

Resort Municipality of Whistler

Priority Habitat Framework

July 2023



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Summary

The Resort Municipality of Whistler (RMOW) is rooted within extensive natural areas that are rich in local biodiversity. While these natural areas are a defining characteristic of Whistler, continued pressures from recreation, climate change, and development pose a risk to healthy ecosystems and biodiversity. The RMOW is committed to maintaining, restoring, and protecting natural areas and the habitat they provide through land development planning, environmental monitoring and restoration. As part of this commitment, natural areas identified as being the most important habitat to conserve local biodiversity will be identified as Priority Habitats. The understanding of these high value areas and the role they play to protect biodiversity in the region will be used to guide and focus environmental protection efforts.

This Priority Habitat Framework is an overarching planning guide that will help the RMOW achieve the OCP's goals, objectives, and policies with respect to the natural environment. It aims to establish a clear pathway for defining and identifying Whistler's priority habitats while also providing recommendations for their protection. It includes a summary of existing knowledge about the health and condition of natural areas within RMOW, including threats and constraints to ecosystem health & biodiversity. It defines what areas are considered Priority Habitats and makes recommendations on how to protect them, restore areas that have been degraded and to monitor their condition over time. This Strategy identifies five goals which have been used to organize high level recommendations:

Goal #1 – Clearly define and map Whistler's Priority Habitats

Goal #2 – Protect and restore an ecological network of Priority Habitats

Goal #3 – Develop and update policies and other planning tools to protect and enhance Priority Habitats during land use planning and development

Goal #4 – Minimize the impacts of outdoor recreation on Priority Habitats

Goal #5 – Increase knowledge about Priority Habitats and promote stewardship to protect them

This Framework aims to help the RMOW to protect biodiversity and improve its resilience to climate change by protecting the natural services provided by these ecosystems while striving to balance the resort community's social and economic needs. The next phase of this initiative includes further refinement of the recommendations into action items that can be prioritized and implemented by staff.

Traditional Acknowledgements

The Squamish and Lil'wat First Nations' territories include the RMOW. Natural areas in Whistler and the species that inhabit these areas are integral parts of their culture. Any impacts that affect the integrity of these natural areas are of interest to these nations to ensure their cultural history and future are preserved.

The RMOW is grateful to be on the shared, unceded territory of the Lil'wat People, known in their language as Lilwat7úl, and the Squamish People, known in their language as Skwxwú7mesh. We respect and commit to a deep consideration of their history, culture, stewardship, and voice.



Photo 1: Squamish Nation and Lil'wat Nation community members at the Squamish Lil'wat Cultural Centre.

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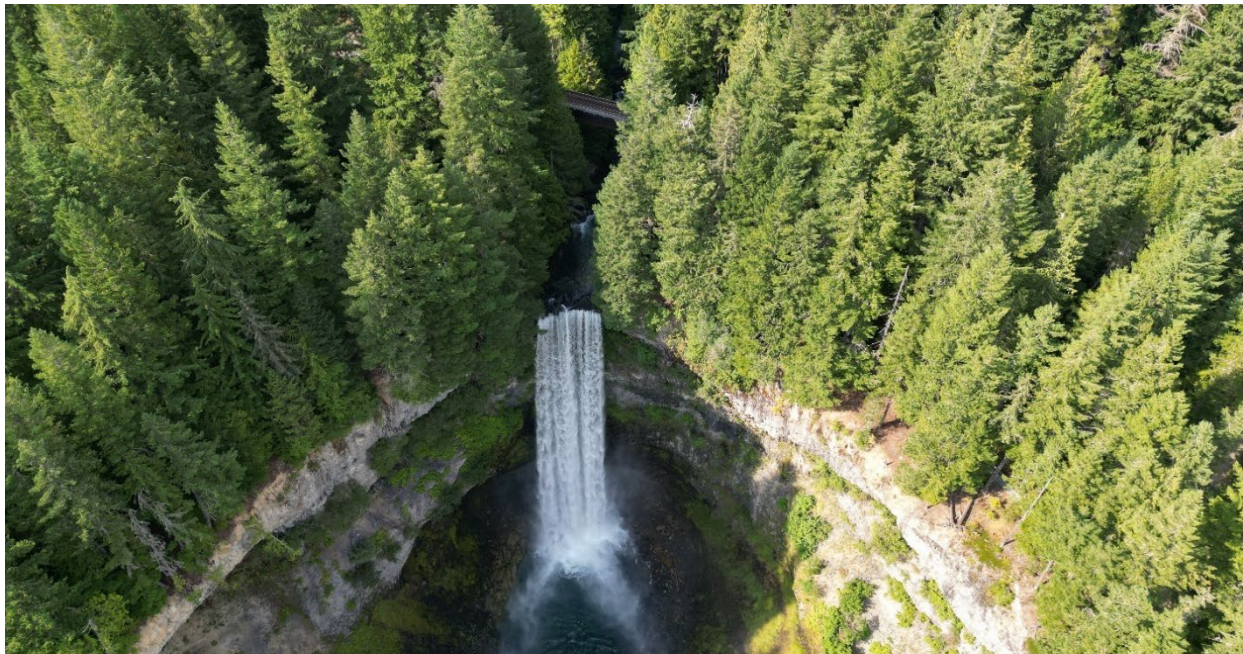


Photo 2: Brandywine falls.

Introduction

The Resort Municipality of Whistler (RMOW) is rooted within extensive natural areas that are rich in local biodiversity. While these natural areas are a defining characteristic of Whistler, continued pressures from recreation, climate change, and development pose a risk to maintaining healthy ecosystems and biodiversity. The RMOW is committed to maintaining, restoring, and protecting important natural areas and the habitat they provide through land development planning and environmental monitoring and restoration.

The Official Community Plan (OCP), zoning and environmental Development Permit Areas (DPAs) have been key tools for protecting RMOW's natural environment. Seven types of draft *priority habitats* were identified in 2018 following extensive environmental monitoring efforts. The RMOW has now developed this Priority Habitat Framework (the Framework) to guide the overarching next steps in the proactive management of Whistler's most important natural habitat areas. This is a municipal guiding policy framework that identifies high level recommendations to further protect and manage Whistler's natural areas and the diverse assets they provide.

To date, the RMOW has developed and adopted a suite of policies, programs, and initiatives to protect local natural areas. These include Development Permit Areas to protect riparian and sensitive ecosystems, an Environmental Protection Bylaw, the Zoning and Parking Bylaw, and the Land Use Procedures and Fees Bylaw to regulate land use and development. In 2022, the Big Moves Climate Action Implementation Plan was formally adopted and now guides actions to reduce RMOW's GHG emissions and increase the community's resilience to the impacts of climate change.

Extensive analysis has been completed by the RMOW and community groups to understand the types of species that live in RMOW and the ones that are most important and/or at risk. These programs include the annual BioBlitz inventory, ecosystem and species monitoring, and reporting on species at risk. These initiatives help provide baseline information to understand these species and ecosystems. This information is used to help understand environmental trends and threats to biodiversity. To date, these studies suggest that there are threats to species and biodiversity within Whistler, which include urban and recreational development, wildfire, forestry operations, the spread of invasive species and the impacts of climate change.

This Priority Habitat Framework is an overarching planning guide that will help the RMOW achieve the OCP's goals, objectives, and policies with respect to the natural environment. It provides a review of existing programs, biodiversity monitoring and protection efforts, and recommends actions the RMOW can take to further their goals for protecting the health of Whistler's most important natural assets.

Why is natural area conservation important to RMOW?

Biodiversity is interpreted as a measure of the number and types of living species that inhabit an area. It is a term often used to describe the health and integrity of natural ecosystems. Documenting the health of species that inhabit urbanized areas of the valley helps to understand how the function of these natural ecosystems is impacted by historical and ongoing development. The diversity of wildlife species and plant life that inhabit RMOW in the future depends on the integrity and connectivity of the habitat features found ranging from the wet valley bottom up to the high alpine. Some species require naturalized habitat areas and movement corridors that are separated from human activity, while other species can adapt to the urbanized areas of the RMOW and make use of altered habitats such as designed landscapes, gardens, urban trees, stormwater features, and rooftop plantings.



Photo 3: Lost lake provides habitat for a variety of species in the RMOW including the western toad.

The natural environment has been a key component for the planning of RMOW since it was recognized by the Province as a “Resort Municipality” in 1975. The role of the natural environment as a key characteristic of the community has been recognized throughout planning and operations ever since. The OCP emphasizes the protection of its natural assets. The Community Vision Statement is:

“Whistler: A place where our community thrives, nature is protected and guests are inspired.”

Preserving the health of natural areas and biodiversity in and around Whistler is a priority to fulfill our obligation as citizens and stewards of this area. The natural environment also provides benefits to the community beyond aesthetics and stewardship. Healthy natural areas can help to mitigate the risks associated with climate change like flooding, heat and drought and other natural disasters. Natural areas support the physical, psychological and overall well-being of residents and visitors. The natural environment is also central to Whistler’s economy and lifestyle, and is one of the reasons why the community is renowned worldwide as a destination resort.

This framework is a high-level planning document that supports the commitments in the OCP to protect RMOW’s natural environment. The following Vision has been developed for this Framework:

“Whistler is a community where sensitive ecosystems, natural habitats and biodiversity are valued, protected, connected, and restored.”

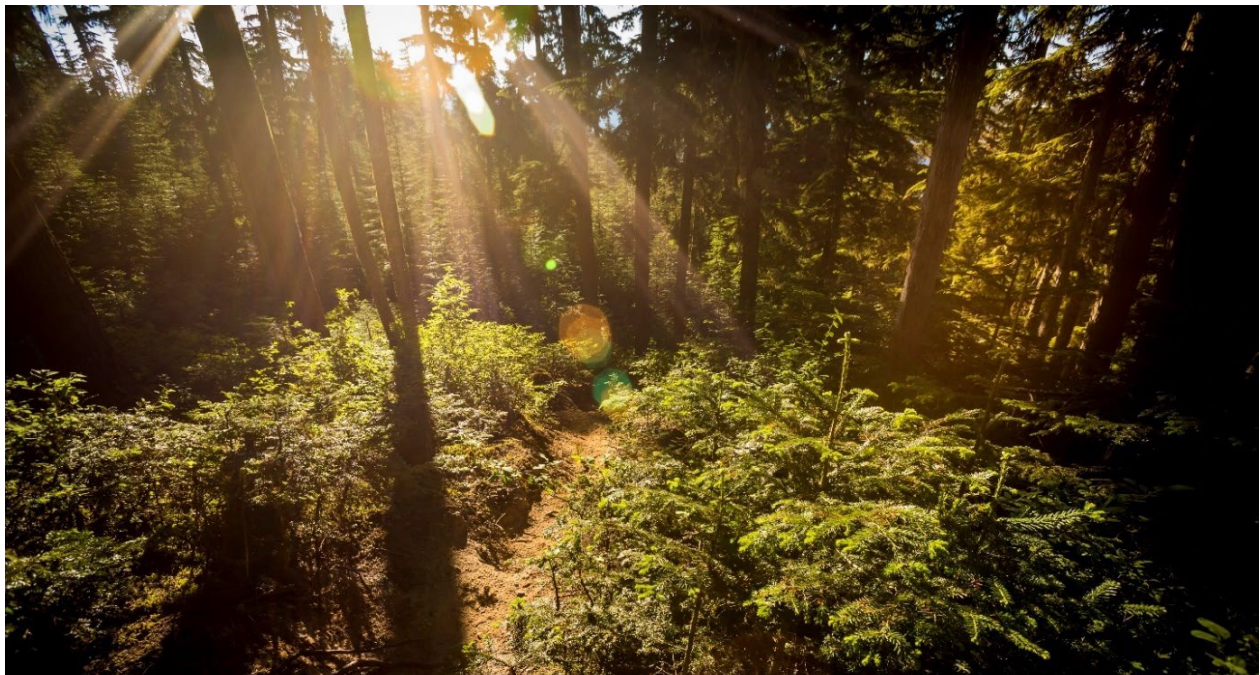


Photo 4: The natural environment is a key characteristic of Whistler.

The RMOW's Environmental Protection Policies

The RMOW is within the unceded territories of the Lil'wat Nation and Squamish Nation who have managed this area and thrived for thousands of years before European settlement. European settlers first lived in Whistler in the late 1800s. Logging and recreational activities increased throughout the early 1900s and were further supported by the construction of the railway in 1914. The ski resort was built in 1966 and in the 1970s, RMOW was recognized by the Province as a "Resort Municipality". A master plan was developed to guide the growth of the RMOW. The natural environment was a key component of this plan, which envisioned a town that exists in harmony with the natural environment. Connecting residents and visitors to the natural environment has remained central to all community planning processes since.

Natural areas in the RMOW are protected and managed by a variety of legislations, regulations, policies, and guidelines. These regulate how property and infrastructure are planned, constructed, and maintained over time. Bylaws help to protect sensitive environmental features from damage outside of approved development. The most influential policies are summarized below.

Official Community Plan Bylaw No. 2199, 2018 (2022)¹

The Official Community Plan (OCP) provides high-level guidance for community planning and land use. Throughout the OCP, the natural environment is framed as an integral part of the RMOW's culture and economy, and its protection is a central theme of the vision of the OCP. The Plan recognizes the importance of the natural environment not only for conservation, but also for the health and well-being of residents, and as a key characteristic supporting its tourism-centered economy.

Chapter 7 of the OCP, Natural Environment, recognizes the value of natural areas as one of the RMOW's greatest assets. The goal of this chapter is to protect, restore, and manage sensitive ecosystems, wildlife, habitat, and biodiversity. This Priority Habitat Strategy has been developed in response to policy 7.1.2.2 of the OCP which is to "Explore a Priority Habitat Management Strategy that prioritizes connectivity and protects and manages sensitive ecosystems."

Big Moves Climate Action Implementation Plan (BM CAIP 2022)²

The RMOW has been tracking and working to manage its greenhouse gas (GHG) emissions since 1997. The Community Energy and Climate Action Plan (CECAP) was adopted in 2016 and in 2020 RMOW's Big Moves Climate Strategy (BM CAIP) was developed to prioritize the top actions to mitigate climate change. As of the summer of 2022, the BM CAIP formally guides climate action in the RMOW. The BM CAIP consolidates previous priorities, initiatives, and actions under two broad goals to address climate change. The first is to mitigate the impacts of climate change by reducing RMOW's GHG emissions to 50% below 2007 levels by 2030. The second goal is to increase RMOW's resilience to the impacts of climate change through adaptation measures. One of RMOW's climate change Adaptation Goals is to "Protect Local Ecosystems & Biodiversity". This goal recognizes not only the threat of climate change to the integrity of natural ecosystems, but also the important role that both ecosystems and biodiversity

play in mitigating the potential impacts of climate change on the community. This Priority Habitat Framework responds to the first Key Initiative of this Adaptation Goal, which is to develop policy, planning, and legislation strategies to protect and restore local ecosystem health.

