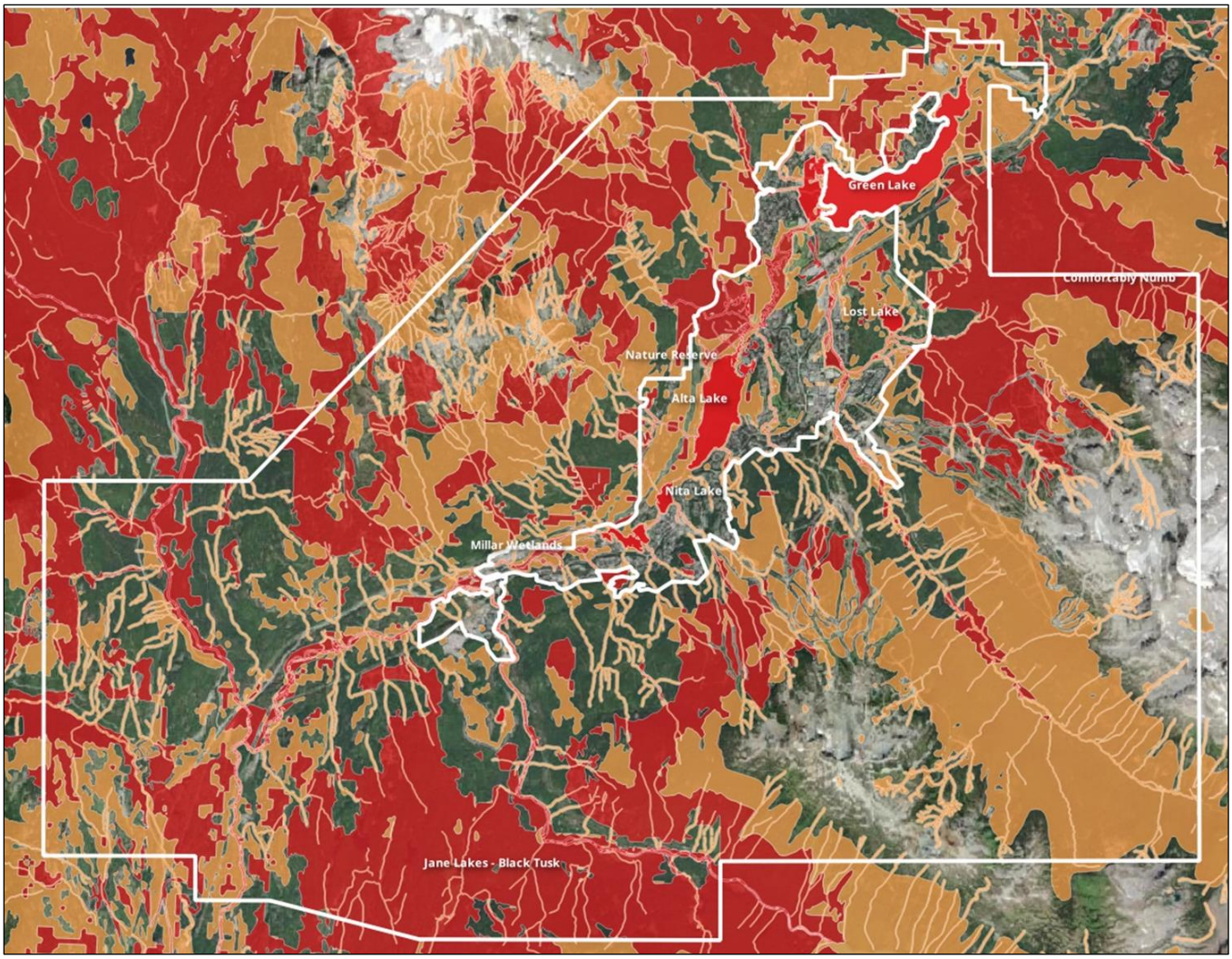

Priority Habitats in Whistler 2024 Update
Mapping and Technical Report

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Prepared for
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Executive Summary

The Priority Habitat types identified and mapped in the 2018 report formed the basis of the RMOW's Development Permit Area for the Protection of Sensitive Ecosystems, as outlined on Schedule K of the Official Community Plan. This 2024 mapping update greatly expands the geographic scope, comprehensiveness, and accuracy of that mapping. It produced a total of 25maps:

- The Priority Habitat Overview which highlights Very High and High Priority Habitats;
- 20 base maps, including 9 ecosystem and 11 species-specific maps;
- Three maps to aid connectivity planning: (i) Recruitment/Future Forests; (ii) Conceptual Mountainside Greenbelts; and (iii) Conceptual Cross-Valley Connectivity; and
- Existing Conservation Areas.

This technical report describes the context of the 2024 Priority Habitats update and documents how data was incorporated into mapping. The appendices include a data dictionary of fields in each mapping layer to aid current users and future revisions. Maps as they appear online on the RMOW GIS are also included with each section.

Improvements to the 2018 mapping:

- Expanded Scope: Mapping now extends beyond RMOW boundaries to include areas directly impacted by Whistler, e.g., by commercial and non-commercial recreation, CCF, etc. Will help provide broader landscape context to support land use planning.
- Expanded and Improved Habitat Mapping: Revised maps revised RMOW data to accurately differentiate lakes and wetlands, including for the first time, important Shallow Shoreline habitats in Whistler's lakes. Important aspects of forests are also mapped for the first time, e.g., the location of forests with ancient trees, high volumes (big trees), and yellow cedars (a proxy for ancient forests).
- Addition of Species Mapping: Greatly expanded the amount and accuracy of species-level mapping available on the RMOW GIS, including the first online mapping of fish presence, tailed frog streams, Western Toad and Red-legged Frog breeding ponds, shorebirds at-risk, as well as habitat suitability mapping for goshawks and Mountain Goats.
- Better Connectivity Mapping: More accurate and detailed mapping of old and ancient (unlogged) forests. Important riparian corridors are also clearly shown on the new maps, e.g., ROGD, 19-Mile, and 21-Mile Corridors.
- Improved Base Mapping: Improved useability of TEM mapping to allow more accurate identification of key habitats (e.g., floodplains and wetlands). Obtained additional TEM mapping for areas south, west, and north of the RMOW. Modified government forest data (VRI) to make it more useable and accurate for non-timber applications.
- New Information Layers: (1) Recruitment and Future Forests; (2) Conceptual Westside and Eastside greenbelts; (3) Potential Cross-valley Greenbelts; and (4) Existing Conservation Areas.
- More Accurate and Easier to Use: The new PH maps more clearly highlight "hotspots" for RMOW staff and other map users. They are also based on expanded and more accurate underlying data which increases the ability of staff and other users to prioritize the most important habitats.

Notable Hotspots identified by 2024 Priority Habitats Mapping

Within WUDCA

- All fish-bearing lakes & streams
- Shallow shoreline habitats in local lakes
- ROGD corridor, Alta Lake to Green Lake
- Whistler Nature Reserve
- Emerald Forest
- Millar Creek Wetlands
- Edgewater & adjacent wetlands
- Fitzsimmons wetlands [Montebello area)

Beyond WUDCA

- Jane Lakes-Black Tusk ancient forest
- Blackcomb Mt. to Wedge Cr. (Comfortably Numb)
- 21-Mile Creek Corridor (Bob's Rebob to Rainbow Lake)
- Whistler Mt. ancient forests
- One Duck Lake area above Emerald Estates
- Callaghan Valley ancient forests
- Nineteen-Mile Creek corridor
- Upper Sproatt Mountain

Abbreviations

BEC	Biogeoclimatic Ecosystem Classification.
BGC	BioGeoClimatic; generally used in the term BGC mapping or classification. See also BEC.
CCF	Cheakamus Community Forest.
CDC	BC Conservation Data Centre.
CWH	Coastal Western Hemlock Zone. The lowest-elevation BEC Zone in Whistler that is found form valleybottom elevations to midway up the surrounding mountains.
COSEWIC	Committee on the Status of Endangered Wildlife in Canada.
DPA	Development Permit Area, as defined in the RMOW Official Community Plan.
FIP	Forest Inventory Polygons, aka, Forest Cover. Mapping of forested land in BC that forms the basis of timber management. Now replaced by the VRI.
GIS	Geographic Information System. Software that combines spatially-defined data and mapping. The RMOW Web Map is based on GIS.
LU	Landscape Unit. An area as defined for timber management by the Ministry of Forests, that is, within the timber land base. Within the Whistler Area, the Cheakamus Community Forests has a tenure that includes parts of three Landscape Units: Whistler LU, Callaghan LU, and Soo LU.
OCP	Official Community Plan (RMOW 2022).
OGMA	Old-Growth Management Area.
RMOW	Resort Municipality of Whistler.
SARA	Federal Species at Risk Act.
SLRD	Squamish-Lillooet Regional District.
TEM	Terrestrial Ecosystem Mapping. Mapping used for, among other things, determining the location of Red- and Blue-listed ecosystems. TEM is the mapped expression of BEC (also called BGC) mapping and maps down to the Site Series level of BEC. Site Series is the site-level unit used in timber management and many other applications. Note that users often refer to TEM mapping which is redundant (mapping is included twice). The term TEM has thus become a noun for many people who use it.
UWR	Ungulate Winter Range.
VRI	Vegetation Resource Inventory. The current version of mapping that forms the basis of timber management in BC. Replaced FIP (Forest Cover) mapping.
WHA	Wildlife Habitat Area.
WUDCA	Whistler Urban Development Containment Area. A boundary defined in the OCP within which the future development is focussed.

Table of Contents

1.0 Introduction

1.1 Context and Structure

Since its inception in 1976, the Resort Municipality of Whistler (RMOW) has demonstrated its commitment to protecting the natural environment, the land and water that support native biodiversity. This commitment is seen the Vision Statement in its current Official Community Plan (OCP):

"Whistler: A place where our community thrives, nature is protected and guests are inspired" (RMOW 2022, p. 2-3).

Nature protection has been enshrined in every OCP since 1976. In 1999, the Whistler Environmental Strategy (Waldron 1999) produced the first vision of a comprehensive, science-based approach to protecting nature. It set the stage for many subsequent efforts, including the precursor mapping to this project (Brett 2018). That 2018 mapping assessed species-based habitat priorities and was used to define Development Permit Areas (DPAs) in the updated OCP. The next step in this process was the Priority Habitats Framework (Diamond Head 2023) which presented a strategic plan for implementation. This 2024 Priority Habitats Update reports on improvements and refinements to the 2018 mapping, and delivers on key recommendations in the 2023 Framework.

The following pages focus mainly on the technical aspects of the Priority Habitats mapping that is now online on the RMOW Web Map (https://webmap.whistler.ca/HTML5Viewer/Index.html?viewer=ExternalGIS). The purpose of the technical details presented here is to document for technical users such details as data sources, how fields were defined, and the relationship between the maps. If successful, such details will enable current and future users to better understand the data, as well as to provide tools that enable future updates and refinements to be more accurate and efficient.

In spite of its technical focus, I also include some of the background and rationale for which maps were included. I assume a familiarity with conservation concepts and therefore do not define some such terms as biodiversity, indicator species, etc. – please instead refer to Brett (2018) and other such documents for additional discussion of those concepts and terms as they apply to this project.

This 2024 update produced a total of 25 online maps:

1. One Priority Habitats Overview Map that aggregates all priority scoring;
2. 20 scoring layers including 9 types by ecosystem type and 11 Priority Habitat types by species; and
3. Four non-scoring (information) layers – 3 Connectivity maps and a map showing Existing Conservation Areas.

See Section 1.3 below for additional details and page links for each.

1.2 Improvements and additions to 2018 mapping

The original version of this mapping (Brett 2018) was based almost exclusively on somewhat limited spatial data available at the time from the Whistler GIS library. In addition, the scope was limited to the RMOW boundaries and focussed mostly on areas outside of the Whistler Urban Development Containment Area (WUDCA) and at lower elevations within the Coastal Western Hemlock (CWH) Zone. In spite of the limitations of the data (incomplete data, generally coarse scale, and restricted geographic coverage), the 2018 mapping nonetheless reinforced the value of such key habitats as lakes, wetlands, creeks, old forests, and large connected patches of unlogged forests.

The goal of the 2024 update was to build on the 2018 mapping in significant ways to provide better tools for conservation planning. The improvements included:

- Expanded geographic range that included the entire RMOW (including WUDCA) and the surrounding area impacted by economic, recreational, and forestry activities emanating from Whistler (Figure 1-1). This expanded area is also mean to reflect natural landscapes rather than political boundaries.
- Refinement of habitat definitions and mapping. For example:
  - Lakes and wetlands were differentiated based on clear, biologically-appropriate definitions.
  - Steam segments were rationalized so that they could be selected as a single whole.
  - "Shallow Shoreline" wetlands were for the first time mapped where they occurred in lakes.
  - More accurate (additional) mapping of ancient (>400 years) forests, as documented through tree coring (Brett and Ruddy 2020.

- Two additional maps to help identify Whistler's oldest forests (Yellow Cedar Ancient Forests map) and unlogged forests with the largest trees (Big Tree Forests map).
- Provincial forest mapping was corrected where outdated, e.g., in areas that are now outside the timber landbase and have since been developed. One such example is the Nicklaus North Golf Course which still appears on the VRI as uncut forest.
- Addition of three additional Terrestrial Ecosystem Mapping (TEM) projects: (i) Callaghan Landscape Unit; (ii) Soo Landscape Unit; and Whistler Landscape Unit. The addition of these TEM maps gave complete coverage forested parts of the study area (Figure 1-1; also see Section 2.3.2).
- Presence of a number of species was mapped online for the first time, e.g., salmonid fish, tailed frogs, Western Toad and Red-legged Frog Breeding Ponds, and yellow cedars.
- The existing habitat suitability model for Grizzly Bears was refined to improve useability. Habitat suitability models for goshawks and Mountain Goats were added for the first time.
- Three non-scoring Connectivity layers were added to help staff and other interested users envision habitats in Whistler's future.
- Areas with existing conservation legislation were mapped to allow easier analysis (Table 1-1).

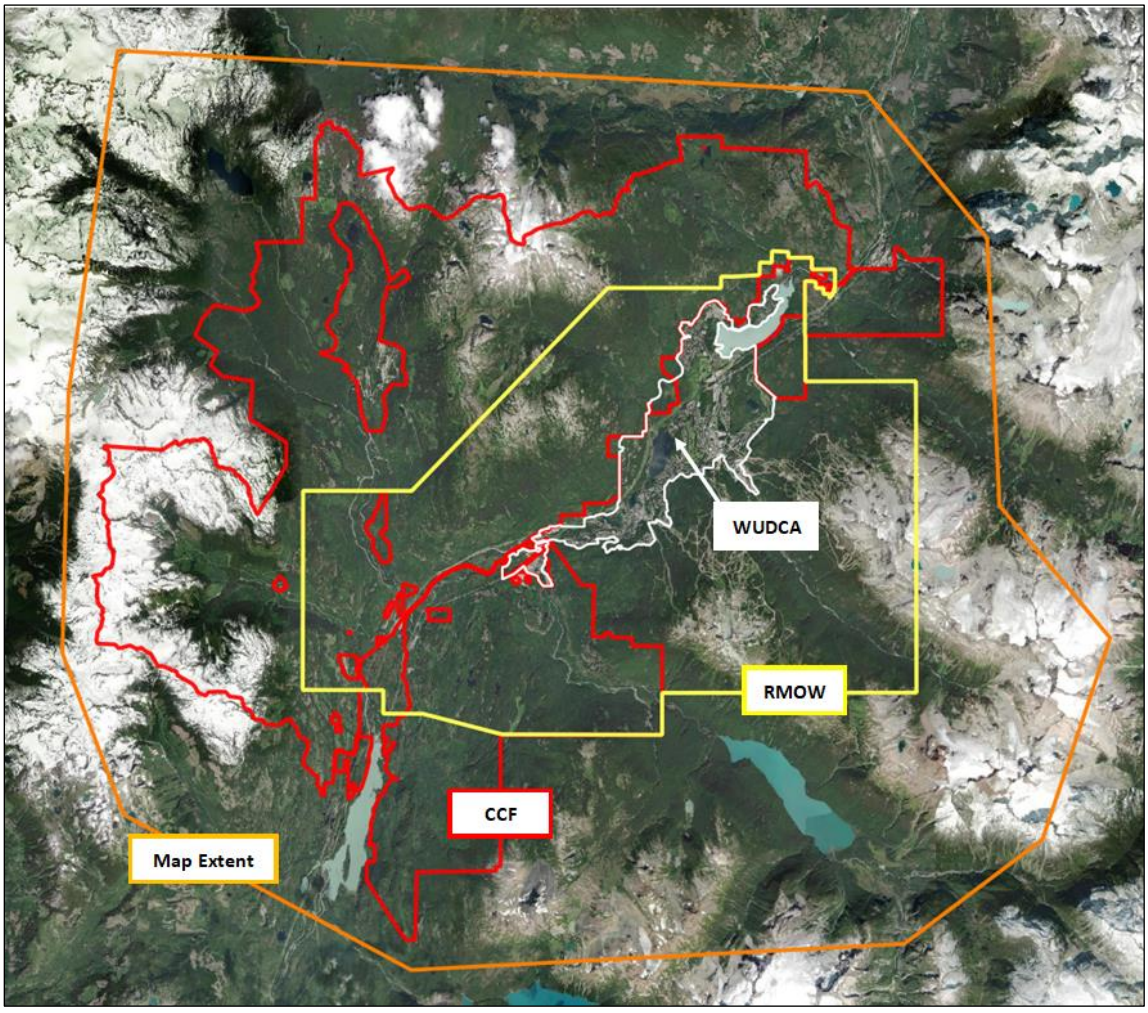


Figure 1-1. Approximate extent of expanded mapping area (orange line). White: Whistler Urban Development Containment Area (WUDCA). Yellow: RMOW boundary. Red: Cheakamus Community Forest (CCF) tenure. Note that the actual extent of some base layers may be inside the orange line, while others might extend beyond it.

Table 1-1. Comparison of 2018 and 2024 Priority Habitat Mapping

Metric	**2018**	**2024**
Number of Maps	10	25
Scope	RMOW only (24,586 ha)	RMOW + CCF + buffer (~144,000 ha)
Quality of Source Data	Low to Medium	Medium to High
Scoring	Broader definitions (i.e., more area ranked as PH). Overall score based on how many Priority Habitats (layers) overlapped.	Emphasis on identifying the highest value habitats, i.e., a narrower definition of them. Overall score based on highest priority core within each 5m x 5m area.
Useability	Low. Limited ability to interpret habitat value at finer scales. Limited ability to distinguish habitat value by different ecosystems and species.	High. Ability to click on an area in the Overview map and show which of the 20 scoring layers contributed to the overall score. Also possible to individually view each of the 20 scoring maps.
Habitat-level Mapping	Some data based on outdated or inaccurate source data (e.g., forest ages), and/or data difficult to interpret by most users (e.g., Whistler TEM).	First mapping of Shallow Shoreline wetlands in major lakes. First mapping of ancient (>400 years) forests. Many corrections to base data (e.g. VRI age data and location of forested polygons). Daylighting of data to make it available/useable (e.g., first online mapping of existing map data for salmonid fish presence; TEM data).
Species-level Mapping	None	First mapping of goshawks, Mountain Goats, Coastal Tailed Frogs, Red-Legged Frogs, Western Toads, salmonid fish, Western Screech-Owls, and shoreline birds that are at risk.
Connectivity Maps	Very conceptual (low detail)	First mapping of recruitment/future forests, that is, which logged forests will mature within the next 30 years (i.e., become >80 years old). More detailed analysis of cross-valley corridors. Presentation of conceptual greenbelts on the east and west mountainsides.
Existing Conservation Areas	Not mapped	Mapped
Extent of TEM	2003 TEM only (~18,000 ha)	4 TEMs (~118,000 ha)
Use of VRI	No edits/corrections	Edited to remove developed areas and correct (where possible) ages.
Use of TEM	No edits/corrections	Updates to Stand Structure; multiple edits to fully include information in complex polygons, i.e., those with two or three sub-units.
Data Sources	RMOW GIS (as of 2017) plus basic data from VRI.	RMOW GIS plus VRI, TEM (4 projects), BC Government habitat modelling, RMOW Grizzly Bear habitat modelling (2020), Whistler Biodiversity Project, RMOW Ecosystems Monitoring Project (through 2023), AWARE, Snowline.

1.3 Map organization

This report follows the same organization as the maps presented on the RMOW GIS (Table 1-2).

Table 1-2. Map organization and location in this report.

Map Group	Map Number	Section(s)	Map Name
Priority Habitats Overview	Overview Map 1	4.00	Priority Habitats Overview (Highest Score by Area)
Scoring Layers (20 Maps)			
Priority Habitats – By Ecosystem	Ecosystem Map 1	5.1	Lakes & Wetlands
	Ecosystem Map 2	5.2	Streams
	Ecosystem Map 3	5.3	Riparian Buffers
	Ecosystem Map 4	5.4	Floodplains
	Ecosystem Map 5	5.5	Old & Ancient Forests
	Ecosystem Map 6	5.6	Yellow Cedar Ancient Forests
	Ecosystem Map 7	5.7	Big Tree Forests
	Ecosystem Map 8	5.8	Largest Old Forest Patches (CWH)
	Ecosystem Map 9	5.9	BC Red-Listed Ecosystems
Priority Habitats – By Species	Species Map 1	6.1	Beaver-Affected Wetlands
	Species Map 2	6.2	Red-legged Frog & Western Toad Ponds
	Species Map 3	6.3	Salmonid Fish (Lakes & Wetlands)
	Species Map 4	6.4	Salmonid Fish (Streams)
	Species Map 5	6.5	Shorebirds at Risk
	Species Map 6	6.6	Tailed Frog Streams
	Species Map 7	6.7	Cottonwoods & Screech-Owl Habitat
	Species Map 8	6.8	Goshawk Habitat Suitability
	Species Map 9	6.9	Grizzly Bear Habitat Suitability
	Species Map 10	6.10	Mountain Goat Habitat Suitability
	Species Map 11	6.11	Whitebark Pine (Estimated Locations)
Non-Scoring Layers (4 Maps)			
Connectivity Maps	Connectivity Map 1	7.1	Recruitment/Future Forests (CWH)
	Connectivity Map 2	7.2	Mountainside Greenbelts (Conceptual)
	Connectivity Map 3	7.3	Cross-Valley Greenbelts (Conceptual)
Existing Conservation Areas	Conservation Map 1	7.4	Existing Conservation Areas

2.0 Data Sources and Limitations

2.1 Introduction

The intent of the 2024 Mapping Update was to amass all possible information at the species and habitat levels that could help prioritize habitats in the Whistler area. Even though the resulting maps are the most comprehensive and accurate on the RMOW GIS to date, it should be noted that much of the base data (e.g., VRI and species-level data) is not accurate or comprehensive enough to produce the kind of mapping that would be ideal. This section will therefore discuss improvements to mapping since 2018, but also some of the limitations that can hopefully be addressed if and when better data becomes available.

2.2 RMOW GIS

All relevant base mapping from the RMOW GIS was included in this project, for example:

- Lakes, wetlands, and streams;
- 2004 Terrestrial Ecosystem Mapping (TEM; Green 2004). See notes below.
- Roads, trails, and infrastructure.
- Boundary lines for the RMOW, WUDCA, Provincial Parks, CCF, etc.
- 2018 Priority Habitat mapping.

2.3 TEM (Terrestrial Ecosystem Mapping)

2.3.1 TEM Concepts and Application within the RMOW

Terrestrial Ecosystem Mapping (TEM) is used to map the terrestrial landbase at the ecosystem level. The term ecosystem, as used in TEM, refers to a number of scales. It maps such broader concepts as floodplains, riparian and alluvial areas, and avalanche tracks, and also at finer scales down to the site level. At the site level, the term ecosystem is synonymous with the "Ecological Communities" (aka Ecosystems At-Risk) tracked by the BC Conservation Data Centre (CDC), and the basis of that layer in this mapping (Section 5.9). It is also generally synonymous with Site Series within the BEC system that is used in timber and other land management (e.g., Green and Klinka 1994), which in turn are based on the BEC's concept of Plant Associations (otherwise known as plant communities; e.g., MacKinnon et al. 1992).

TEM mapping[1] differs in two important ways from the other main source of mapping, Vegetation Resource Mapping (VRI, discussed below in Section 2.4):

1. It is based on the BEC system and therefore groups similar ecosystem types. VRI polygons are based on photo interpretation of forest stand types which, though related to the underlying ecosystems, often differ. For example, similar tree species of a similar age can span across somewhat similar ecosystems, and thereby include more than one TEM polygon. Conversely, if part of a given ecosystem (TEM polygon) has been logged and part hasn't, the VRI polygon will show a boundary (split) within the TEM polygon.
2. Additionally, the VRI is only reliable as an inventory of commercial tree species while a TEM can describe an entire landscape including non-forested areas such as subalpine parkland, alpine, talus slopes, wetlands, lakes, and urban areas (including parks, golf courses, hydro lines, subdivisions, etc.). It is further important to note that most TEM projects are not given the scope to go beyond forested ecosystems that are included within the timber land base. Luckily for this project, Whistler's 2004 TEM mapping (Green 2004) includes all ecosystems within its study area, including non-forested and urban areas, and is therefore much more useful than the other three TEM maps produced in this area (Section 2.3.3) for conservation and other non-timber planning.

Air photo interpretation and ground-truthing is used to group (type) the study area into TEM polygons that have more or less similar characteristics. The resolution of the air photos and the number of sites that are visited (i.e., ground-truthed) directly impact precision, accuracy, and cost, as does the complexity of the landscape and also by budget. Reasonable precision and accuracy in a low complexity landscape such as parts of BC's Interior Plateau can be achieved with relatively large polygons and therefore lower cost. In a complex, mountainous landscape such as Whistler, polygons should ideally be

[1] Even though the acronym "TEM" includes mapping within it, TEM is often now used as a noun to describe a particular approach, hence the term "TEM mapping."

smaller to capture and make more sense of that complexity. One of the main benefits of smaller polygons is that there is more opportunity to map simple instead of complex polygons – terms used here to indicate polygons that have include only one ecosystem unit (simple) versus polygons with two or more units (complex). Challenges presented by the complex polygons in the Whistler TEM (Green 2004) is discussed further below (Section 2.3.2).

2.3.2 Whistler TEM (Green 2004)[2]

As noted above, the Whistler TEM goes beyond Provincial guidelines to include non-forested and wetland ecosystems (Figure 2-1). This additional data is exceptionally helpful for conservation planning such as Priority Habitat mapping. The 2004 TEM was therefore a huge advance in mapping and is still much better than available in most jurisdictions. There were, nonetheless, some challenges in applying the Whistler TEM to this project, notably the number of polygons with two or even three sub-units ("complex" units).

