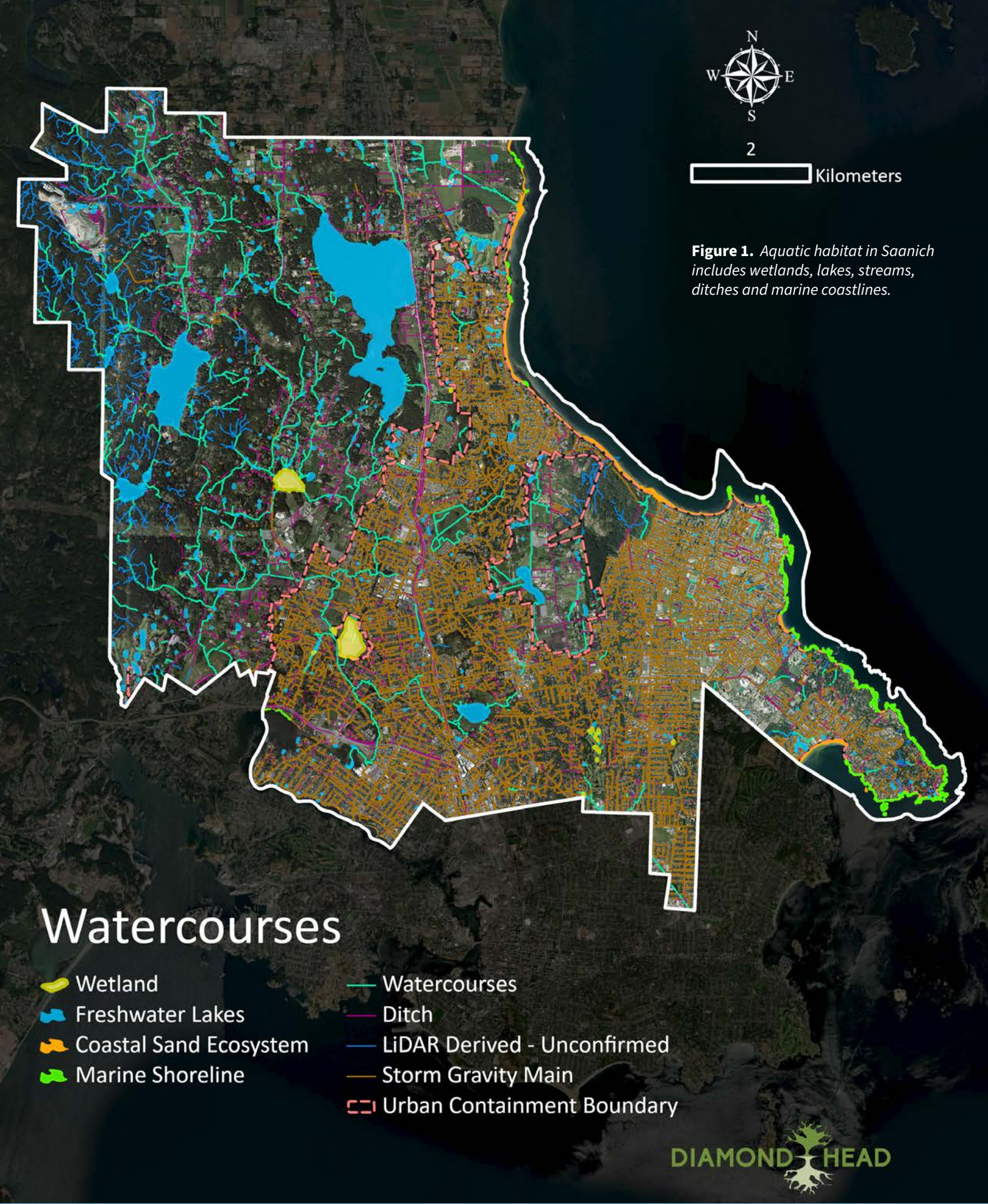


Figure 1. *Aquatic habitat in Saanich includes wetlands, lakes, streams, ditches and marine coastlines.*

3.3. Terrestrial Ecosystems

Most forests in Saanich are less than 150 years old, owing to a long history of logging that has eliminated nearly all old-growth trees in the District (Figure 2). **Approximately 2% of forests in Saanich still contain trees that are old growth, >250 years old**. Most of these old growth trees are located in protected areas such as PKOLS (Mount Douglas Park), Elk/Beaver Lake Regional Park, and Mount Work Regional Park.

Forests cover approximately 30% of the total land area in Saanich (Figure 3). The most common forest type are mixed forests with a variety of both evergreen and broadleaf trees. These mixed forests cover 15.6% of the District's total area. Coniferous forests, referred to as evergreen trees, are the second most common and cover 11% of Saanich's total land area. The remaining 3.2% of forests contain primarily deciduous trees and are referred to as broadleaf forests. About two-thirds of these deciduous forests are Garry oak ecosystems which are considered at risk, the remaining third are often younger stands consisting of trees that quickly establish after disturbance, such as red alders (*Alnus rubra*) and black cottonwoods (*Populus trichocarpa*).