Zoning and Parking Bylaw No. 303 (2015) - Protected Areas Network Zoning³

This bylaw regulates the use of lands, the design of buildings and structures, parking requirements, and landscaping. The RMOW is divided into zones with specific use requirements. The Protected Areas Network 1 (PAN1) zoning was adopted to help protect sensitive environmental areas. Areas zoned PAN1 are intended to provide areas for nature conservation and passive recreation. Permitted uses in PAN1 are limited to nature conservation parks, wildlife viewing platforms, and auxiliary uses. The PAN1 designation was initially granted to two sites: the Emerald Forest (central River of Golden Dreams wetland complex) and the Millar Creek wetland areas situated between Creekside and Function Junction. Additionally, there are currently some other small sections of land zoned PAN1 throughout the RMOW. The PAN1 zoning designation is a significant tool for protecting valuable habitat and ecosystems in RMOW.



Photo 5: The natural environment and the recreation opportunities it provides contributes to the health and well-being of RMOW residents and tourists alike.

Land Use Procedures & Fees Bylaw No. 2205 (2022) ⁴

This bylaw specifies the requirements for development approvals within development permit areas, including those for the protection of the natural environment. It allows for the authorization of amendments, exemptions, and variances to land use policy. Where the proposed development may impact the natural environment, this bylaw specifies the requirement of agreed-upon Terms of Reference as part of development approvals. It requires that watercourses and their riparian areas be protected following the procedures in the Provincial Riparian Areas Protection Regulation. Securities are specified when there is damage to natural areas and restoration is required as part of a development permit.



Photo 6: Land use planning is central to the RMOW's growth and economy.

Development Permit Area (DPA) for Protection of Riparian Ecosystems (OCP 2022)⁵

This DPA applies to all parcels of land that are within or partly within 30 m of streams, defined as the Riparian Ecosystem Protection Area (REPA). For proposed development on lands that include some area within the REPA, an environmental impact assessment study is required to be prepared by a QEP. This assessment must identify the potential impacts of the development on the REPA and establish measures to protect, preserve, and enhance the REPA. DPA guidelines may require habitat compensation if development alters natural vegetation within 15 m of a stream.

Development Permit Area for Protection of Sensitive Ecosystems (OCP 2022)⁶

This DPA includes most of the remaining natural lands within the RMOW. Any new land development that includes sensitive ecosystems must comply with the guidelines of this DP. A QEP must be engaged to complete an environmental impact assessment of the proposed development and to prescribe recommendations to protect and, where possible, restore these natural areas. Sensitive ecosystems are currently defined in the OCP as:

- species at risk habitat
- ecosystems at risk
- raptor's nesting sites
- core forest habitat
- CWH forest
- cottonwoods
- forested floodplain



Photo 7: The RMOW's Development Permit Areas help protective sensitive ecosystems from development.

Community Wildfire Resiliency Plan (2022)⁷

The RMOW has a long history of wildfire planning initiatives. The first wildfire plan was developed in 2005 and updated in 2011. A Wildfire Protection Strategy was developed in 2017 and most recently in 2022, the Community Wildfire Resiliency Plan (CWRP) was adopted. This strategic document analyzes the wildfire risk within and surrounding the community and recommends actions to mitigate this risk and make the community more resilient to wildfire events in the future. Operational treatments of forest interface areas have been ongoing and include the treatment of forests in the Cheakamus Community Forest, on Whistler-Blackcomb-managed terrain, and on municipal lands including areas along the Valley Trail.

Wildfire Protection Development Permit Area (OCP 2022)⁸

All areas identified as being at moderate to high risk from wildfire and all wildland areas are included within this Development Permit Area. Guidelines are provided for treating forested areas to reduce their fire behaviour potential and for development with fire-resistant building materials and landscaping.

Environmental Protection Bylaw No. 2000 (2012)⁹

This bylaw protects streams and trees and helps to manage invasive species. It is consistent with and helps to support the guidelines in the riparian and sensitive ecosystems DPAs. The protection of streams focuses on preventing pollution into streams. This bylaw prohibits the planting of invasive species and allows the RMOW to require their removal. The process for protecting riparian areas is also specified in this bylaw.



Photo 8: The RMOW has a variety of legislative tools to protect the environment.

Invasive Species Management Plan (2014)¹⁰

This plan outlines the RMOW's regionally integrated plan for managing invasive species. It directs actions to prevent and manage the spread of invasive plants and animals to reduce their impacts on the natural environment. The key objectives of the plan fall under four categories: education and outreach, regional collaboration, policy and legislation, and practical management of invasive species within RMOW. The RMOW closely collaborates with the Sea to Sky Invasive Species Council to prevent, eradicate, contain, and strategically control invasive species in the Sea to Sky region..

Pest Management Policy and Integrated Pest Management Framework (2022)

This policy applies to properties owned by the RMOW. It prohibits the use of first or second-generation anti-coagulant rodenticides or other regulated substances for pest management. It is recognized that these products are necessary for certain circumstances and allows for their use with a permit through the RMOW. This policy states that the RMOW discourages the use of these products on all other properties but does not currently regulate it.

Pesticide Use Regulation Bylaw No. 1822, 2007¹¹

This bylaw prohibits the application of use of pesticides on private or public lands for cosmetic purposes within the RMOW. Reducing toxins throughout the community continues to be a priority in Whistler.

Green Building Policy¹²

This policy was originally adopted in 2008. The updated policy was adopted by RMOW Council in 2022. The Green Building Policy provides guidelines and requirements for rezoning projects. It focuses on achieving the goals for sustainability and climate change within the Big Moves Climate Action Implementation Plan and the OCP. This policy addresses the design, construction, and operations of buildings and landscaping. The policy will also be used as a tool to assess the sustainable features of Development Permit applications, as well as Building Permit applications for single-family homes over 465 square metres. Requirements related to biodiversity are mostly addressed within the section on sustainable site design. The policy aims to prevent habitat fragmentation, destruction, pollution, and the introduction of invasive species. Guidelines aim to avoid disturbing existing natural plant communities and trees and to incorporate naturoscaping in landscape design.



Photo 9: The control of invasive species is important for maintaining healthy ecosystems in high-use areas.

Summary of Existing Programs to Understand and Monitor the Natural Environment

The RMOW recognizes that its developed footprint within the valley bottom has damaged and may continue to threaten some of RMOW's most biodiverse and sensitive natural areas. The RMOW has committed to monitoring its impact on the natural environment and to take measures to minimize those impacts. The RMOW monitors environmental indicators including water quality, sensitive ecosystems, key local species and species at risk. This is done through studies sponsored by the RMOW as well as a dedicated community of volunteers. The following is a summary of some of the most prominent of these studies and programs.

Identifying Species and Habitat Priorities for Biodiversity Conservation

In 2018, the RMOW began the work of identifying its most important priority habitat areas. The report "Species and Habitat Priorities for Biodiversity Conservation in the Resort Municipality of Whistler"¹³ (2018) defines and maps what were then identified as RMOW's most important priority habitats, key local species and their habitats. This Priority Habitat identification process began by considering 105 species at risk and twelve species of local concern. Of these, eight species were chosen by a working

group as priority species and eleven ecosystems at risk were identified. A total of nineteen habitat types were mapped that are either essential for these priority species or contained ecosystems at risk. These habitat types were given a priority score based on the number of species at risk, ecosystems at risk, and species of local concern. Habitat types providing the highest value included old-growth and older mature forests, as well as those associated with water including rivers, lakes, wetlands, riparian areas, and forested floodplains.

A series of maps were produced to illustrate these priority habitat areas, including a summary map which displays a synthesis of these areas together. Wetter ecosystems along the valley bottom were identified as some of Whistler's highest-value priority habitats. These areas are generally closest to existing and planned development areas and are at the greatest risk of harm.

Several priority habitats identified through this process are identified and in part protected by the OCP through the Riparian Ecosystem Protection Development Permit Area and the Protection of Sensitive Ecosystems Development Permit Area. The RMOW has designated most of its undeveloped land outside of the RMOW Urban Development Containment Area (WUDCA) and many areas within the WUDCA as part of the Sensitive Ecosystems DPA.

The RMOW now aims to refine the definitions of what are considered Whistler's Priority Habitats. The current work will expand on the work that was published in initial 2018 report. The 2018 Priority Habitat criteria will be reviewed and re-defined, with new mapping generated to identify where these Priority Habitats exist.

RMOW Ecosystems Monitoring Program

Since 2013, the RMOW has been conducting an annual comprehensive Ecosystems and Species Monitoring Program to track and assess the health of key species and other habitat and biodiversity indicators in Whistler. This program aims to monitor the health of ecosystems over time through ecological indicators, to help guide the conservation of species and habitat, and inform more sustainable land use planning and management in Whistler.

An annual report summarizes data results regarding the following current terrestrial and aquatic ecosystem indicators:

- Coastal-tailed frogs (tadpoles detected in multi-creek sampling)
- Beavers (numbers/locations of lodges, extrapolated for population estimate)
- Beaver-affected wetlands
- Northern goshawks (number/location of active nests)
- Stream water temperature (sampled across multiple creeks)
- Benthic invertebrates (sampled across multiple creeks)
- Alta Lake ice on/ice off dates
- Fish habitat assessments (multiple creeks)
- Kokanee salmon and rainbow trout (spawning data on multiple waterways)

Invasive Species Management

The RMOW has an Invasive Species Management Plan (2014) that guides the municipality's overall approach to managing invasive species in Whistler. Central to this plan is the collaboration between the RMOW and the Sea to Sky Invasive Species Council (SSISC) to prevent, eradicate, contain, and strategically control invasive species in Whistler. A fee for service funding agreements exists between the RMOW and SSISC, which directs treatment priorities, training and other collaboration. SSISC's work is guided by their Regional Strategy and the priority list for the Whistler Invasive Species Management Area. SSISC also carries out invasive species management on other jurisdictions within the RMOW under funding agreements with other partners such as the Ministry of Transportation and Infrastructure, BC Hydro and Innergex.

The Whistler Biodiversity Project

The Whistler Biodiversity Project was started in 2004 by local ecologist Bob Brett of Snowline Ecological Research. This project documents the multitude of species that inhabit Whistler. This data comes from volunteer scientists as well as the annual BioBlitz and Fungus Among Us community events. In 2020, the total number of species confirmed within the RMOW area was 4,497 including plants, mosses, lichens, fungi, dragonflies and damselflies, butterflies, amphibians, and reptiles. The proportion of species identified by taxa from this project illustrates the importance of species that are typically not noticed or seen by the public. This includes insects (~1/4 of the species inventoried), and lichens and fungi which together make up about 1/3 of the species inventoried. Furthermore, a list of species and ecosystems at risk is produced for the community annually as part of the RMOW's environmental monitoring efforts. As of December 2022, it was reported that 153 species at risk were confirmed as resident, seasonal, or likely within the RMOW, with an additional 34 species at risk deemed as possible.

Whistler Biodiversity Project

Number of species documented by taxa in 2020

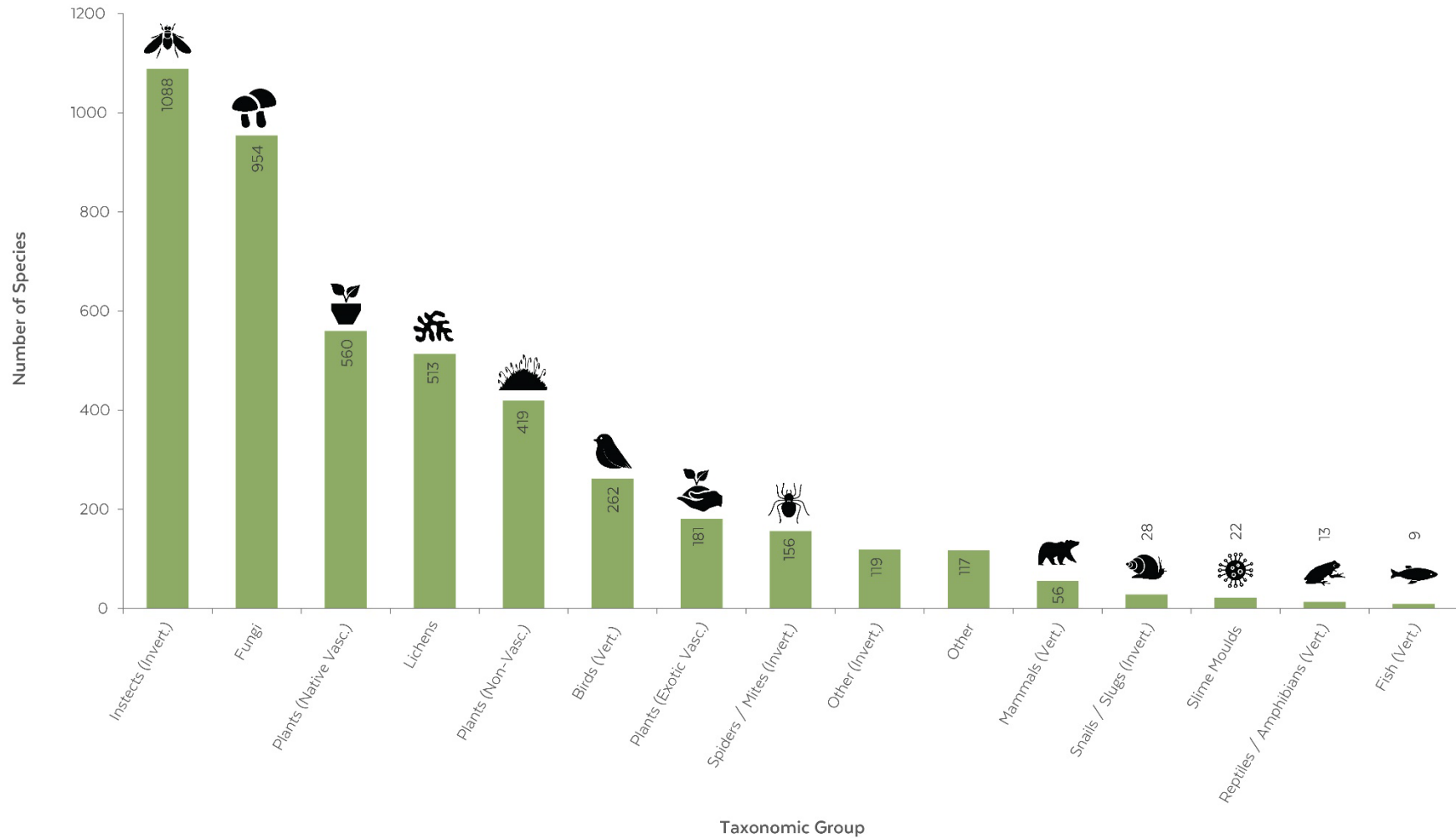


Figure 1: Number of species identified in 2020 as part of the RMOW Biodiversity Project.¹⁴

RMOW Lakes Monitoring

Five prominent lakes exist along Whistler's valley floor: Alpha, Alta, Green, Lost and Nita. These lakes range from 0.1 km² to 1.9 km² in area, with average depths between 4 m and 14 m and maximum depths reaching 40 m. These lakes provide valuable habitat for both aquatic and terrestrial species. They are also used extensively for recreation, play a role in managing floodwater, and provide access to water to the community.