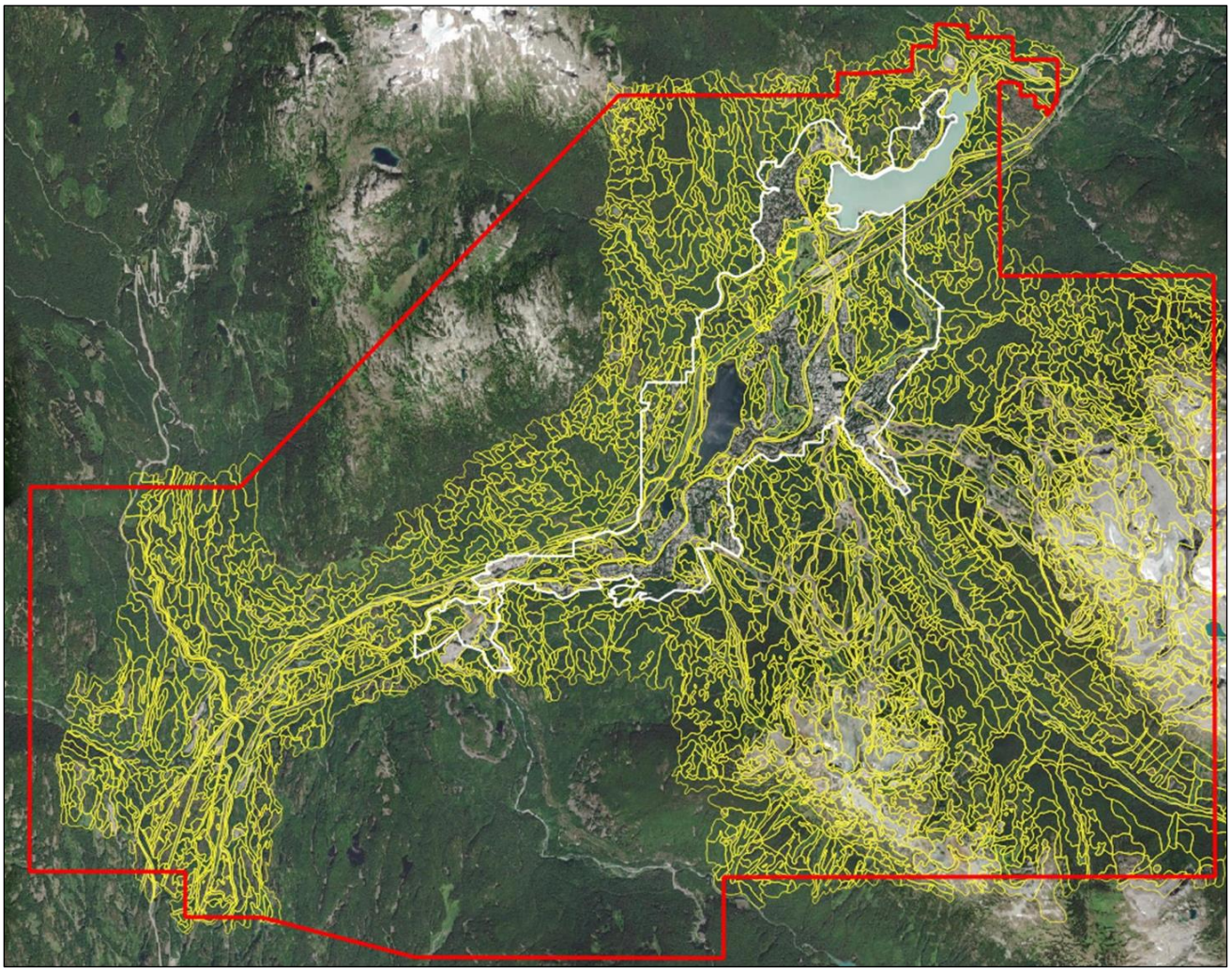


Figure 2-1. Extent of 2004 TEM mapping that currently appears on the RMOW Web Map. Note that the 2004 TEM mapped the RMOW municipal boundary before it was expanded. The outer edge of the TEM polygons, shown in yellow, was the previous municipal boundary. The red line shows the RMOW's current, expanded boundary.[3]

[2] Note that this mapping was actually completed in 2003 but that the report was dated 2004. Further note that it was based mainly on 1994 or older air photos.

[3] The municipal boundary was expanded in ca. 2005 and increased the RMOW area from 16,500 ha to close to 27,000 ha.

Nature is much more complex than mapping can capture, and the finer-scale the mapping (that is, the smaller each polygon), the more the complexity can become apparent. The Whistler TEM dealt with this complexity by describing many polygons with two and often three sub-units. In total, only 39% of all polygons mapped were "simple" (described as containing only one Site Group, or ecosystem type; Table 2-1). The rest of the complex polygons had either two (51%) or even three (10%) sub-units.

Table 2-1: Number of sub-units per polygon in the Whistler TEM.

No of sub-units		Total		Percent	
Simple	1	1226		39%	
Complex	2	1615	1929	51%	61%
	3	314		10%	
	Total	3155			

Number of Deciles	Number of Site Groups			Total Polygons	Percent
	1	2	3		
1	1226	-	-	1226	39%
2	1162	453	-	1615	51%
3	91	130	93	314	10%
Total	2479	583	93	3155	100%
Percent	79%	18%	3%	100%	

When there is more than one sub-unit, it makes mapping Priority Habitats more difficult. For example, if half the polygon is shown as forested and the other half as wetland, it makes further mapping decisions difficult. In some cases, it could be mapped as forested, and in others as wetland.

One example of misinterpretations that can result from complex polygons occurred in 2023 when the RMOW explored options for joining the Valley Trail between Alta Lake Road and Alpha Lake Park. One of the TEM polygons the proposed trail crossed was typed in TEM mapping online on the RMOW Web Map as "Urban" (Figure 2-2). As it turned out, that polygon included an area from the lake edge to Alta Lake Road within which 60% was typed as forested while only 40% was typed as Urban. Online, the Site Group for that polygon showed as Urban since for the forested parts of the polygon were subdivided into two forested Site Groups. The underlying data, which did not appear, was: 40% Urban, 40% one forested sub-group (Site Series CWHms1/01), and 20% another forested sub-group (CWHms1/03). In viewing that particular site, it is clear it is mostly forested rather than Urban (Figure 2-3).

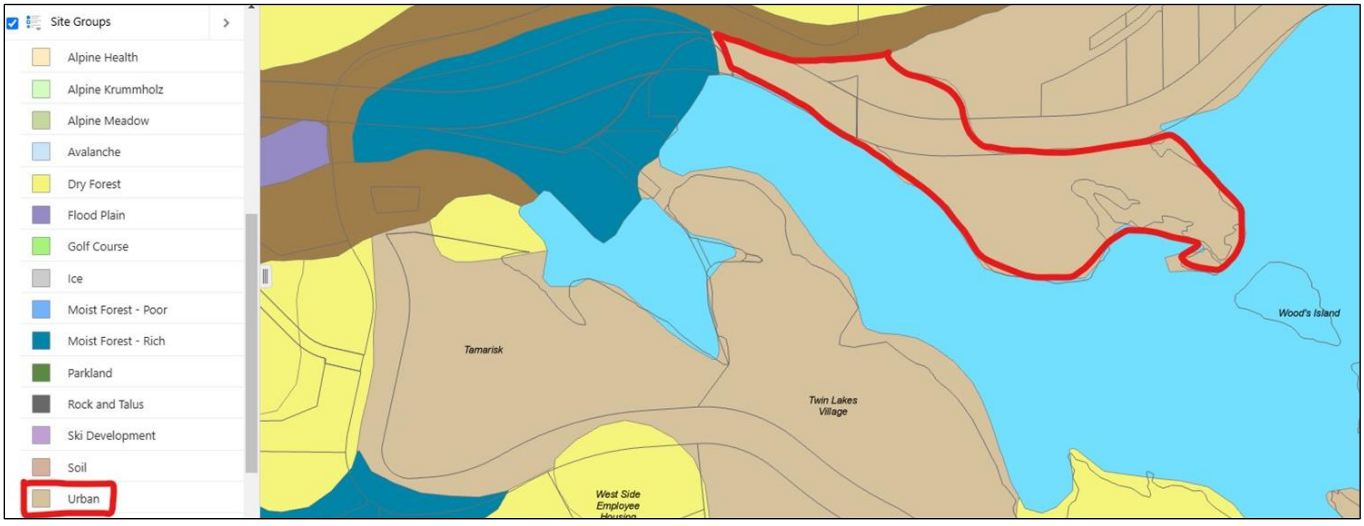


Figure 2-2. Polygon showing as "Urban" Site Group in TEM mapping on the RMOW Web Map.

Figure 2-3. The same polygon over an air photo of the site that shows it is mostly forested.

The example above demonstrates the difficulty in presenting extremely complex data in a format that is useable to a non-practitioner (that is, someone who is not very familiar with how TEM is produced). In this case, the underlying data was correct but the collation of that data into useable mapping obscured important details. In this case, a user saw an incorrect mapping of a mostly forested site as "Urban" (i.e., developed). In other complex polygons, the current RMOW mapping might miss wetlands or other important habitats if they are part of a complex polygon in which another Site Group occupies a higher percentage of the area.

To deal with this challenge, I went through the data and did my best to daylight any important habitat types, e.g., wetlands and floodplains that were not the largest sub-unit within that polygon. When the Whistler TEM is updated, one helpful change would be to map at a more detailed level (smaller polygons) with the goal of reducing the number of complex polygons. Of course, this would increase the cost of the update but in my opinion is necessary to make it a useful too for the average user.

Any future update could and should also deal with other limitations of the 2004 TEM mapping, notably:

- The 2004 TEM only extends to RMOW boundaries at that time. Since then, the RMOW boundary was extended uphill on Rainbow and Sproatt Mountains, and farther up the Callaghan Valley. New TEM mapping should include these areas.
- Much of the mapping is outdated and possibly not as accurate as possible due to the age and resolution of the orthophotography which was based mostly on 1994 imagery flown at 1:15,000 scale. Imagery for the upper Fitzsimmons Valley was even older: 1980 imagery at 1:40,000 scale.
- The forest data presented in the 2004 TEM data is static and does not include important information that could be derived from the VRI. As a result, there is no way to "age" forests to reflect their current age nor attributes such as Structural Stage (e.g., young forest, mature forest, old forest, or ancient forest).

In an ideal world, stand age and other data from the VRI (Section 2.4) would be incorporated within a master, hybrid map that included TEM, VRI, and other ecosystem-based data. Without such information, conservation planning is hampered, especially in forested areas.

2.3.3 Extent of 4 TEM Projects Used Here (2004 Whistler TEM, Callaghan LU, Soo LU, and Whistler LU)

The original Whistler TEM (Green 2004) mapped the RMOW at that time, that is, before the RMOW was expanded to its current boundaries (Figure 2-1). Since 2004, three additional TEM projects were completed that extended coverage to most of the area addressed in this project: (Figure 2-4):

1. Callaghan Landscape Unit (LU: Timberline 2007a). Shown as magenta lines in Figure 2-4.
2. Soo Landscape Unit (LU: Timberline 2007b). Shown as blue lines in Figure 2-4.
3. Whistler Landscape Unit (LU; Green 2010). Shown as green lines in Figure 2-4.

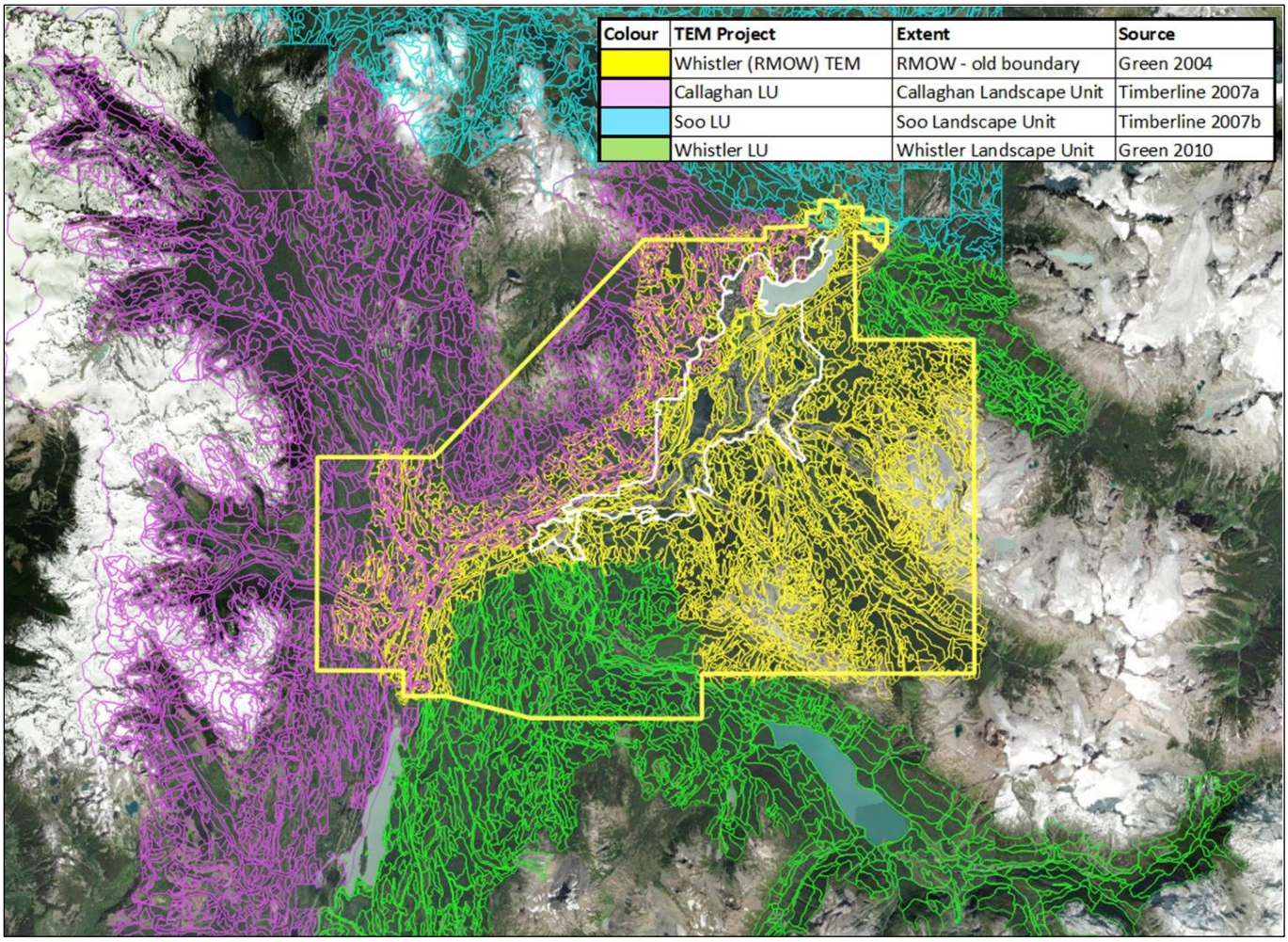


Figure 2-4. Extent of four TEM projects used in the 2024 Priority Habitats Mapping Update. Note that only the 2004 TEM extended only to the smaller RMOW boundary of that time (see Figure 2-1 to compare to the 2004 RMOW TEM).

Adding these additional TEM projects resulted in near-complete coverage of the expanded area of this project. They added: (a) areas within the current RMOW boundary missing from the 2004 RMOW TEM; (b) mid and upper elevations in the west side of Whistler Valley; (c) the entire Jane Lakes-Black Tusk area; and (d) forested sites in adjacent valleys, including: Brandywine, Callaghan, Sixteen-Mile, Wedge, and Cheakamus.

Although this expanded mapping provides important new tools for conservation and other planning in the RMOW, there are limitations both in geographic extent and comprehensiveness. The three additional TEM projects were mapped by Landscape Unit (LU) and completed as part of the requirements of forest licenses within the area. Limitations include:

1. Unlike the 2004 RMOW TEM, the TEMs completed for the three Landscape Units were not required to map non-forested ecosystems such as high-elevation areas and wetlands. Compare colour-coded lines in Figure 2-1 to see that the 2004 Whistler TEM extends into alpine areas on Whistler-Blackcomb. It also maps wetlands, lakes, and urban areas. The other three TEMs do not include high-elevation areas or wetlands.
2. Not only do the three TEMs for LUs not map areas outside the timber land base, the data included for areas within the timber landbase is limited compared with the Whistler 2004 TEM. In my admittedly brief use of those three TEM maps, it seemed they were conducted at a coarser scale and, as a result, were less precise, accurate, and comprehensive.

I have two main conclusions after using the TEM mapping available for this project. First, it is extremely helpful to have such detail for the areas covered by the 2004 TEM. Second, updated and expanded TEM mapping is needed.

2.3.4 Edits to TEM mapping within this Priority Habitat Mapping Update

For details on how fields in the 2004 TEM were modified to allow better application to this Priority Habitats Mapping Update, see Data Dictionary 1 at the back of this report.

2.4 BC VRI (Vegetation Resource Inventory)

2.4.1 Introduction

The primary source of data for map layers dealing with forest ages, species composition, and volume was the 2022 BC Vegetation Resource Inventory (VRI). For more information on how the VRI was incorporated into Priority Habitats mapping, refer to the following sections: Old and Ancient Forests (Section 5.5), Yellow Cedar Ancient Forests (Section 5.6), Big Tree Forests (Section 5.7), and Largest Old Forest Patches (Section 5.8). The VRI is also the basis of habitat suitability mapping for goshawks (Section 6.8) and an important component in the calculation of habitat suitability for Grizzly Bears (Section 6.9) and, to a lesser extent, Mountain Goats (Section 6.10).

The breadth and scope of data within the VRI is impressive, but its limitations also become apparent when that data is applied to a non-timber project such as this. From the start, the purpose of the VRI and its predecessor (Forest Cover mapping, aka, FIP) has been to inventory forest stand data to identify commercial opportunities which, in most cases, means logging opportunities. Even though the VRI can be, and is, used to provide valuable information for other purposes, its original purpose often limits its applicability, usefulness, and, ultimately, accuracy.

Since the 1980s when the BC Government greatly reduced its forest inventory capabilities, virtually the only updates in the VRI have been to map changes on the timber land base, that is, areas that have been logged. This is the reason why areas developed since still show in the VRI as forested, e.g., the Nicklaus North Golf Course and the Kadenwood subdivision. Perhaps the main challenge for conservation applications in the VRI data is that the age data is often inaccurate for older forests (discussed more below). In addition, since the VRI is the basis of many other non-timber applications such as habitat suitability mapping, any problems caused by the limitations of the VRI are multiplied.

2.4.2 Edits to VRI mapping within this Priority Habitat Mapping Update

VRI data from 2022 was the latest available when this project began. Even though the 2023 update is now available, it is highly unlikely that any changes would affect this 2024 Priority Habitats Mapping Update (for reasons mentioned above). A number of edits were made to the 2022 VRI to help improve accuracy and application to conservation planning. Many of these edits were meant to reduce the impact of the imperfections inherent in the design and methodology of the VRI that make it an imperfect source of information for conservation purposes, including:

- It includes only areas that are or were intended to be logged.
- Its age data that is often inaccurate for stands older than 250 years, and almost always inaccurate for stands >400 years (see Section 2.6).
- It doesn't include accurate data for non-commercial species such as black cottonwood.
- It is itself based on different data sources including the previous Forest Cover (FIP). In addition, the current VRI polygons differ from FIP which makes some of the data suspect due to the challenges of data transfer. To add to the confusion, there is no relationship between VRI and TEM polygons.
- And, as mentioned above, the VRI is currently only updated to reflect recent logging or other timber-related data such as insect infestations. This is the reason why areas developed since the 1990s (e.g., Nicklaus North Golf Course mentioned above) still show as uncut forest.

I therefore made a number of changes in the VRI database to address the most pressing of these issues, including:

- Deleted many fields and re-ordered them to make the dataset more useable for this project (Data Dictionary 2).
- Corrected ages of 35 polygons based on coring data (Brett and Ruddy 2020; Section 2.6). Many other polygons no doubt also support ancient forests but further coring work is needed to determine how many and where.
- Deleted 67 polygons that are no longer forested but showed as such in the 2022 VRI (Table 2-2). Examples of deleted areas include: Emerald Estates, Rainbow Housing, Spruce Grove, Myrtle Philip School, Alpine Meadows,

Whistler Village, Blueberry Hill, Hillcrest, Millars Pond, Spring Creek, Cheakamus Crossing, Function Junction, Callaghan Transfer Station, Nita Lake Estates, Alta Lake Road, and power lines. Note that these deletions were not always perfect since VRI polygons and recent developments did not always match. In general, a polygon was deleted if it was mostly non-forest and retained if was more than approximately 2/3rds forested.

Table 2-2. List of VRI polygons deleted during preparation of 2024 Priority Habitat Mapping by VRI field "ObjectID").

138504	538581	1112260	1415590	2235860	2829984	3436144	3774032	4280994	5067609
226526	712589	1131432	1534442	2337899	3027822	3441111	3804183	4368498	5110233
302378	739967	1239181	1566001	2364883	3031688	3536163	3823758	4456159	5144907
321544	763110	1265792	1648056	2513392	3141072	3545304	3978885	4887861	5367970
376425	808998	1265959	1948424	2592226	3179604	3554690	4160567	4932104	
384821	877341	1309978	2092438	2752380	3186734	3643326	4211823	4942038	
461346	977725	1333630	2115400	2828648	3376706	3697046	4246791	4996397	

2.4.3 Current and Future Use of VRI in Conservation Planning

Although I made the case above that the VRI is an imperfect source of information, conservation planning as presented in this report would be impossible or severely hampered without it. The great strengths of VRI outweigh the challenges it creates and with some major but feasible alterations, the historic VRI data could provide an excellent foundation for a master mapping database that incorporates the best aspects of both VRI and TEM mapping so that non-timber land managers can make best use of that data.

In the meantime, it is important to realize that the VRI is overwritten each year. That means that any edits made during this project will be overwritten. For example, Nicklaus North Golf course will again show as uncut forest rather than the golf course and subdivision it became in the 1990s. Similarly, any corrections to age data will be overwritten. Until the useful information in the VRI is separated from the annual updates, this will continue to happen. As long as any separated, Whistler-specific spatial data retains the ObjectID (e.g., Table 2-2) and other unique identifiers for VRI polygons, it will always be possible to compare and share data between the two, now separate, sources of information about Whistler's forests.

2.5 Cheakamus Community Forest (CCF)

The CCF provided map layers for Old Growth Management Areas (OGMAs), Wildlife Habitat Areas (WHAs), and Ungulate Winter Range (UWRs). Future mapping will ideally incorporate the CCF's 5-year Management Plans to allow comparisons between CCF plans and Priority Habitat Mapping. Similarly, the CCF will ideally use the RMOW's Priority Habitat Mapping when it is planning its future activities.

2.6 Age Data for Old and Ancient Forests

2.6.1 Inaccurate Age Data in the VRI; No Age Data in the TEM

The VRI is the repository for stand age data that is perhaps the single most important metric in forest management, especially in conservation planning. The original age data is based on a huge effort in the 1950s to inventory all of BC's forests, though notably with the expectation that any money spent on that inventory would be dwarfed by the revenues it helped recoup through logging. This emphasis on expected logging revenue colours what data was collected, and how it was collected.

Overall, the accuracy of the age data collected in the 1950s ranges is remarkably good. In some instances, and especially in old and ancient forests with shade-tolerant trees, the data can nonetheless be woefully inaccurate. The fact that age data for unlogged forests is not reliable is seldom known or acknowledged by users of that data, whether it is the BC Government or industry. Even if someone understands the limitations of VRI age data, there are seldom opportunities to replace it with more accurate data.

The main limitation of VRI age data is that it was collected by and for the forest industry, that is, the BC Ministry of Forests, forestry companies, professional foresters, and university programs such as UBC Forestry. These entities believed in the 1950s (when the majority of the age data was collected) that all old forests should be replaced by young "thrifty" stands, thereby resulting in a fully managed forest that would provide a sustained harvest each year.[4] Forest policy and value systems affected the way ages were collected in a number of ways, for example:

- Age data collection was focussed on commercial tree species. Non-commercial trees such as black cottonwood was often excluded.
- Much of the age analysis was derived from air photo interpretation bolstered by some "air calls", that is, flights over stands to check for anomalies. Even though some stands were cored, it seems (based on my understanding), that the ages were determined in a way that unintentionally biased the results:[5]
    - Tree cores were counted in the field, and coring focussed on commercially valuable trees such as Douglas-fir. A fairly accurate count of rings could be determined in this way for relatively fast-growing, shade-intolerant trees such as Douglas-fir. For this reason, the ages of most Douglas-fir leading stands in Whistler's valleybottom are usually accurate.
    - There are many cases where it is impossible to accurately count tree rings in the field. The true number of rings from all of the oldest trees that I have cored (Brett and Ruddy 2020; Brett unpubl. data) could only be determined after extensive core preparation and counting under a microscope. A yellow cedar core, for example, can have 100 rings (years) in the width of a little finger. Unlogged stands in the Whistler area, especially when comprised of only shade-tolerant trees, cannot be accurately aged using field counts.
- Tree ages were and are still grouped into only nine age classes, the oldest of which is 250+ years (Age Class 9). In areas such as Whistler where stand-replacing fires are relatively rare, the lack of detail beyond 250 years prevents proper planning. As forest stands age beyond 400, 600, or 1,000 years, their structure, species composition, and habitat conditions continue to change (Table 2-3).

In spite of the documented inaccuracy of age data for many of Whistler's remaining old and ancient forests, it appears there is no way to permanently correct VRI data. This comment is based on discussions with three current staff with the Inventory Branch with the BC Government (phone discussion with Bruce McClymont, Marc Rousseau, and Tim Sakeld).

As mentioned above (Section 2.3), one problem with TEM mapping is that it contains no age data at all. In addition, there is no easy, accurate way to import age data from the VRI since the two mapping databases use different polygons. Without any age data, it is impossible to "age" the TEM inventory, e.g., reflect changes in Successional Stage.

2.6.2 Age Corrections and Adaptations used the 2024 Priority Habitats Mapping Update

I have cored approximately 1,000 trees in the Whistler area and found many stands with far older trees than shown by the VRI (Brett and Ruddy 2020; Brett, unpubl. data). The oldest tree documented to date, for example, is a living yellow cedar that is at least 1300 years old and was found in a VRI polygon that lists stand age as Age Class 8 (140-249 years; Table 2-3). That is an error of >1,000 years, and I think representative of the problem of relying on VRI ages for unlogged forests in our area. In fact, based on my coring work and regardless of ages listed in the VRI, I can confidently state that the vast majority of unlogged stands in the Whistler area are >300 years, with many that are >500, 800, and 1,000 years. Due to logging and other human activities, such ancient forests are increasingly rare, not only in Whistler and BC as a whole, but also globally.

To improve analysis for this project, I therefore made a number of revisions and corrections to the age data:

- Corrected ages of 35 polygons based on coring data (Brett and Ruddy 2020; Brett unpubl. data).
- Expanded age classification from the nine commonly used in BC (including the VRI) to 13 age classes (Table 2-3). The main goal was to classify unlogged forests >250 years since stands continue to develop well beyond that age. For example, the main early successional species (Douglas-fir) is present in many valleybottom stands for 400 or

[4] The replacement of old forests was the express policy of the BC Government until at least the 1980s, and arguably still exists today in much of the forest industry.

[5] These notes are based on what I have learned from conversations with various professionals over the years, most recently the BC Government staff mentioned in the acknowledgements.

more years. Once it is replaced in the canopy by shade-tolerant trees, it becomes a multi-generational or ancient forest (Brett and Ruddy 2020). Beyond 400 years, the composition of species may stabilize but the stand structure and other factors such as mycorrhizal connections continue to evolve.

- Where possible, updated and standardized the classification of stands by Stand Structure and Stand Age (BC MOFR and BC MOE 2010; Table 2-3) based on updated age calculations for VRI and TEM polygons. Some of this updating was based on values inferred from other evidence, e.g., species composition, ecosystem type, etc., and should therefore be considered approximate.
- Also refer to Sections 5.5 and 5.6 for additional discussion of age data.

Table 2-3. Age classification used in this project compared to original VRI data.

VRI (Original)		**2024 Priority Habitats Mapping**							
VRI Age Class	**VRI Age Range (years)**	**Revised Age Class**	**Revised Age Range**	**Calendar Year (Youngest)**	**Calendar Year (Oldest)**	**Whistler Area (approx.)**	**Generalized Age Classes**	**Structural Stage (approx.)**	**Successional Stage (approx.)**
1	1–20	1	0–19	2005	2024	**Logged**	Young	Regrowth	Early Regrowth to Young
2	21–40	2	20–39	1985	2004				
3	41–60	3	40–59	1965	1984			Young Forest	
4	61–80	4	60–81	1945	1964				Maturing to Late Seral
5	81–100	5	80–99	1925	1944		Mature	Early Mature	
6	101–120	6	100–119	1905	1924	**Unlogged**			
7	121–140	7	120–139	1885	1904			Late Mature	Maturing Climax
8	141–250	8	140–249	1775	1884				
9	>250	9a	250-324	1700	1774		Old	Old Forest	
n/a		9b	325-399	1625	1699				
		10	400-599	1425	1624		Ancient	Ancient Forest	Old Climax
		11	600-799	1225	1424				
		12	800-999	1025	1224				
		13	1,000+	n/a	1024				

2.7 Other Data Sources

Sources of other data are listed by map layer in the following sections (Sections 5 through 7) and in the metadata included online with each layer (and copied as Appendix A).