In addition to natural forest stands, trees growing within urbanized areas provide a sizable contribution to the District's overall canopy cover. Urban trees cover 1,613 ha or 14.2% of the District's land area. These urban trees are highly variable in species, age, and size, and will be addressed as part of an ongoing Urban Forest Strategy renewal process.

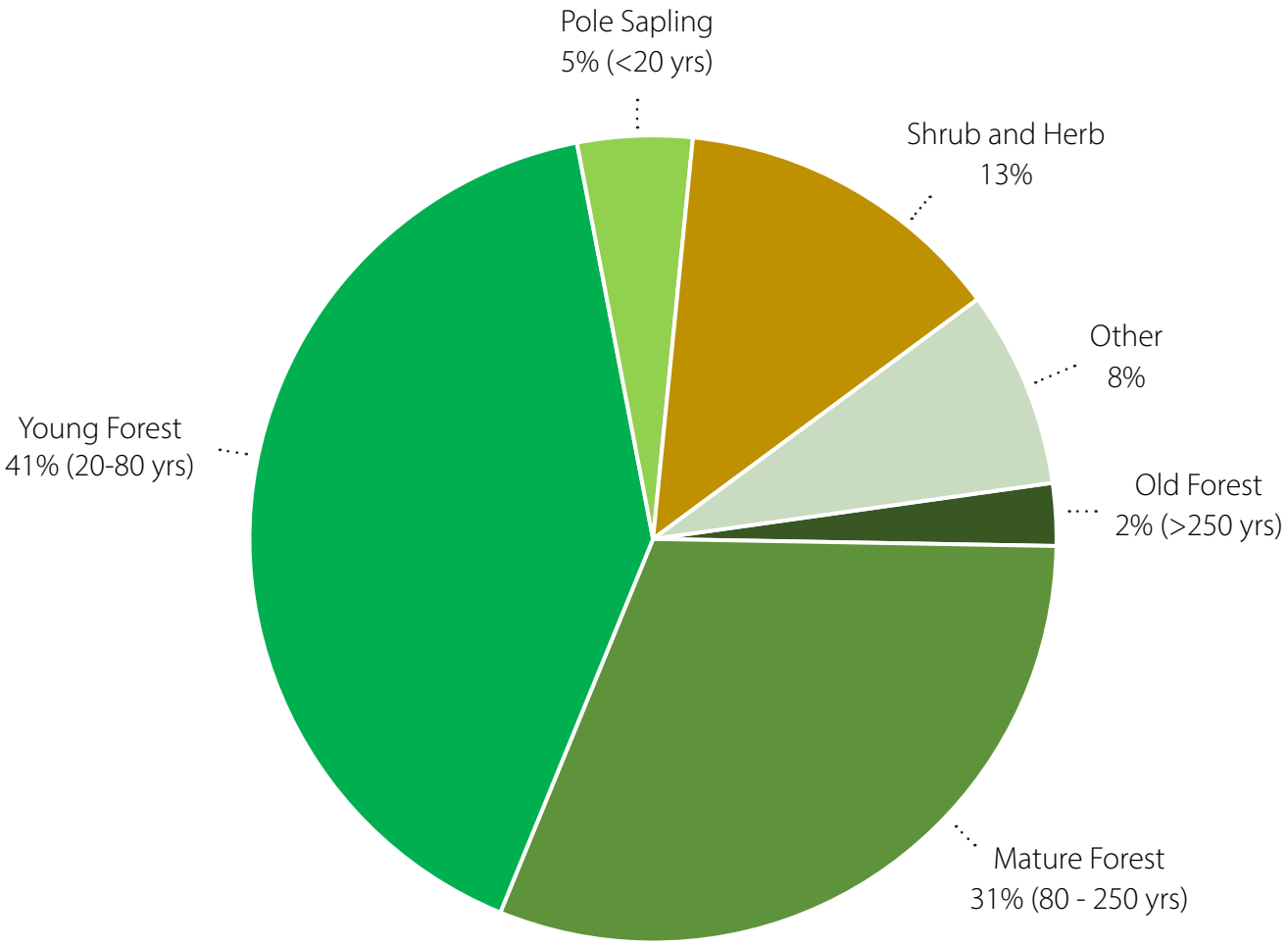


Figure 2. *Natural area breakdown by stand age.*

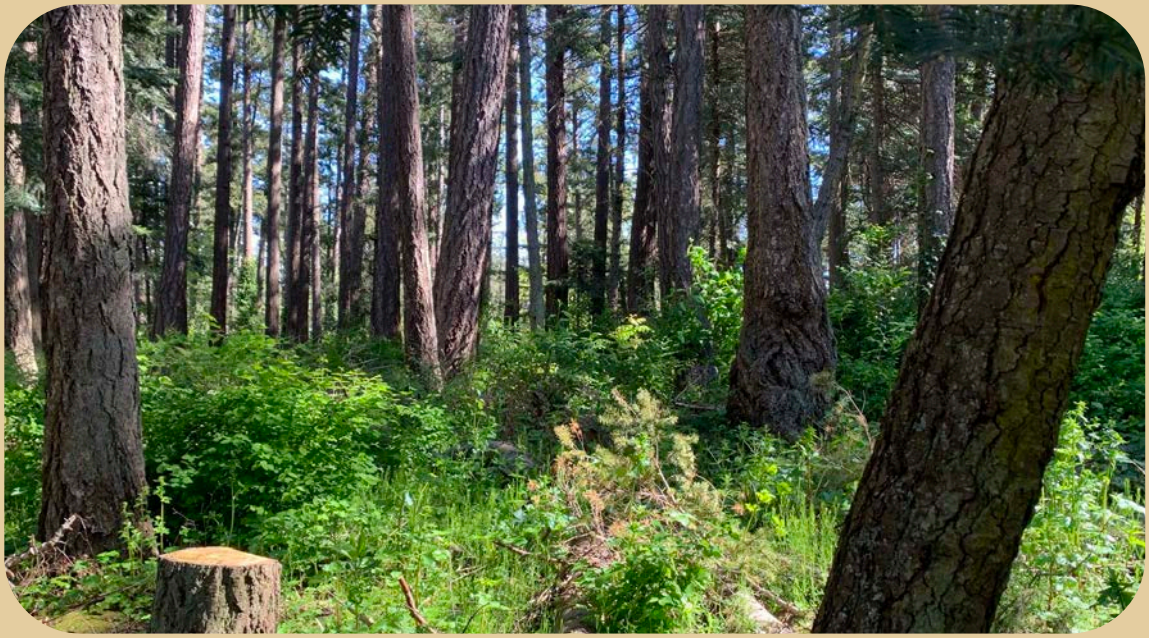


Photo 11: Most coniferous stands in Saanich are composed of a tall, single-aged, co-dominant layer of Douglas-fir.

Photo 12: Young deciduous stands play a significant role for wildlife as they mature.