The RMOW has a monitoring program that collects data from 1 lake per year and rotates through all 5 Whistler lakes. The program involves a full water chemistry analysis of both the epilimnion and hypolimnion twice per year, during spring turnover and in late summer. A series of Secchi depth measurements and depth profiles are collected throughout the ice-free period. Depth profiles include dissolved oxygen, temperature, turbidity, pH, and conductivity. Data collected through the RMOW lakes monitoring program has been standardized with the provincial program and is shared with the BC Lakes Stewardship Society (BCLSS) and the Province. All major beaches are also tested for fecal coliform on a weekly basis through the summer months. This is done on the beaches found in Lost, Alta, and Alpha Lakes.

The Whistler Lakes Conservation Association (WLCA) is a volunteer organization created in 2020 that monitors the health of some lakes in the RMOW. WLCA's mandate is to promote and practice conservation and environmental protection of RMOW's lakes. Most lakes have a Level 1 monitoring program which tracks water temperature, air temperature, Secchi depth, and weather conditions. They also record ice-on and ice-off dates and submit this data to the IceWatch program. The Alta Lake and Lost Lake areas are also assessed to understand dissolved oxygen and temperature profiles. This provides an understanding of lake dynamics and their ability to support healthy populations of fish and other aquatic species.



Photo 10: The health of local lakes are monitored by the RMOW and the Whistler Lakes Conservation Association.

RMOW Bear Smart Programs

RMOW has been engaged in proactive initiatives to reduce and prevent human-bear conflicts since 1995. Several initiatives over the years have created a strong culture and awareness of bear safety in the community. In 2009, a Human-Bear Conflict Management Plan was created for the RMOW, which formed the basis of RMOW's application to the Ministry of Environment for becoming a Bear Smart Community. This designation was granted in 2011 and it recognizes RMOW's commitment to addressing the root causes of human-bear conflict and thereby reducing the risks to human and bear safety.

Updates to RMOW's Human-Bear Conflict Management Plan were made in 2016 to update the mitigation actions that had been completed and to develop a list of guiding actions for the next five years. Twenty-five actions over four categories – infrastructure, planning and policy, public education, and partnerships – continue to guide the RMOW and partner organizations' efforts to reduce human-bear conflicts today.

The RMOW also has a RMOW Bear Advisory Committee of Council which meets monthly to discuss updates and issues regarding bear safety across the RMOW. The mandate of this committee is to support ongoing public education to reduce human-bear conflict.

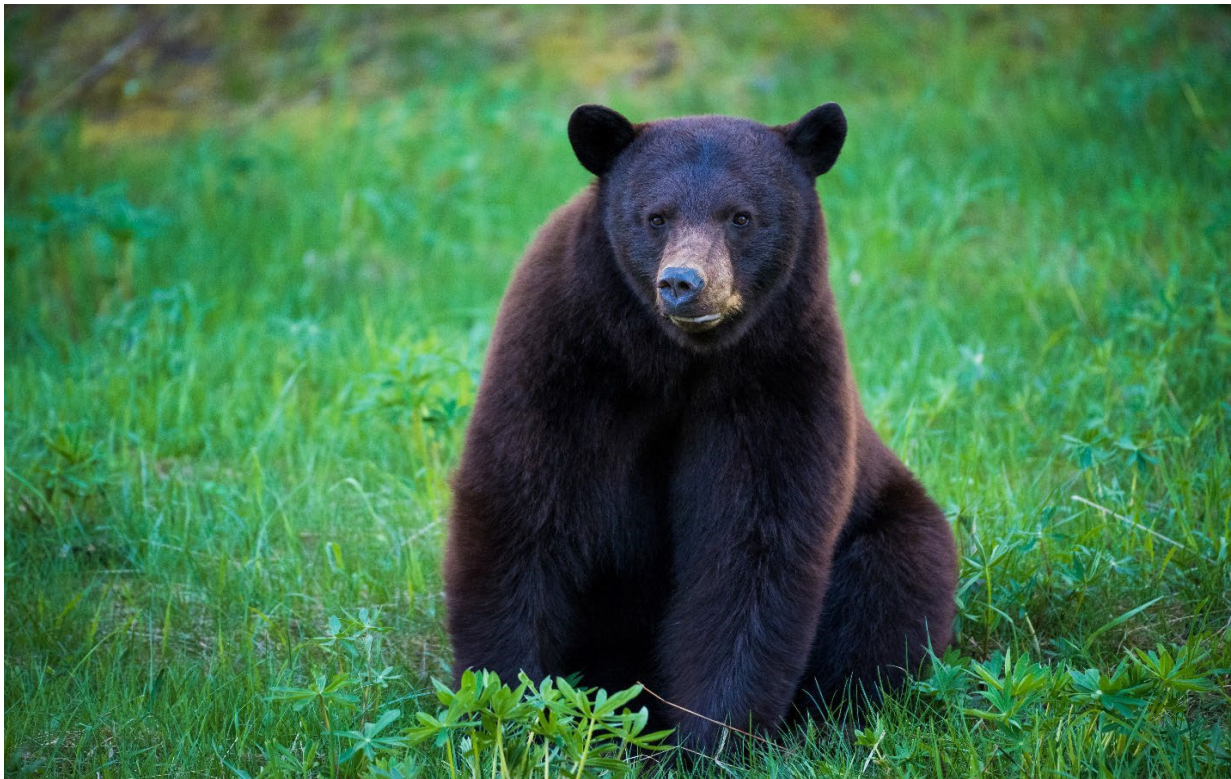


Photo 11: Bear conflicts are monitored closely by the RMOW.

RMOW Human-Grizzly Bear Conflict Mitigation Plan¹⁵

In 2014, RMOW Council passed a resolution to support the recovery of the Grizzly bear populations in BC. The RMOW's Human-Grizzly Bear Conflict Mitigation Plan was developed after a series of human-Grizzly interactions that resulted in trail closures in 2018. This plan guides decision-making to minimize impacts on Grizzly bears and their habitat with respect to the management of recreational hiking and biking trails. It also provides guidelines for communicating with the public in the event of Grizzly bear presence in the Mount Sproatt and Rainbow Mountain alpine areas.

The Mount Sproatt and Rainbow Mountain alpine areas encompass the Squamish-Lillooet Grizzly bear population unit (GBPU) – one of five threatened GBPU in the South Coast region, and experience year-round use from over 10,000 hikers and mountain bikers, in addition to an unknown number of backcountry skiers, and snowmobilers. The 59 known Grizzlies in this GBPU are commonly found in the headwaters of remote valleys where their habitat is more secure. These include the Ryan River, the undeveloped headwaters of Callaghan Creek, and the Soo, Elaho, Ashlu, and Tzoonie Rivers.¹⁶ This species migrates with the seasons to forage, which increases the likelihood of human-Grizzly conflict in the Whistler area. Whistler's Human-Grizzly Bear Conflict Mitigation Plan provides overarching objectives and key recommendations for ensuring the sustainability of this Grizzly bear population, the longevity of these trails, and the safety of users.

Municipal Natural Assets Inventory¹⁷

Whistler's municipal inventory of natural assets was prepared following the standard adopted by the Municipal Natural Assets Initiative. All natural areas are classified and rated on their condition. The inventory also identifies threats to the health and functioning of these natural areas. The inventory provides a system for accounting and valuing natural areas as assets so that they can be incorporated into the RMOW's financial program. A municipal natural assets management roadmap has recently been developed. The next steps of this project include the valuation of infrastructure services and a risk assessment for these assets.



Photo 12: Wetlands are an important natural asset in Whistler.

The Current State of Whistler’s Natural Areas

Whistler is located within a transition zone from the wetter and milder coastal ecosystems to the interior which tends to be drier, hotter, and with longer winters. The Whistler area provides the habitat characteristics of both regions, which is why the species it supports are so diverse. The topography of this mountainous region largely dictates the types of habitats that exist.

Whistler is situated in a deep valley surrounded by high alpine mountains. Water drains off these mountains and collects in valley bottoms where a complex of rivers, lakes, and wetlands have developed. All living creatures require water to survive, and these lowland areas provide habitat for a high number of both aquatic and terrestrial species. These areas have collected nutrients from the surrounding landscape and resulted in ecosystems that are both rich and wet and support lush forests and ground vegetation communities. Dense protective cover and abundant forage support many terrestrial species. Trees include a mix of large conifers and deciduous species. The mosaic of lakes, rivers, and wetlands provide habitat for many fish and amphibians. These wet and rich ecosystems exist along the valley bottom where pressures from urbanization are the greatest. It is estimated that ~72% of the wetlands that once existed along the valley bottom have been lost to development (McBlane, 2007).

There is a distinct transition from the rich and lush valley bottoms to the adjacent mountain slopes. The valley was formed by glaciers which scoured this landscape. Many areas are characterized by broken terrain of bedrock outcrops and colluvial boulders with thin soils. The ecology in many of these areas is dry and nutrient-poor which contrasts with the rich and wet valley bottoms. There are, however, flat benches and depressions along these mountainside slopes where soils have been deposited and provide sites with richer growing environments. Smaller lakes and wetlands have formed on these valley slopes in depressed areas and provide valuable water sources for birds and mammals, as well as habitat for a variety of amphibians and insects.

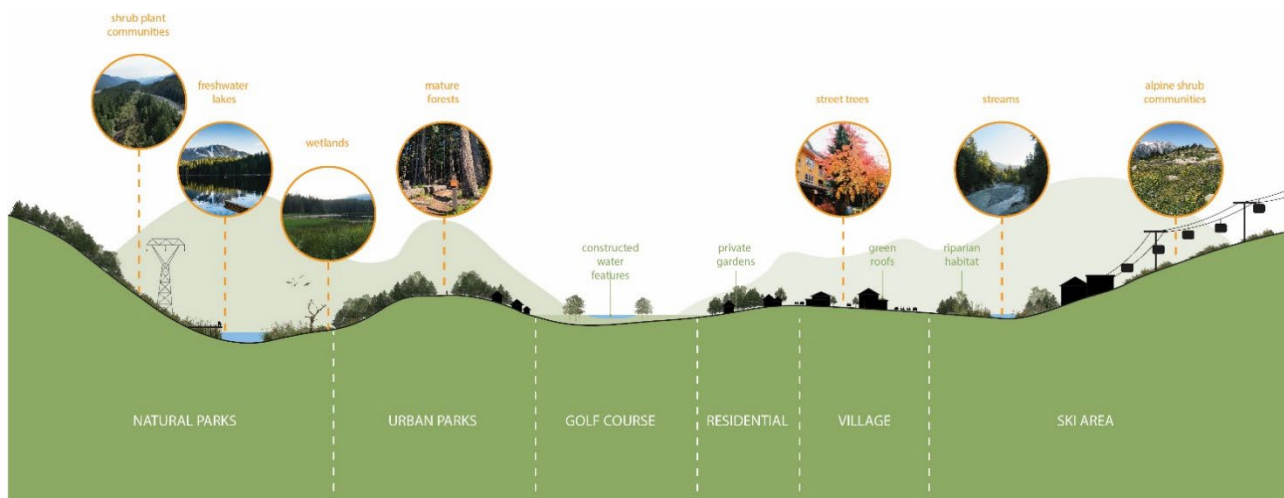


Figure 2: Land use types and components of biodiversity in Whistler

Most low-elevation forests in the RMOW have been logged over the last 80 years. What remains today are mostly second-growth stands characterized by similar-aged trees. There are some old-growth stands (>250 years old) and single old-growth trees that remain. Some trees in Whistler are documented as being over 1200 years old and are considered ancient. Many of these remaining old-growth trees are not large in size and can be easily mistaken for younger second-growth.



Photo 13: Forests are dominated by second growth stands.

The mountains that frame the Whistler valley extend well above the tree line. These alpine areas have short growing seasons and a harsh growing environment. Only a small number of shrubs, herbs, and lichens are adapted for the challenging growing conditions of the true alpine. These areas are covered by snow or ice for much of the year, are subject to strong winds, and have very thin or non-existent soils. At these higher altitudes, smaller and hardier subalpine species dominate the landscape. These patches of forests are distinguished by trees with long, slender crowns and dense understory vegetation. Most are old-growth stands that have never been logged.

High precipitation and spring snowmelt feed the soils in this ecosystem which support high levels of biodiversity and the growth of long-lived species including yellow cedar. These subalpine ecosystems are adapted to the harsher conditions of these altitudes; trees grow slowly and have short branches to compensate for snow weight, and wildflowers bloom quickly after emergence to have the best chance of being pollinated. These ecosystems also provide important habitat for at-risk Grizzly bears. They are remote and hard to access making them some of the least disturbed natural areas in Whistler.



Photo 14: Alpine ecosystems away from the resort operations are natural and have experienced little disturbance.

The mountain areas that form the Whistler Blackcomb Mountain Resort contain a mosaic of treed areas, thinned stands, and shrub communities where ski runs and trails for hiking and mountain biking have been established. Some of these cleared areas are dominated by non-native grasses that were seeded in to manage erosion on these slopes. The active parts of the mountain provide a mix of valuable habitat types including dense forage areas as well as protected treed habitat. These are, however, fragmented by ski lifts, underground utility service corridors, roads and trails, supporting structures and lodges. In the winter and summer, large numbers of visitors visit the area which can impact species that are less tolerant of human presence.