3.0 Scoring Methods

3.1 Criteria by Scoring Layer

This project describes a total of 20 Scoring Layers (Table 1-2; Sections 5 and 6) that each contributed to the summary map, the Priority Habitats Overview (Section 4). See those sections for explanations of scoring criteria for each.

3.2 Scoring Definitions and Examples

Features in each of the 20 Scoring Layers were scored by one of four ranks: Very High, High, Moderate, and Unranked (Table 3-1). Note that only areas scored as Very High and High appear in the online maps. See Section 4 for details on how the aggregated "Overview" map was produced.

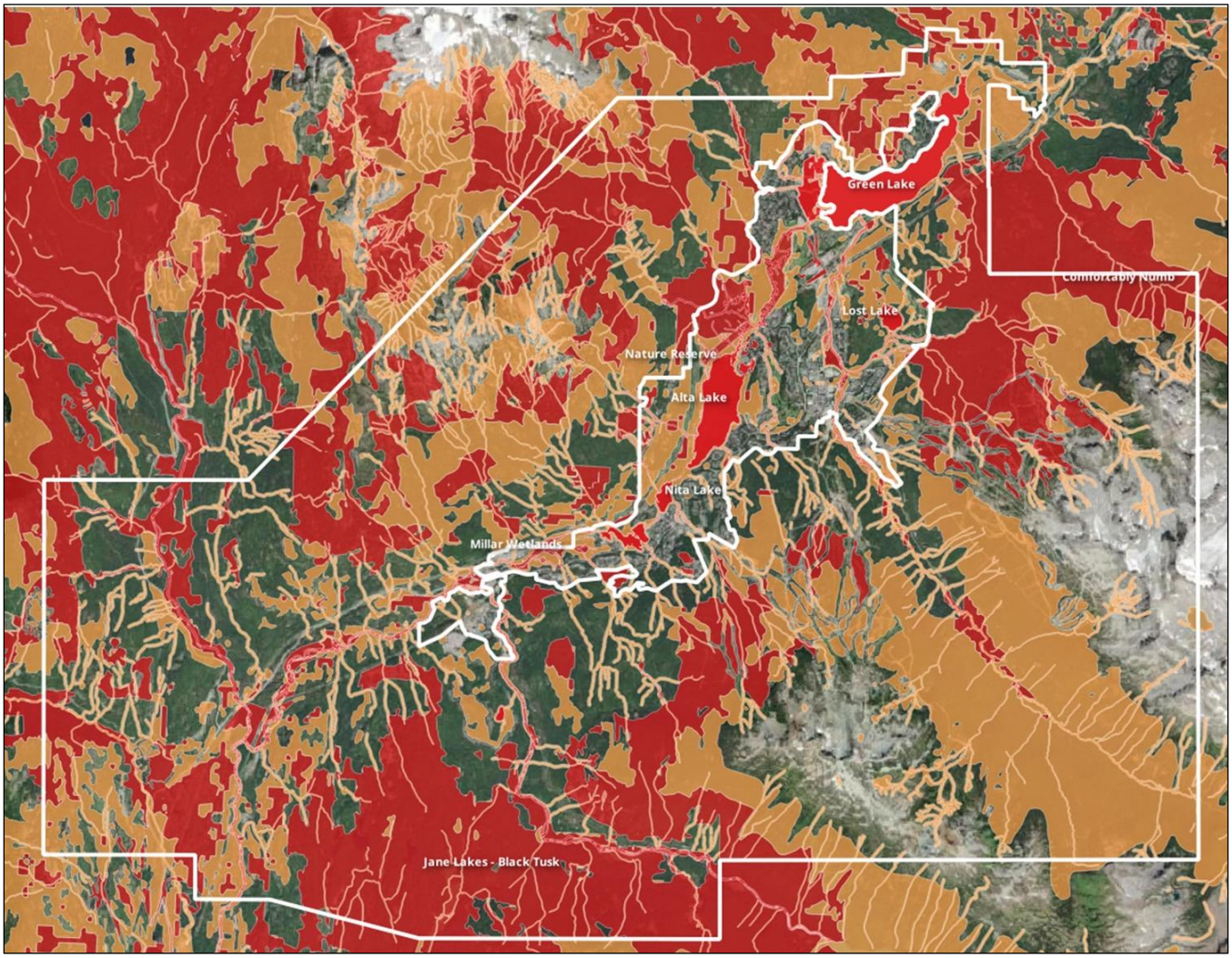
Table 3-1. Scoring definition and examples.

Score	Definition	Examples
Very High	Highest value habitat due to rarity (e.g., Old and Ancient Forests; BC Red-Listed Ecosystems), connectivity (e.g., Largest Old Forest Patches), or importance to local species (e.g., streams and lakes that are habitat for salmonid fish; high value habitat for grizzly bears; Beaver-affected Wetlands, Shallow Shorelines on Alta Lake, Green Lake, and Lost Lake).	• Ancient forests (400+ years) • Forest stands with the biggest trees (highest volume). • Unlogged forest stands with yellow cedar in the canopy layer (i.e., likely to be ancient). • BC Red-listed ecosystems. • Beaver-affected wetlands. • Streams and lakes with salmonid fish. • Shallow shoreline wetlands on Alta, Green and Lost Lakes. • Highest-value habitat for Western Screech-owls (large cottonwoods with undisturbed buffer). • Breeding ponds for red-legged Frogs and western toads. • Highest value habitat for goshawks and grizzly bears (mapping includes areas with known presence of these species).
High	Other high value habitat, e.g., Tailed Frog Streams, Floodplains, Wetlands	• Other streams, lakes, and wetlands. • Floodplains. • Riparian areas (30m buffers around streams, lakes, and wetlands). • Old (250-399 years) and other unlogged forests (100+ years). • Riparian areas (30m buffer).
Moderately High	Habitats flagged for future consideration.	• Highest value habitat for Mountain Goats (would be ranked higher if goat presence were confirmed). • Cottonwood forest remnants less likely to be able to support Western Screech-owls (limited by poor data; future mapping of large old cottonwoods needed). • Estimated locations of whitebark pine. Local risk to this species needs to be assessed.
Unranked at Present	Conceptual Mountainside and Cross-Valley Greenbelts	• Future conservation planning should address how to: (a) ensure future forests include more old forests (i.e., allow logged forests to develop back into old forests over time); and (b) maintain or ideally improve the ability of species to cross human barriers, notably Highway 99.

3.3 Non-Scoring (Information) Maps

Four Non-Scoring Layers were also included as background information, especially for helping future connectivity planning of the "Future Forest," (Section 7.1), Mountainside Greenbelts (Section 7.2), and Cross-Valley Greenbelts (Section 7.3). A map of Existing Conservation Areas (Section 7.4) is also included for information.

4.0 Priority Habitats Overview (Aggregated Scoring Layers Map)



Priority Habitats Overview Map

4.1 Description

The Priority Habitats Overview Map (above) will be the main entry point for most users to this project. It aggregates the highest value habitats as defined in each of the 20 Scoring Layers (Sections 5 and 6). It is produced by dividing the study area into 5 m x 5 m squares (pixels), then deriving the highest score from all of the 20 Scoring Layers. For example, if the highest score within that square is Very High on only one Scoring Layer, then that square will be ranked Very High. If that square is ranked as High on all 20 Scoring Layers, the resulting score would still only be High.

4.2 Methodology

The Priority Habitats Overview Map is a raster (point-based) map used to calculate the highest score per 5m x 5m square. Raster maps store their data as "bands." The first band in the Overview map lists the highest score on that square, and that is what is mapped. The additional 20 bands show scores for each of the 9 Ecosystem maps and 11 Species maps. This process included the following steps:

1. Priority Scores were calculated for the 20 Scoring Maps, each of which were mapped as shapefiles (that is, vector-based maps).

2. Priority Scores for the 20 base maps were collated in the "Scoring by Layer" raster layer. A raster map can only store integers within a given area (pixel). The pixel size used was 5m x 5m.
3. The highest Priority Score within each 5m x 5m pixel are presented in “Scoring by Layer”. This map also shows individual scoring for each map (shown as individual bands of data), i.e., it shows results from rasterizing those maps.
4. Note that some of the 20 contributing layers include a third Priority Score (Moderate Priority) which is not included in the Scoring by Layer or Priority Habitat Overview. This decision was made to highlight only the highest priority areas.

4.3 Useability

The Priority Habitats Overview Map is meant to provide users with the quickest way to assess where Very High and High Priority Habitats occur in the Whistler area. After receiving the data, the RMOW GIS Department added an excellent improvement to improve access and useability. Now when a user clicks on an area, all Scoring Layers that contributed to the overall score are listed (Figure 4-1).

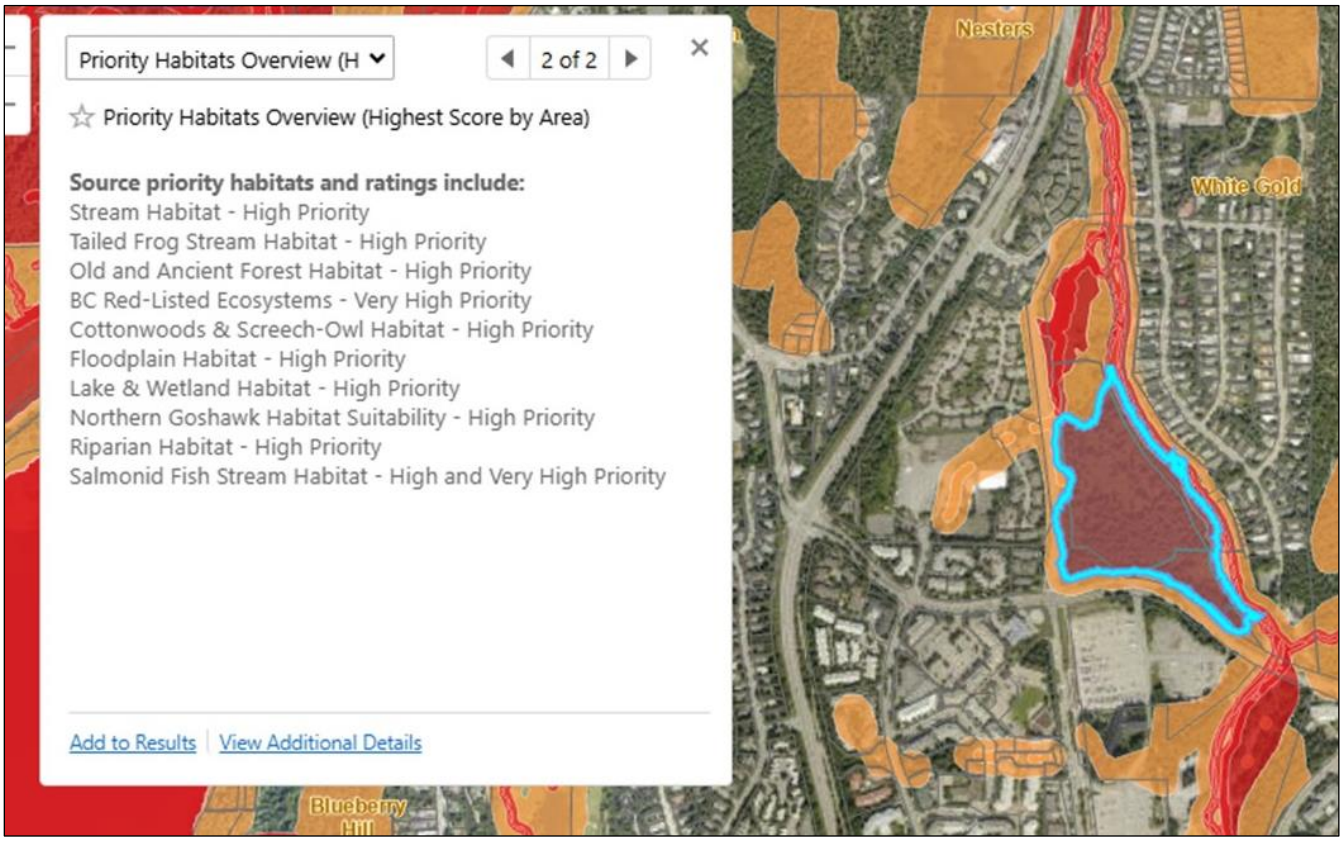


Figure 4-1. Detailed Information by layer available on the main Priority Habitats Overview Map. The area highlighted in blue (the Fitzsimmons wetland complex north of Village parking lots 4 and 5) is ranked as a Very High Priority Habitat. The box on the top left appears when a user clicks an area, then scrolls to the second page of the box. All Scoring Layers that include ranks of Very High or High for that site are included.

5.0 Scoring Layers – By Ecosystems (9 Maps)

5.1 Lakes and Wetlands

5.1.1 Description

Mapping of lakes and wetlands (Ecosystem Map 1a) is based on two main sources, RMOW GIS (2023) and TEM (Green 2004), plus additions/corrections from the 2023 orthophoto by this project. The distinction between lake and wetland is based on the area of the water body. Lakes are defined as waterbodies >1 ha; wetlands are defined as waterbodies and seasonally-inundated areas <1 ha. This approach meant that a total of 9 local lakes were identified: Alpha Lake, Nita Lake, Alta Lake, Lost Lake, Green Lake, Logger's Lake East Jane Lake, West Jane Lake, and "Far West" Jane Lake. All smaller ponds were included as open water wetlands.

There is a continuum between terrestrial ecosystems, wetlands, small ponds, and lakes. Mapping them often requires applying misleadingly precise boundaries between them. The simple area-based distinction between lakes and wetlands above is more a mapping convenience than a reflection of exact definitions. For example, BC defines a lake as "…an open waterbody with a depth greater than 2 m, and less than 25% of its surface area covered with wetland vegetation" and a wetland as "…any open waterbody less than 2 m deep" (BC MOE 2008). Meanwhile, the classification of wetlands in BC (Mackenzie and Moran 2004) includes seasonally wet areas that are vegetated and have no open water. These differing definitions demonstrate that the purpose of the classification often has more importance than the actual definition. Furthermore, it has no impact on this project since Priority Scoring is the same for lakes and wetlands, regardless of definition.

5.1.2 Rationale for Inclusion

Lakes, wetlands, and streams provide essential habitat for fish and other aquatic species. Most lakes, wetlands, and streams are already mostly protected in BC and the RMOW. Small and/or ephemeral wetlands and streams are, however, often not mapped and as a result have no explicit protection. Project goals for these ecosystems include: (i) add all possible elements from existing mapping and additions based on 2023 orthophotos; and (ii) identify those with the highest habitat value (including those with confirmed salmonid presence and/or beaver-affected wetlands; Section 6).

5.1.3 Scoring Criteria

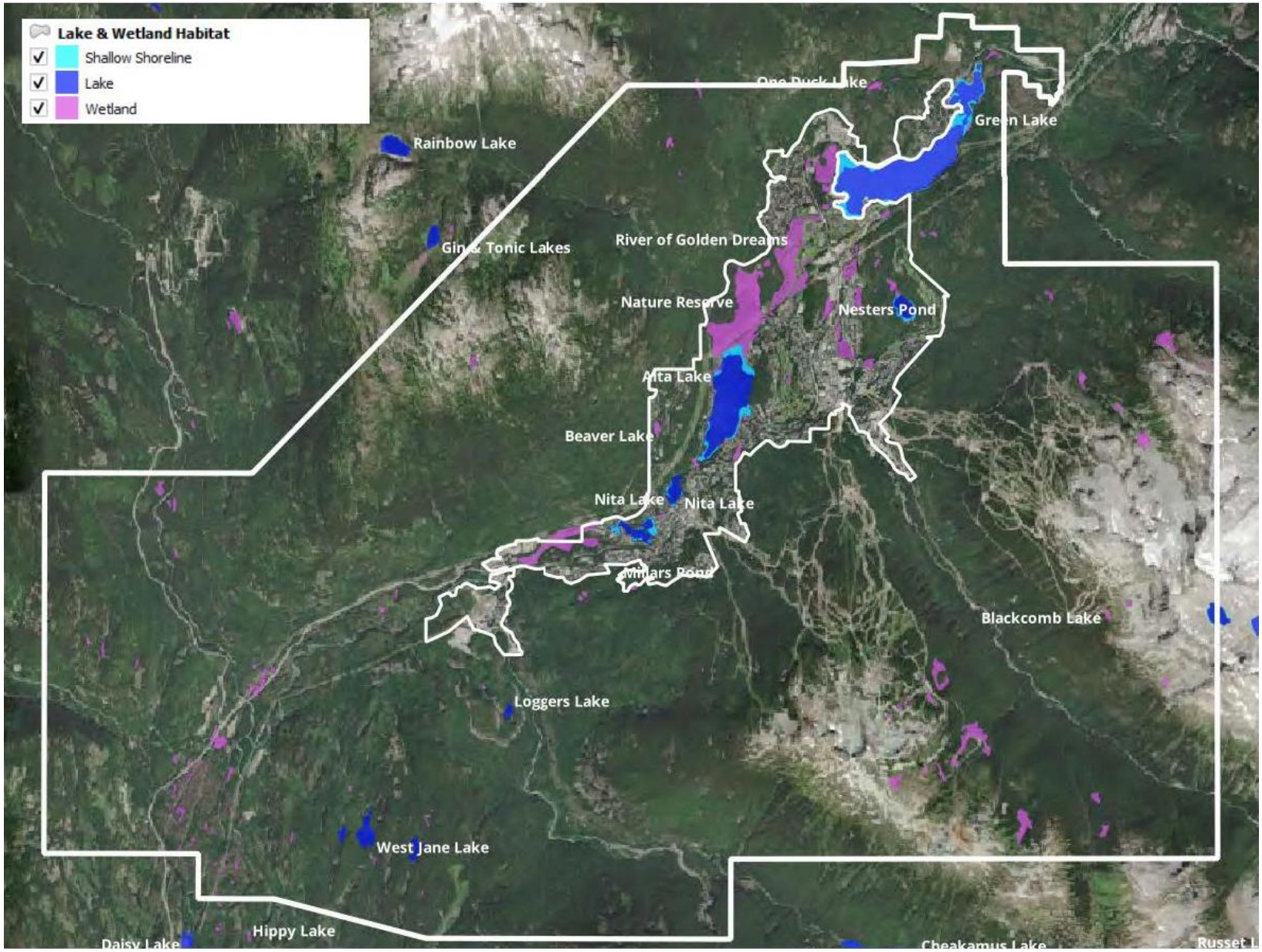
Very High Priority = Shallow Shorelines at the north end of Alpha & Alta Lakes, south end of Green Lake, and north & south ends of Lost Lake; Otherwise = High Priority (Ecosystem Map 1b). N.B. lakes and wetlands where salmonid fish are present are ranked Very High (Section 5.3). The Priority Habitats Overview map (Section 4) therefore shows all waterbodies with salmonid presence as Very High Priority.

5.1.4 Edits to source mapping

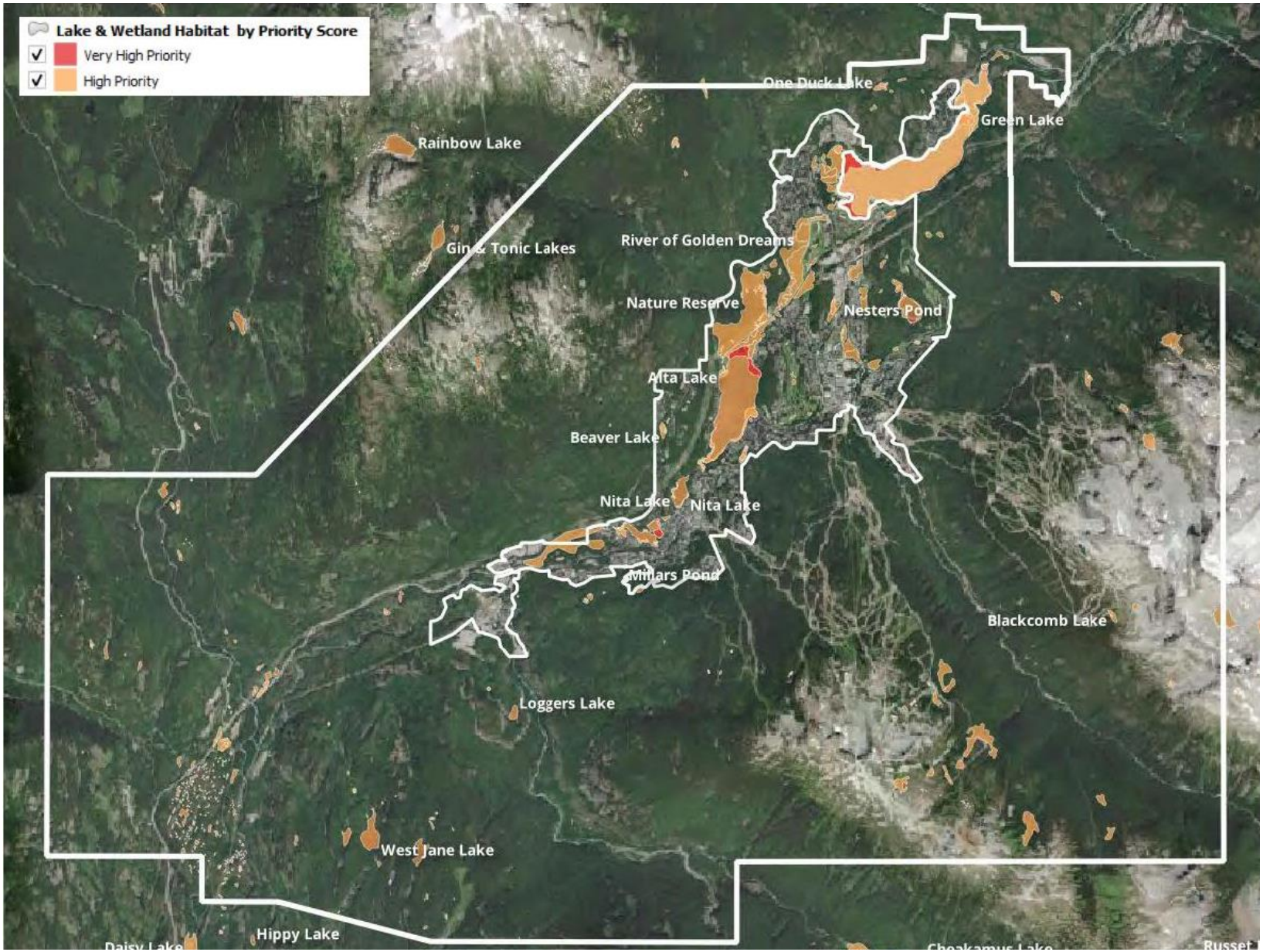
1. The RMOW TEM (Green 2004) did not state a clear distinction between lakes and wetlands, nor has there been a consistent definition on the RMOW Web Map. To improve useability, I discovered that a cutoff of 1 hectare limited the term "lake" to the nine waterbodies typically considered by local residents as lakes (listed above).
2. Many previously unmapped wetlands were added in the Brandywine basalt pond area, within Brandywine Falls Provincial Park. These additions were made using 2023 orthophotography that has a higher resolution than previous imagery and therefore showed small wetlands/ponds more clearly.
3. Identified Shallow Shoreline wetlands in valleybottom lakes (Section 5.1.5, below).

5.1.5 Shallow Shorelines

The 2004 TEM (Green 2004) mapped five types of wetlands as detailed above. One of them, Shallow Shoreline, is an ecosystem with water <2 m deep which allows aquatic vegetation to be present, some of which may emerge from the water surface. Green (2004) restricted mapping of this ecosystem to larger ponds rather than extending them into his concept of a lake ecosystem. This project is the first to include mapping of Shallow Shoreline ecosystems in lakes where those ecosystem conditions can also occur – these are mapped separately in light blue in Ecosystem Map 1, below. Shallow areas within Whistler's lakes provide critical habitat for shorebirds, including Shorebirds At Risk ((Section 6.5). Locating them on a map allows users to identify these high-value habitats.



Ecosystem Map 1a: Lakes and Wetlands



Ecosystem Map 1b: Lakes and Wetlands by Priority Score

5.2 Streams

5.2.1 Description

This updated Steams layer (Ecosystem Map 2a) joins separate mapping on the RMOW Web Map of "streams" and "rivers," which were separated due to the limitations of ArcGIS software rather than useability or ecological reasons. On the RMOW system, streams were mapped as lines, and rivers (which were mapped as having a width, or second dimension) were forced by ArcGIS onto a separate layer that allowed polygons.

5.2.2 Rationale for Inclusion

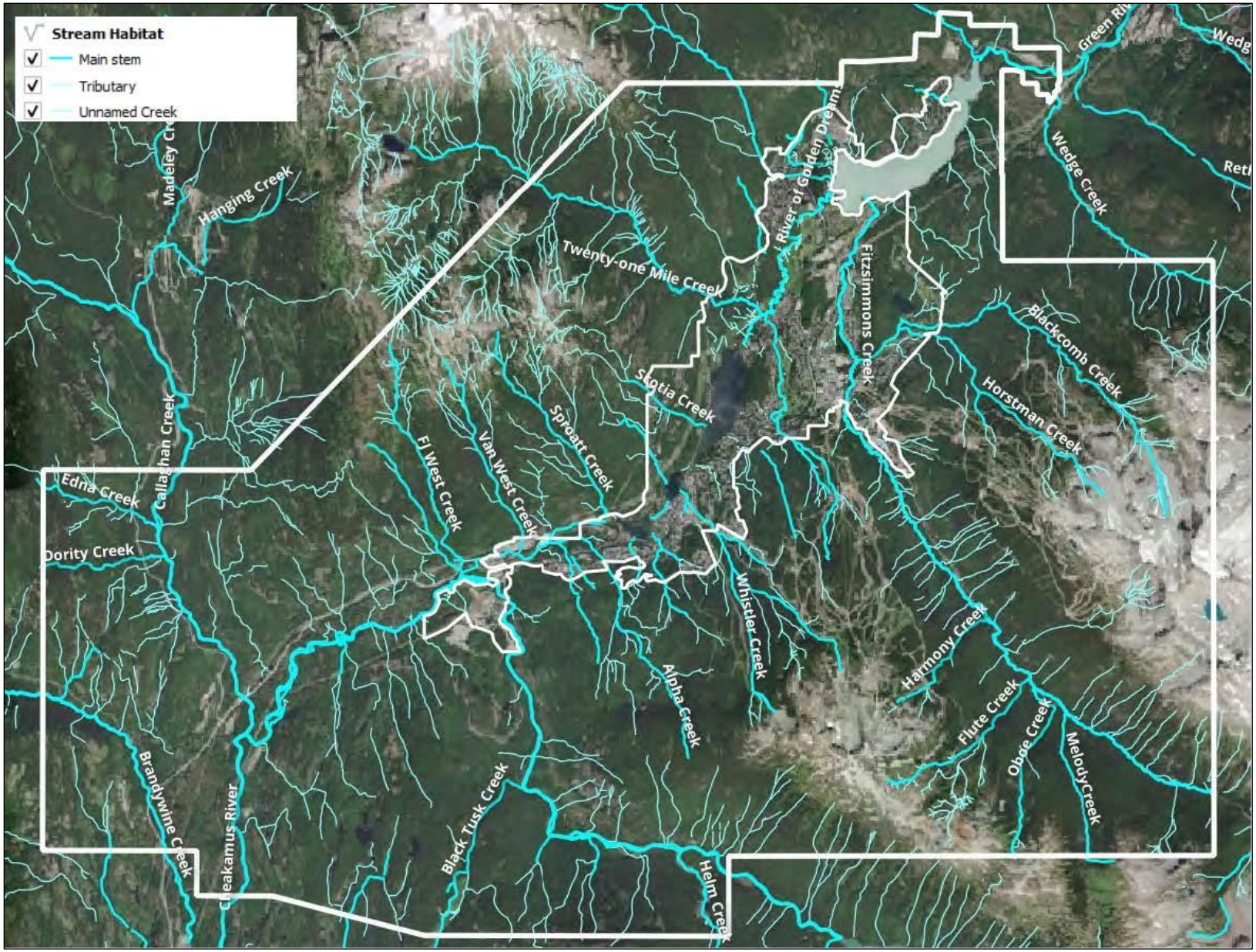
Lakes, wetlands, and streams provide essential habitat for fish and other aquatic species. Most lakes, wetlands, and streams are already mostly protected in BC and the RMOW. Small and/or ephemeral wetlands and streams are, however, often not mapped and as a result have no explicit protection. Project goals for these ecosystems include: (i) add all possible elements from existing mapping and additions based on 2023 orthophotos; and (ii) identify those with the highest habitat value (those with confirmed salmonid presence and/or beaver-affected wetlands; see below).