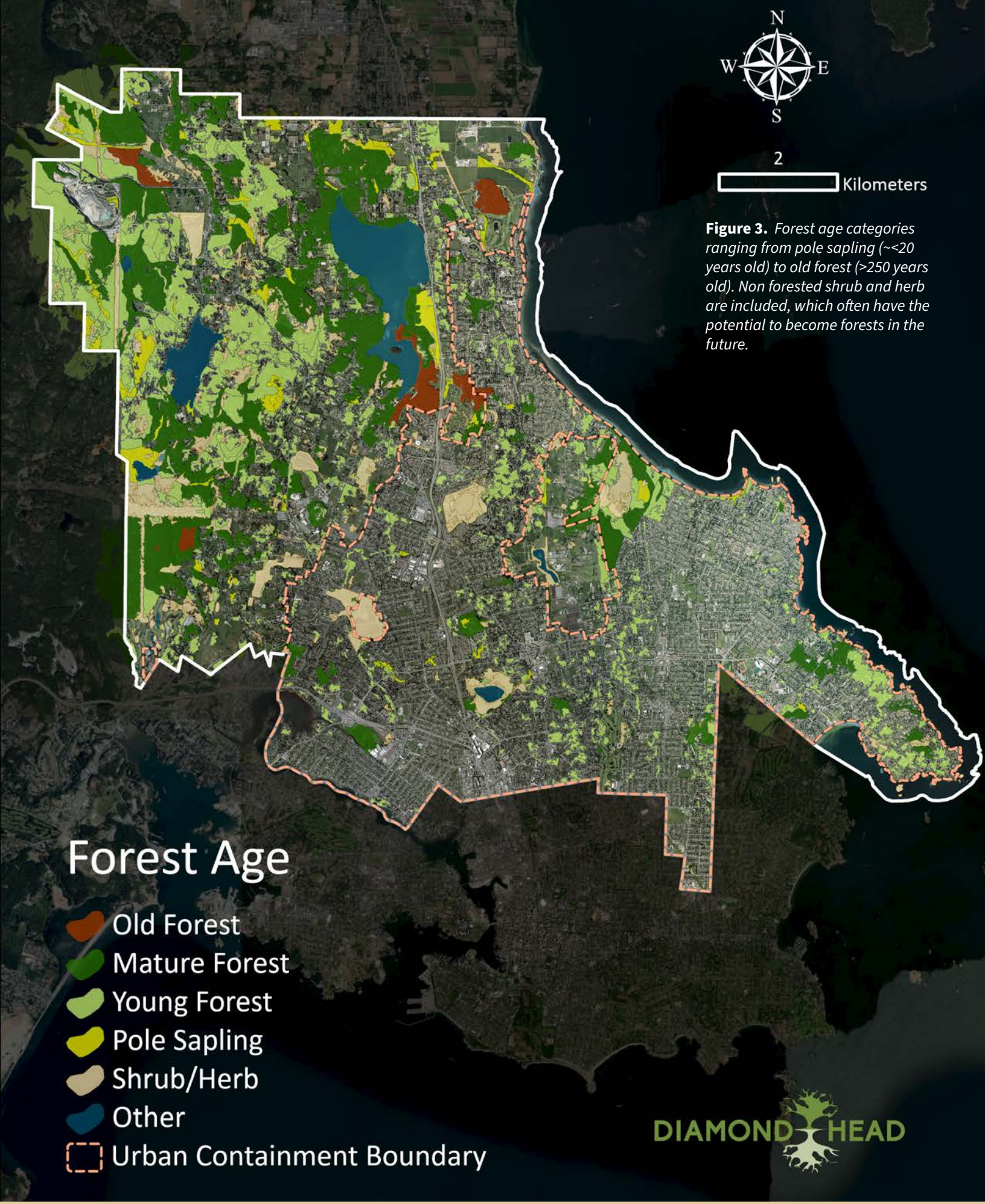


Figure 3. *Forest age categories ranging from pole sapling (~<20 years old) to old forest (>250 years old). Non forested shrub and herb are included, which often have the potential to become forests in the future.*

3.4. Species and Ecosystems at Risk

Saanich is home to many rare and threatened species and ecosystems. These are tracked by the BC Conservation Data Centre (BCCDC), using a colour-coded list of species and ecosystems which are at risk of being lost (Red), of special concern (Blue), or secure or not at risk (Yellow). The federal Species At Risk Act also ranks species as extirpated, endangered, threatened, or not of concern.

Saanich's unique ecosystems support many species and ecosystems which are considered at risk through the provincial system, the federal ranking, or both. **Nearly 94% of the distinct plant communities described in the Coastal Douglas-fir zone are classified as Red- or Blue-listed by the BCCDC. These ecosystems support over 280 provincially listed species, 24 of which are considered at-risk worldwide.** Only 11% of these forests are protected, leaving many at risk of being degraded further.