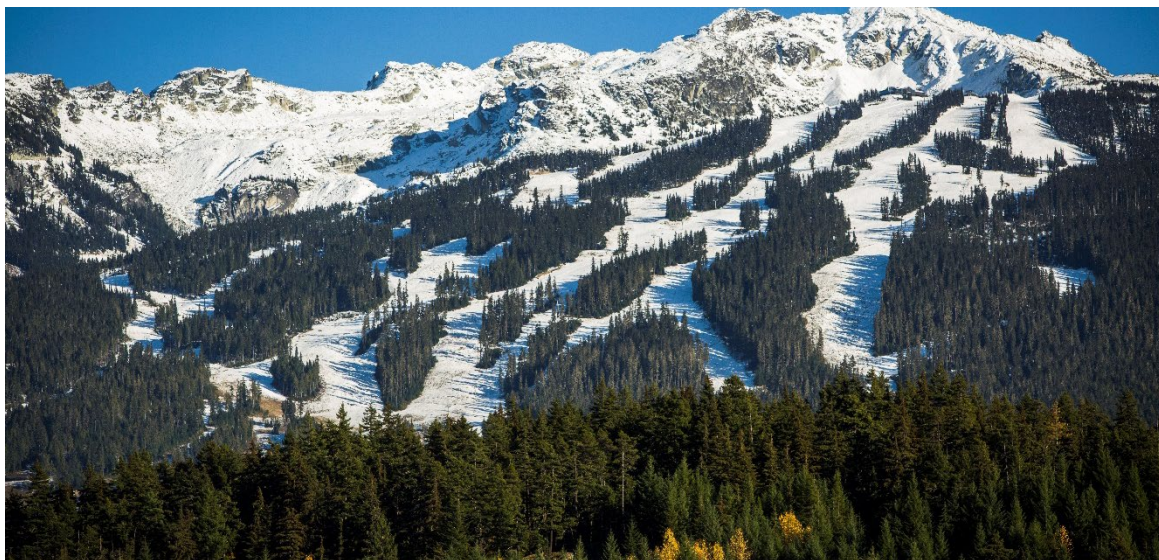


Photo 15: On the ski hill, habitat is fragmented by ski lifts, roads and trails, supporting structures and lodges.

Within Whistler, there are semi-natural habitats found across the valley bottom, which include active park areas and golf courses. These facilities see high recreation use and provide fragmented habitat areas with altered pockets of mature trees, wetlands, ponds, and shrub communities.

The urbanized areas of the RMOW include the dense core Village area, Creekside and Function Junction, as well as a diversity of residential developments including townhouses, high-density buildings, and single-family homes. The amount of development that has been allowed in Whistler has been carefully managed to protect the natural environment. This has been done through a suite of growth policies include enforcement of the Whistler Urban Development Containment Areas (WUDCA).

The habitats associated with these areas and many of RMOW's neighbourhoods are adjacent to or woven into forests and other natural landscapes, often altered from a fully natural state. Features such as the trees that have been retained and planted, landscaped areas, open ditches, and stormwater ponds provide additional habitat and are used by native and also invasive species that are more tolerant of human presence.



Photo 16: Cheakamus crossing is a relatively new subdivision in Whistler, developed as a housing legacy from the 2010 Olympic and Paralympic Winter Games.

The Cheakamus Community Forest

The Cheakamus Community Forest (CCF) was formed in 2009. The CCF includes a large area within the RMOW and is administered by the Cheakamus Community Forest Society. The RMOW is a partner in the CCF along with the Lil'wat Nation and Squamish Nation. The mission of the CCF is to manage the community forest collaboratively and sustainably for the benefit of all of the community.

Sensitive environmental areas are recognized and managed by the CCF. Rare and unique forest ecosystems have been identified and mapped. Old Growth Management Areas and Ecosystem-Based Management Reserves are protected from logging for ecological, cultural, or recreational purposes. As of 2022, there is a temporary moratorium on harvesting old-growth trees in the tenure. An ecosystem-based management plan for harvesting the CCF was developed that specifies measures to try to reduce impacts on high-value habitat areas while continuing forest operations, timber production and other partner interests. The CCF's management of the forest involves a significant reduction in harvesting from historical levels, with decisions made locally.

The CCF collaborates with the RMOW to support the Community Wildfire Resiliency Plan. The CCF harvests fuel treatment areas that will thin out linear bands of forest to reduce their fire behaviour potential. To better understand the effects that harvesting and thinning operations are having on biodiversity, the CCF is initiating a monitoring program. This will help the CCF and the RMOW make more informed decisions on harvesting practices.

The CCF works closely with the Whistler Off-Road Cycling Association (WORCA) and other backcountry recreation organizations including commercial operators to facilitate access through the network of forest roads and to minimize potential impacts of harvesting on backcountry recreation.

Timber harvesting began at the turn of the last century. It was most intense between 1930 and 1980 and focused at first on the lower elevation areas that had the largest trees and were easiest to access.

Provincial Vegetation Resource Inventory¹⁸ data was analysed to understand the types of forests remain in Whistler. It was found that most of the forests that remain within the urban development containment area are second-growth stands that regenerated after the original old growth was cut. About half are considered young forest types (<80 years old). Only 9% of the stands within the WUDCA are mapped as old growth (older than 250 years). There are very old trees that remain and are estimated as being over 1000 years old. These are considered ancient trees. An inventory of these ancient trees has not been developed.

Most of the old growth that remains in lower elevations are over 300 years old. There are also individual old growth trees that remain intermixed with second growth stands. Some are small in size but can be up to 600 years old. The oldest trees documented are in the subalpine forests where many of the yellow cedar trees are over 600 years old. The oldest yellow cedar tree that has been documented to date is over 1200 years old.¹⁹

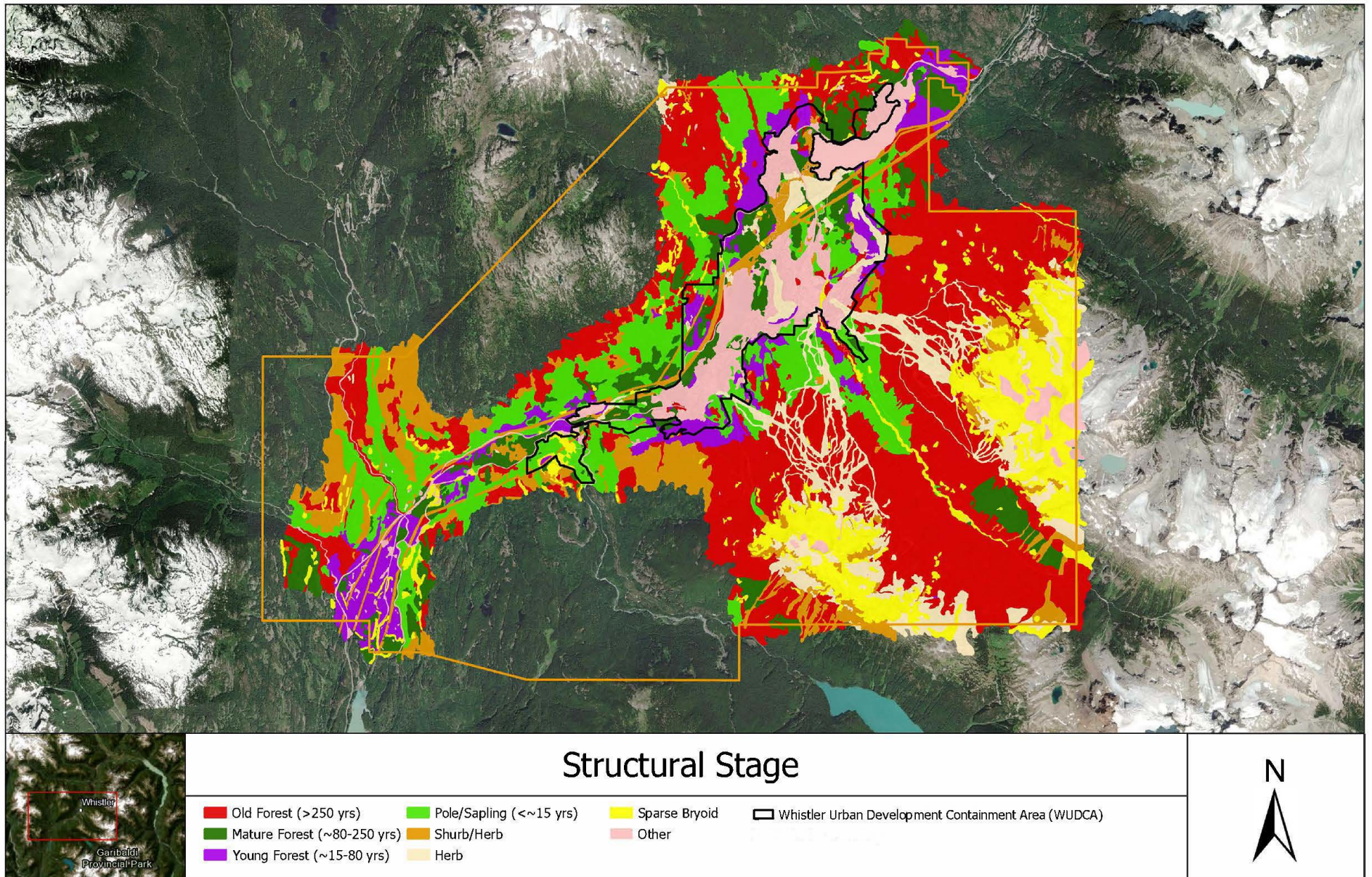


Figure 3: Forest structural stage within 3 km of the urban containment boundary.²⁰ In some areas, mapping is not available.

Light Detection and Ranging (LiDAR) was used to determine tree heights throughout RMOW. Trees that are greater than 60 m in height are identified in Figure 4. The tallest tree was identified in the Brandywine Falls Provincial Park located just outside of the southern municipal boundary and measures 71 m tall. Douglas-firs are British Columbia's tallest-growing tree and likely make up many of the tallest trees in RMOW. These Douglas-firs are also likely among the oldest in the region, found in valley basins where water and nutrients collect and form an ideal growing environment. The RMOW is also home to some ancient yellow cedar trees. Black cottonwood trees are also fast-growing trees that reach tall heights. In wet ecosystems along the valley bottom, many of the identified tall trees are likely black cottonwoods.



Photo 17: Large trees can be found in forested sites throughout the Valley bottom

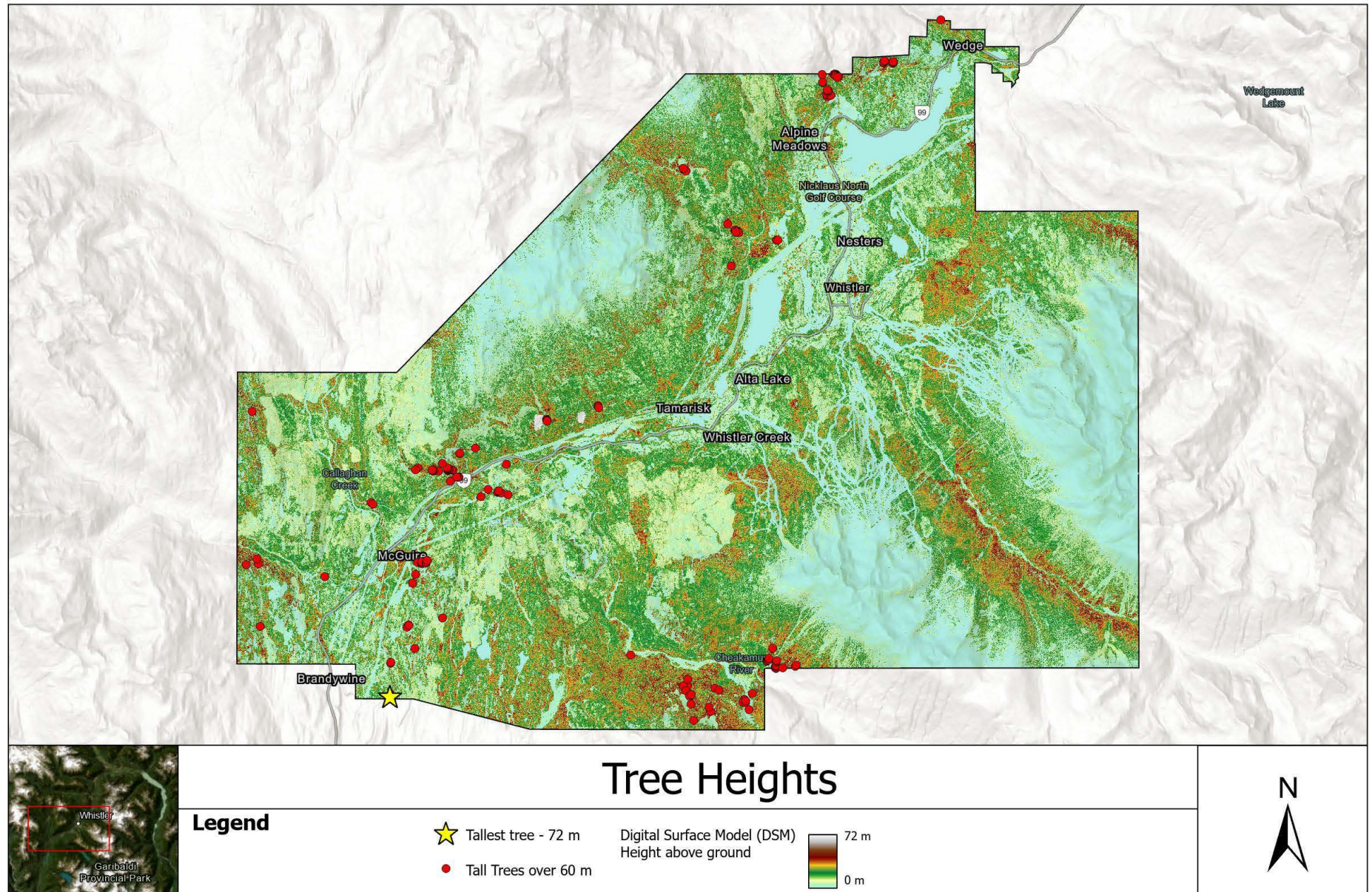


Figure 4: Tree heights across Whistler including individual trees that are greater than 60m tall (Derived from LiDAR).

What are Priority Habitats?

Priority Habitats is a term that has been adopted by the RMOW to identify the natural areas that are most important to conserve local biodiversity. Priority habitats were first identified in 2018 through a detailed analysis of the species at risk that inhabit the RMOW and the habitats that they require to survive (Brett et al. 2018). The priority habitats currently include wet ecosystem types and those associated with water such as lakes, wetlands, streams, riparian areas, cottonwood stands and forested floodplains. Old-growth forests (>250 years old) are considered priority habitats as well as “core forest habitat” which are continuous areas of mature forest that are recruitment sites to evolve into old-growth stands. All known ecosystems at risk are considered priority habitats to be protected. Nine maps were produced to illustrate these priority habitat areas and a tenth summary map provides a synthesis of these nine areas together, displaying their ranking based on how they overlap (Figure 5).