5.2.3 Scoring Criteria

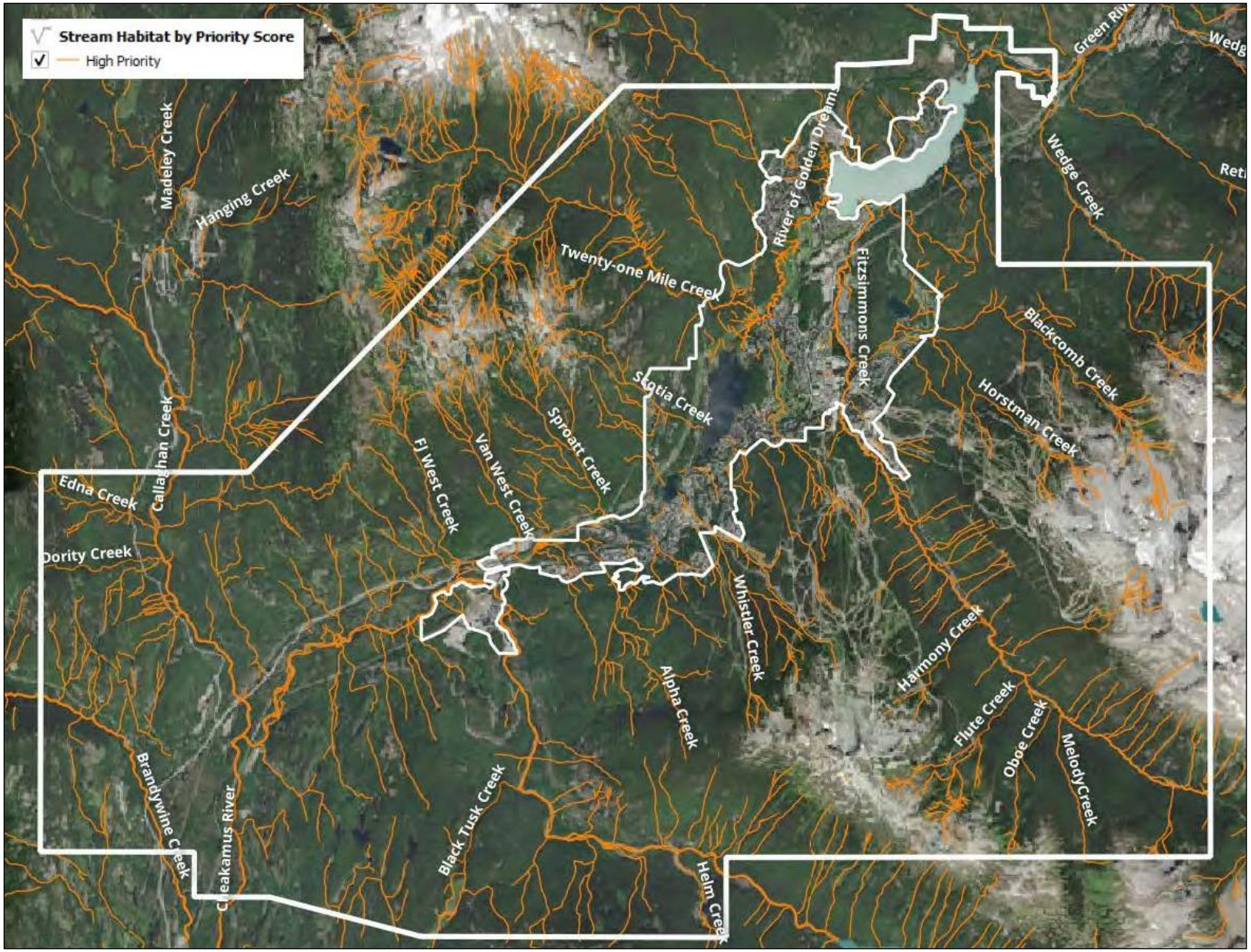
All = High Priority ((Ecosystem Map 2b). Note that streams with known presence of salmonid fish are all ranked Very High (Section 6.4). As a result, the Priority Habitats Overview map (Section 4) shows all waterbodies with salmonid presence as Very High Priority.

5.2.4 Edits to Source Mapping

1. Some stream segments were deleted if they appeared to be in error, e.g., appeared to flow back uphill, were discontiguous, etc.
2. Stream segments were joined then by watershed to allow more accurate identification. This process resulted in far fewer line segments labelled as "Stream" rather than by name of watershed.
3. Original RMOW data mapped streams and rivers separately due to software constraints. That is, streams were mapped as lines and larger rivers were mapped as polygons, and ArcGIS software does not allow two different shapes (lines and polygons) in the same file. Rivers were therefore redigitized as lines to merge the two features.



Ecosystem Map 2a: Stream Habitat



Ecosystem Map 2b: Stream Habitat by Priority Score

5.3 Riparian Buffers

5.3.1 Description

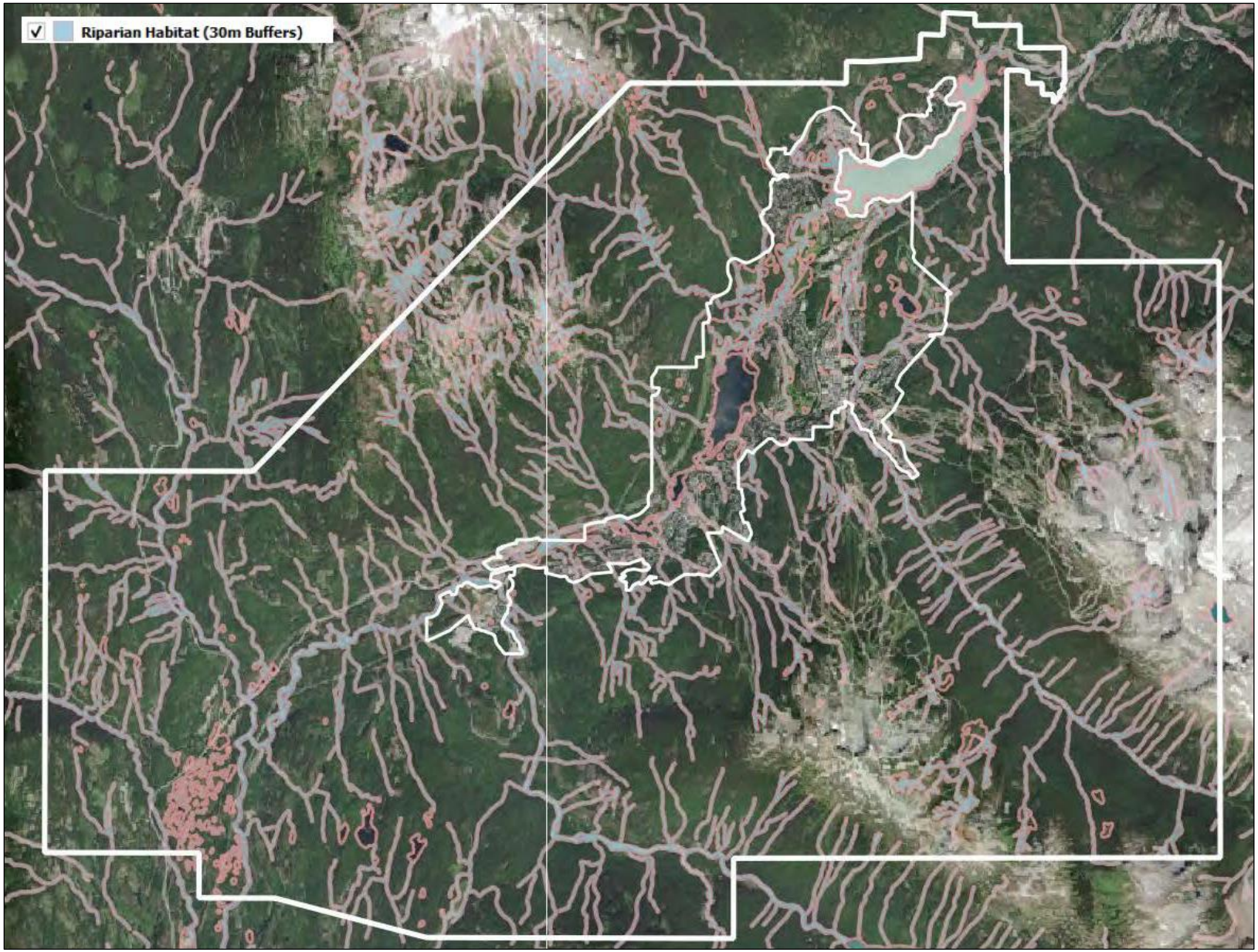
The Riparian Buffer map (Ecosystem Map 3a) applies 30 m buffers to streams, lakes, wetlands, and 10 m buffers to ravines as required by BC Riparian Areas Protection Regulation (BC Government 2023). Buffers are mapped as simple shapes that are 30 m from the edge of wet features and are not meant to imply accuracy at the site level.

5.3.2 Rationale for Inclusion

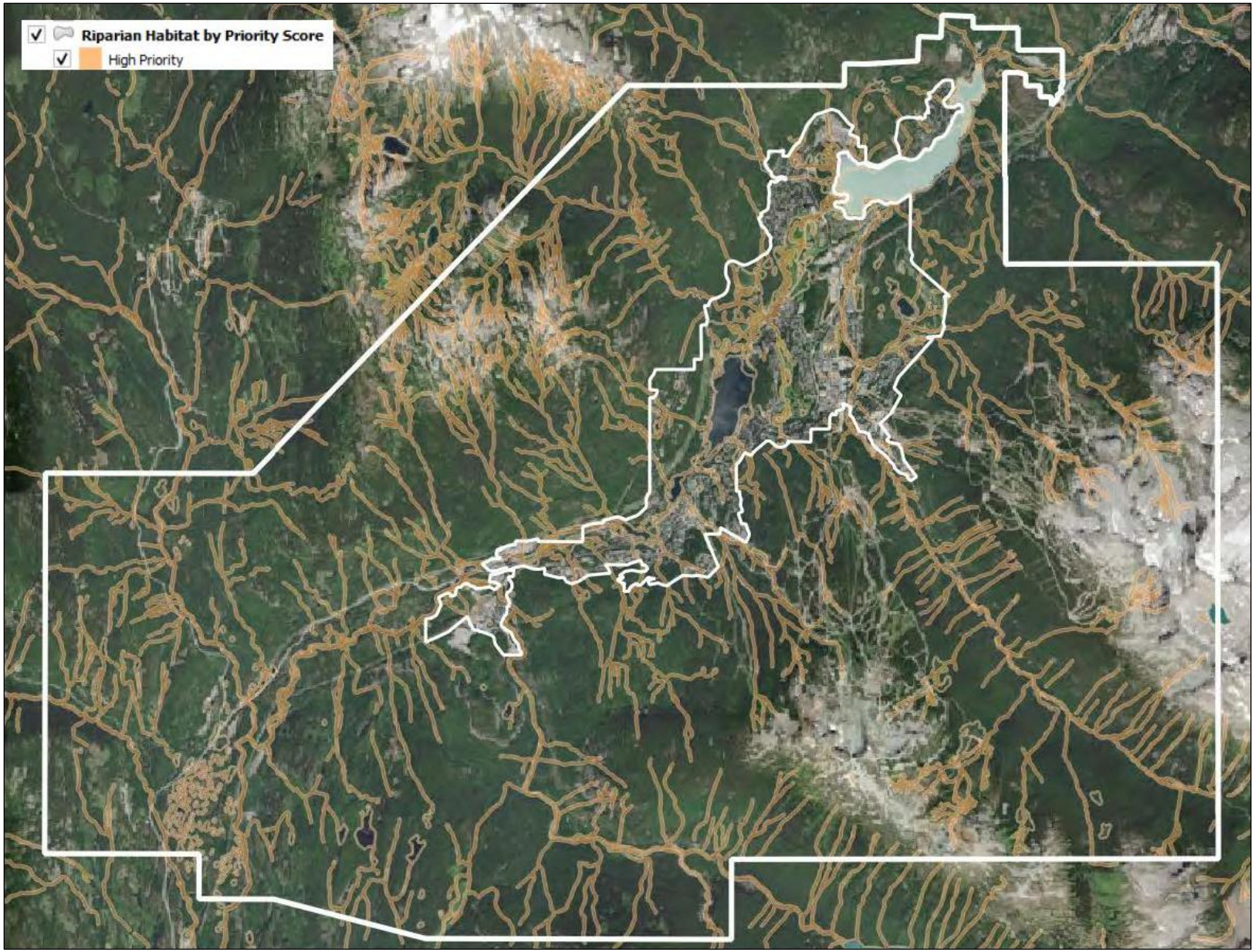
The term "riparian" is typically used to describe the interface between a lake, stream, or wetland and the adjacent upland (drier) area. These interface areas provide important ecological functions that contribute to water and habitat quality, e.g., temperature regulations, direct habitat, wildlife movement corridors, and filtering of water. Due to the lack of precise mapping of this interface, riparian areas are identified in this project 30 m buffers around lakes, streams, and wetlands.

5.3.3 Scoring Criteria

All = High Priority (Ecosystem Map 3b)



Ecosystem Map 3a: Riparian Buffers for Lakes, Wetlands, and Streams



Ecosystem Map 3b: Riparian Buffers for Lakes, Wetlands, and Streams by Priority Score

5.4 Floodplains

5.4.1 Description

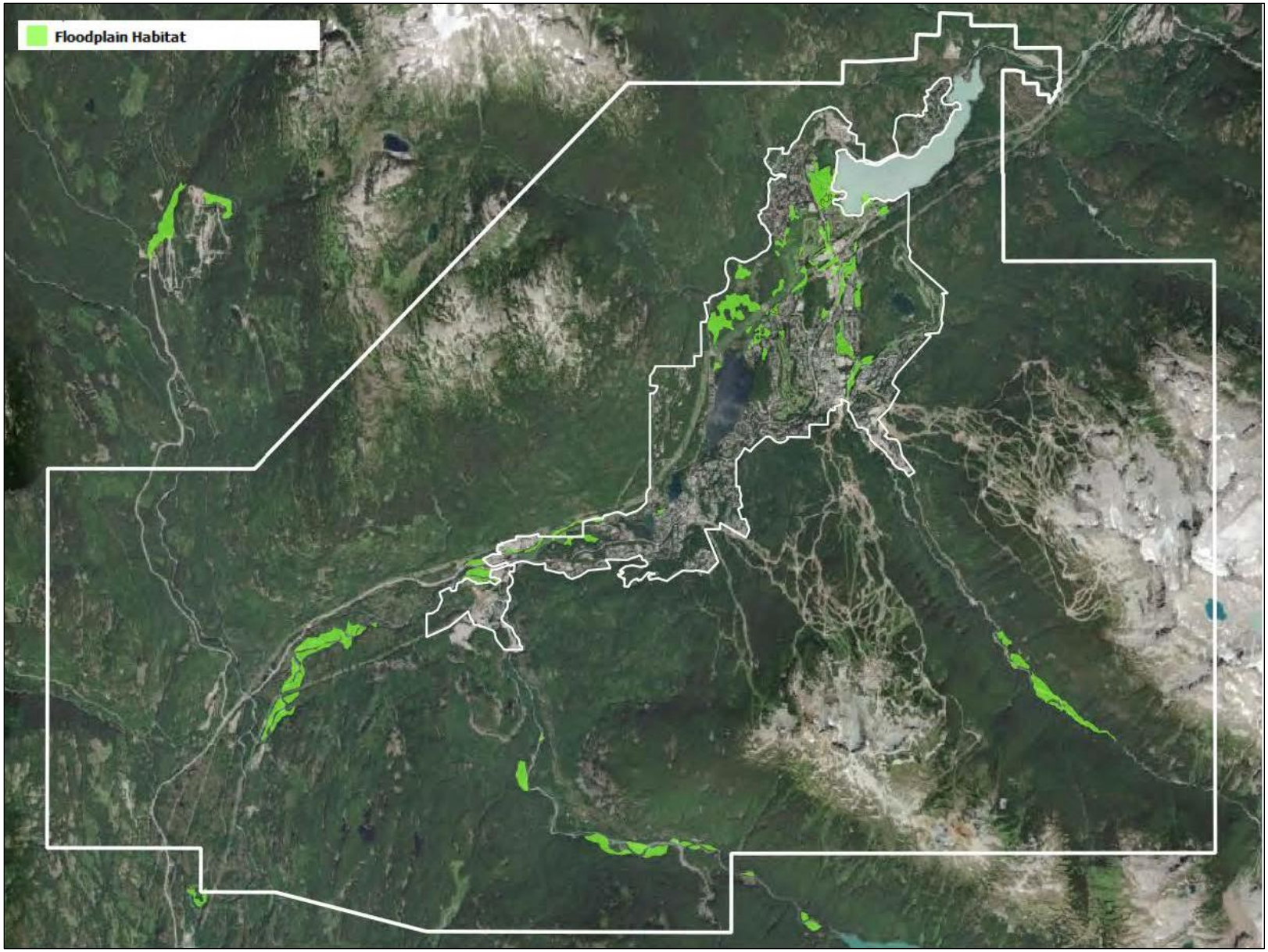
The main sources of Floodplains mapping (Ecosystem Map 4a) are the four TEM projects: RMOW TEM (Green 2004), Callaghan and Soo LUs (Timberline 2007a/b), and Whistler LU (Green 2010). Each have been Interpreted and edited for this project to ensure all polygons that include floodplains are mapped, even if they are a minor part (sub-unit) within that polygon.

5.4.2 Rationale for Inclusion

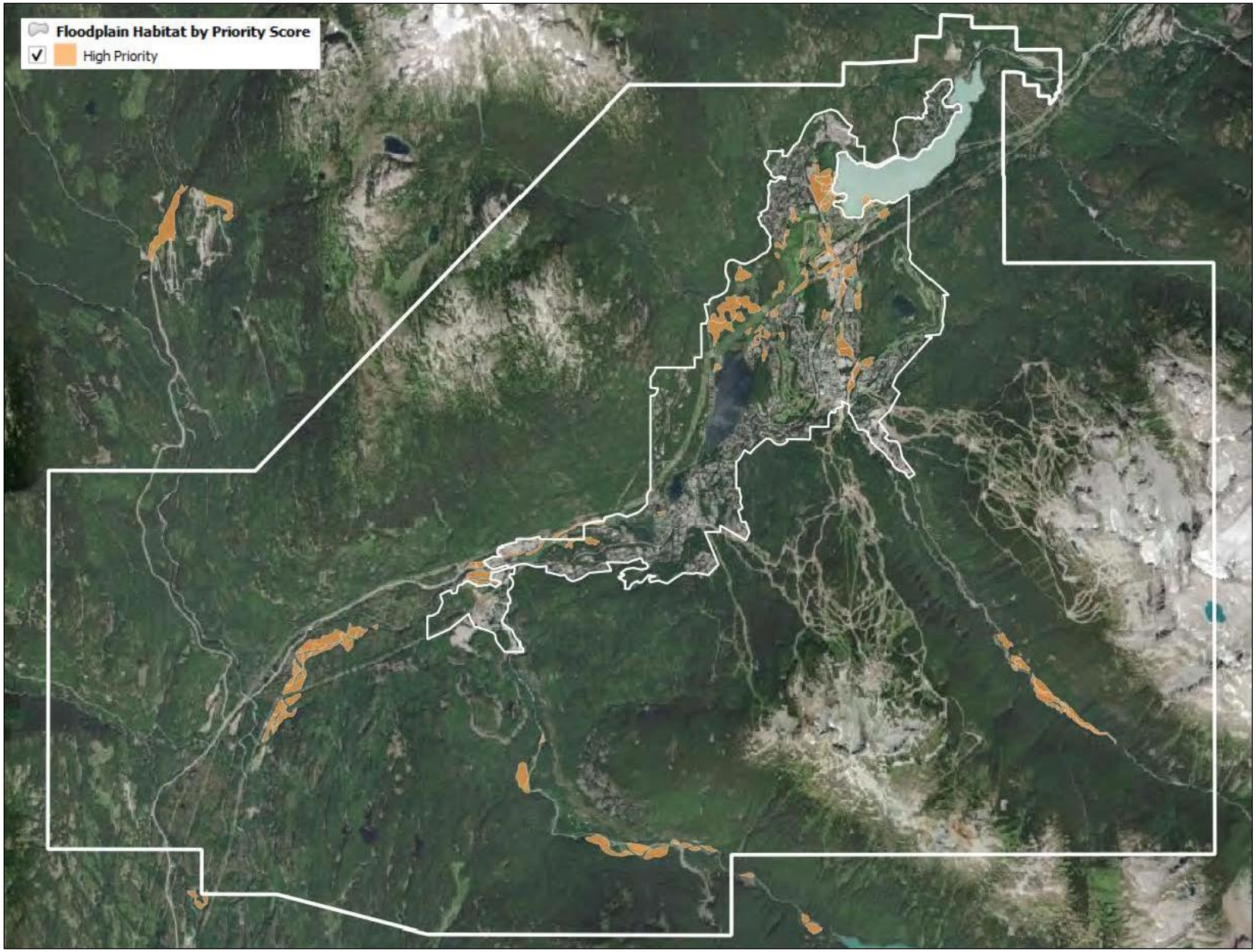
Floodplains are also riparian areas (though not all riparian areas are floodplains). Unlike Riparian Habitat described above, there is good mapping of floodplains in the RMOW TEM. Floodplains are most common along Whistler's largest rivers, e.g., Fitzsimmons, Cheakamus, and Callaghan Rivers. They provide important shrub and forest habitat, including cottonwood stands that have outsized habitat value given how many species use them (also see Cottonwoods and Screech-Owl Habitat below).

5.4.3 Scoring Criteria

All = High Priority (Ecosystem Map 4b).



Ecosystem Map 4a: Floodplains



Ecosystem Map 4b: Floodplains by Priority Score

5.5 Old and Ancient Forests

5.5.1 Description

The intent of the Old and Ancient Forests map (Ecosystem Map 5a) is to map the location and extent of Whistler's primary forests. While this may appear to be an easy task, age data for many of Whistler's unlogged forests often underestimates, sometimes significantly, their actual age (Section 2). Most logging in the Whistler area occurred in the past 100 years so all stands >99 years old were therefore assumed to be unlogged. Old = 250-399 years; Ancient = 400+ years.

This map is based on VRI data with some corrections based on coring data (Brett and Ruddy 2020; Brett unpublished data. See Section 2 for a discussion of limitations of VRI age data.

5.5.2 Rationale for Inclusion

The Old Growth Technical Advisory Panel (2021) defined old forests on BC's coast (including Whistler) as 250-399 years old, and ancient forests as 400+ years old. Virtually all unlogged stands in Whistler are >300 years old, and many (especially in subalpine areas) are much older than 400 years (Brett and Ruddy 2020; Brett unpubl. data). Unmanaged and old forests have many characteristics that make them important both from biodiversity and climate considerations. For example: they provide specialized habitat for many species, store vast amounts of carbon, directly cool the air, and regulate and filter water. Old forests are increasingly rare in BC and the rest of the world. Ancient forests are even rarer since they only occur in areas that have been fire-free for many centuries or even millennia. Local examples include the Brandywine, Callaghan, Twenty-one Mile, and Nineteen Mile Valleys, the unlogged forests on Blackcomb and Whistler Mountain, and in the Jane Lakes-Black Tusk area.

5.5.3 Scoring Criteria

Ancient (400+ years) = Very High Priority; Old (250-399 years) and Other Unlogged (100-249 years) = High Priority (Ecosystem Map 5b).

5.5.4 Terminology

Logged Forests (<100 years):

- Industrial logging did not start in Whistler until the 1920s, and the majority of the area's logging occurred between the 1930s and mid 1970s. Stands (polygons) with VRI <100 years therefore assumed to be previously logged.
- While age data for logged stands is generally accurate, the VRI data does not accurately differentiate between logged and unlogged stands younger than 100 years (the latter could include burned areas, treeline stands, etc.). This class could therefore include young stands that have not been logged.

Unlogged Mature Forest (100-249 years)

- At least some (and probably most) polygons shown in the VRI within this age range are actually older, unlogged stands, i.e., >250 years. This statement is based on coring data (Brett and Ruddy 2020; Brett unpubl. data). Further coring would be needed to clarify the actual ages of these and other stands.
- To complicate classification, many low-elevation stands were high-graded (partially cut) in the past century, especially for western redcedar.

Old = 250-399 years

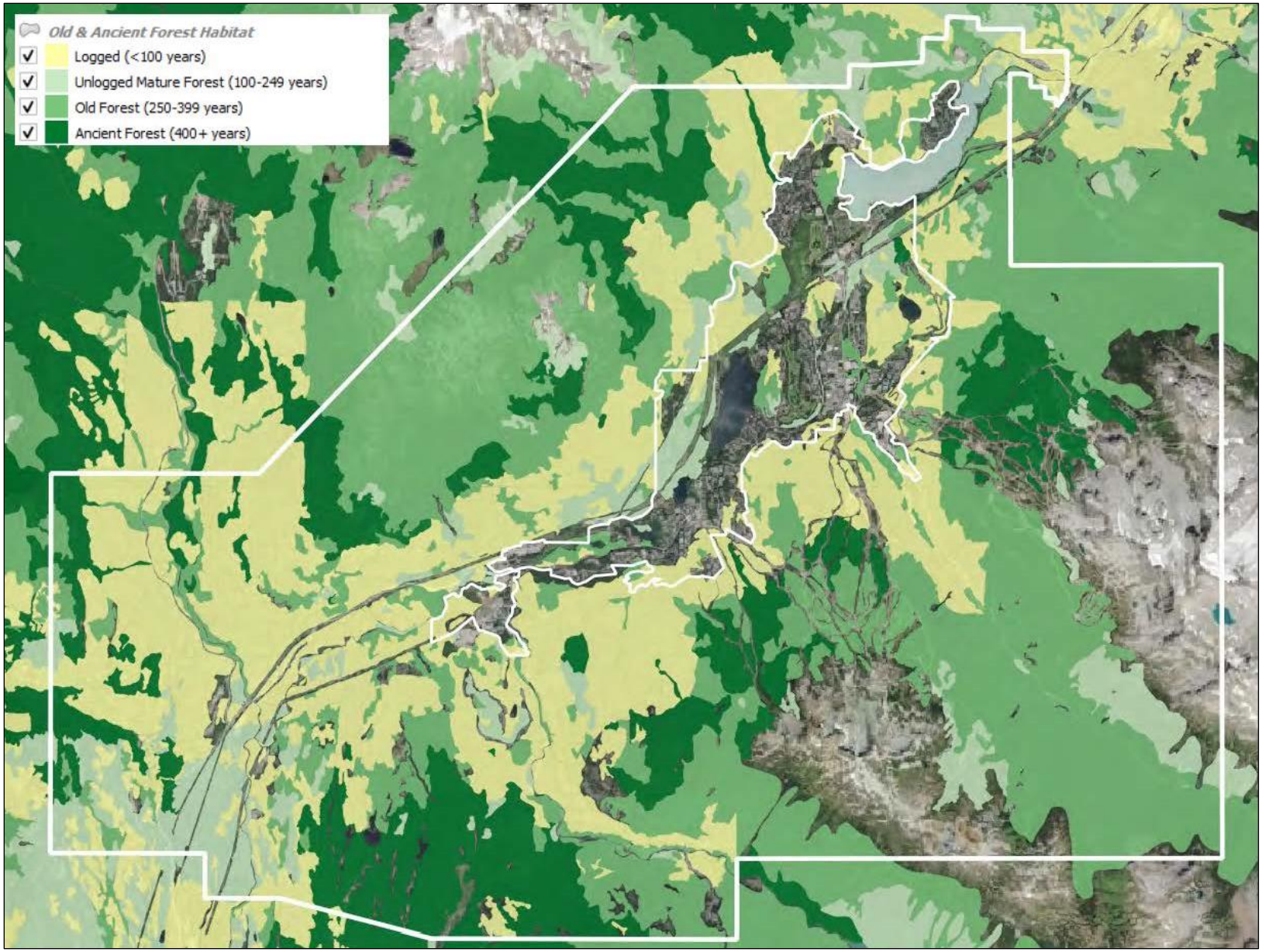
- The accuracy of age data in the VRI for older unlogged stands is variable. For low-elevation stands with shade-tolerant canopy trees (mainly Douglas-fir in our region), ages can be fairly accurate. (There are, however, some Douglas-fir stands >500 years old that are not shown in the VRI).
- The ages of stands with shade-tolerant species in the canopy layer are meanwhile typically underestimated in the VRI, often by many centuries. This is due to the methodology used to produce age data in the VRI: mainly air photo interpretation, some use of aerial surveys, and some coring in the field. Accurate ages of trees in these very old/ancient stands cannot, however, be determined without multiple cores analyzed under a microscope -- a process which was rare if ever applied to local stands in the VRI.