A prime example of these declining ecosystems are some of Saanich's most recognizable. Garry oak ecosystems were once much more plentiful, but climate change, land use modifications, fire suppression and many other factors have dramatically reduced the abundance of these ecosystems. **Garry oak ecosystems cover 2.2% of Saanich, with only 40% of them protected as parkland or under a covenant.**

Photo 13: Camas is a one of the most recognizable flowers in Garry oak ecosystems and has a long history of use by Indigenous peoples.

Beyond the ecological importance of these ecosystems, there is a rich history of use by Indigenous peoples in coastal Douglas-fir ecosystems. Coast Salish nations have relied on the diversity of culturally significant plants that they provide. Plants like camas (*Camassia leichtlinii*) are a cornerstone of many Coast Salish nations' traditions and are a key component of their current and historical ways of life.

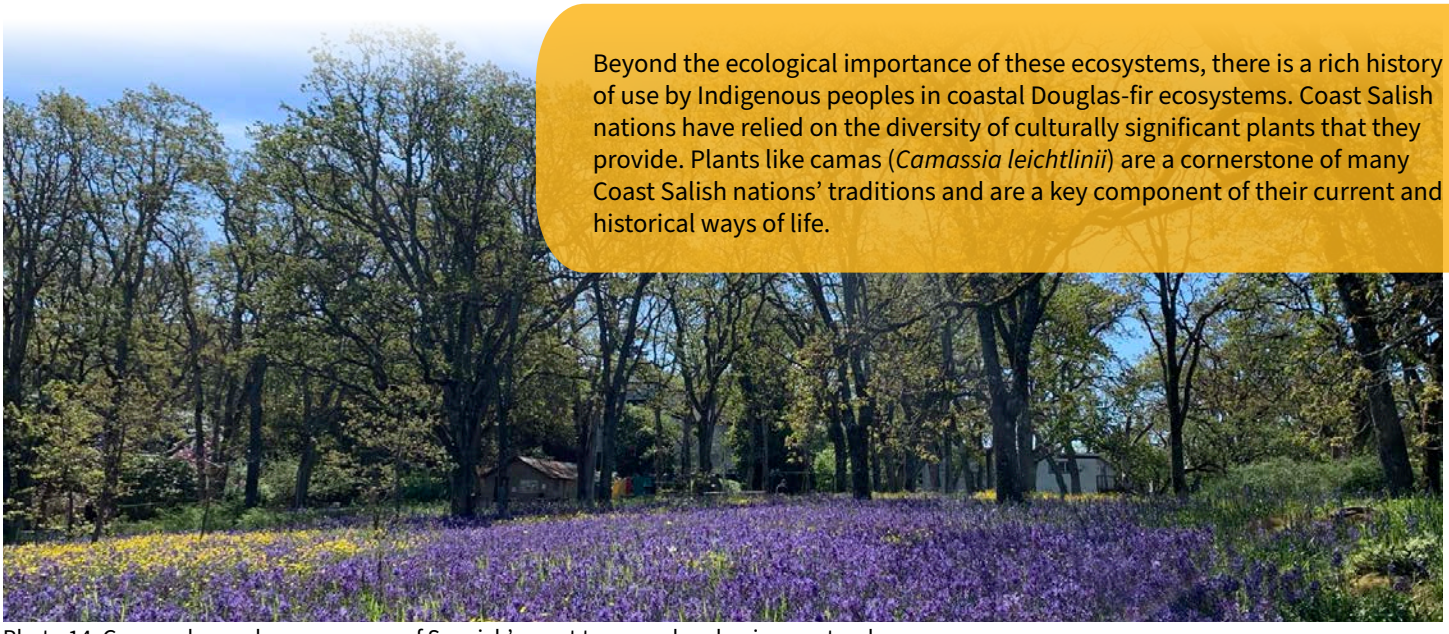


Photo 14: Garry oak meadows are some of Saanich's most treasured and unique natural spaces.