Photo 18: Priority habitat includes the significant lakes found along the valley bottom.

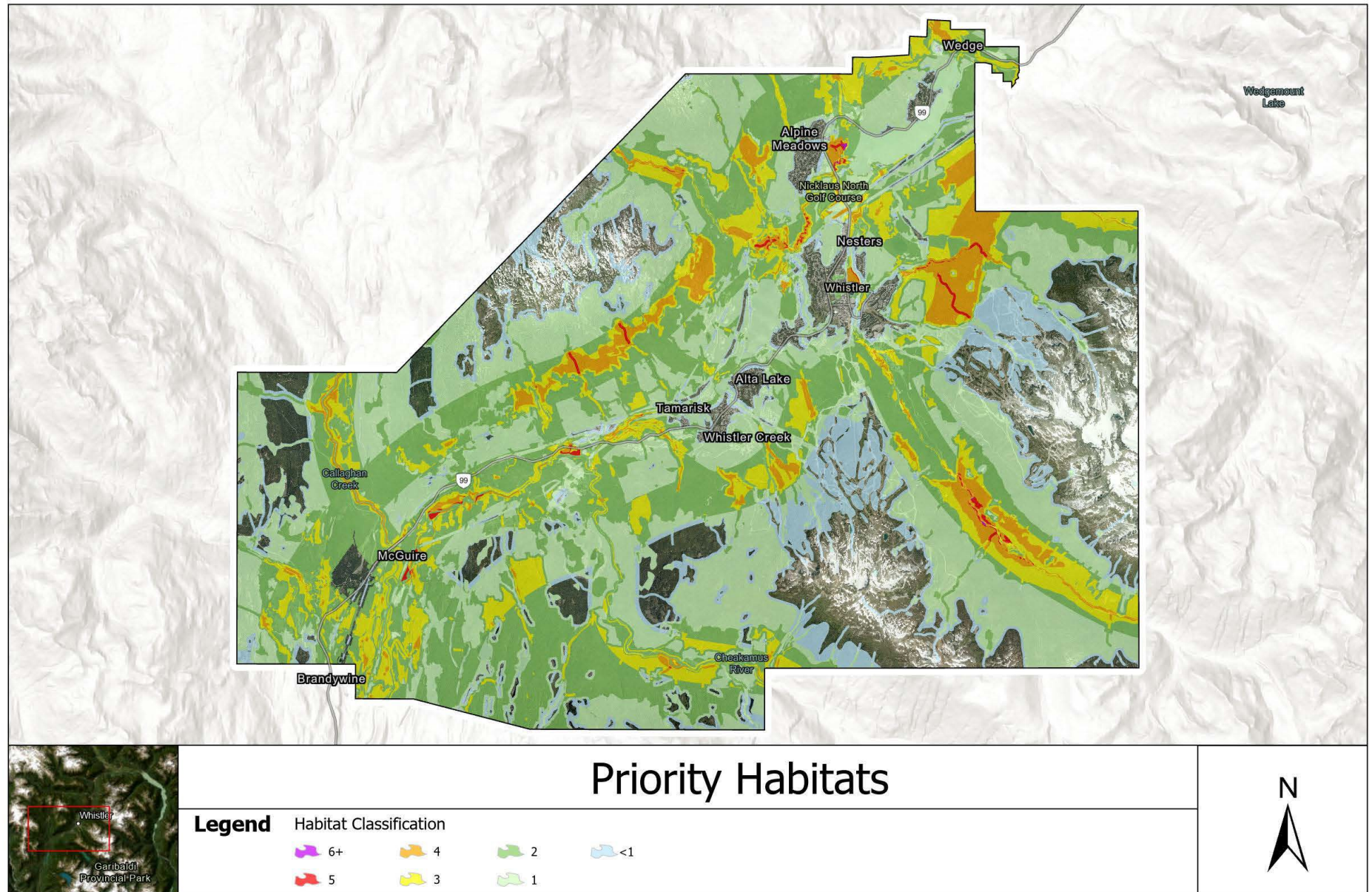


Figure 5: Synthesis map illustrating where the identified critical habitats overlap. (Brett et al. 2018).

There are currently some inconsistencies in the terminology used for priority habitat areas within RMOW policy and its GIS layers. The environmental DPAs and OCP use the terminology “Sensitive Ecosystems” instead of “priority habitats”. The OCP defines sensitive ecosystems as “a rare, ecologically fragile or at-risk ecosystem including species at risk habitat and ecological communities at risk.” The sensitive ecosystems DPA identifies seven ecosystem types that are mapped and protected through land use and development planning. The ecosystem types that have the same or similar definition as the priority habitats defined by Brett et al. 2018 include ecosystems at risk, core forest habitat, CHW forest which are old-growth stands, cottonwoods and forested floodplains.

There are some differences between the RMOW’s definitions of Sensitive Ecosystems and Priority Habitats. Sensitive Ecosystems protected through RMOW policy that are not specifically recognized as Priority Habitats include species at risk habitat and raptor nesting sites. Priority Habitats that are not consistently identified as Sensitive Ecosystems include connectivity corridors, wetlands and riparian areas, although these latter two habitat types are protected by the RMOW’s Riparian DPA.

The RMOW GIS data and public mapping refers to Priority Habitats as they are defined in the 2018 report “Species and Habitat Priority for Biodiversity Conservation”. This term is also referred to in the terms of reference provided to landowners and QEPs when planning new development.

The inconsistencies in how Priority Habitats are defined within RMOW policy, previous studies and the GIS mapping layers can cause confusion among staff and the public as to what areas are and should be prioritized for protection and restoration.

In this Framework, the terminology Priority Habitats refers to the natural areas defined in Species and Habitat Priorities for Biodiversity Conservation in the Resort Municipality of Whistler²¹ as well as those identified for protection in the Sensitive Ecosystems DPA. It includes all areas that are considered critical for supporting the diversity of species that inhabit the RMOW including species at risk. One of the recommendations in this Framework is to align the terminology used to describe sensitive ecosystems and priority habitats to improve clarity.

Defining Priority Habitats

The following is the criteria proposed to be used to define priority habitats. This will be explored in more detail in the next phase of planning as the RMOW refines the definitions, criteria and mapping of priority habitats building upon the 2018 “Species and Habitat Priority for Biodiversity Conservation” report. These should be defined in more detail and adopted as development planning policy and GIS planning layers are updated.

Water features and their riparian areas

All living creatures require water to survive. Areas where water flows and collects, provide critical access to this resource for both aquatic and terrestrial species. Water features include all areas where there is standing or flowing water. They also include areas with seasonal flooding, high water tables, and

wetlands. The interface of these water features with the terrestrial environment is known as the riparian area. Water features and their riparian areas are known to support some of the highest levels of biodiversity in a given environment.

The water feature categories defined by the 2018 report “Species and Habitat Priority for Biodiversity Conservation” include Large and Old Cottonwoods, Forested Floodplains, Lakes, Rivers Creeks and Riparian, and Wetlands. All features defined in the Protection of Riparian Ecosystems and Protection of Sensitive Ecosystems DPAs are considered priority habitats. These include areas defined as Cottonwoods and Forested Floodplain. All water features and their riparian areas are considered priority habitats and will be protected by the highest standards possible. The restoration of these features and their connectivity to each other is a priority for the RMOW.

The water features that are included in the definition of Priority Habitats include:

- **All natural bodies of water including those that are permanent and seasonal as well as those that are connected or disconnected from other water bodies.**
- **Human constructed features that convey water and flow into natural bodies of water**
- **Standing bodies of water of all sizes including lakes and ponds**
- **All wetlands including swamps, marshes and fens**
- **Terrestrial area that are seasonally flooded**



Photo 19: The Cheakamus River.

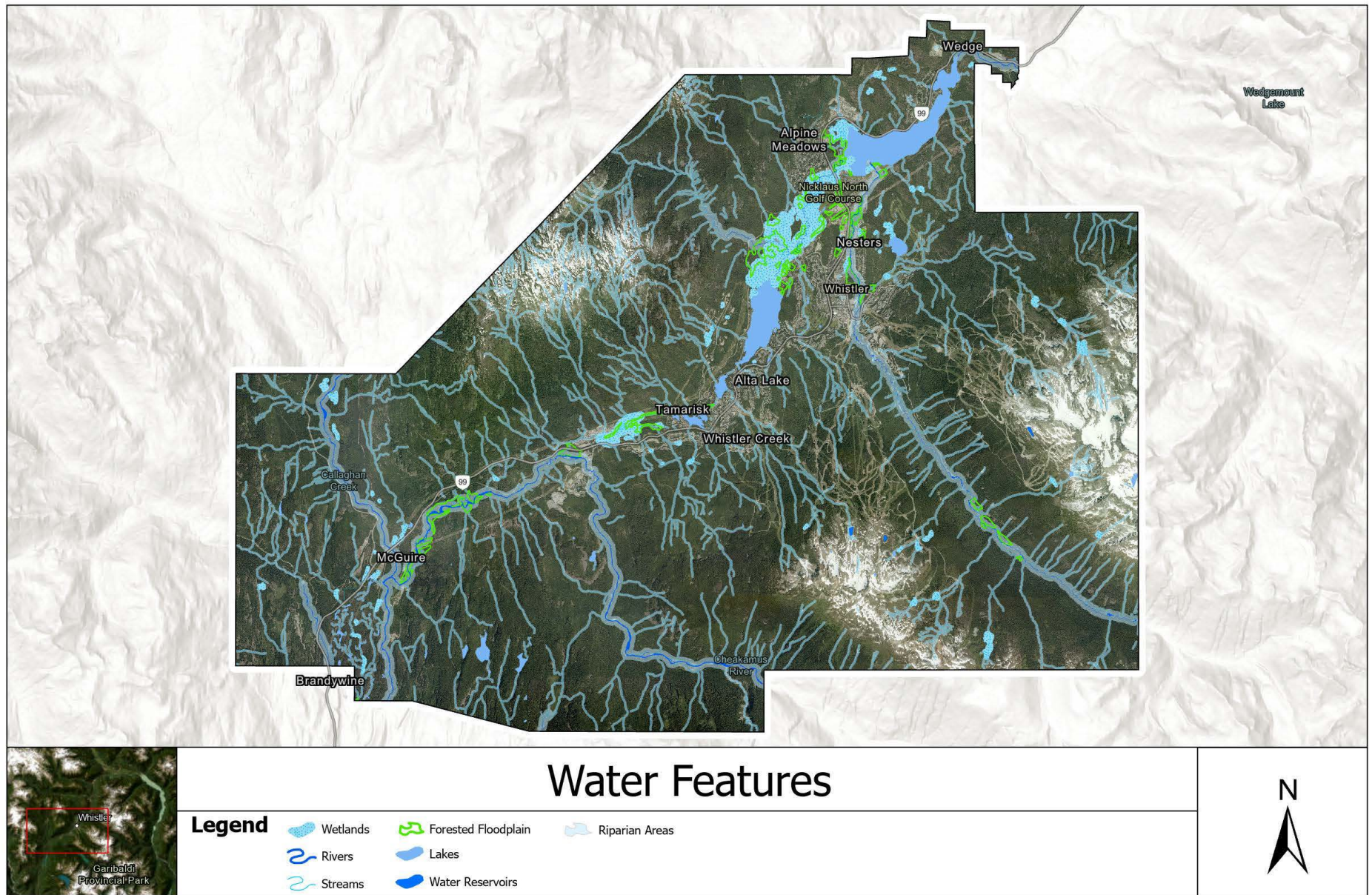


Figure 6: All water features and their riparian areas are considered priority habitats.

Mature and Old Forests

Most low-elevation forests in RMOW have been logged over the past century. What remains today are mostly second-growth stands characterized by similar-aged trees. Of the forests that remain within the urban containment boundary, about half are at young stages (<80 years old) of a forest's development and only 9% are considered old growth (>250 years old). Within the valley, some trees are estimated as being over 1000 years old and are considered ancient trees. Many old-growth trees growing on nutrient-poor sites are not large and can be easily mistaken as younger second-growth trees.

The categories defined by the 2018 report "Species and Habitat Priority for Biodiversity Conservation" includes CWH Old Forest and Core Forest Habitat. Features defined in the Protection of Sensitive Ecosystems DPAs include areas defined as Core Forest Habitat and CWH forest.

All old growth stands are considered Priority Habitats. They have reached a state of equilibrium in their successional pathways and contain high levels of ecological complexity. Trees of all ages are found across the layers of the forest canopy. Many of these trees provide unique habitat features that certain species at risk rely on. Dead standing wildlife trees are found at all stages of decay as well as an abundance of large organic debris across the forest floor. The understory plant community includes a variety of species which form dense ground cover and habitat for many species of both prey and predators.

Mature forests, defined as stands with trees ranging from 80 to 250 years old are also considered Priority Habitats. They are starting to express some of the important characteristics of old growth stands. They are important to protect as they are recruitment areas that will develop into old growth stands.