Ancient = 400+ years (including Yellow Cedar forests)

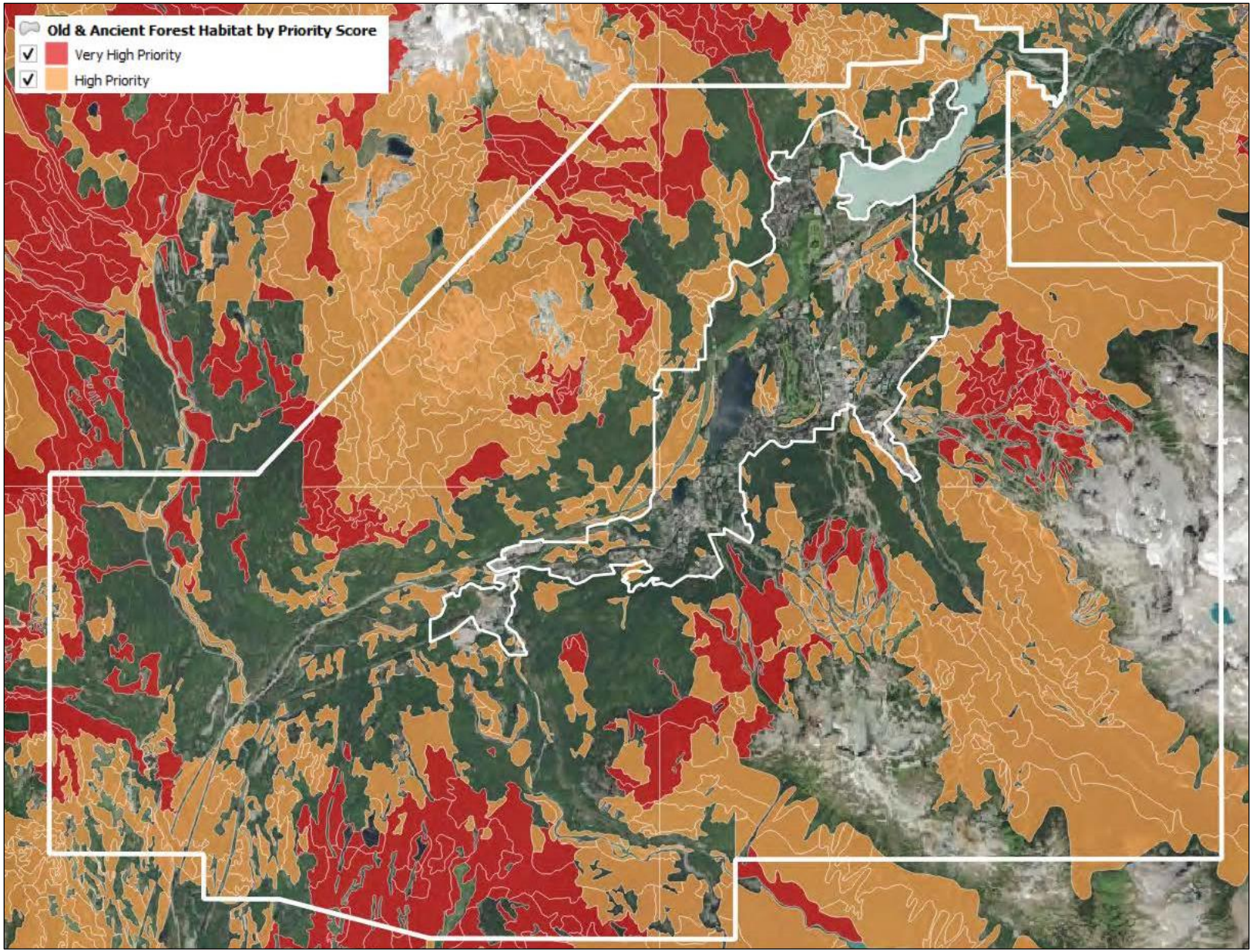
- Notes above apply here also.
- Based on coring data (Brett and Ruddy 2020; Brett unpubl. data), ancient forests are far more common than shown in the VRI, especially in north-south valleys such as Brandywine, Callaghan, Twenty-one Mile, Nineteen Mile, and Cheakamus. There are also extensive ancient forests on Whistler and Blackcomb Mountains.
- Yellow cedar is slow-growing, shade-tolerant, and exceptionally long-lived, e.g., numerous coring locations included trees>800 years and even >1300 years.
- In the absence of coring data for each polygon, the presence of yellow cedar in the canopy layer is therefore the best indicator that a forest stand is ancient. Polygons with yellow cedar in the canopy layer (656 polygons in the study area) are therefore classed as Ancient within this map. For transparency, they are duplicated in the "Yellow Cedar Ancient Forest" layer. See additional notes in that map.
- Further coring work is needed to improve the accuracy of age data in all stands, but especially ones dominated by shade-intolerant species that include western hemlock, western redcedar, mountain hemlock, and amabilis fir. These stands are most likely to be in "climax" or ancient stage, that is, uneven-aged, multi-generational forests.

5.5.5 Data Challenges

The overriding challenge in mapping Whistler's old forests is that the main source of age data, the Provincial VRI, often underestimates stand ages (Section 2.3). Those underestimates are greatest in older forests, especially ancient forests with shade-tolerant trees. This topic is discussed at length in Section 2.3 (TEM) and 2.4 (VRI).



Ecosystem Map 5a: Old and Ancient Forests



Ecosystem Map 5b: Old and Ancient Forests by Priority Score

5.6 Yellow Cedar Ancient Forests

5.6.1 Description

The Yellow Cedar Ancient Forests map (Ecosystem Map 6a) show which stands have yellow cedar in the canopy layer. Since yellow cedar grows so slowly, its presence in the canopy layer is a strong indicator that the stand is ancient (>400 years; Brett, unpubl. Data; Brett & Ruddy 2019).

5.6.2 Rationale for Inclusion

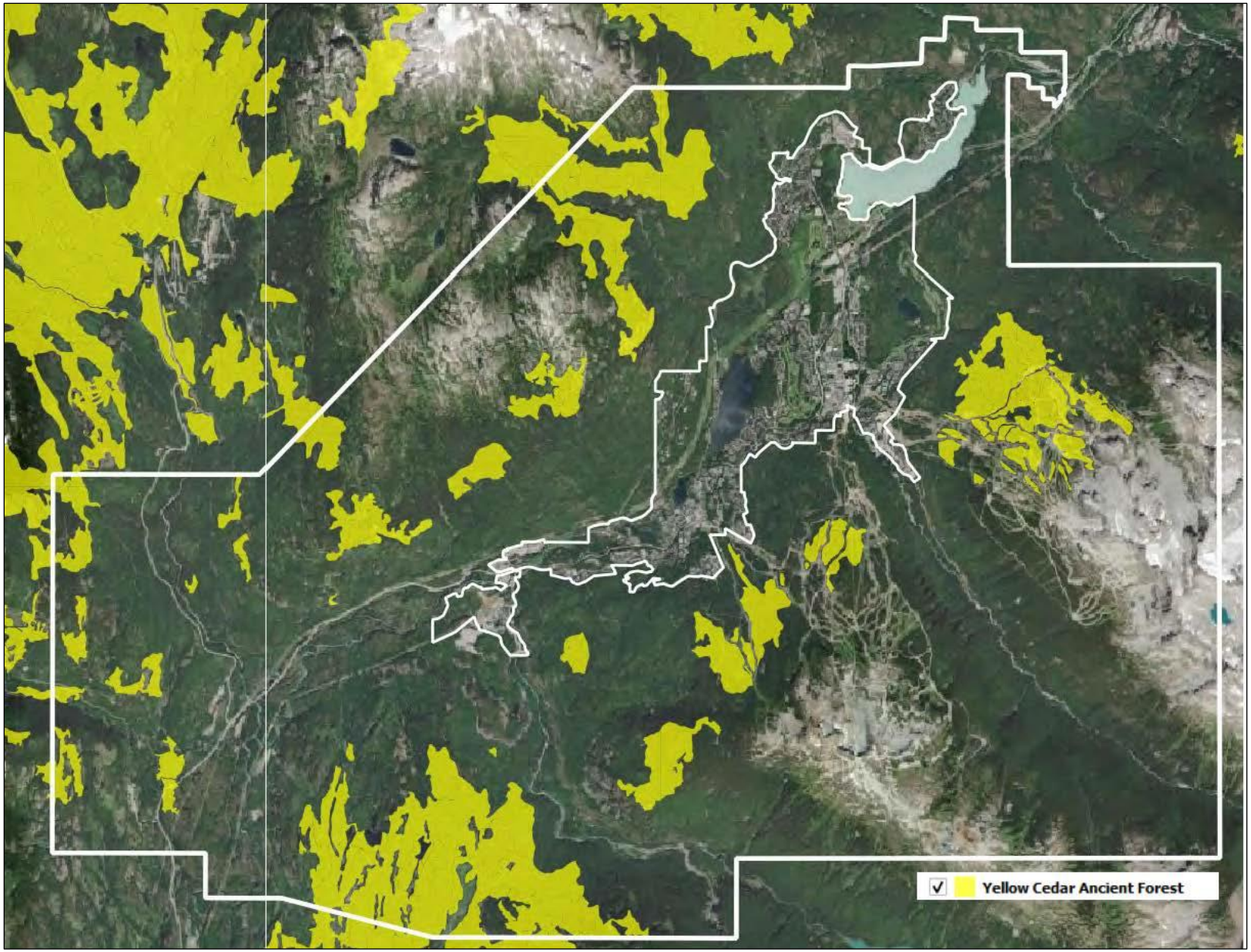
The data in this layer duplicates polygons added to the Ancient Forest class within the Old and Ancient Forest layer (Section 5.5). It is based on coring data (Brett and Ruddy 2020; Brett unpublished data) and the characteristics of yellow cedar – a species which is slow-growing, shade-tolerant, and exceptionally long-lived. Numerous coring locations included trees>800 years and even >1,300 years. In the absence of coring data for each polygon, the presence of yellow cedar in the canopy layer is therefore the best available indicator that a forest stand is ancient. A total of 656 polygons meeting these criteria are duplicated here from the Old and Ancient Forest Habitat map. Also see notes in the metadata for that layer.

5.6.3 Scoring Criteria

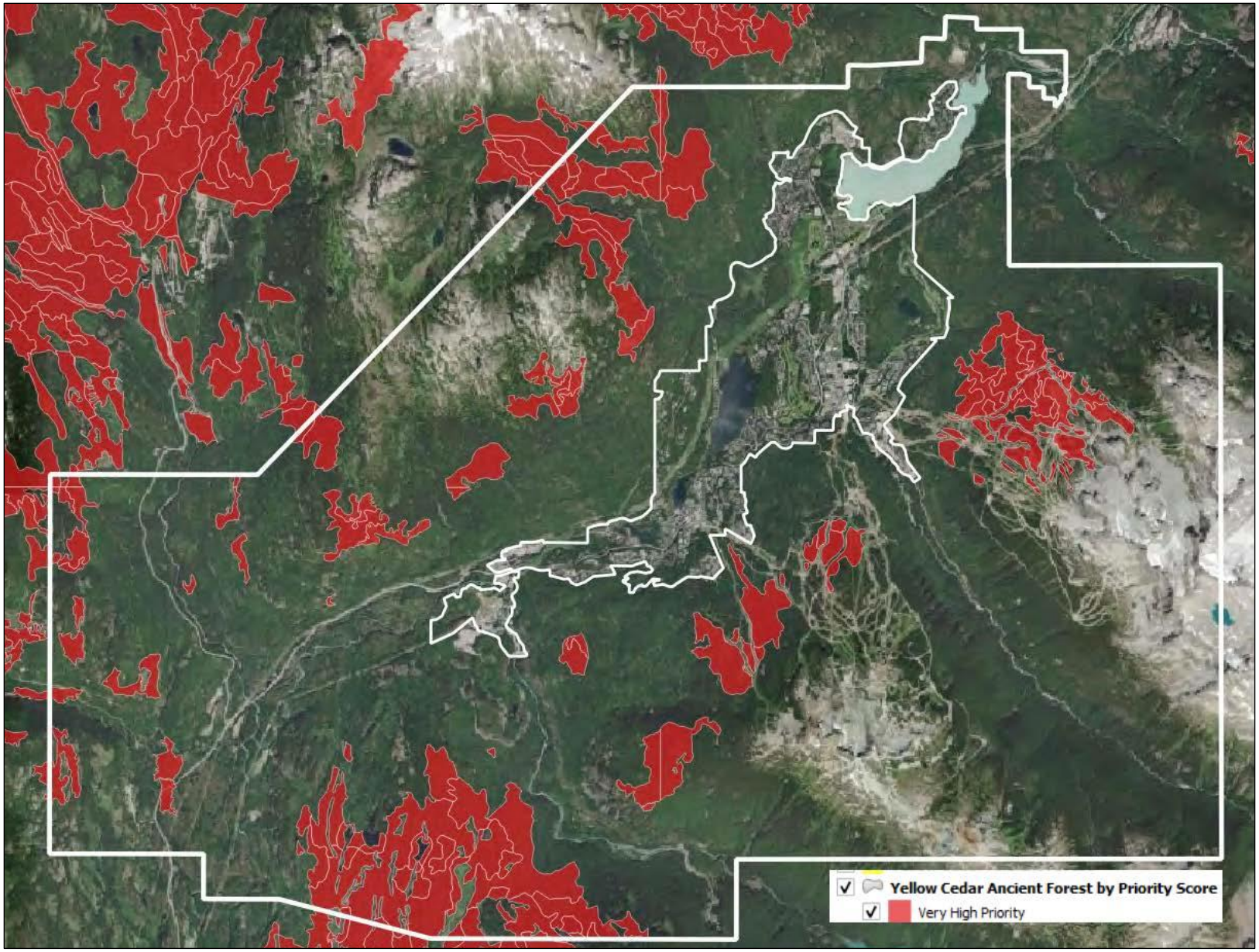
Very High Priority = Yellow cedar present in canopy of unlogged stands (Ecosystem Map 6b).

5.6.4 Data Challenges:

The challenge of ages that are underestimated in the VRI are discussed above and in Sections 2.3 and 5.5. An additional challenge is that the presence of yellow cedar in the canopy may be underrepresented. This comment is based on my observation that some stands that I have visited appear to have a larger component of yellow cedar in the canopy than reported. If that is true, one reason could be that yellow cedar may not be as visible to air photo interpreters since it often has a dead and therefore very narrow top.



Ecosystem Map 6a: Yellow Cedar Ancient Forests by Priority Score



Ecosystem Map 6b: Yellow Cedar Ancient Forests by Priority Score

5.7 Big Tree Forests

5.7.1 Description

The Big Tree Forests layer (Ecosystem Map 7a) actually maps tree (timber) volume in cubic metres (m3) per hectare as reported in the VRI. Volume per hectare is used as a surrogate for the availability of large trees that are critical to forest-dwelling species. The term Big Tree Forest is used to help convey that concept to lay users. It should be noted that only the volume of commercial species is included which potentially reduces the applicability of this mapping for non-timber purposes such as this project.

5.7.2 Rationale for Inclusion

The stand volume in cubic metres (m3) of merchantable trees is used as a proxy for large trees. The presence of large and tall trees (hence large volumes) is probably the single most important habitat characteristic in forests. Not only do large live trees provide habitat and ecosystem connections for countless species, they are also necessary to produce future habitat as dying and dead standing trees and, ultimately, large wildlife logs. The quantify and quality of habitat increases exponentially with the diameter of trees, especially as snags and wildlife logs. Larger snags and logs provide much more habitat volume and also retain moisture much longer than smaller trees. These habitat elements provide critical (and increasingly rare) habitat for cavity-nesting birds and mammals, as well as many other species groups such as invertebrates, fungi, etc.

The reason Big Tree Forests are included here is also related to rarity. Before logging began in the early 1900s, most of the valleybottom would have had old forests with very high volumes. The rationale for this claim is that the first areas to be logged were typically at lower elevations and on sites with the biggest trees. In turn, the reason for such high volumes was that those valleybottom ecosystems included some of the richest, most productive growing sites. Foresters classify the productivity of forested areas through a metric called Site Index, which is the expected height a tree would grow in the first 50 years of growth on a particular site. A comparison of Site Index and Stand Volume in the Whistler area (Figure 5-1) demonstrates that:

- Site Index is typically higher (darker green) in the valleybottom; and that
- There are few stands left in the valleybottom with high stand volume (darker blue).

The areas with the highest remaining volumes (and big trees) are therefore unlogged stands, especially in the Jane Lake-Black Tusk area. The reason to map Big Tree Forests (i.e., those with high stand volumes) is therefore to highlight the highest productivity stands that have not yet been logged. It is these stands that still provide big tree habitat.

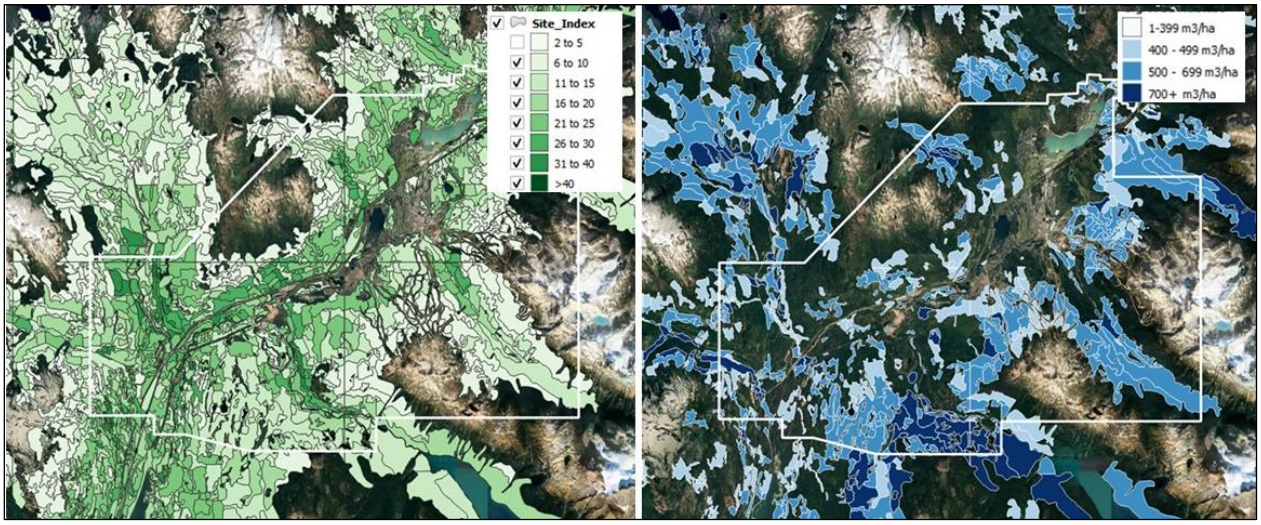
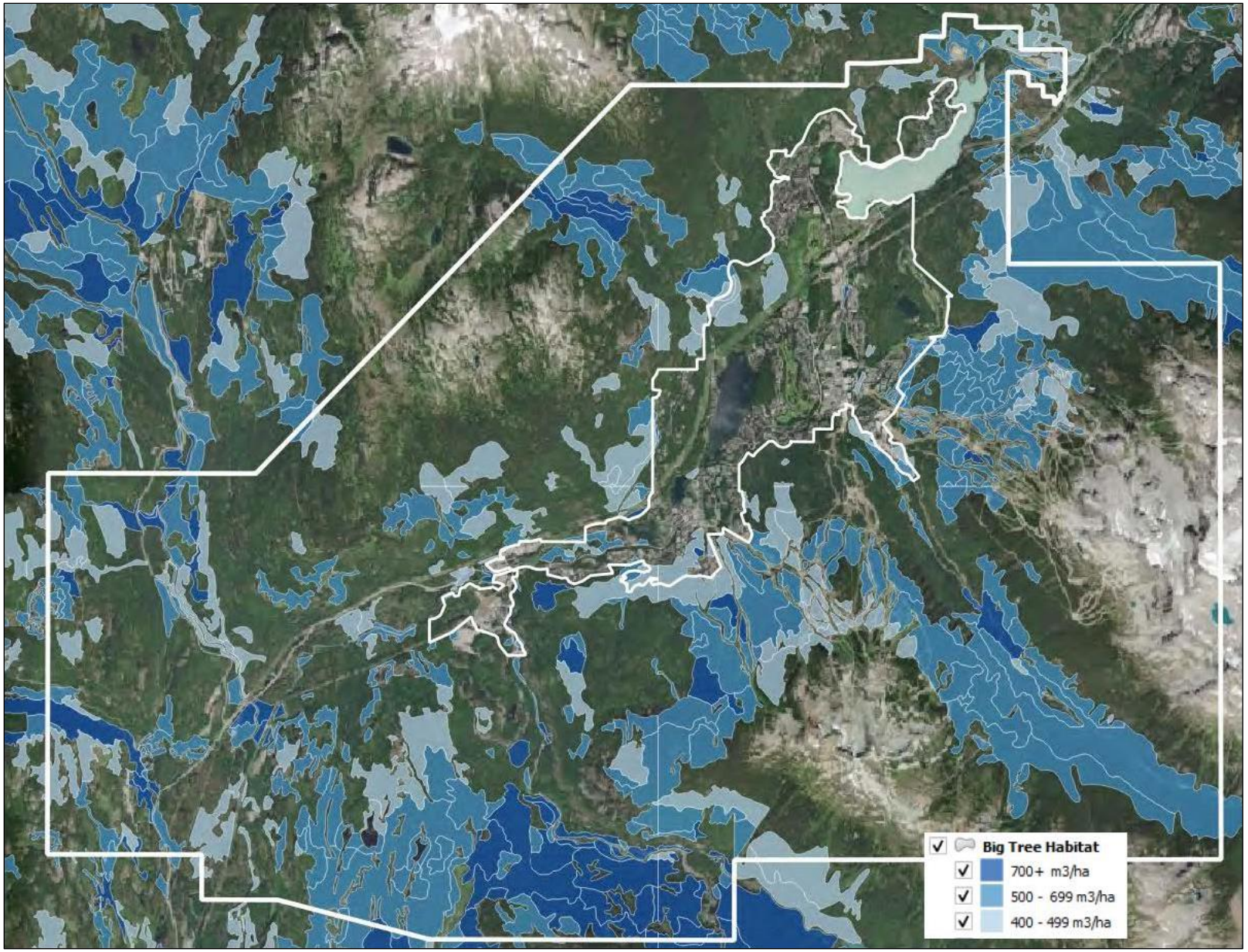


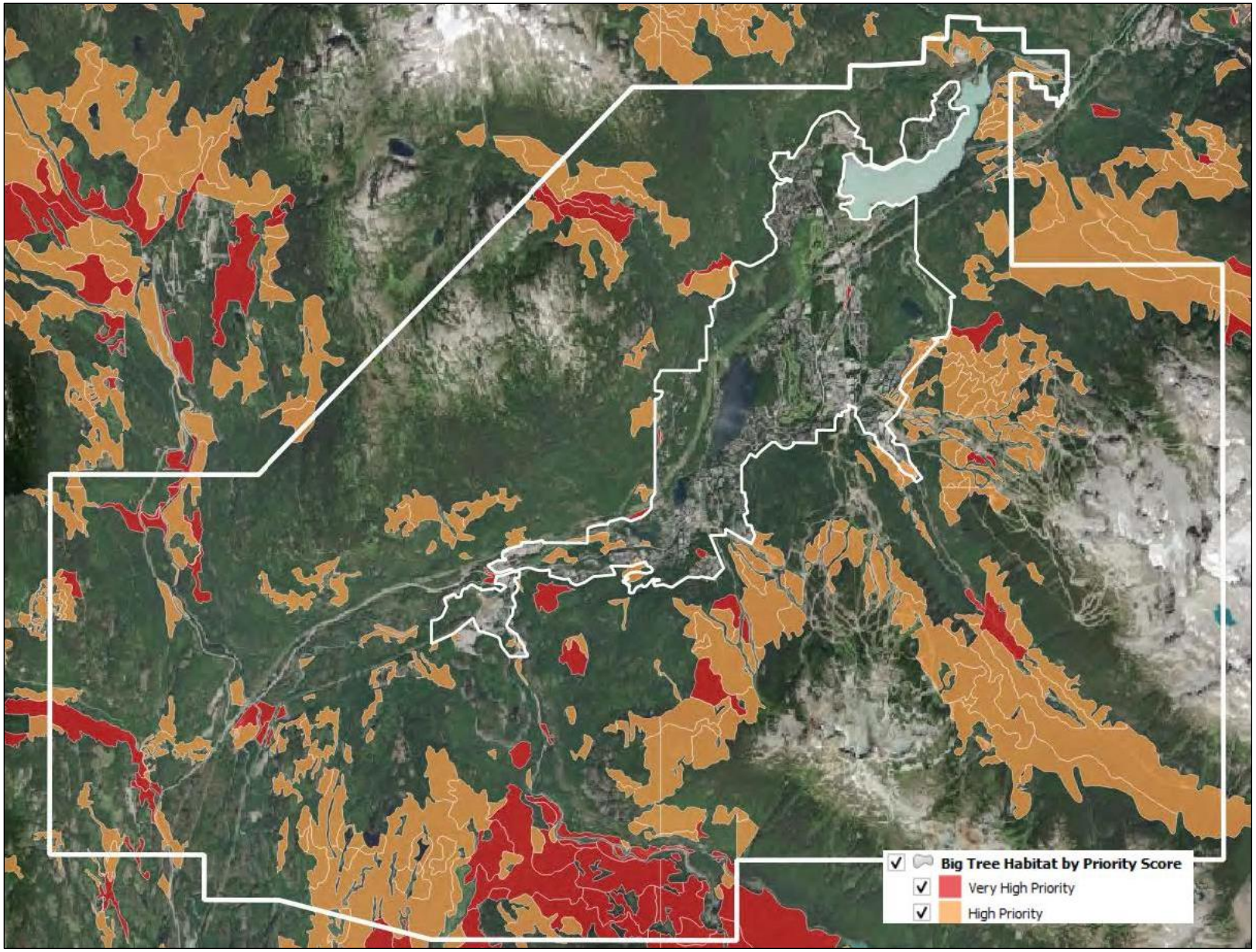
Figure 5-1. Site Index (left) compared to Stand Volume (right). Darker green means higher Site Index. Darker blue means higher Stand Volume.

5.7.3 Scoring Criteria

Very High Priority (>699 m3); High Priority (500-699 m3); Moderately High (400-499 m3; (Ecosystem Map 7b).