The District of Saanich is considered to be a biodiversity hotspot due to its unique climate, rich soils and range of habitats. **The District is home to many of BC's endemic, rare and at-risk species**. Endemic species are those which can only be found in one location, and at-risk species are considered in danger of being removed from an area. Detailed inventories of species are difficult and time-intensive to complete over large areas such as the entirety of Saanich. This would require extensive trapping and extended observation at various times of the year. These assessments were not conducted as part of the State of Biodiversity report, however, data from government sources and citizen science programs (such as iNaturalist and Christmas Bird Counts) were used to understand what species can exist in Saanich. Some of these programs can be skewed towards easily recognizable species and those which are visible during the day and in commonly visited areas but are also valuable tools in understanding what species exist and where.

The following list is a small summary highlighting some of the data we have on wildlife in the District:

- 201 listed species at risk from the BC CDC database
- 137 species of birds identified through Christmas Bird Counts – some species data are from outside the boundaries of the District
- 23 fish species from the BC CDC database, 14 of which are native species
- 4,115 different species of plants, fungi, and wildlife recorded in iNatualist.

Photo 15: Henderson's shooting star (*Dodecatheon hendersonii*).

Species Diversity

Arthropods are the most diverse group of animals on Earth. This group accounts for over 80% of the known animal species in the world. Its diversity is so immense that accurate species numbers cannot accurately be determined. There are 168 species of freshwater and terrestrial invertebrates known to be endemic to British Columbia and a total of 203 species that are potentially rare and endangered.

Global declines in insect populations are being documented worldwide, which raises concerns about the impact this will have on biodiversity and ecosystem health. It is unknown how many rare and endangered species are currently in the province or on Vancouver Island; however, the global declines are a significant concern, and it is crucial to protect and conserve habitat for arthropods to support biodiversity in Saanich.

The Saanich peninsula is within the Pacific Flyway – one of the most important migration routes for migratory waterfowl in North America. Many of Saanich's birds travel back and forth from Mexico, Central, and South America. Saanich also plays host to many species which breed in the Arctic and travel south to overwinter. Protecting habitat for these migratory species, whether neotropical, arctic, or locally migrant is of international importance as these birds depend on stable conditions throughout their range.

4. BIODIVERSITY TARGET CATEGORIES

The Resilient Saanich Technical Committee's Biodiversity Working Group identified eight habitat types to use to discuss biodiversity conservation in Saanich, called Target Categories (Figure 4). These Target Categories have been applied to all pervious areas of the District and include habitats ranging from sensitive natural areas to backyards and playing fields. While conservation methods and ecological sensitivities vary across these Target Categories, each plays a role in conserving and enhancing biodiversity across the District.

Target Category	
	**Coastal Douglas-fir forests** – These forests cover 23.8% of the district and are part of the smallest and most at-risk forest type in BC. Most of the remaining forests are within parks and protected areas, though some forests remain on private land.
	**Greenspace** – Grassy areas which are used for passive recreation are considered Greenspace. This includes golf courses and grassy areas near the south end of Prospect Lake. Most of these areas are on private land.
	**Garry oak ecosystems** – This ecosystem is among the most cherished and recognizable in the District. These ecosystems cover only 2.2% of land in the district.
	**Backyard biodiversity – rural** – Backyards, agricultural fields, hedgerows, varied gardens, and sports fields outside of the Urban Containment Boundary (UCB) are included in this category. These areas cover 19.1% of the District.
	**Backyard biodiversity – urban** – This grouping includes the same land uses as Backyard biodiversity – Rural, but for lands within the UCB. This covers 23.8% of the district. In total, backyard biodiversity covers 43% of the entire district.
	**Wetlands, lakes and hydroriparian streams** – These areas include the District's wetlands, lakes, and streams, as well as the land next to them.
	**Coastal sand ecosystems** – Saanich's sandy beaches, spits, and dunes are grouped into this category. These cover only 0.3% of Saanich
	**Marine shorelines** – This category includes rocky beaches, marshy estuaries and any other coastal areas that are not considered sand ecosystems. Only 0.2% of Saanich is included in this type.