Forests that are included in the definition of Priority Habitats include:

- **Forests considered as old growth. This includes forests that include any trees greater than 250 years old. These old trees can be found growing intermixed with younger trees. These forests have a multistoried canopy with trees of all ages, canopy gaps, a well developed understory plant community, large dead standing trees and large woody debris across the forest floor.**
- **Forests considered as mature forests. These are generally older than 80 years. They have gone through natural thinning and include canopy gaps and small openings. The understory vegetation is well developed and there are shade tolerant trees that have established under the main canopy.**

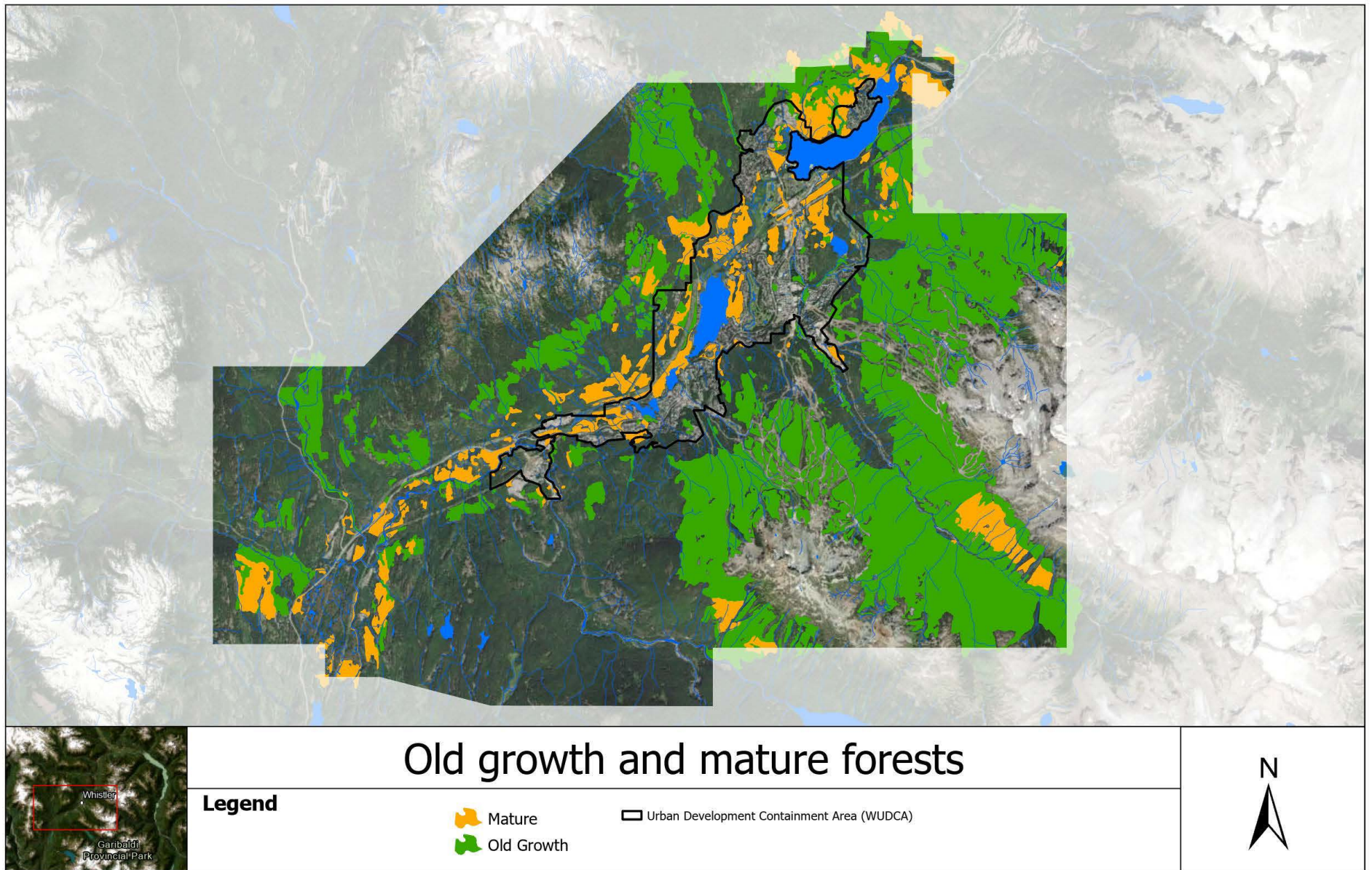


Figure 7: Old and mature forest stands are considered priority habitats.

Species and Ecosystems at Risk

A list of species and ecosystems at risk is produced for the RMOW annually as part of the Whistler Biodiversity Project. In 2022, 299 species at risk were assessed and grouped into classes based on their likelihood of inhabiting RMOW. It was reported that 75 of these species were confirmed, likely resident, or migratory within the RMOW. This represents 47% of the 159 species considered for this assessment. There were 4 red-listed species confirmed to inhabit the RMOW including two mosses a liverwort and the Northern Goshawk, *laingi* ssp. There were 40 blue-listed species confirmed and 19 ecosystems at risk. Of the blue-listed species, many were invertebrates, lichens, mosses and birds. Some examples of wildlife species are grizzly bear, mountain goat, wolverine, northern red-legged frog, bull-trout, green heron and great blue heron. The habitat required by a select number of species at risk was mapped as a part of the project “Identifying Species and Habitat Priorities for Biodiversity Conservation.”²²

Habitat areas that are known to support species or ecosystems at risk are considered “Priority Habitat.” These will change as the understanding of these species and what they required for survival improves. This is another aspect of Priority Habitat definition and criteria that could use refinement in terms of specific parameters and mapping.

Habitat areas required by species and ecosystems at risk and are considered Priority Habitats include:

- **Areas that provide habitat features critical for the survival of wildlife and plant species that are red or blue listed by the province of BC. This includes all species that are assessed by the Conservation data Center as extirpated, endangered, threatened, or special concern or that are legally designated under the federal Species at Risk Act.**
- **Ecological communities that are considered as extirpated, endangered or threatened by the Conservation data Center.**



Photo 20: The northern goshawk is a provincially blue-listed species found in Whistler.

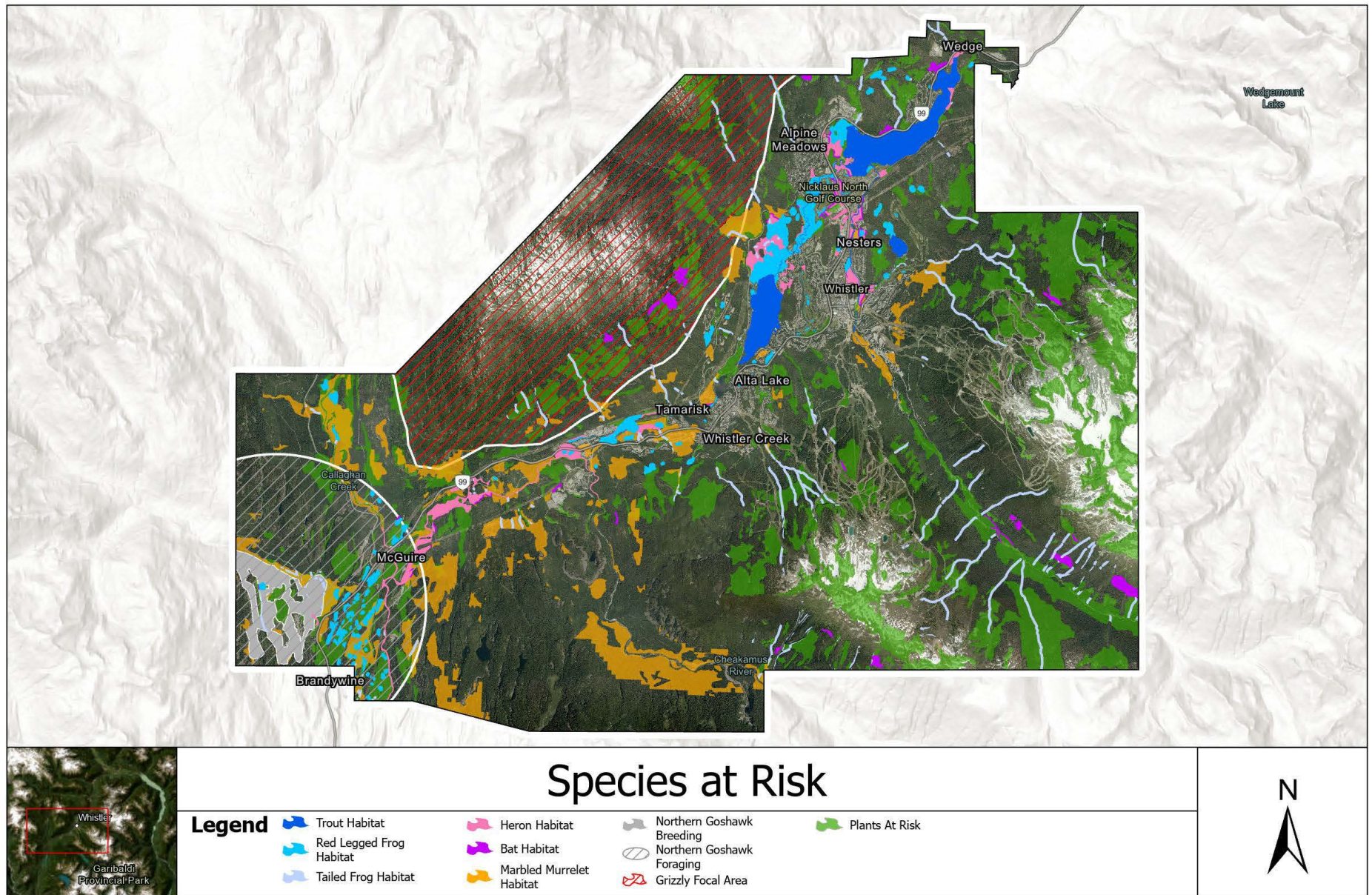


Figure 8: Critical habitat identified for supporting species at risk are considered priority habitats.²³

What Are the Threats to Priority Habitats and Biodiversity in Whistler?

Trees and plants grow and populations of wildlife species change in response to their environment, predators, and the availability of food and shelter. Impacts caused by pests, diseases, and abiotic influences such as windthrow and drought are normal and healthy agents of change in natural ecosystems. There are, however, some agents of change that are not natural. These include the direct impacts of urban development and recreation and the abiotic influences caused by our changing climate such as drought, flooding, and wildfire. There are also species of plants and animals that are not native to this region but that are establishing and out-competing our native species.

Some of these threats are directly or indirectly related to climate change. Modeling for Whistler predicts that with global warming there will be an increasing the number and intensity of rainfall events, summers that are longer, hotter with more intense periods of drought. Winters will be shorter and milder with less snow accumulations. These changes influence what types of plants and animals are able to survive. Some species will be extricated while others that are better adapted to the changing habitats will migrate here. Some natural events such as flooding and wildfire may be more frequent and could cause dramatic changes to the physical and natural landscape.²⁴ The following are some of the agents that threaten biodiversity in Whistler.

Drought

Drought was identified as a high-level risk for RMOW's five groundwater aquifers and 21-Mile Creek surface water supply in the RMOW's recent Natural Assets Inventory. Wetlands, lakes, and rivers absorb runoff surges, retain water for summer usage, and provide water during drought conditions. As summer droughts become longer and more pronounced, there is an increased risk of depleting water reserves to critical levels before they can be replenished.

Climate change is expected to increase the average annual temperature and the moisture deficit of RMOW by 3.1°C and 21% by 2100, respectively.²⁵ These changes will significantly reduce or eliminate the presence of moisture dependent species like black cottonwood, western redcedar, western hemlock, mountain hemlock, and amabilis fir, which compose much of RMOW's native forests. Subalpine ecosystems are especially prone to excessive heat and drought impacts as their habitable range is pressed between a warming valley and the rocky, inhospitable alpine zone. Changes to this ecosystem has impacts on the mammals, birds, insects, and vegetation that live in this zone as resources become scarcer. At lower elevations, the impacts of drought are already being seen in species that are less capable of adapting to these drier conditions. Western redcedar is already showing signs of stress on drier and well-drained sites throughout the region.

Flooding

There have been historical flooding events in Whistler which have caused extensive damage to natural areas and built infrastructure in the past. The highest risk of flooding in Whistler is caused by heavy rainfall events that melt snowpacks and cause river flows to quickly increase. Additionally, steep mountain slopes direct water down to the valley bottom where urban development is concentrated. The RMOW has installed engineered features such as dikes, pump stations, and flood boxes to relieve some of the impacts caused by these high flows. There are also structures along certain rivers to catch debris flows that can potentially block rivers and cause them to overflow. These features all require ongoing monitoring and maintenance. The RMOW has developed a flood forecast tool that helps determine what level of response is required for forecasted weather events.

Lowland areas of the valley have historically evolved and adapted to flooding events. The lakes, wetlands and floodplains in these areas absorb water accumulations and slow their flow into downstream rivers. The loss of these areas to land development along with climate change predictions of larger and more intense weather events will increase the risk of flooding in the RMOW.



Photo 21: Meadow creek wetlands at the south end of Green Lake.

Wildfire

There is generally a high wildfire risk in Whistler due to the extensive forested landscape and the interface between the forest and urban development, and significant backcountry uses in forested areas and the community's remote location. A Community Wildfire Resiliency Plan (CWPP) was developed for RMOW in 2022. This plan focuses on a one-kilometre area around the urban development containment area and provides action items to address wildfire risk in this area. The CWPP identified potential treatment units for future fuel management within the wildland-urban interface (WUI), which RMOW has been actively treating. RMOW has also adopted a Wildfire Development Permit area to ensure that new and re-development considers wildfire risk.

Whistler's ecosystems have evolved with wildfire as a natural disturbance agent throughout history. In the 20th century, fire and forest management practices have resulted in stands with accumulated fuels and elevated fire risk ratings across the WUI. The valley sides are generally steep with continuous conifer forests, which pose a moderate to high wildfire behaviour potential. The high-risk season for wildfire is during the summer, which is short but can be very dry and hot. Climate change trends predict that the summer season will extend, evidenced by longer dry spells and hotter summer days. This is predicted to increase the frequency of wildfires as well as their intensity.

The RMOW has been treating interface areas by thinning forests. This treatment involves cutting and removing woody debris from the forest floor, removing trees to reduce the density of conifers, and pruning lower branches on trees that are retained. This treatment reduces the fire behaviour potential in these stands. However, it also reduces the habitat value in these areas by removing cover and forage.



Photo 22: Wildfire is a natural disturbance mechanism of Whistler's ecosystems.

Forest harvesting and thinning to reduce wildfire risk

A large proportion of the forests in Whistler have been harvested for timber and are now younger second growth stands. The level of biodiversity in forests changes with their age. Immediately following harvesting light reaches the forest floor and allows a wide diversity of shrubs, herbs and trees to grow. This ground-based plant community supports high levels of biodiversity as it provides forage and ground cover for a diversity of species. Once tree crowns close and limit the light that reaches the forest floor, certain species can no longer survive. These young forests tend to have lower levels of biodiversity. They often consist of an even-aged layer of trees of similar species and low cover of ground vegetation. As these stands mature, they start to open up and become more structurally diverse and have a greater cover of ground vegetation. This process often does not start until these forests reach ages of about 80 years old. Over time, these forests continue to mature and develop into complex ecosystems with high variability of habitat structures.

Some forests in Whistler are being thinned and treated to reduce their wildfire behaviour potential. These include dense forests that are within the urban-wildland interface; often young forests with high densities of coniferous trees. Treatments include selectively thinning trees, pruning lower branches, and removing fallen trees and wood from the forest floor. However, the removal of the mid-canopy and reduction of forage by this work reduces the value of the habitat in these areas and their ability to support species.



Photo 23: A forest that has been treated to reduce its wildfire behavior potential.

Urban development

Whistler's popularity as a mountain resort is increasing the pressure to provide more housing, commercial space, recreation amenities and supporting infrastructure. The OCP guides the future growth of the Resort and is focused on lands within the designated Whistler Urban Development Containment Area (WUDCA). The protection of the natural environment within this area is a priority as Whistler grows. Many high-value and sensitive natural areas remain in the WUDCA. The increasing value of real estate and the need for affordable employee housing is threatening these remaining natural areas. The OCP recognized that by the end of 2017, RMOW had reached a 90% build-out level of its approved development capacity.