Ecosystem Map 7a: Big Tree Forests



Ecosystem Map 7b: Big Tree Forests by Priority Score

5.8 Largest Old Forest Patches (CWH)

5.8.1 Description

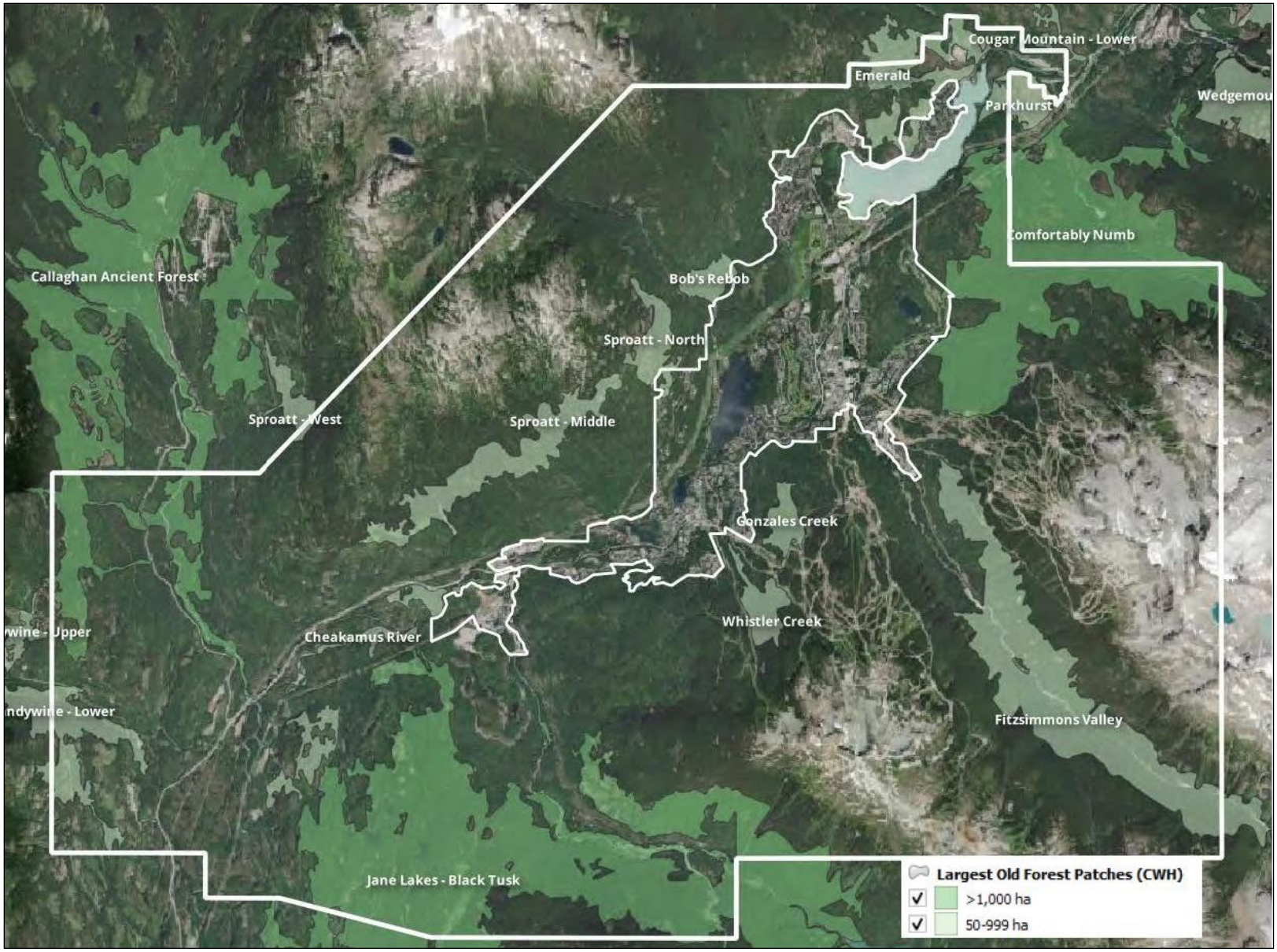
The Largest Old Forest Patches map (Ecosystem Map 8a) is calculated by grouping adjacent polygons in the Coastal Western Hemlock (CWH) Zone that have old and ancient forests (>250 years). The purpose of limiting this analysis to CWH forests is because most logging has occurred at lower elevations (within that zone) which means large, contiguous patches of old and ancient forests are rare on the landscape.

5.8.2 Rationale for Inclusion

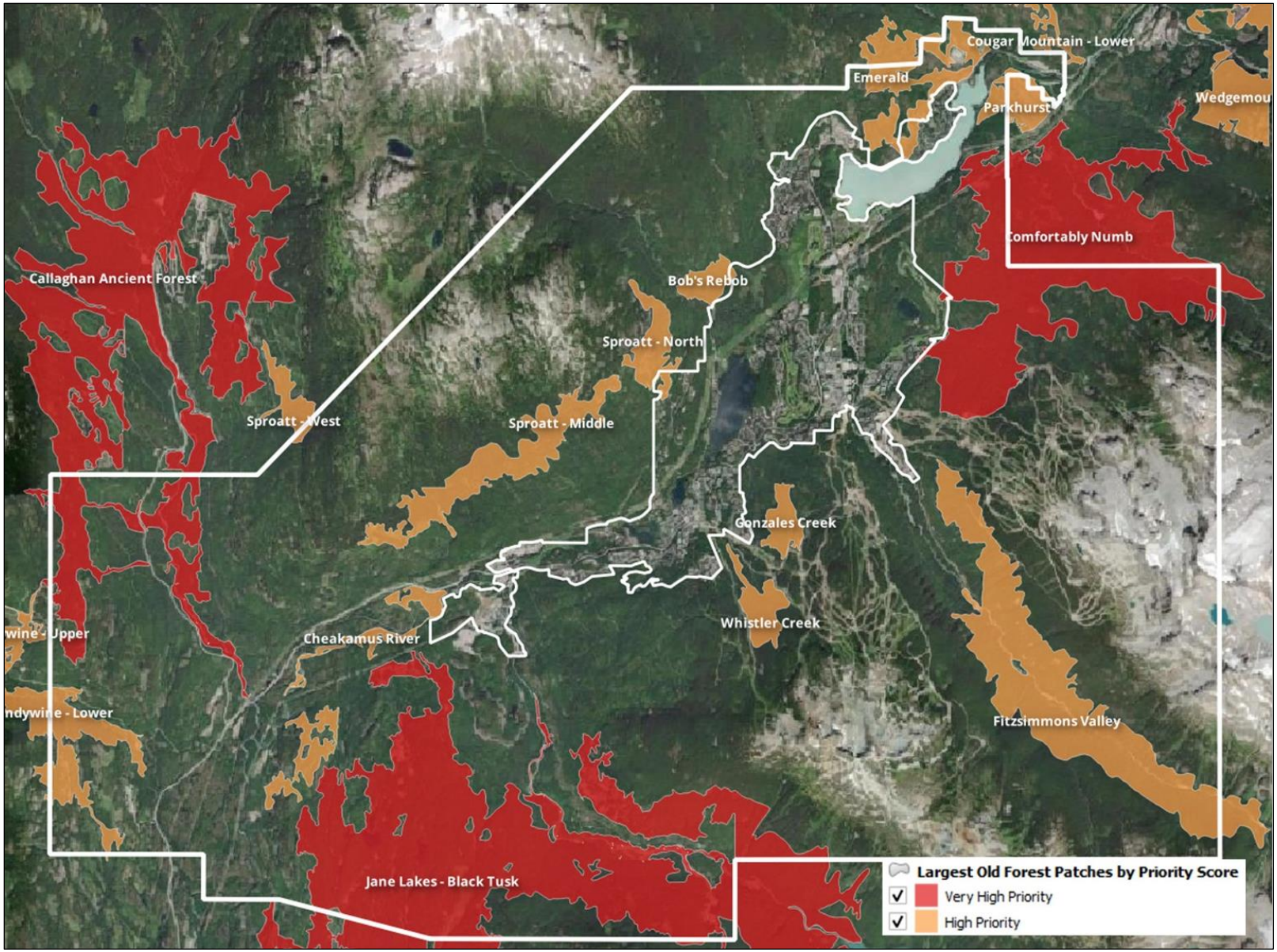
Connectivity is a key concept in landscape ecology. It is based on data that demonstrates that the spatial arrangement of habitats can be as important as the total area of them. For example, many species require interior habitat such as the part of a forest that is two or more tree lengths inside the edge of that stand. A landscape that is heavily fragmented by roads and other disturbances has much less interior habitat than unroaded and unlogged forest stands. The forest patches here include the largest patches of unlogged forests left at lower elevations in the Whistler area.

5.8.3 Scoring Criteria

Very High Priority (>1000 ha); High Priority (50-999 ha; (Ecosystem Map 8b).



Ecosystem Map 8a: Largest Old Forest Patches (CWH)



Ecosystem Map 8b: Largest Old Forest Patches (CWH) by Priority Score

5.9 BC Red-Listed Ecosystems

5.9.1 Description

The Red-Listed Ecosystems map (Ecosystem Map 9a) ecosystems as ranked by the BC Conservation Data Centre (CDC[6]). These ecosystems are discussed in more detail in the RMOW's Species and Ecosystems at Risk reports (Brett 2022; in prep.). Blue-listed ecosystems are excluded from this mapping (see rationale below).

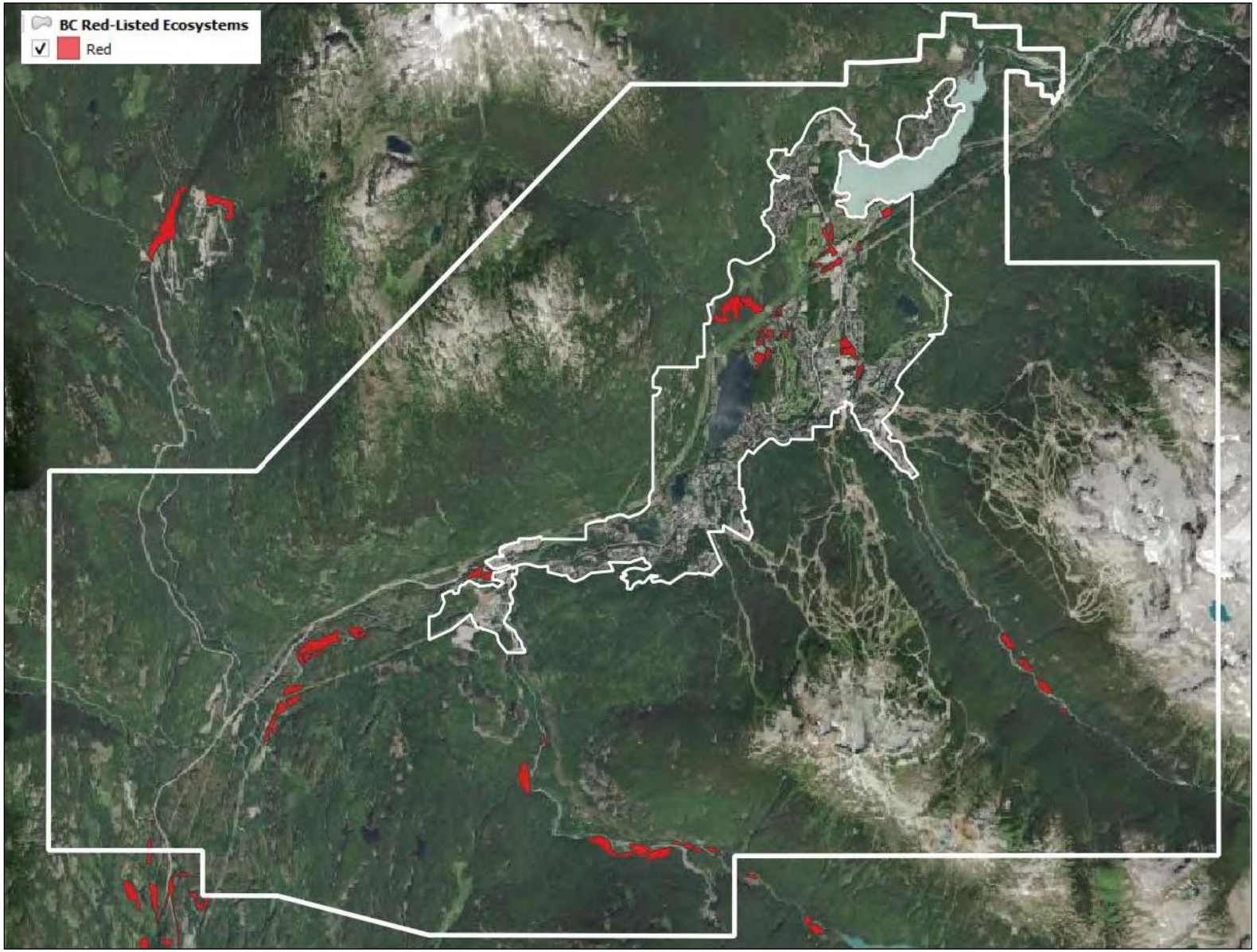
5.9.2 Rationale for Inclusion

The 2018 Priority Habitat mapping included all Red- and Blue-listed ecosystems, which meant that virtually all forested areas in the RMOW were shown as priorities. Since one of the goals of the 2024 update was to have a narrower definition of which areas are the highest priorities, only Red-listed ecosystems are shown. Within the study area, all Red-listed ecosystems are in floodplain forests.

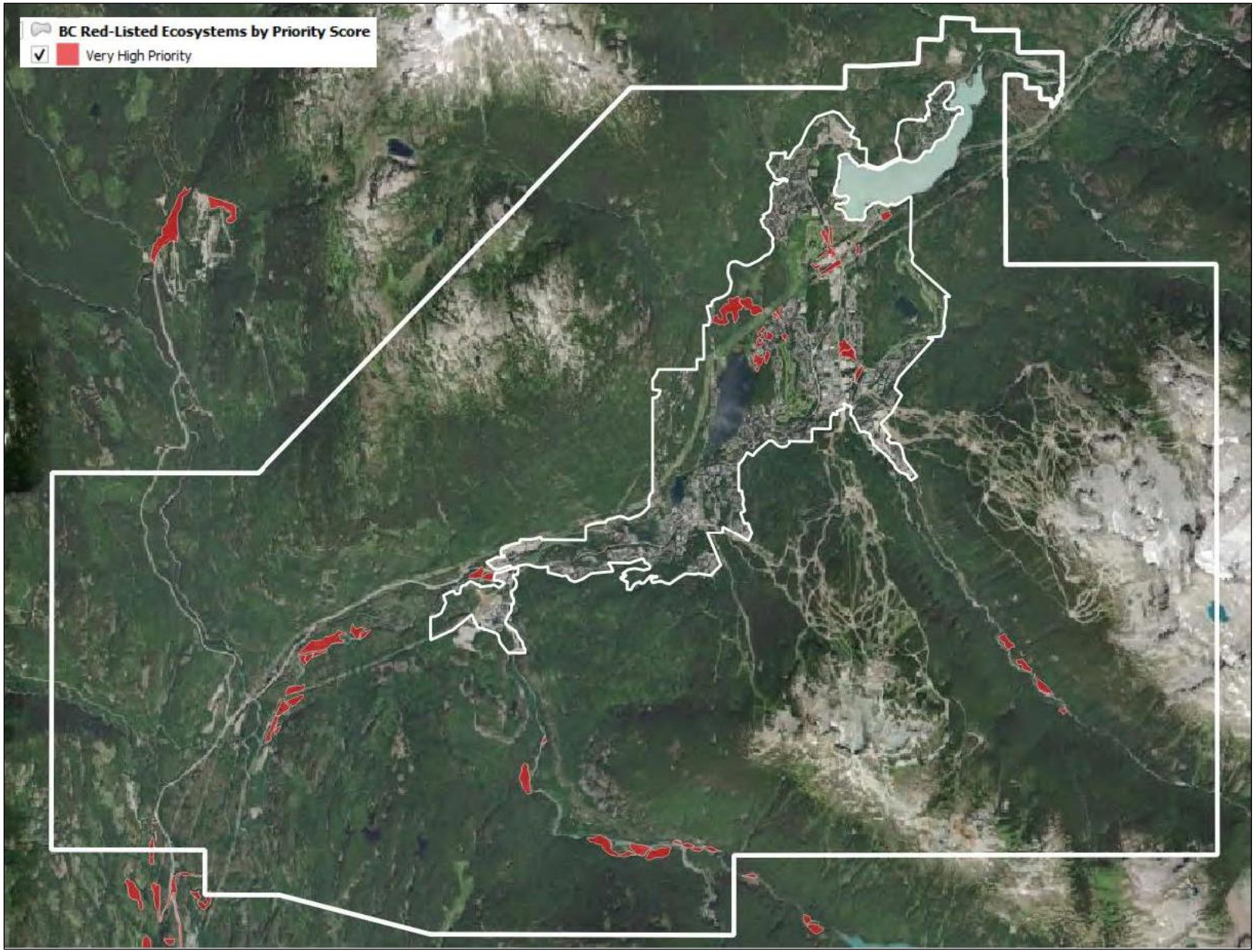
5.9.3 Scoring Criteria

BC CDC Red List = Very High Priority (Ecosystem Map 9b). Note that Blue-listed ecosystems are not shown, but include most of the unlogged forested landbase at lower elevations (CWH Zone).

[6] https://a100.gov.bc.ca/pub/eswp/.



Ecosystem Map 9a: BC Red-Listed Ecosystems



Ecosystem Map 9b: BC Red-Listed Ecosystems by Priority Score

6.0 Scoring Layers – By Species (11 Maps)

6.1 Beaver-Affected Wetlands

6.1.1 Description

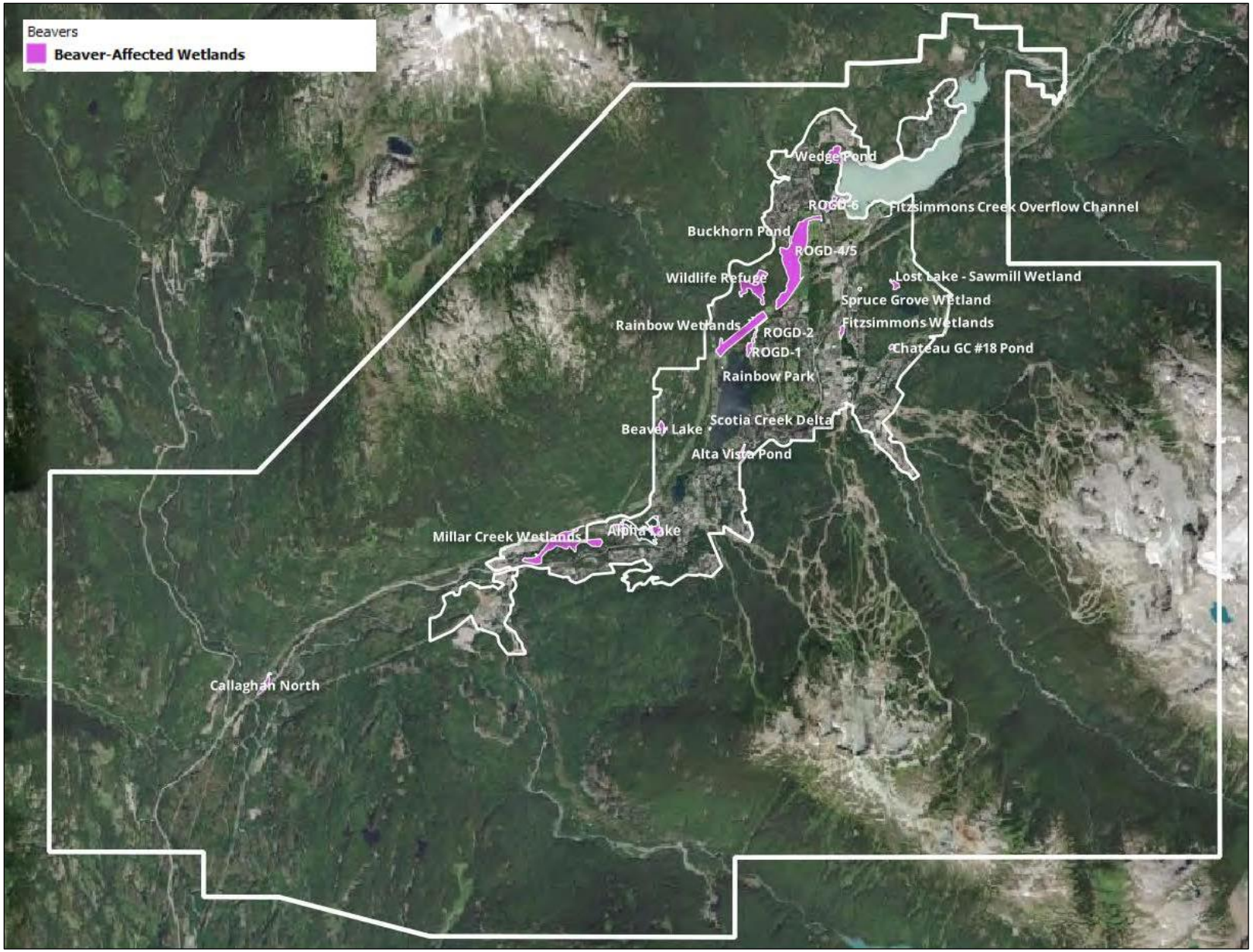
The Beaver-Affect Wetlands map (Species Map 1a) shows wet areas created, modified, and/or maintained by beavers. It is based on data from annual surveys originated by the Whistler Biodiversity Project in 2007. Bob Brett created the first mapping of beaver-affected wetlands in 2018 (in Palmer and Snowline 2019). It was most recently updated in 2023 (Snowline 2023).

6.1.2 Rationale for Inclusion

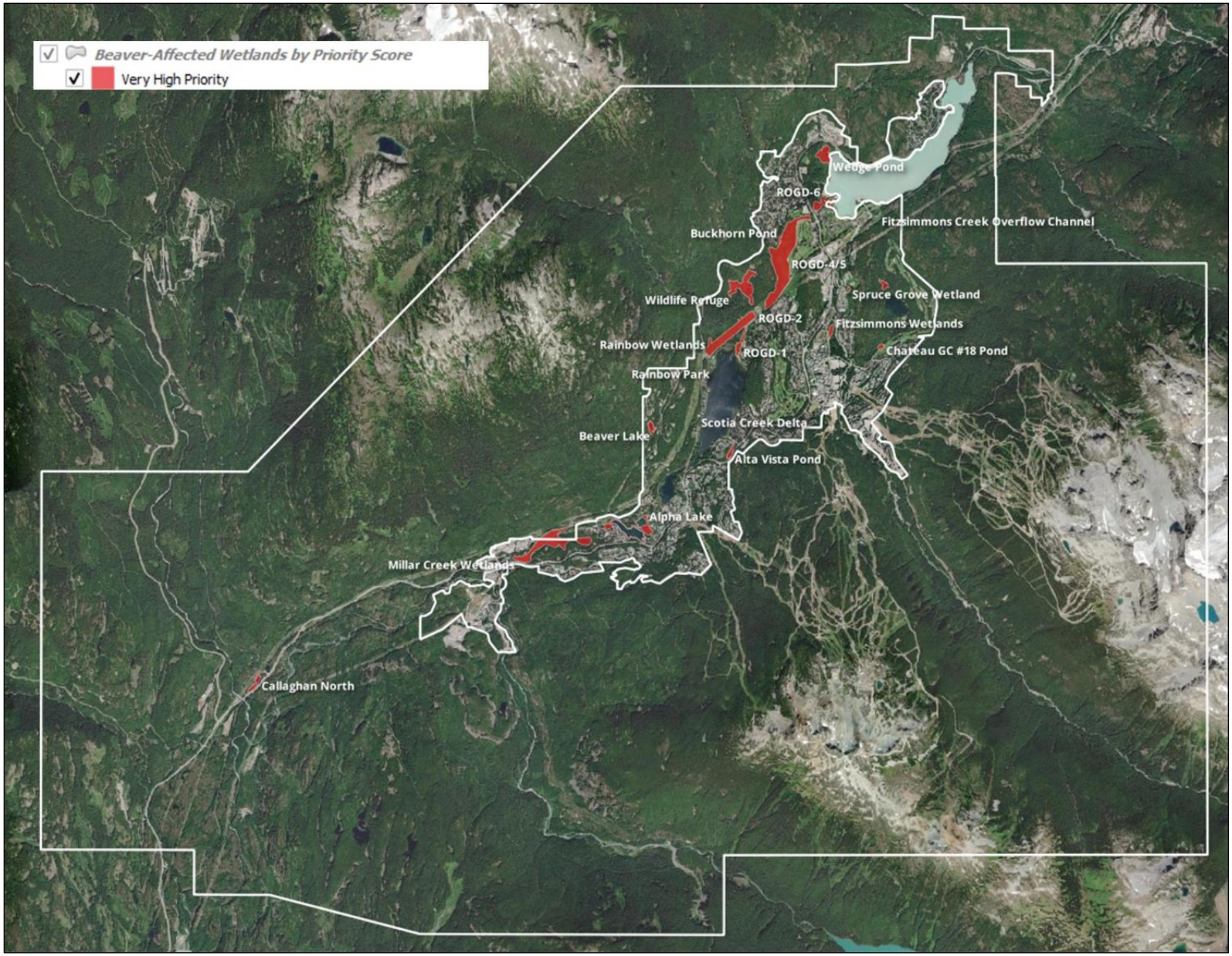
The ecological significance of beavers in a wide valley such as Whistler cannot be overstated (cf. Snowline 2023 and other annual RMOW Ecosystems and Species Monitoring Program reports). All large wetlands and many smaller ones within the valleybottom were created and/or are maintained by beavers. By raising water levels, beavers create habitat for other species, thereby maintaining biodiversity. The wetlands also help achieve the RMOW's climate goals by storing water and carbon, and regulating water flows.

6.1.3 Scoring Criteria

All = Very High Priority (Species Map 1b).



Species Map 1a: Beaver-Affected Wetlands



Species Map 1b: Beaver-Affected Wetlands by Priority Score

6.2 Red-Legged Frogs and Western Toad Ponds

6.2.1 Description

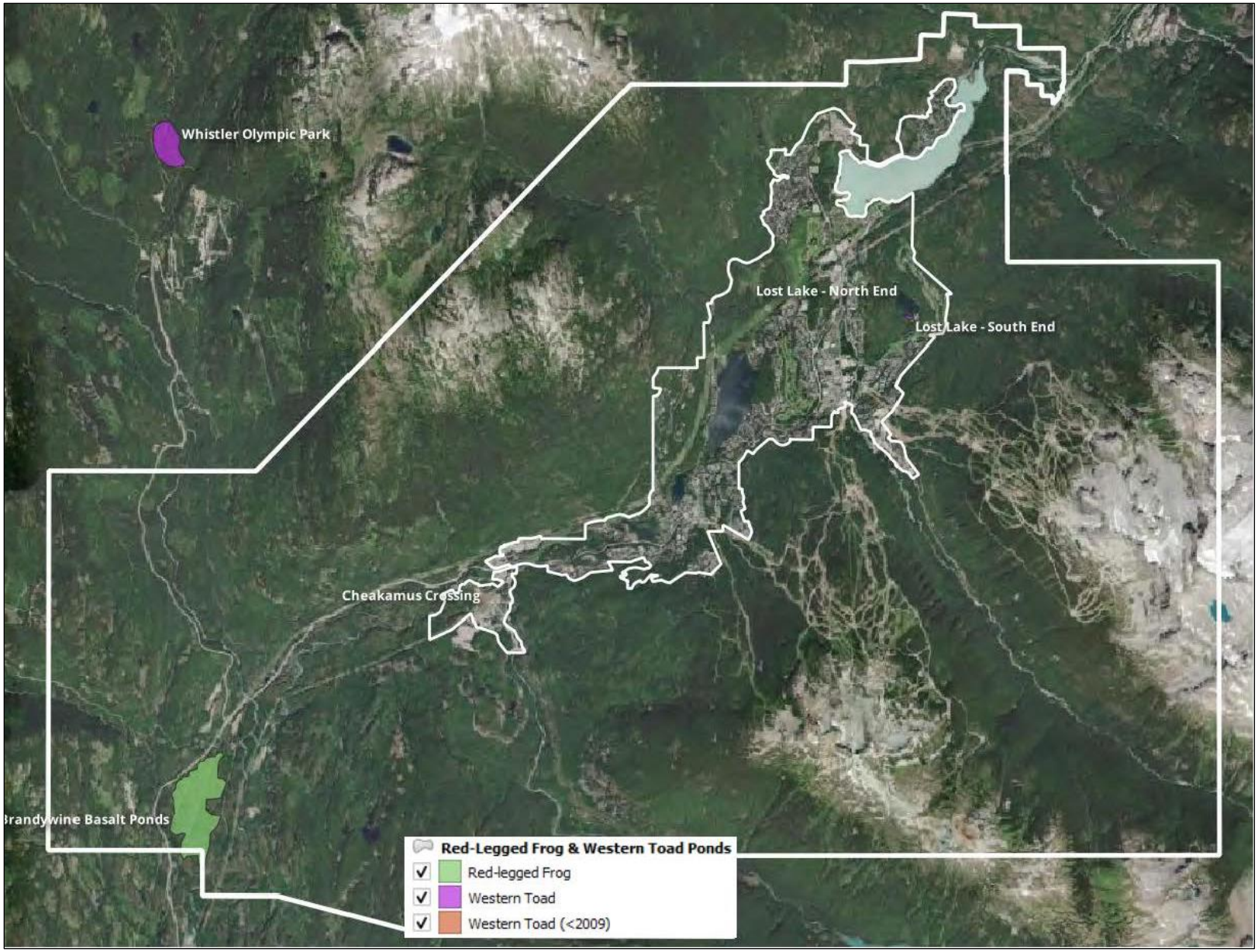
The Red-Legged Frogs and Western Toad Ponds map (Species Map 2a) shows ponds with current or historic breeding activity of these species, and is based on data collected since 2005 by the Whistler Biodiversity Project (2007; 2024); and RMOW Ecosystems and Species Monitoring Program since 2019 (Palmer and Snowline 2020, 2021; Snowline 2021, 2022, 2023, in prep.)