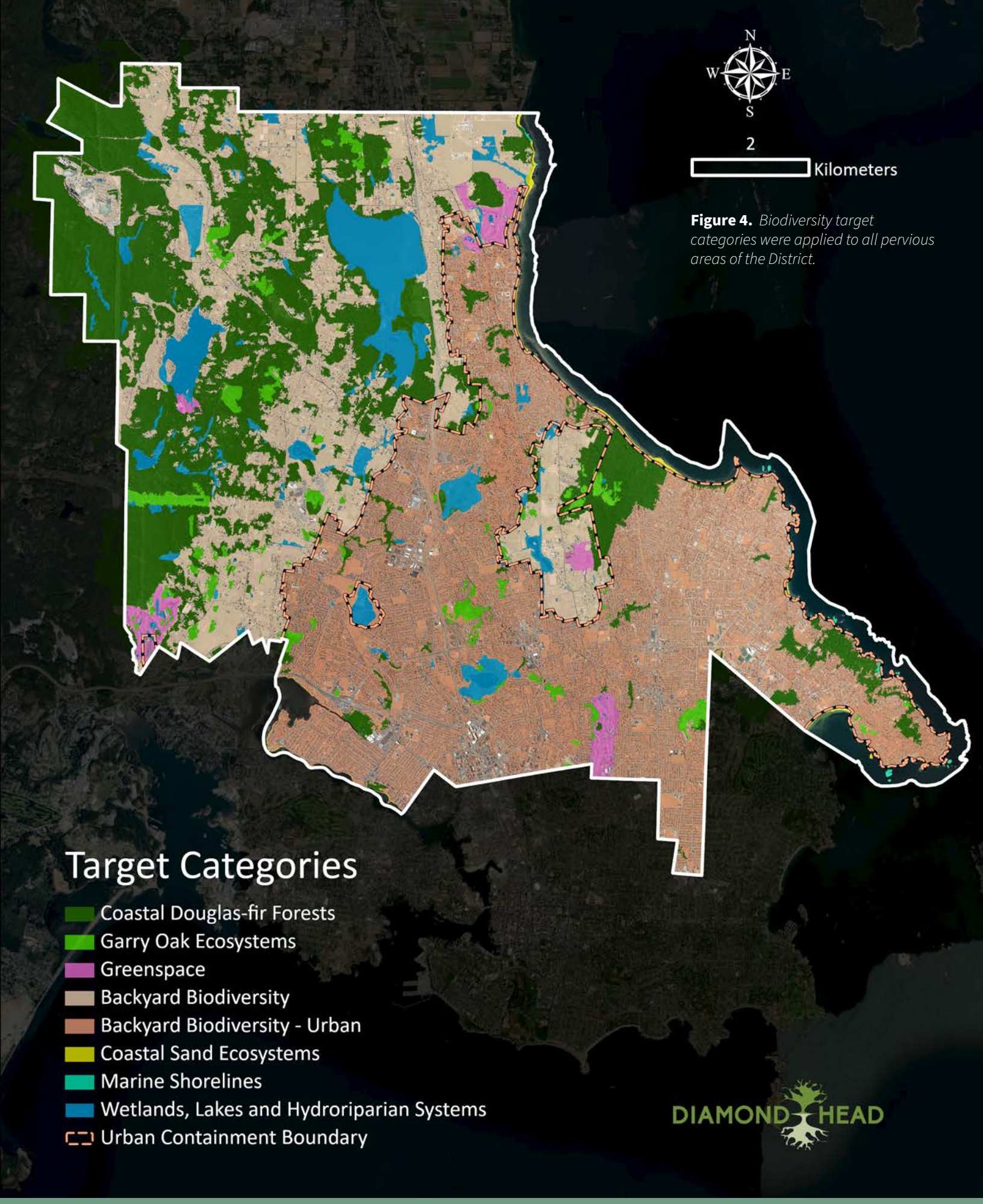


Figure 4. *Biodiversity target categories were applied to all pervious areas of the District.*

5. BIODIVERSITY RANKING

The biodiversity ranking allows a comparison of which areas in Saanich are likely to support the largest variety of species. These rankings were divided into five categories (very low – very high). **42% of the area included in this analysis came out as 'very low', while just 5% came out as very high (Figure 5)**. The areas that ranked highest are typically large, located away from urban centres, and have access to water. Areas which rank low are generally small, isolated, and disturbed. Ultimately, access to water is one of the most important factors in supporting high levels of biodiversity.

In general, areas outside the Urban Containment Boundary (UCB) ranked higher, and areas within the UCB ranked lower. This is because these areas are separated from each other inside the UCB, are often smaller, and more disturbed. Large urban parks like PKOLS (Mount Douglas Park), Swan Lake and Rithet's Bog ranked highly, and stand out in their ability to support higher levels of biodiversity inside the UCB.

Even within urban areas, biodiversity ranking is variable. Neighbourhoods with many mature trees and closed canopies, such as Cadboro Bay support more biodiversity than areas with young, spread-out street trees. Rural Saanich includes many large forests and agricultural fields. Large forests support high levels of biodiversity due to their size. Agricultural fields may not support large wildlife or high levels of biodiversity on their own, but so provide large areas with limited disturbance when compared to urban centers.

Photo 16: Arbutus (*Arbutus menziesii*) are a broadleaf evergreen tree typically found on exposed rocky bluffs.