Recreation

There has been an increase in the recreational use of the natural areas within and around RMOW. In the winter season, snow sports are focused on the ski resort areas of Whistler Mountain and Blackcomb Mountain. However, there has also been an increase in the popularity of backcountry skiing and snowmobiling. When the snow melts, hiking, camping, and mountain biking bring people into the natural areas in and around the community.

Mountain biking is one of RMOW's premier summer activities. Locals and visitors come to enjoy world-class freeride and singletrack trails across the mountainsides and valley. There are several hundred kilometres of trail in the region that provide users with an intimate, low-barrier way to experience the outdoors. The intensity of this use is highest closer to the Resort, however, with an increase in the popularity of mountain biking and electric-assisted bikes, access to backcountry and alpine areas around the community is also increasing. The intensification of backcountry use can cause the degradation of natural areas, cause damage to existing trails, increase human-wildlife conflict, increase the risk of human-caused wildfires, and impact water quality.

The impacts on the natural environment caused by trails and trail users include trail widening and tread wear which can lead to soil erosion. Vegetation impacts include exposure of tree roots leading to root damage, soil loss which can destabilize trees, and the degradation of trail-side understory vegetation. Invasive plants can also spread more readily with increased trail use. Seeds and vegetation can attach to boots and clothing spreading them further into the backcountry. Interactions with black and Grizzly bears and other wildlife in RMOW's recreation areas can disturb wildlife habitat and natural behaviours and patterns.



Photo 24: Events such as Crankworx attract many visitors to Whistler.

Invasive plants and animals

Species that are not native to RMOW and are a threat to the integrity of natural plant communities are known as invasive species. The Sea to Sky Invasive Species Council (SSISC) is a non-profit organization that identifies, treats, and monitors the spread of these species which include plants, animals, and insects. RMOW and the SSISC have developed a list of priority invasive species for Whistler. Known locations of invasive species tend to be concentrated around urban development and recreation areas.

Table 1. Priority list of invasive species to target in RMOW.

Highest-priority invasive plants in Whistler (targeted for eradication)		Other priority invasive plants of concern in Whistler (targeted for containment)	High-priority invasive animals.
<ul style="list-style-type: none"> • Japanese knotweed • Himalayan balsam • Purple loosestrife • Scotch broom • Yellow flag iris • Flowering Rush 	<ul style="list-style-type: none"> • Invasive perennial peavines (E.g. flat pea, broad-leaved peavine) • Himalayan blackberry • Cutleaf evergreen blackberry • White Spanish broom • Blueweed • Hoary Alyssum 	<ul style="list-style-type: none"> • Orange hawkweed • Common burdock • Common periwinkle • Diffuse knapweed • Smallflower touch-me-not • Spotted knapweed • Yellow lamium 	<ul style="list-style-type: none"> • Goldfish

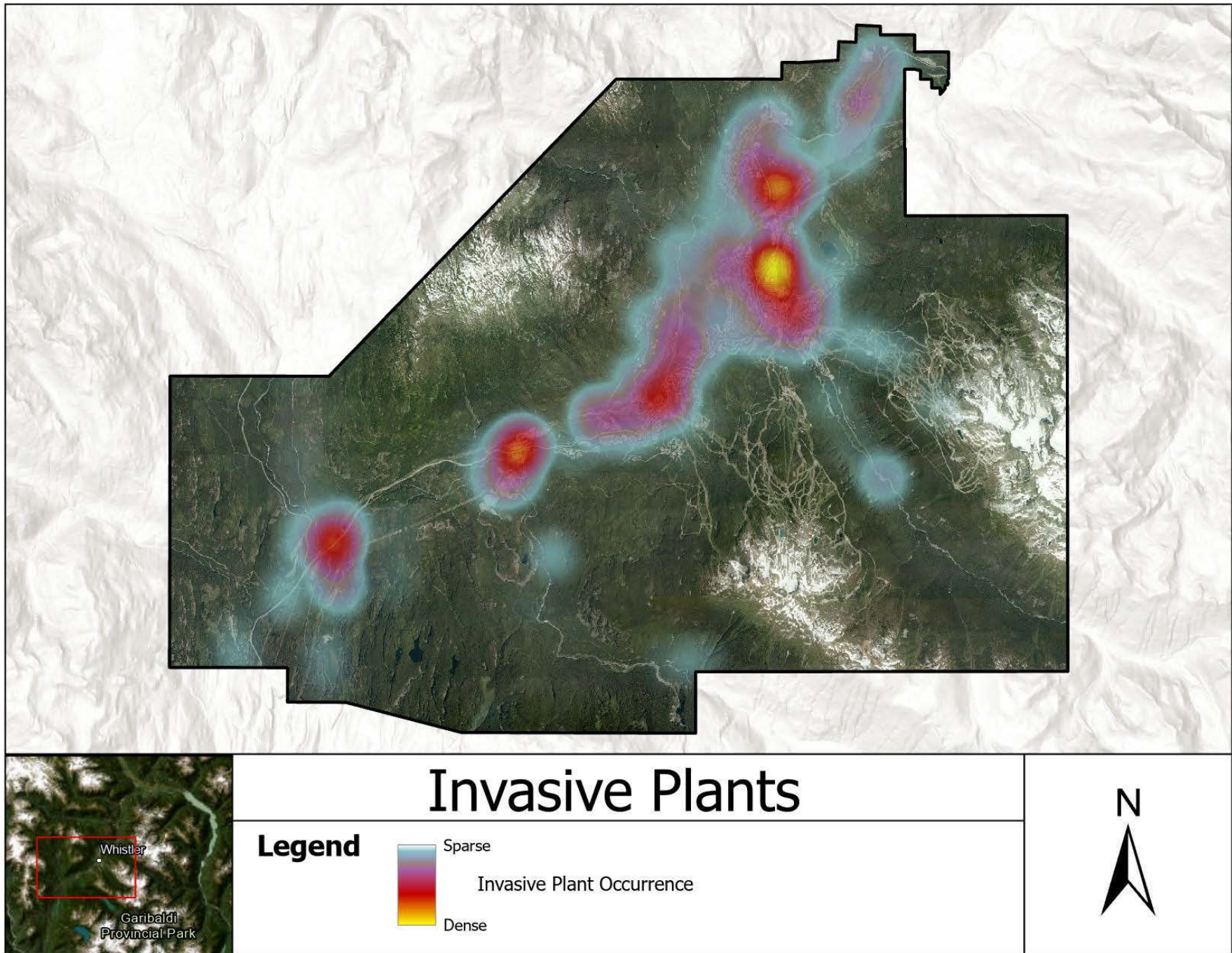


Figure 9: Hotspot map of invasive plant occurrences in Whistler (Sea to Sky Invasive Species Council).

The RMOW's Invasive Species Management Plan recognizes the complexities of managing invasive species and has adopted an integrated pest management (IPM) approach. This decision-making process determines the most cost-effective action to take on a site-by-site basis. Preventing new species introductions and managing infestations to an acceptable level are the priorities of this program. The program's key objectives include education and outreach, collaboration with regional partners, enforcement through policy and legislation, and practical on-the-ground management.

The Sea to Sky Invasive Species Council (SSISC) categorizes species into management categories to help direct efforts. The categories include prevention of new invasions, eradication of smaller infestations, containment of species where eradication is not possible, and strategic control for species that are well established across the region. SSISC works closely with RMOW staff to strategically manage invasive species in Whistler. This includes staff and public education and the inventory and removal of invasive species.



Photo 25: Scotch broom removal along Highway 99

Strategic goals and recommendations to protect Whistler's Priority Habitats

The RMOW has always recognized the value of the natural environment and has prioritized its protection. As land across the valley bottom has been developed however, there has been a loss of some of the most productive and biodiverse habitat areas. The RMOW recognizes that there is a limited amount of land available and that the demand for housing and amenities threatens the remaining natural areas in the valley. The integrity of these natural areas is also at risk from climate change which is creating more extreme weather events and changing the growing conditions that local species have adapted to. With a changing climate, other species including some of which are considered invasive can migrate into Whistler more quickly and become a threat to local populations. The forests that surround the urban containment boundary are threatened by ongoing tree harvesting and thinning, by the risk of wildfires and the by the increasing presence of people recreating in the backcountry. The RMOW has implemented policies and procedures that are aimed at protecting its natural assets while recognizing the need for development and recreation. There are opportunities to improve these to better address these emerging threats.

Five strategic goals have been adopted to identify and protect Whistler's most important priority habitats. They aim not only to protect the remaining priority habitats but also to connect and restore areas that have been separated or degraded. High level recommendations are provided for each of these goals. Implementing these recommendations is at the discretion of the RMOW and will be dependent on available resources.



Photo 26: Managing recreation is a critical component of protecting priority habitats.

Goal #1 – Clearly define and map Whistler’s Priority Habitats

Priority Habitats include all areas that are considered critical for supporting the diversity of species that inhabit the RMOW including species at risk. They were identified through an analysis of the species at risk that inhabit the RMOW and the habitats that they require to survive²⁶. They are also identified for protection in the Sensitive Ecosystems Development Permit Area and its guidelines. There are some inconsistencies between the definitions of Priority Habitats and Sensitive Ecosystems. Clear and consistent terminology and descriptions is required to define what are considered Priority Habitats. These should be used within development planning policy and GIS planning layers.

The landscape of Whistler has changed since these Priority Habitats were mapped. There is also now improved mapping technology can help to more accurately identify and map these areas. LiDAR can be used to accurately map the edges of natural areas along vegetation boundaries. It can also be used to determine general stand characteristics and to identify and map individual trees of significance. By mapping ground terrain LiDAR can be used to accurately locate streams, wetlands and floodplain areas.

The confirmed presence of species at risk and the habitat they rely on are assessed annually by the RMOW and stewardship groups. This information can help planners to mitigate the impacts of development and recreation on these species. The understanding of priority habitats, species at risk and their location should continually be improved and made available to the public through the RMOW’s online Web Map. This mapping should be dynamic and updated regularly.

Goal # 1 Recommendations - Define and Map Priority Habitats

1.1	Review and refine RMOW’s current definitions of and criteria for “Priority Habitats” (from the 2018 “Species and Habitat Priority for Biodiversity Conservation” report) and adopt a consistent terminology to be used in policy and on maps.
1.2	Prioritize all identified Priority Habitats according to their relative importance.
1.3	Update the existing mapping of Priority Habitats, based on revisions to definition/criteria (as per 1.1 above).
1.4	Align terminology related to “sensitive ecosystems” (OCP Sensitive Ecosystems DPA) and “priority habitats” (2018 Species and Habitat Priority for Biodiversity Conservation report) to improve clarity.

Goal #2 Protect, restore and monitor Priority Habitats

There are Priority Habitats within the WUDCA that are unprotected and vulnerable to impacts of development. Outside of the WUDCA, mature/old forests and other Priority Habitats are at risk from timber harvesting, backcountry recreation and wildfire. Identifying and protecting Whistler's Priority Habitats will help ensure that these important natural areas remain intact into the future. The protection of Priority Habitats may include ecological restoration and the purchasing of lands or legal protection using tools such as zoning, conservation covenants and land trusts.



Photo 27: Fencing and signage help to protect breeding habitat for Western toads on Lost Lake.

Priority Habitats that interface with urban areas can be degraded by human caused impacts. These include direct impacts such as dumping, encroachment, vandalism and trampling from high traffic. There are also a number of indirect human caused impacts such as the establishment of invasive plants, windthrow of newly created forest edges or changes in hydrology due to land development.

Climate change modelling predicts warmer temperatures with longer summer droughts, wetter falls and winters, and more frequent precipitation events. These changes may impact the health and resiliency of

ecosystems and the species that live there. Species that are less tolerant of these changing conditions may be at risk while species that could not live in the region previously may establish including some that are considered invasive. These dynamics can have cascading effects on the plants and wildlife that live in Whistler.

Priority habitats that have been degraded should be restored to healthy priority habitats. There are also grass areas in passive parks that may be underutilized by the public. Where these interface with Priority Habitats, there are opportunities for restoration to expand these priority habitats, introduce missing habitat features and climate resilient plant communities.

Aquatic habitat and their riparian areas are some of the most biodiverse areas in the RMOW and provide critical habitat for fish, invertebrates and herpetofauna. Terrestrial organisms also use and rely on aquatic habitats for food and water. Wetlands and floodplain areas act as natural buffers and groundwater recharge areas helping to reduce flood damage. Restoring these aquatic systems and their riparian habitats is critical for protecting biodiversity in the RMOW.



Photo 28: Rivers and their riparian habitat provide some of the highest levels of biodiversity in Whistler.

There are certain habitat elements within natural areas that some species rely on for survival. This is particularly true of many species at risk. Old-growth and large mature trees are important features for many species. They are often tall with large crowns and are windfirm, providing shelter to the younger trees that are growing around them. They have large branches and platforms associated with old broken tops that provide nesting sites for mammals and raptors.

Large dead wildlife trees and dead standing trees provide habitat for cavity-nesting species such as woodpeckers. They excavate standing dead trees for homes that they use to raise their young. These cavities are then used by other species that may not have the ability to create these protected spaces like squirrels, owls, and smaller birds. These trees slowly decay, supporting fungi and insects which are food sources consumed by birds and mammals.

Large woody debris on the ground of a forest provides a diversity of growing environments for plants and animals. When they decay, they provide organics and nutrients to the forest floor. Understory plants and trees use these as “nurse logs” to establish themselves. Many small animals use these logs as protective corridors, providing shelter from predators as they travel across the forest floor. Protecting and enhancing these specific habitat elements will enhance the habitat value in Priority Habitats and in particular where they have been degraded.

Invasive plants and animals are an increasing threat to the integrity of Priority Habitats. This threat is increasing as climate change is altering growing environments and with increased transport of these species by recreationalists. The RMOW’s Invasive Species Management Plan uses an integrated pest management approach to determine the most cost-effective action to take on a site-by-site basis. This program aims to prevent new species from establishing and strategically managing infestations to an acceptable level using the resources available to the RMOW. It targets RMOW lands but also provides education to landowners on how to identify invasive species and protect against them. Water-borne invasive species are a growing concern in the Sea to Sky region, and their spread can be limited by ensuring watercraft are clean before and after use on waterbodies in RMOW. The SSISC promotes a number of programs to change public behavior which can be referenced on their website²⁷.

The adoption of new policy tools to protect priority habitats requires staff to oversee and enforce them. The implementation of this report must include a recognition that significant staff time and additional resources will be required to implement these recommendations.