6.2.2 Rationale for Inclusion

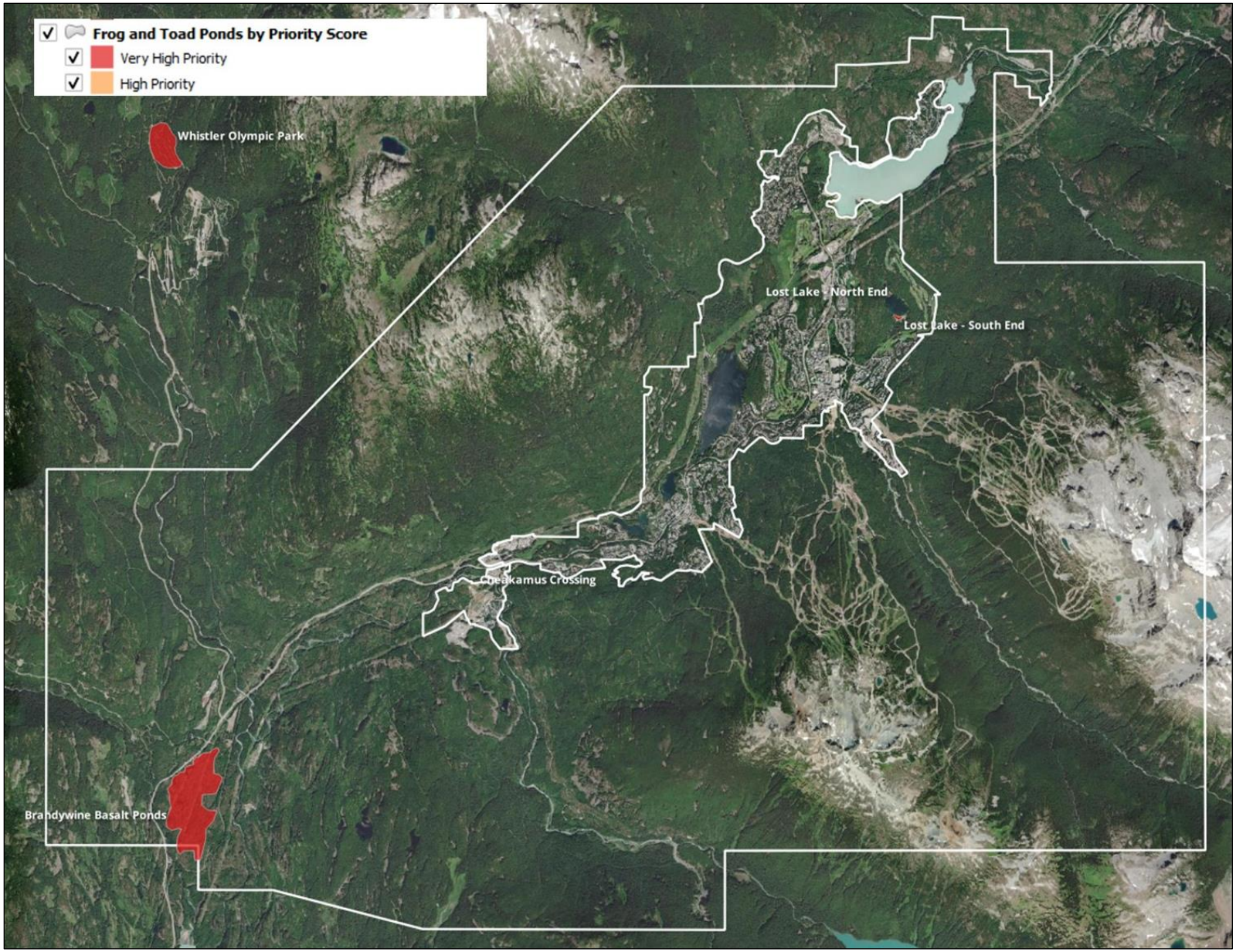
There are only four known breeding locations within the study area for Red-legged Frogs (*Rana aurora*; Provincial Blue list) and Western Toads (*Anaxyrus boreas*; Federal Special Concern), which is why each is ranked as Very High Priority. Further surveys may yet reveal other breeding ponds, in which case they would be similarly ranked.

6.2.3 Scoring Criteria

Current habitat = Very High Priority; Historic (Cheakamus Crossing) = Moderate Priority (Species Map 2b). Note that Moderate Priority areas are not included in this Priority Habitat mapping.



Species Map 2a: Red-Legged Frogs and Western Toad Ponds



Species Map 2b: Red-Legged Frogs and Western Toad Ponds by Priority Score

6.3 Salmonid Fish (Lakes & Wetlands)

6.3.1 Description

Note: The mapping of waterbodies that support salmonid fish is separated into two maps: (1) lakes and wetlands, and (2) streams. The reason for this approach is to be consistent with the base mapping of ecosystems, that is, Lakes and Wetlands (Section 5.1) and Streams (5.2). As presented in online maps, this approach works since it doesn't imply a hard boundary between waterbodies. As presented in this report, however, there is duplication between this section and the next (6.4 Salmonid Fish in Streams).

The Salmonid Fish (Lakes and Wetlands) map (Species Map 3a) shows salmonid presence as digitized from a PDF version of Fisheries Watercourse Classification Data (Woodruff 2006). Watercourses are classified into: Class A: Year-round presence); Class A(0): Presence in spring freshet or high water; Class B: Significant food/nutrient value. Class C: No salmonids documented.

6.3.2 Rationale for Inclusion

All large fish in Whistler are salmonids, including Rainbow Trout, Kokanee salmon, and Bull Trout. The smaller species, sticklebacks and sculpins, are not considered to be such strong indicators of good aquatic habitat. Prioritizing habitat for salmonids is important for at least two reasons beyond their recreational value: (i) to maintain native biodiversity; and (ii) their presence is an indication of good water quality that is important for other species.

*6.3.3 Scoring Criteria**

** Note that the scoring criteria and advisories are the same for Salmonid Fish (Lakes and Wetlands; this section) and Salmonid Fish (Streams; Section 6.4).*

Very High Priority = fish-bearing per Woodruff (2006), i.e., Class A and A(0). Otherwise = High Priority (Species Map 3b).

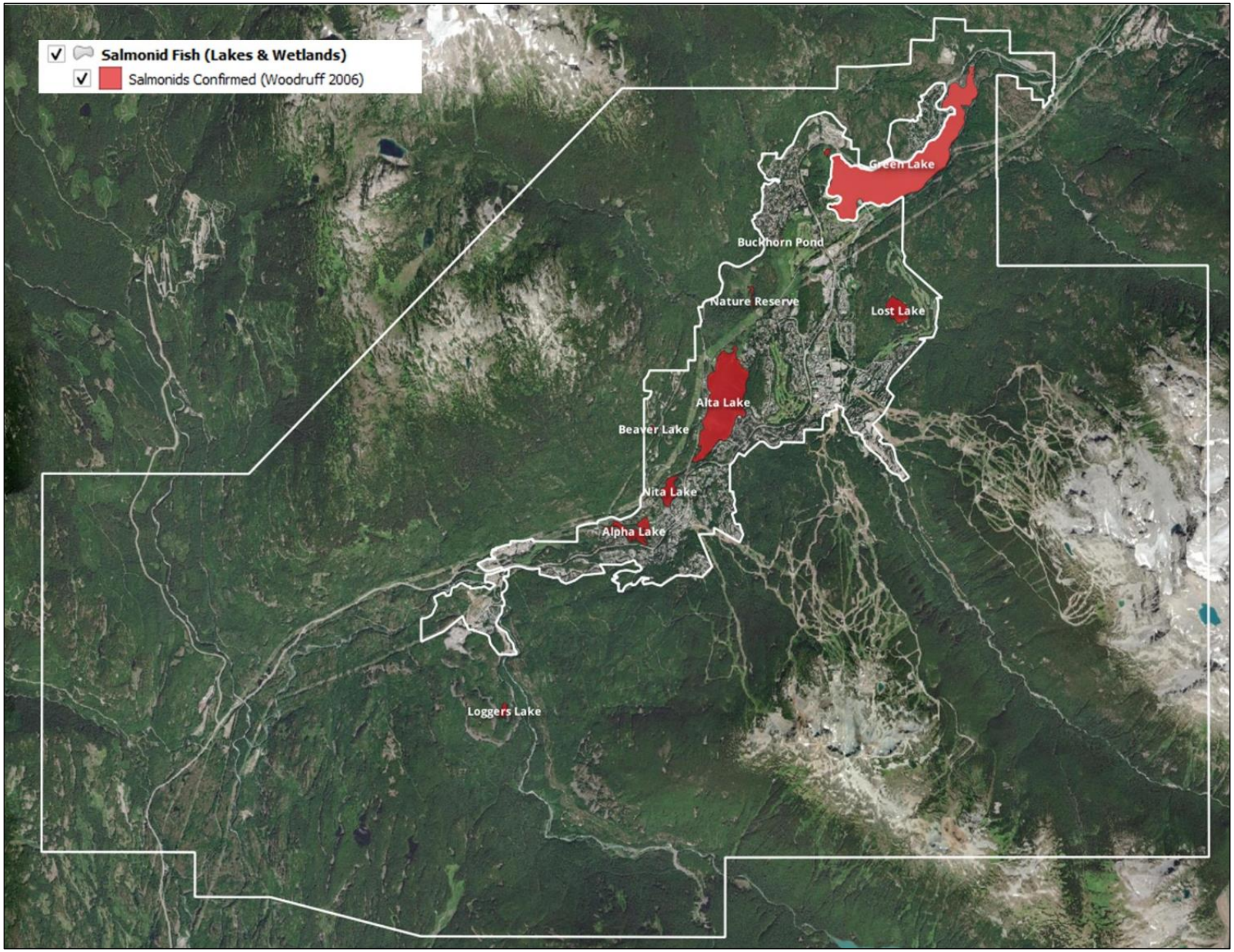
- Class A(0): Presence in spring freshet or high water [only Jordan Creek is mapped in this class];
- Class B: Significant food/nutrient value;
- Class C: No salmonids documented.
- Only Class A and A(0) are shown on the map, but the other classes are included under the field "Fish_Class".

6.3.4 Advisories

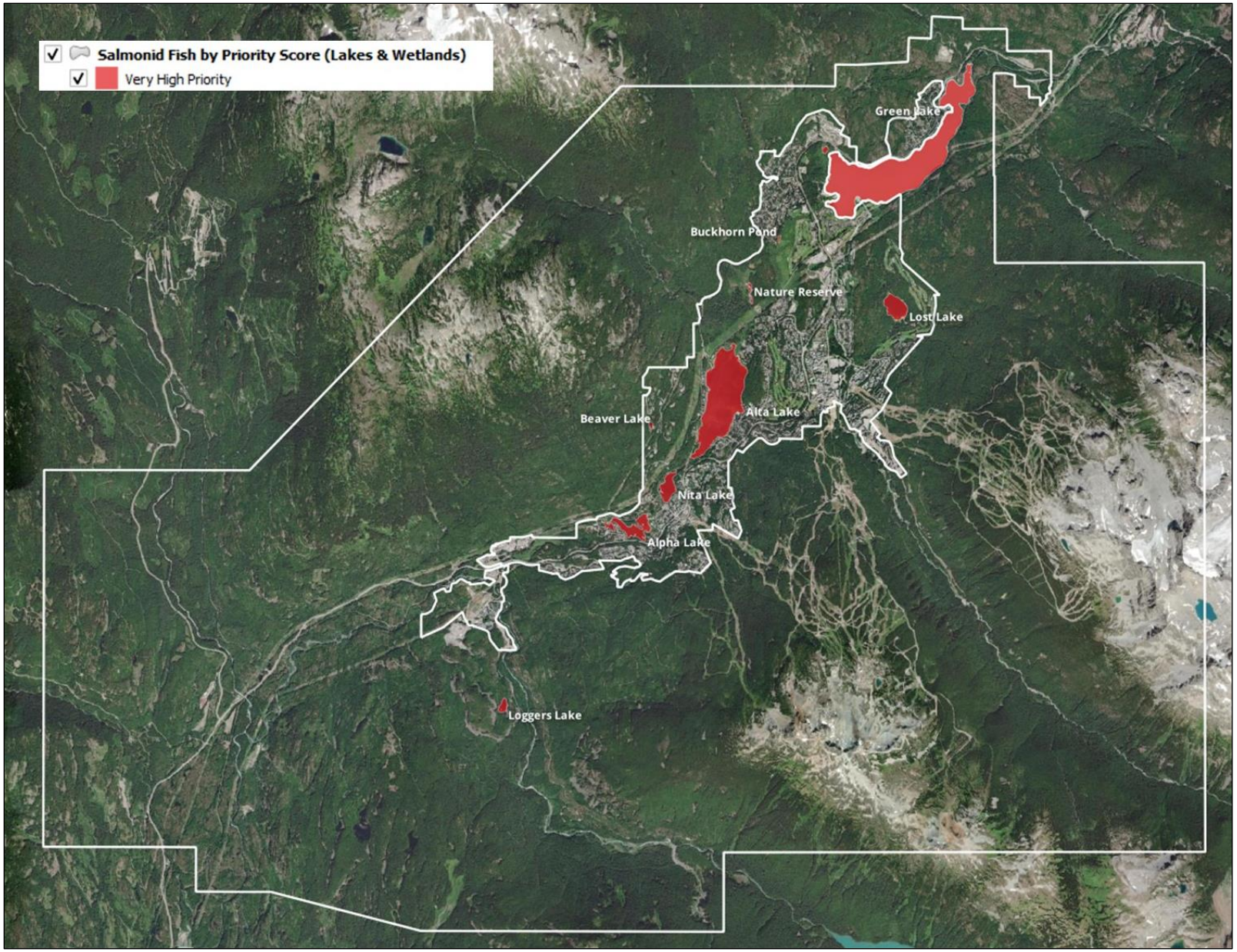
- Note that the data in this map may be incomplete or out of date. Consult the RMOW Environmental Stewardship Department for more information.
- The mapping software does not allow streams to be shown on the same layer as lakes and wetlands (the former are lines and the latter are polygons, and only one geometry type is permitted per layer). Therefore, also refer to the Salmonid Fish (Streams) layer to see all available data.

6.3.5 Data Challenges:

Since the data presented in the maps is from a digitized PDF (Woodruff 2006), it is possible some mistakes were introduced. The main limitations in this data are: (1) that it is possibly outdated; and (2) it is possibly incomplete. Additional surveys would be needed to confirm current presence.



5pecies Map 3a: Salmonid Fish (Lakes & Wetlands)



5pecies Map 3b: Salmonid Fish (Lakes & Wetlands) by Priority Score

6.4 Salmonid Fish (Streams)

6.4.1 Description

Note: The mapping of waterbodies that support salmonid fish is separated into two maps: (1) lakes and wetlands, and (2) streams. The reason for this approach is to be consistent with the base mapping of ecosystems, that is, Lakes and Wetlands (Section 5.1) and Streams (5.2). As presented in online maps, this approach works since it doesn't imply a hard boundary between waterbodies. As presented in this report, however, there is duplication between this section and the next (6.4 Salmonid Fish in Streams).

The Salmonid Fish (Streams) map (Species Map 4a) shows salmonid presence as digitized from a PDF version of Fisheries Watercourse Classification Data (Woodruff 2006). Watercourses are classified into: Class A: Year-round presence); Class A(0): Presence in spring freshet or high water; Class B: Significant food/nutrient value. Class C: No salmonids documented.

6.4.2 Rationale for Inclusion

All large fish in Whistler are salmonids, including Rainbow Trout, Kokanee salmon, and Bull Trout. The smaller species, sticklebacks and sculpins, are not considered to be such strong indicators of good aquatic habitat. Prioritizing habitat for salmonids is important for at least two reasons beyond their recreational value: (i) to maintain native biodiversity; and (ii) their presence is an indication of good water quality that is important for other species.

*6.4.3 Scoring Criteria**

** Note that the scoring criteria and advisories are the same for Salmonid Fish (Lakes and Wetlands; this section) and Salmonid Fish (Streams; Section 6.4).*

Very High Priority = fish-bearing per Woodruff (2006), i.e., Class A and A(0). Otherwise = High Priority (Species Map 4b).

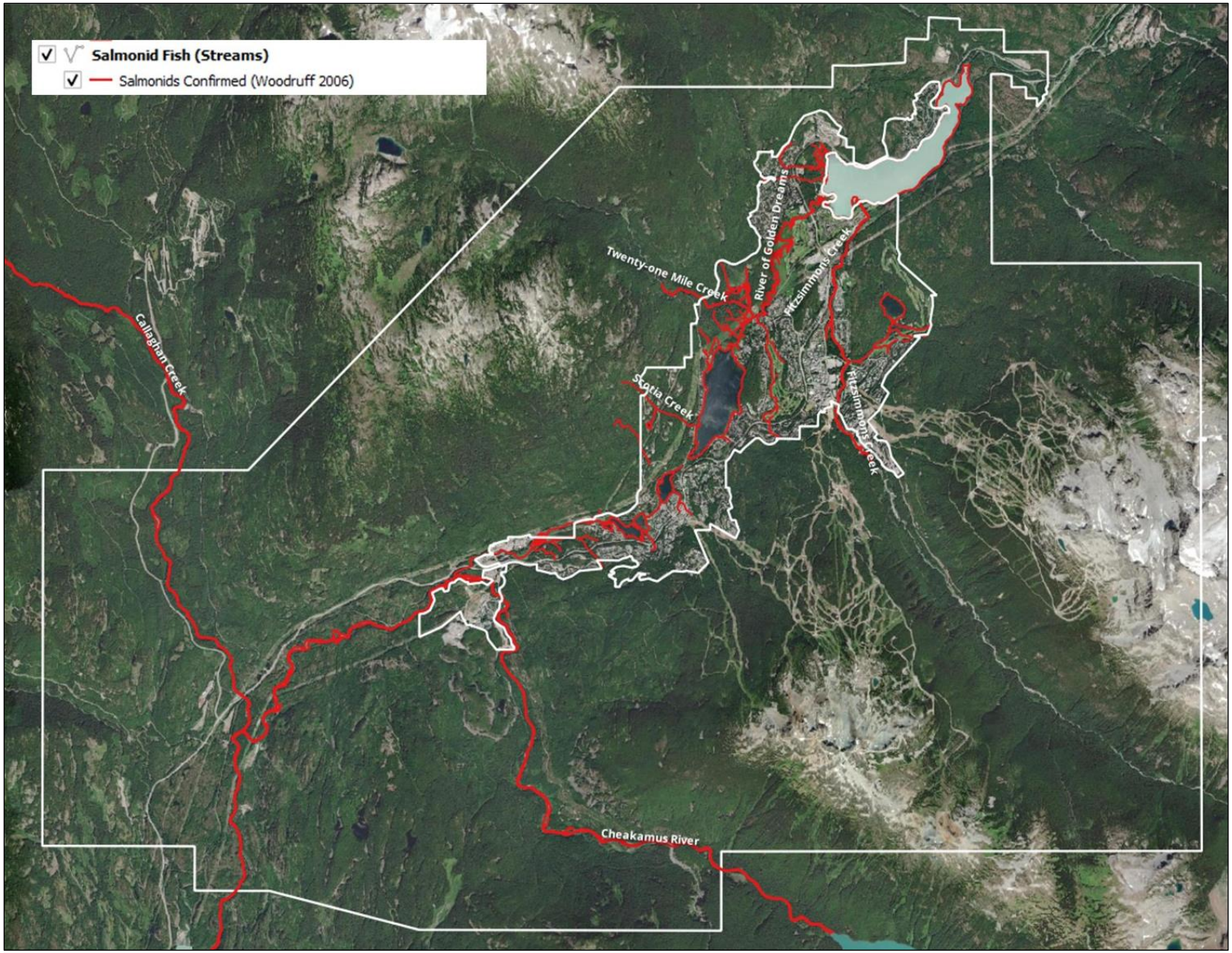
- Class A(0): Presence in spring freshet or high water [only Jordan Creek is mapped in this class];
- Class B: Significant food/nutrient value;
- Class C: No salmonids documented.
- Only Class A and A(0) are shown on the map, but the other classes are included under the field "Fish_Class".

6.4.4 Advisories

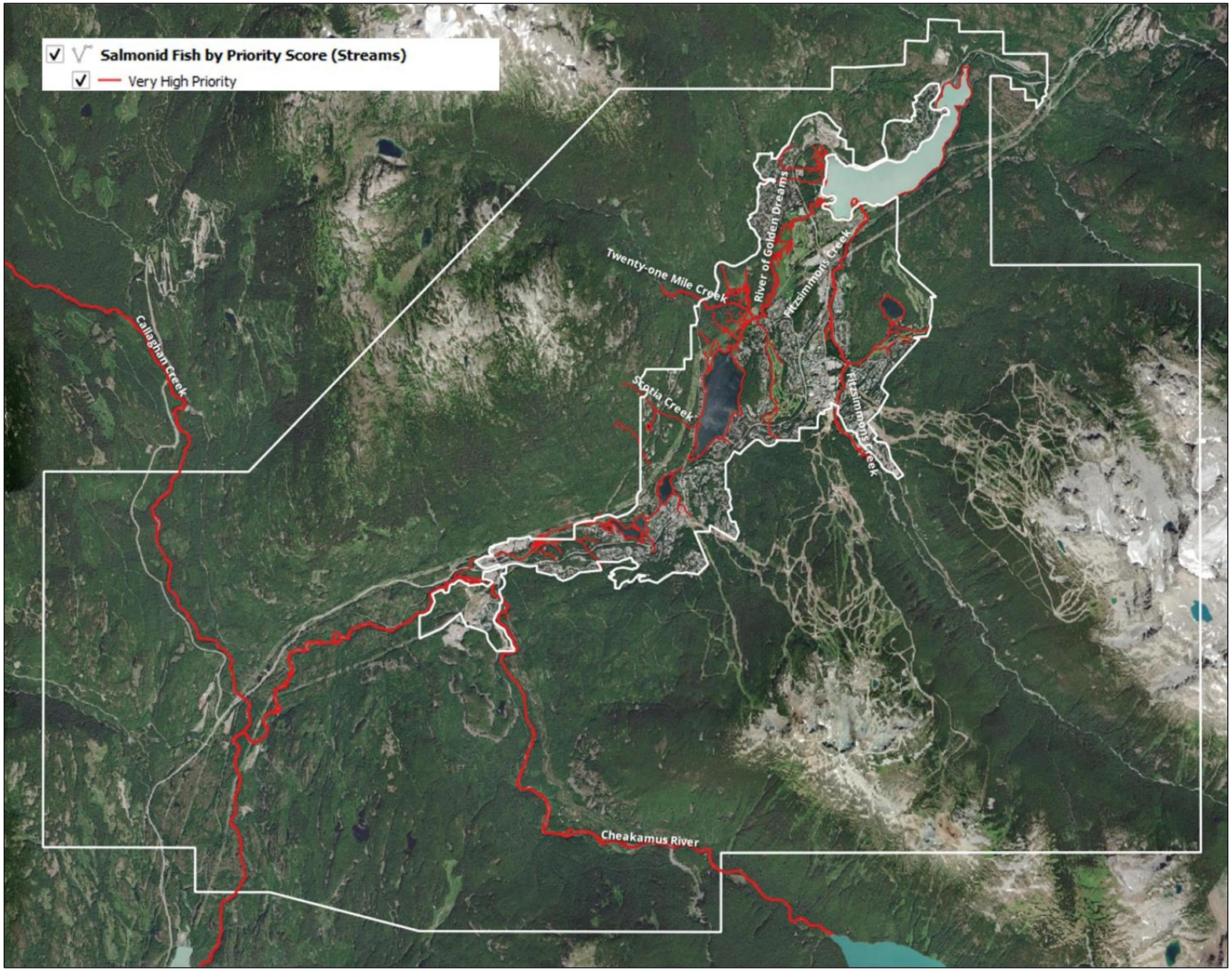
- Note that the data in this map may be incomplete or out of date. Consult the RMOW Environmental Stewardship Department for more information.
- The mapping software does not allow streams to be shown on the same layer as lakes and wetlands (the former are lines and the latter are polygons, and only one geometry type is permitted per layer). Therefore, also refer to the Salmonid Fish (Streams) layer to see all available data.

6.3.5 Data Challenges:

Since the data presented in the maps is from a digitized PDF (Woodruff 2006), it is possible some mistakes were introduced. The main limitations in this data are: (1) that it is possibly outdated; and (2) it is possibly incomplete. Additional surveys would be needed to confirm current presence.



5pecies Map 4a: Salmonid Fish (Streams)



5pecies Map 4b: Salmonid Fish (Streams) by Priority Score

6.5 Shorebirds at Risk

6.5.1 Description

The Shorebirds at Risk map (Species Map 5a) is meant to highlight important habitats for at-risk shorebirds as well as many other bird and other species that require Shallow Shoreline habitats, typically in lakes (also see Section 5.1.5) Note that although all shorebirds at-risk are seasonal or migratory, the ones included in this map are seen each year (Ricker et al. 2022) and therefore require Whistler habitat.