6. PROTECTED AREAS

1,758 hectares of land in Saanich is protected from development (Figure 5). These protections range from municipal parkland, conservation areas and private properties with natural state covenants. For this assessment, all parkland was considered protected, even though not all of these include natural areas. Natural state covenants are registered, legal agreements between the District and a private landowner. These are often used by the District to protect sensitive ecosystems, plants and wildlife during development. Other areas are protected provincially, through environmental regulations such as the Riparian Areas Protection Regulation or the Water Sustainability Act. There are also federal regulations which protect wildlife, such as the Migratory Bird Regulation, the Fisheries Act and the Species at Risk Act, although all of these have limitations. It is important to note that natural areas with strict legal protections are still vulnerable to threats such as invasive species, climate change, and overuse.

The upcoming Biodiversity Conservation Strategy will highlight tools available to Saanich to conserve, protect, and enhance biodiversity.

Photo 17: 40% of Garry oak ecosystems are protected from development across the District.

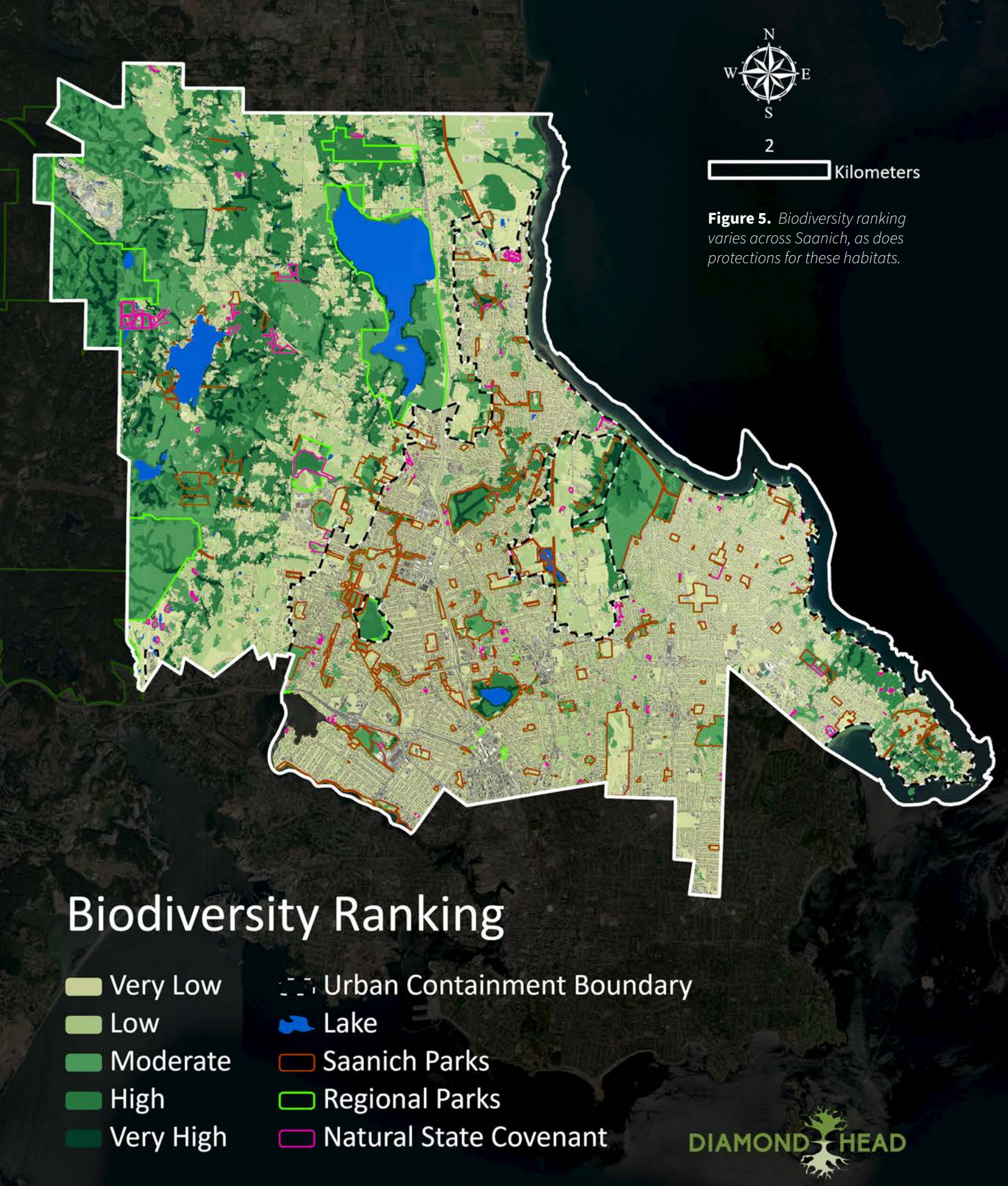


Figure 5. *Biodiversity ranking varies across Saanich, as does protections for these habitats.*

7. THREATS TO BIODIVERSITY

There are many threats to biodiversity in Saanich. These range from global-scale threats such as climate change to landscape changes through development to individual invasive species and diseases. Many of these threats are interconnected and can combine to have major impacts on biodiversity in Saanich.