The protection of Priority Habitats may require that materials be purchased and installed, such as signs, fencing and gravel. Plants and trees must be purchased for restoration and enhancement. Habitat features such as nesting boxes, pollinator homes and bat boxes must also be purchased or constructed. Altered standards and procedures such as the creation of wildlife trees instead of the falling of full trees may require additional training, effort and costs. Recommendations adopted as part of this report should be considered along with its costs to the RMOW.

The RMOW initiated the Ecosystems and Species Monitoring Program²⁸ in 2013 to help understand how biodiversity is being impacted by development, land use, climate change and other factors. This program includes assessing the health of streams by monitoring water quality, the presence of benthic invertebrates and species such as Coastal Tailed Frogs. It assesses riparian and wetland areas by monitoring beavers and old-growth forests by monitoring northern goshawks. The wildlife species chosen are considered indicators as they represent a guide of other species with similar habitat

requirements and are sensitive to changes in their habitat. Tracking them over time helps the RMOW understand how changes to the natural landscape are affecting the species that inhabit them. This program also has also monitored the number of days per year that ice covers Alta Lake. Inviting the public to be contribute to this program and sharing the findings with them fosters support for the management of Priority Habitats.

Goal # 2 Recommendations - Protect, Restore and Monitor Priority Habitats

2.1	Pursue the acquisition or legal protection of vulnerable Priority Habitats. Assess existing land use designations and implement appropriate regulatory tools to enhance the protection of Priority Habitat areas (E.g. rezoning, DPA guidelines, land acquisition, covenants, land trusts, etc).
2.2	Assess, prioritize and restore degraded Priority Habitat areas, particularly within the WUDCA. Efforts will aim to restore healthy climate resilient ecological communities and may include the creation or restoration of habitat features such as wetlands, instream fish habitat, forest ecosystems, pollinator gardens, nest and bat roost boxes. Develop Whistler-specific ecological restoration guidelines and plant lists. Explore opportunities to grow native plant species to support landscaping and restoration projects.
2.3	Protect Priority Habitats from the impacts of invasive plants and animals. Continue to manage invasive species through the RMOW Invasive Species Management Plan and in collaboration with SSISC, encouraging participation from all relevant jurisdictions. Increase efforts to more aggressively manage invasive species in Priority Habitat areas.
2.4	Increase collaboration efforts with the FireSmart program, the community-wide fuel thinning program and the Cheakamus Community Forest to protect the health of Priority Habitats when undertaking tree cutting/forest management for wildfire risk reduction and commercial logging.
2.5	Consider developing a Priority Habitat Network to link Priority Habitats to each other and to connect them with other important features such as wildlife corridors and wildlife refuge areas.
2.6	Explore and secure funding, capacity and resources to help protect, restore and monitor Priority Habitat areas.
2.7	Continue to provide resources to support the RMOW’s annual Ecosystems and Species Monitoring Program and Species and Ecosystems at Risk annual updates. Adapt these programs to help monitor and protect Priority Habitat areas and to share the findings with the public.
2.8	Continue to discourage the use of fertilizers, pesticides, and herbicides on all RMOW-owned lands, other than for the management of invasive species.

Goal #3 – Develop and update policies and other planning tools to protect and enhance Priority Habitats during land use planning and development

The RMOW has a strong suite of policies that it uses to manage the impacts of development and land use on the natural environment. High-level policies such as the OCP provide direction through the adoption of goals and principles which are enforced through planning tools like bylaws and development permit areas. These tools regulate how development is planned and constructed at a site level. These policies were, however, developed at different times and there are now opportunities to update and improve these existing policies.

Development permit areas and their guidelines provide the RMOW with the opportunity to work with property owners to plan development. There are two environmental DPs in the RMOW that protect watercourses and their setbacks, as well as other sensitive natural areas. There is opportunity to strengthen these two DPAs to help protect Priority Habitats and potentially a Priority Habitat Network should one be established.

Bylaws are used to regulate and control activities that could detrimentally impact Priority Habitats. These bylaws allow the RMOW to require permits that have associated fines if the terms of the permit are not followed. They can also prohibit certain activities and require that best practices are followed. Bylaws allow the RMOW to react to unauthorized activities such as disturbance to riparian areas, the cutting of protected trees, and the movement of soils.

Development permit areas and bylaws allow the RMOW to issue penalties and require compensation for policy infractions. Their effectiveness increases with the severity of the penalty. Sufficient resources are required to effectively monitor development activities and to detect unsanctioned activities.

The RMOW requires best management practices, guidelines, and standards that are specific to the ecosystems and habitats found in the RMOW. These should include detailed reporting requirements that must be submitted as a part of development permit applications. Guidelines should include recommendations for the restoration of natural areas and the use of natural plants and habitats in landscapes areas. Requirements should be defined for restricting activities during sensitive timing windows such as the bird nesting season and in-stream work activities. Regular assessments for certain environmental features that may change over time should be required such as species at risk, raptors nests, wildlife dens, wildlife trees and trees of significance.

Many developed areas such as transportation corridors, residential neighborhoods, and community gathering spaces provide little natural habitat. This can fragment priority habitats within the WUDCA. The RMOW can encourage biodiversity within its urban areas by making use of existing grey space (buildings, parking lots, boulevards, etc.) to install habitat features that will attract wildlife. Incentives and public awareness campaigns can encourage landowners to install and maintain natural features on their properties.

Goal # 3 Recommendations – Policy and Planning

3.1	Review and update guidelines, exemptions and application requirements for the Protection of Riparian Ecosystems DPA and the Protection of Sensitive Ecosystems DPA to more effectively protect and restore Priority Habitat areas.
3.2	Review and update the Land Use Procedures and Fees Bylaw, Environmental Protection Bylaw and other relevant municipal regulations so that their riparian protection requirements are clear, consistent and effective.
3.3	Explore legal options to protect Priority Habitats on private land through restrictive covenants or land dedication to the RMOW.
3.4	Develop guidelines, best management practices and required application content for landowners, developers and QEPs to support the protection and health of Priority Habitat areas through the development application process.
3.5	Develop RMOW-specific guidelines for wildfire fuel mitigation (e.g. FireSmart, fuel thinning) in Priority Habitat areas. Mitigation should balance fuel reduction with preserving habitat structure, ecological function and biodiversity.
3.6	Consider adopting a policy to ensure there is a no net loss of Priority Habitats on RMOW owned lands.

Goal #4 – Minimize the impacts of outdoor recreation on Priority Habitats

Whistler consistently ranks among North America’s top mountain recreation destinations. It experiences high levels of seasonal tourism in both winter and summer, which places intense pressure on its natural environment. Recreation pressures are felt the greatest when snow is absent from the valley. Visitors are drawn to the lakes, rivers, and the extensive trail network that provides access to the surrounding forests and alpine areas. In the winter, backcountry use from skiing, snowshoeing, and snowmobiling is increasing. The increasing intensity of visitors as well as new technologies allowing easier access to remote natural areas pose threats to the integrity of these areas.

The most intense pressure on Priority Habitats from recreation use tends to occur on valley bottom and mid-mountain trail networks, although increasing exploration into sub-alpine and alpine areas is also occurring. There is increasing mid and backcountry trail use from foot and bike traffic, including electric-assisted e-mountain bikes and dog walkers.

The RMOW’s draft e-bike policy was supported by Council in 2019 and allows Class 1 electric bikes (those that have a pedal-assist motor which are restricted to 32km/hr) on most trails, with some exceptions for environmental concerns. Class 2 and 3 e-bikes are not permitted on any municipal trails.

E-bikes and dogs are not permitted above the Flank Trail as it traverses Mt Sproat and Rainbow Mountain due to this area’s importance as grizzly bear habitat and sensitivity as an alpine ecosystem. E-bikes are also not allowed in the Emerald Forest Conservation Area. Bikes (e-bikes and otherwise) and dogs are not permitted in the 21 Mile watershed.

In the backcountry, trail use is also increasing with hiking and mountain biking increasing in popularity. Electric-powered bikes are not allowed in the Mount Sproatt and Rainbow Mountain Alpine area due to its importance as grizzly bear habitat and its sensitivity as an alpine ecosystem. E-bikes are also not allowed in the Emerald Forest Conservation Area.

Regular trail maintenance is necessary to prevent degradation and the associated impacts of use on the natural environment. As the intensity of recreation extends further into the backcountry, the ability to maintain those trails becomes more difficult. Currently, the RMOW manages recreational non-motorised trails located within its parks, select trails located on provincial Crown lands, as well as the Valley Trail system. Most of Whistler's recreation trails are managed by the RMOW and by Whistler Off Road Cycling Association (WORCA), which is a non-profit volunteer organization that acts as stewards for the mountain biking community in Whistler. WORCA works with the RMOW and other stakeholders to manage non-motorized trails on crown land in Whistler. This includes the maintenance, design, and building of new trails. The Alpine Club of Canada Whistler Chapter and Recreation Sites and Trails BC (RSTBC) also have responsibility for a lesser portion of non motorized recreational trail network. All new trails require a permit issued by the Province. As part of a trail building application, there is a requirement to address sensitive environmental areas along the proposed alignment. Unsanctioned trail building and use may be an emerging impact to watch for, as backcountry activities become more popular.

Species in the backcountry and alpine such as the grizzly bear, wolverine, and mountain goat can be frightened by flying helicopters and planes. Snowmobiles and other motorized transport can also disturb species that are not tolerant of human presence.

As the number of recreation users increases in Whistler's natural areas, there is a need to accommodate with new and resilient infrastructure. The RMOW strives to achieve a balance between providing diverse outdoor public recreation opportunities, maintaining a high-quality user experience, and minimizing environmental impacts. The RMOW is developing a Recreational Trail Strategy that will provide high-level direction for trail use, management and development. This strategy will also develop a trail planning approach to reduce environmental impacts and provide mitigation strategies. This project is expected to lead to the development of a Master Trails Plan for the RMOW.



Photo 29: Whistlers Interpretive Forest provides educational opportunities to learn about the ecosystems found in Whistler

Goal # 4 Recommendations - Outdoor Recreation

4.1	Explore options with the Province to periodically close specific Priority Habitat areas to recreational use during sensitive times of wildlife lifecycles. Examples include the River of Golden Dreams where boating restrictions in low-flow periods aim to protect salmonid spawning, and sub-alpine Grizzly bear feeding areas such as Sproat/Rainbow where trail closures are implemented when Grizzly bears are known to be near trails.
4.2	Minimize trail and other recreation amenity development within riparian areas, particularly within 10m of a stream or watercourse, and minimize stream crossings. Explore options such as fencing to minimize encroachment into riparian areas where appropriate.
4.3	Assess the impacts of sanctioned and unsanctioned trails within Priority Habitat areas and explore options to reduce impacts (Eg. closures, rerouting). Educate the public on the impacts of unsanctioned trails on Priority Habitats, wildlife and biodiversity.
4.4	Review and explore options to minimize potential environmental impacts of commercial operations on Priority Habitats and wildlife within the WUDCA and backcountry and alpine areas.
4.5	Integrate Priority Habitat mapping and develop guidelines/environmental best practices for recreational trail development in/around Priority Habitat areas (I.e. Recreational Trails Strategy and Trail Standards).

Goal #5 – Increase knowledge about Priority Habitats and promote stewardship to protect them

Whistler is fortunate to benefit from a highly active and engaged community. Many residents and visitors recognize the value of Whistler’s natural places and the important role it plays in shaping the community’s identity. These individuals help to protect, monitor and restore the state of natural areas and the recreation pressures affecting them. The RMOW provides resources and supports these volunteer lead stewardship programs. There are opportunities to expand these programs to engage greater participation by more of the community.

Land owners can be encouraged to restore and enhance their lands through educational campaigns and incentive programs. Educational materials can be distributed that provide guidelines for managing invasive plants and installing natural landscape materials and habitat features. These can be presented at public events along with subsidized plant sales or giveaways. Crafting events can be hosted to demonstrate how nesting and bat boxes and pollinator homes can be constructed. High school programs can encourage students to make and install these types of habitat features on school property. Incentive programs should be established that encourage the planting of native and climate adaptable plants and trees. Tree seedling giveaways can be coordinated with Earth Day or Canada National Tree Day.

Goal # 5 Recommendations - Public Stewardship

5.1	Develop and implement efforts to inform community stakeholders and the public about the importance of protecting Priority Habitats, species at risk and key local species. Efforts may include workshops, events, interpretive signs, social media, website, press releases, Mayor’s comments and calls to action on important dates (E.g. Earth Day, River’s Day and Canada National Tree Day).
5.2	Collaborate with local businesses, organizations, outdoor recreation groups and schools on programs that educate and encourage learning about, protecting and enhancing Whistler’s Priority Habitats.
5.3	Share educational material regarding the species that inhabit Whistler. This should include the findings of the annual Ecosystems & Species Monitoring Program and the Species & Ecosystems at Risk assessments. E.g. social media, website, Council presentations, collaborations with Whistler Museum, etc.
5.4	Investigate the creation of a staff role to more effectively conduct public and stakeholder education and outreach initiatives.



Photo 30: Education and awareness of the natural environment promotes responsible stewardship by the public

Implementation

The RMOW will secure additional funding and dedicate staff time to support new projects, programs and changes in operations to support healthy Priority Habitats. Whistler's community and visitors will continue to be invited and engaged to be stewards of these natural areas. On private lands, policies will be adopted that promote responsible development and encourage the enhancement and restoration of degraded areas.

The next phase of this Priority Habitat Framework initiative includes further refinement of the recommendations into action items that can be implemented by staff. The first steps to be pursued include the refinement of the definitions and mapping of Priority Habitats. The second priority is to review planning tools to ensure that these priority habitat areas are protected during land use planning and development. Other programs are being developed and implemented that will also help achieve the goals of this Framework such as the Recreation Trails Strategy, a Recreation Trails Master Plan, the Big Moves Climate Action Implementation Plan, and the Invasive Species Management Plan.

The RMOW is committed to protecting Priority Habitats. By adopting the goals and pursuing the recommendations in this Framework, it is taking steps to further protect, enhance and connect the Priority Habitats that are critical to maintain the high levels of biodiversity found in Whistler.



Photo 31: Continued stewardship of the natural areas of Whistler will ensure they remain intact for future generations.

Notes

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- ¹⁴ Bob Brett, “Species and Ecosystems at Risk in the Resort Municipality of Whistler 2020 Update,” Whistler Biodiversity Project, December 31, 2020, https://www.whistler.ca/sites/default/files/2021/Mar/related/22976/2020_species_ecosystems_at_risk_final.pdf.
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