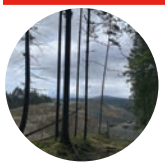
Threat	
	**Land development** affects biodiversity through habitat loss, fragmentation, and increased disturbance. While habitat loss can be directly related to development, indirect effects can include habitat fragmentation and other impacts from buildings, roads, trails, and fencing.
	**Climate change & severe weather** is altering growing conditions across the world. This is expected to change what plants can live where in Saanich. The CDF forests of Saanich are expected to have a different species composition by 2040 due to climate change.
	**Sea level rise** is expected to cause local flooding and coastal erosion in low-lying areas of Saanich. This will have profound impacts on Saanich's beaches, dunes and coastal wetlands.
	**Invasive species** are plants and animals which have been introduced from other regions and have negative impacts on ecosystems. Invasive plants and animals have been identified as one of the greatest threats to biodiversity worldwide.
	**Pests and diseases** can be natural parts of our ecosystems or can be introduced from other areas. The effects of these can range from small stand openings in forests to widescale loss of a species or understory in an area.
	Many threats to biodiversity can be related to **human activity**, whether it be climate change, development, or the introduction of non-native species. The impacts of humans on biodiversity can include numerous other complex and interrelated changes such as vegetation trampling and pollution.
	**Impervious surfaces** are surfaces which do not allow water to pass through. This includes buildings, roads, and parking lots, among others. These can influence how water moves through groundwater, streams, and Saanich's stormwater network. Impervious surfaces cover 29.5% of the land within the UCB and only 4.8% outside of the UCB.
	The lək̓ʷəŋən peoples represented by the Songhees and Esquimalt Nations and the W̱SÁNEĆ peoples represented by the W̱JOŁEŁP (Tsartlip), BOḴEĆEN (Pauquachin), STÁUTW (Tsawout), W̱SIḴEM (Tseycum) and MÁLEXEŁ (Malahat) Nations have had a profound effect on natural areas of Saanich. **The loss of indigenous knowledge and practices** since colonization is partially responsible for the decline of some of these ecosystems.

Photo 18: Many of Saanich's coastal shorelines are vulnerable to sea level rise.

Photo 19: Deer are natural herbivores that have reached unnatural population levels in the District.

8. DATA GAPS AND LIMITATIONS

The State of Biodiversity report and its biodiversity analysis was developed using a combination of available datasets from a municipal, regional, and provincial level. The findings of this report are reliant on the accuracy of these datasets. In addition, only data that was consistently available across the entire District was used in analysis. For District-wide planning and high-level management, it is important that the data be consistent and treated equally so that prioritization frameworks in future phases are not biased towards sites that contain more information.

Field verification was conducted by Registered Professional Biologists from Diamond Head Consulting to assess the accuracy of the data used in analysis, and supplement some areas where data may have been absent. Due to time and budget limitations, the field verification was not comprehensive across the entire District. Field visits were restricted to public land, with 8% of the total ecosystem polygons being field verified.

It is expected that the biodiversity analysis and accompanying datasets be a "living map". Many of the data inputs are continually evolving. The information provided in this report only provides a current (2022) description of what is present within the District. Continual updates and refinement will need to be completed to provide the most accurate information.

Photo 20: Standing wildlife trees provide important functions in natural areas, including nesting, feeding, and perching.

9. NEXT STEPS

The State of Biodiversity Report was developed using available data, new technologies and ground truthing. The next phase of the project will be to identify and prioritize how to protect biodiversity in the District through the Biodiversity Conservation Strategy.

This next phase will include engagement with the public, stakeholders, and First Nations. A polling company will be used to conduct a survey among Saanich's citizens. The Biodiversity Conservation Strategy will provide policy recommendations for Saanich to preserve existing biodiversity in Saanich, and explore ways to enhance biodiversity in the future. This will include using the information developed in this phase to build a Green Infrastructure Network. This is a network of natural areas which can support a variety of species in the District. A Green Infrastructure Network is designed to allow connections and movement between parts of the district for wildlife.

The Biodiversity Conservation Strategy will:

- Review the existing legislative framework to understand current protection and management practices of natural areas and biodiversity in Saanich;
- Identify gaps in legislation coverage;
- Develop a municipal comparison to understand what tools are used in other municipalities; their successes and drawbacks, and provide a range of possible solutions;
- Analyze connectivity – identify existing natural hubs and corridors to create a GIN;
- Collaborate with First Nations;
- Engage with the public through a StoryMap (complete), public open houses, and survey (both publicly available and targeted);
- Engage with relevant stakeholders;
- Develop a vision and high-level goals;
- Develop recommendations for biodiversity indicators;
- Develop recommendations for monitoring, education, and stewardship

There are still many unknowns for biodiversity in Saanich. Some of these unknowns can be answered through future studies in Saanich but these take time, resources, and effort. These can include invasive plant and animal species surveys, species at risk mapping, and aquatic species inventories, among many more. In many cases, these will take multiple years to organize and complete. The Biodiversity Conservation Strategy will discuss some of these in more detail to guide what can be done to better understand Saanich's unique and important ecosystems in the future.

Photo 21: Garry oaks form acorns which fall off the tree when ready. Over time, these acorns can grow to become seedlings and eventually mature Garry oaks.