Rankings by the Conservation Data Centre (BC) and COSEWIC/SARA (Federal) are shown when applicable as follows:

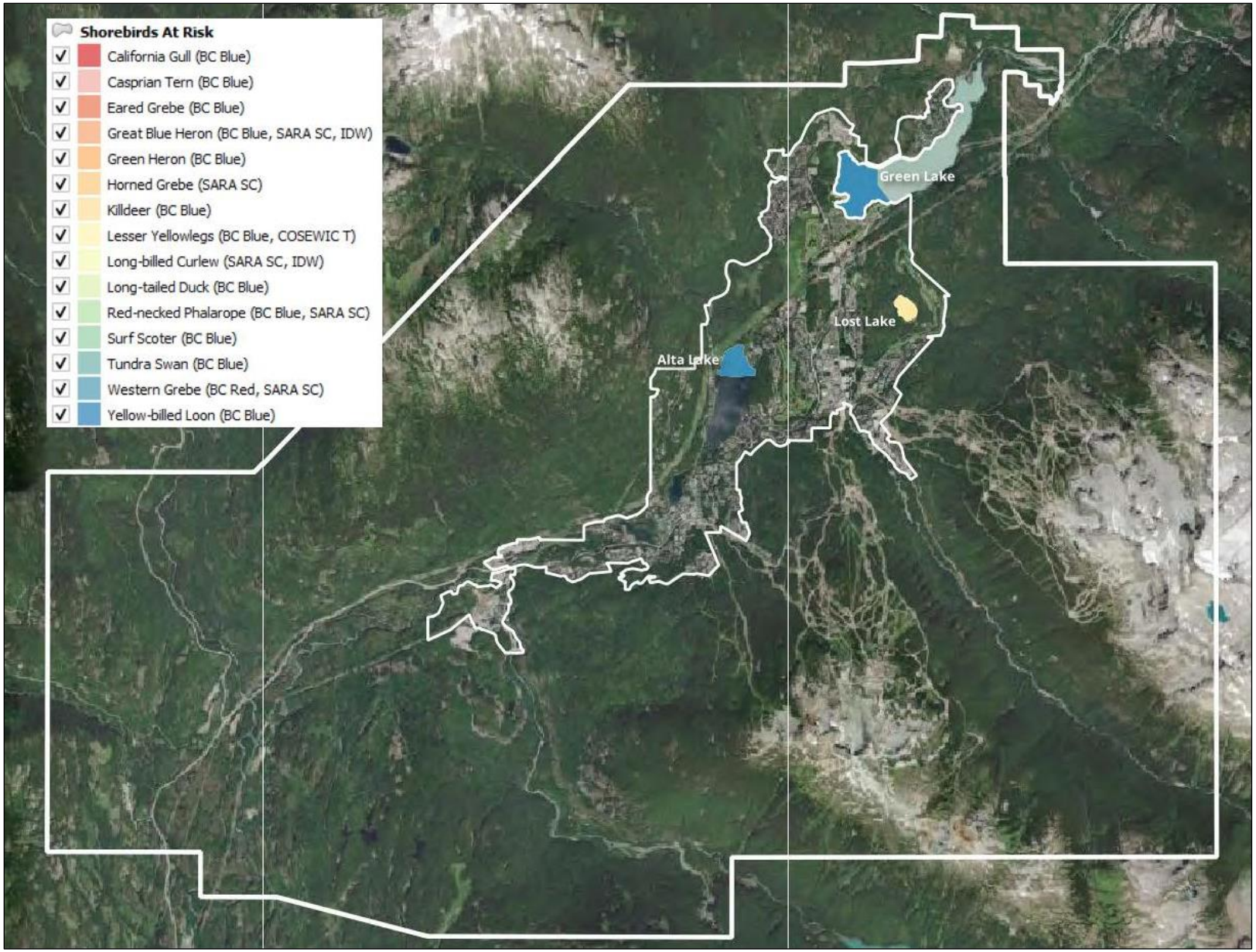
- BC list: Red, Blue, or blank if not at-risk (Yellow)
- Federal list (SARA or COSEWIC): SC = Special Concern; T = Threatened.

6.5.2 Rationale for Inclusion

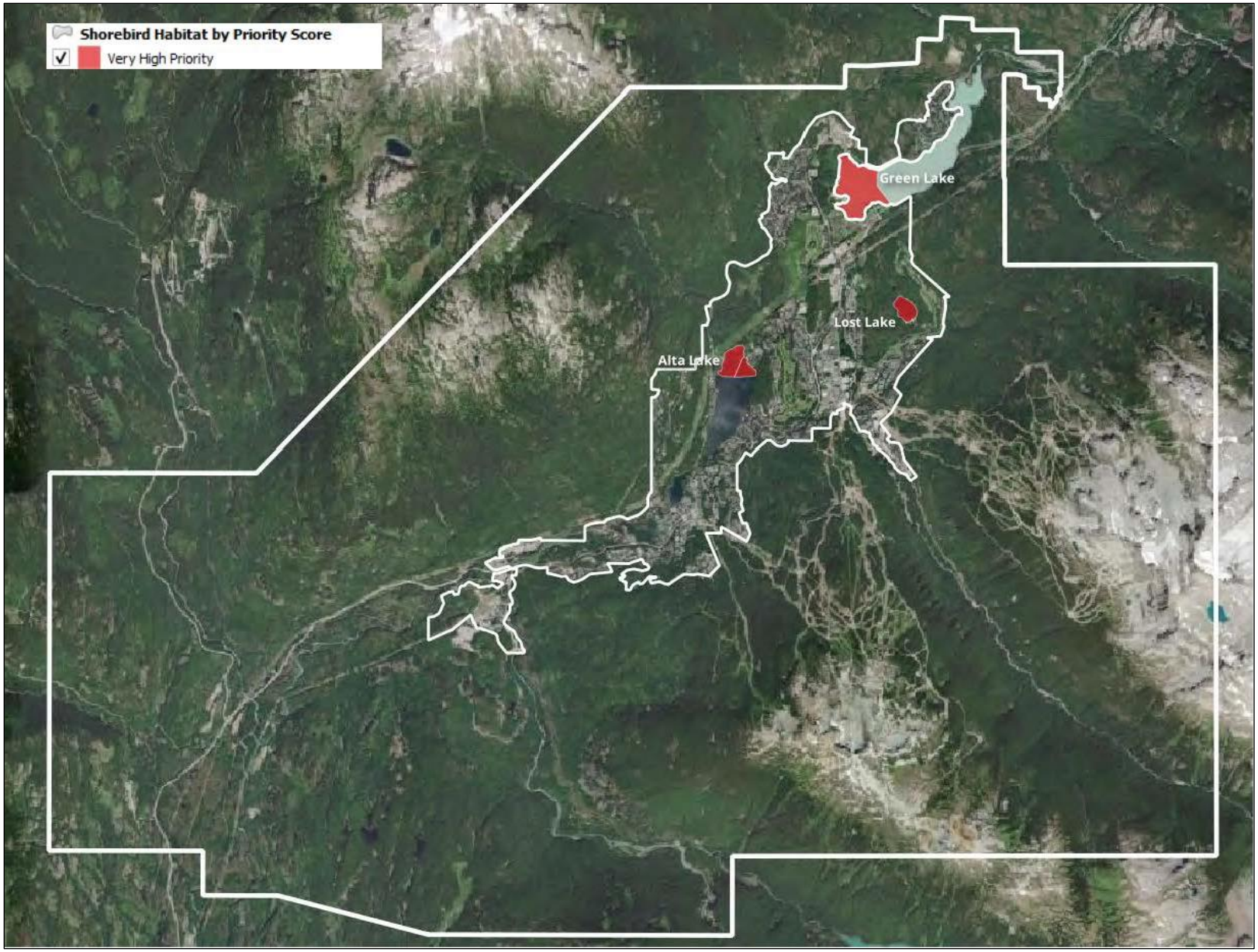
It is important to protect the habitat of birds that breed in the Whistler area, whether year-round residents or birds that migrate annually to breed (e.g., neo-tropical migrants). It is also important to protect the habitat of non-breeding migrants, that is, birds that rely on Whistler habitats for shorter or longer periods only during spring and fall migration. There are a total of 15 at-risk shorebird species listed by the BC CDC or Federal Government that use shoreline habitat in Whistler, almost exclusively at the west end of Green Lake, north end of Alta Lake, and/or Lost Lake. Most are non-breeding migrants, though at least one (Killdeer) breeds annually in this area. These species were included both to reflect the need to provide habitat for them, and because of their reliance on Shallow Shoreline habitat (mapped separately; Section 5.1.5).

6.5.3 Scoring Criteria

All = Very High Priority (Species Map 5b).



5pecies Map 5a: Shorebirds at Risk



5pecies Map 5b: Shorebirds at Risk by Priority Score

6.6 Tailed Frog Streams

6.6.1 Description

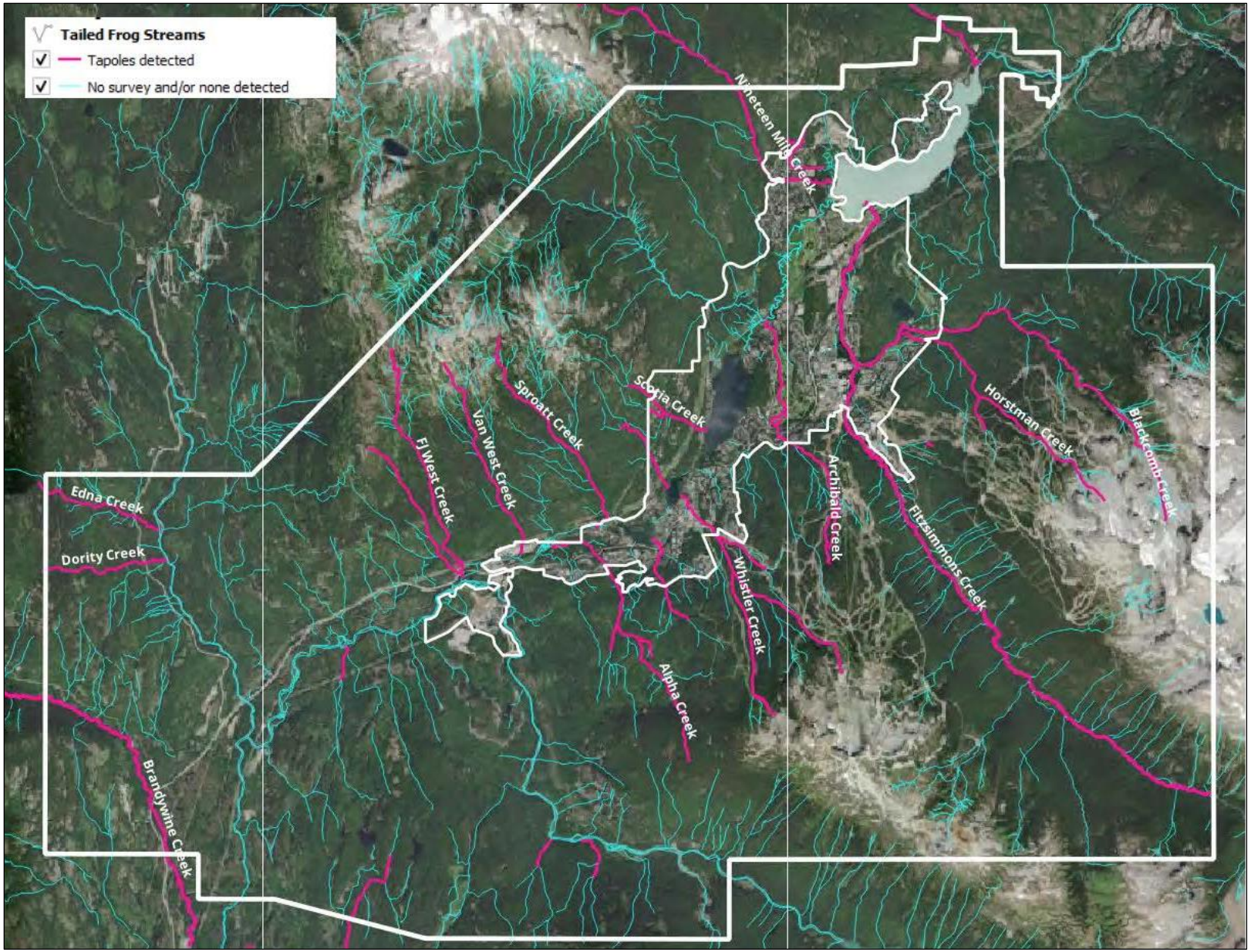
The Tailed Frog Streams map (Species Map 6a) shows streams in which Coastal Tailed Frogs (*Ascaphus truei*) have been detected. It is based on tadpole surveys by the Whistler Biodiversity Project (2005-2010) and subsequent surveys by the RMOW Ecosystems and Species Monitoring Program (Cascade 2013-2015; Palmer and Snowline 2016-2020; Snowline 2021-2023, in prep.).

6.6.2 Rationale for Inclusion

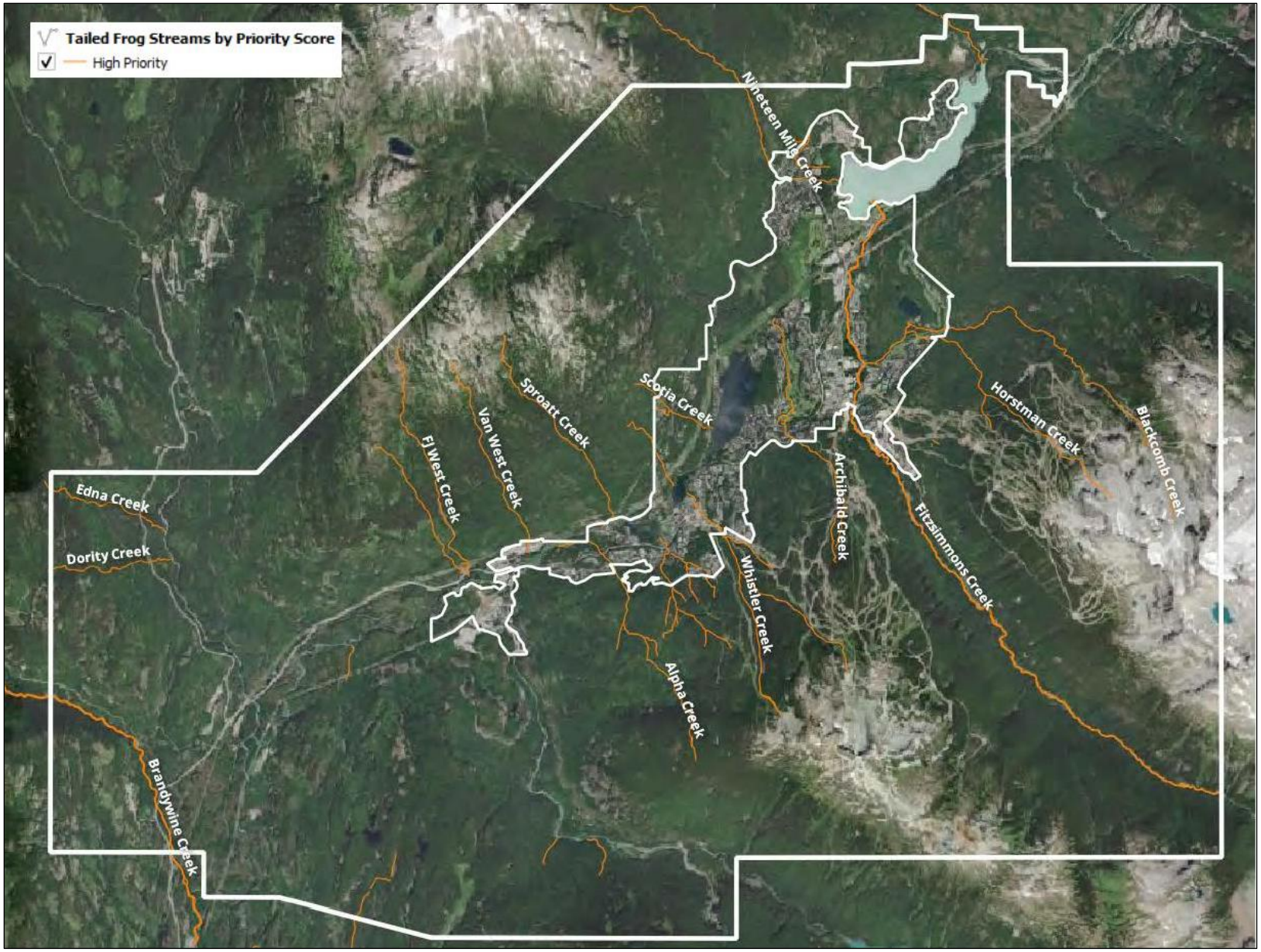
Tailed frogs have long been used as indicators of healthy mountainside streams. They are found in clear (non-turbid), fast-flowing streams and are sensitive to disturbances to that habitat. Surveys conducted in Whistler over the past 20 years have found them in most mountainside streams, from elevations just above the valley bottom to the subalpine.

6.6.3 Scoring Criteria

High Priority = Tailed frog tadpoles confirmed in stream (Species Map 6b).



5pecies Map 6a: Tailed Frog Streams



5pecies Map 6b: Tailed Frog Streams by Priority Score

6.7 Cottonwoods & Screech-Owl Habitat

6.7.1 Description

The Cottonwoods and Screech-Owl Habitat map (Species Map 7a) is meant both to map significant stands of black cottonwood (*Populus trichocarpa*) and, by extension, to help identify the most likely habitat for Western Screech-Owl (*Megascops kennicottii kennicottii*). The *kennicottii* subspecies of Western Screech-Owl that occurs rarely in Whistler (Ricker et al. 2022) nests in cavities in black cottonwoods and is also typically found in riparian areas in which cottonwoods are common (Jared Hobbs, pers. comm.). Large cottonwoods with complex canopies are also very important habitat for many other species, including other cavity-nesting birds and animals.

This map shows areas below 800 m elevation in which cottonwoods are present. The main source of data was the VRI, with some interpretation for this project by Bob Brett. The estimated habitat suitability is based on the presence of "soft edges" and distance from disturbance (per Jared Hobbs, pers. comm). Screech-owls are more likely present in locations which have a gradual transition (soft edge) from good habitats such as large cottonwoods) to poor habitat such as roads and lawns. That transition could be to shorter trees or tall shrubs that can provide some cover.

6.7.2 Rationale for Inclusion

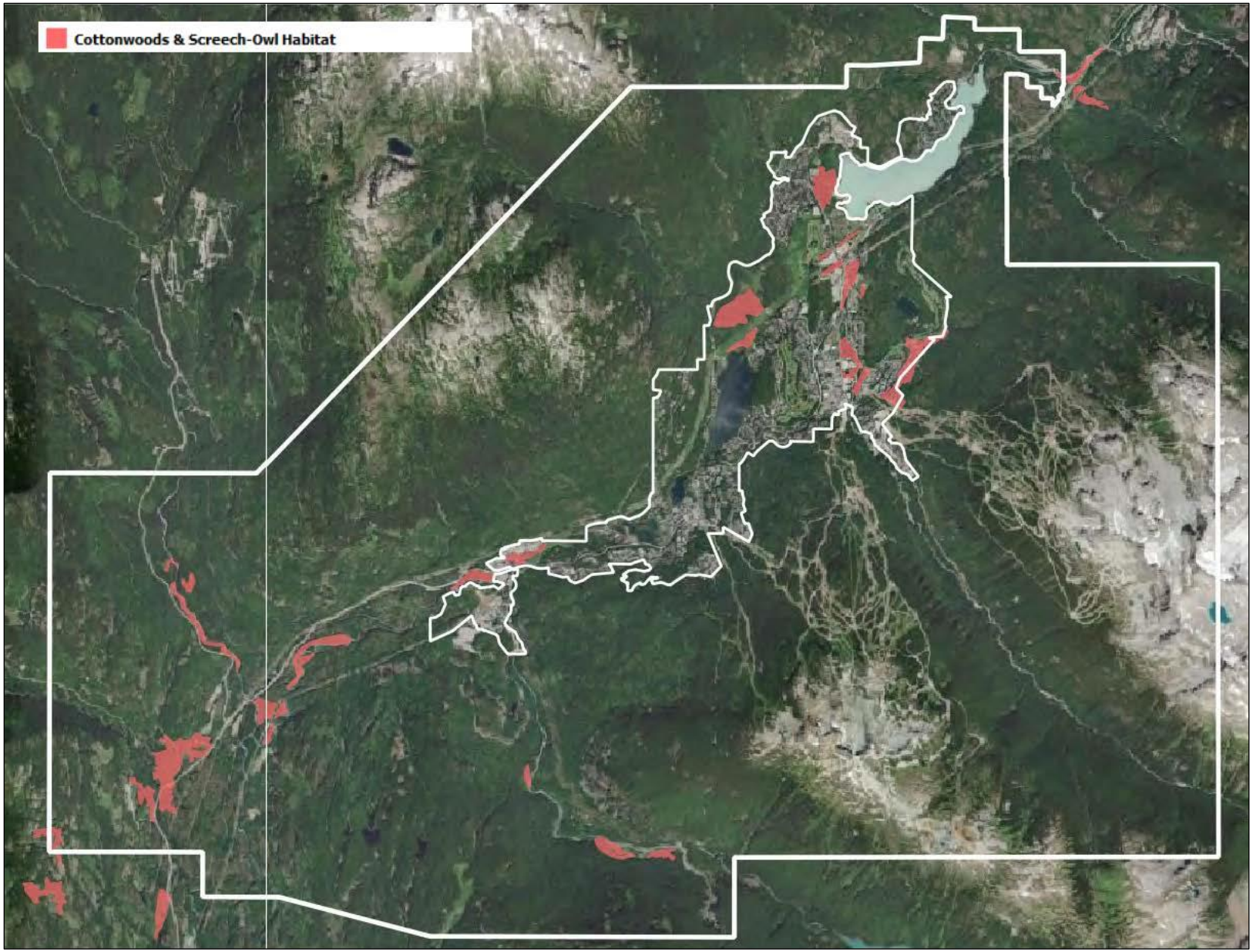
A single large, old cottonwood tree provides more valuable habitat than any other tree species in Whistler. Such trees are locally rare because much of their valleybottom floodplain habitat has been converted into urban areas, e.g., between Whistler Village and Green Lake. The remaining trees are therefore even more valuable. Western Screech-owls (CDC Red list) are an example of a species that is reliant on the availability of large cottonwoods (>30 cm, but often larger) that are surrounded by "soft edge" habitat, that is, other vegetation. This map is the only one that explicitly combines a habitat type and a species reliant upon it. That decision was based on the premise that cottonwoods are valuable on their own, as well in relation to screech-owls.

6.7.3 Scoring Criteria

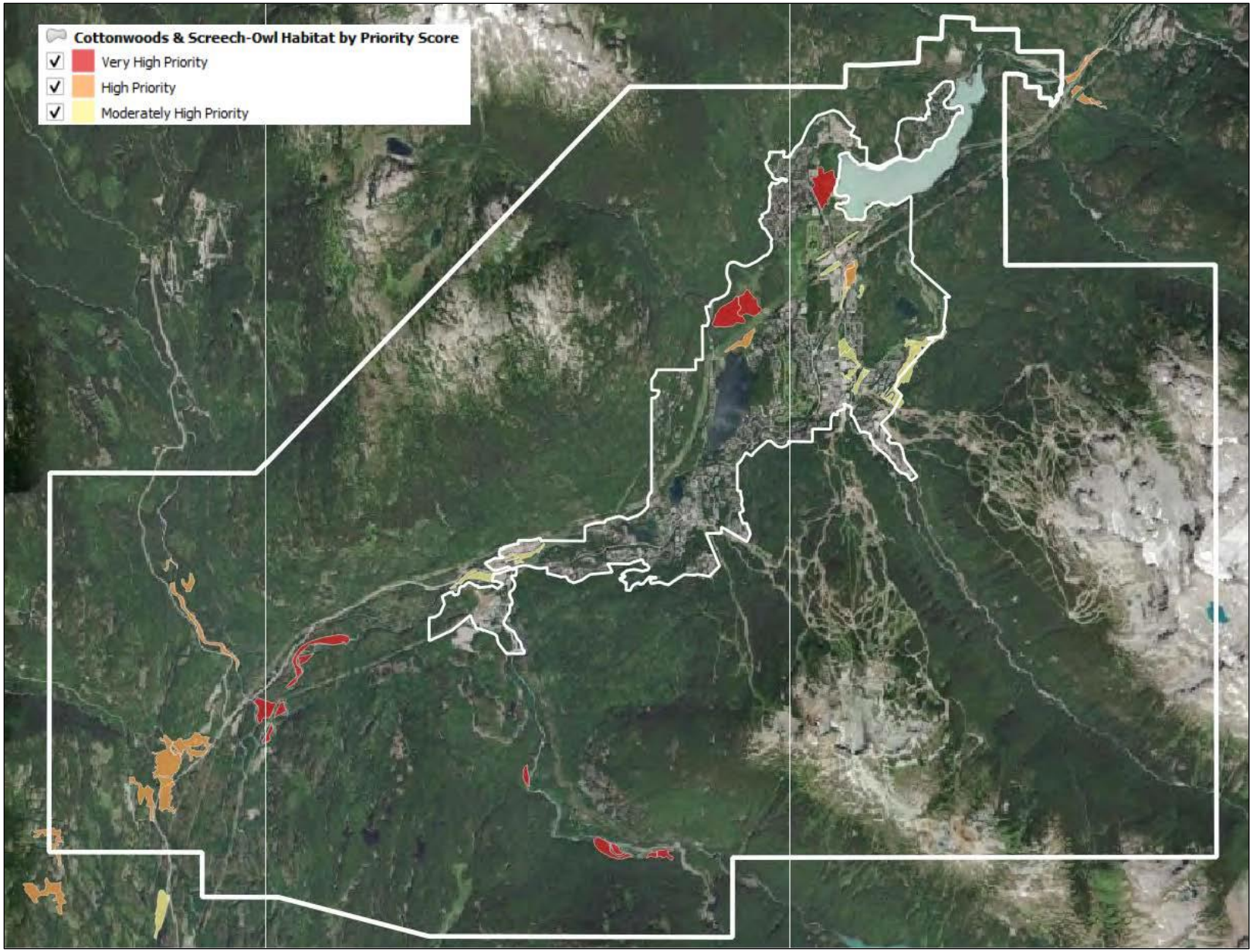
Very High Priority (soft edge, farther from highways, etc.); High Priority (soft edge, more potential disturbance); Moderate Priority (partial or no soft edge; Species Map 7b). Note that Moderate Priority areas are not included in this Priority Habitat mapping.

6.7.4 Data Challenges:

Note that the data available for both cottonwoods and Western Screech-owls is not complete or entirely accurate. Further stand-level surveys would be needed to assess stands mapped here and to determine the location of other cottonwood stands.



5pecies Map 7a: Cottonwoods and Screech-Owl Habitat



5pecies Map 7b: Cottonwoods and Screech-Owl Habitat by Priority Score

6.8 Goshawk Habitat Suitability

6.8.1 Description

The Goshawk Habitat Suitability map (Species Map 8a) is directly based on BC Government modelling (Mahon et al. 2019). Since that modelling was based on outdated VRI data, I deleted some areas marked as suitable habitat that are no longer forested, for example, all of Alpine Meadows and Emerald Estates. (See discussion in Section 2.4 regarding the problems with outdated VRI data and how inaccurate data affects habitat modelling and other applications.)

6.8.2 Rationale for Inclusion

Whistler provides critical habitat for goshawks which are raptors whose breeding success on BC's mainland coast and Vancouver Island is tied to the availability of old forest habitat. The population and breeding success of goshawks on Haida Gwaii, the BC mainland coast, and Vancouver Island has decreased due to loss of their old growth habitat, mainly due to logging. Recent surveys in Whistler have nonetheless documented at least five current or recent breeding territories (Snowline 2019, 2021 to 2023; in prep.). This scale of breeding activity is notable for two main reasons.

1. This activity makes Whistler a hotspot for successful goshawk breeding on BC's South Coast, in an area where goshawk populations have been in steep decline.
2. It also reflects the tight connection between old forest habitat and the success of goshawk breeding. Whistler still has significant areas of old forest at relatively low elevations (goshawks typically nest in forests below 900 m). Protecting these forests also means protecting goshawk habitat.

The tight connection between goshawks and lower-elevation, old forests make the mapping of goshawk habitat suitability particularly well-suited to the Priority Habitat Mapping project. To emphasize that point, all active and inactive nests found by surveys in Whistler have been in areas mapped as High or Very High habitat suitability by the modelling presented here.

6.8.3 Scoring Criteria

High suitability (Mahon et al. 2019) = Very High Priority (Species Map 8b).
Moderate suitability (Mahon et al. 2019) = High Priority.

6.8.4 Taxonomic Note

During the preparation of this project, the BC Conservation Data Centre formally recognized the change in taxonomy for goshawks that occurred following DNA analysis of Eurasian and North American goshawks.[7] Previously, these goshawks were considered to be the same species, Northern Goshawk (*Accipiter gentilis*). Within BC, two subspecies were recognized: Accipiter gentilis ssp. laingi and ssp. atricapillus. Goshawks in Whistler were presumed to be the *laingi* subspecies, which is the more threatened of the two and was therefore Red-listed in BC and Threatened under SARA.

DNA research showed enough difference between the Eurasian and North American birds to split them into two distinct species: Eurasian Goshawk (*Accipiter gentilis*) and American Goshawk (*A. atricapillus*). To further muddy the waters, BC now considers the rarer subspecies (now *A. atricapillus laingi*) to occur only on Haida Gwaii, and therefore that all other goshawks in BC are the less rare, but still Blue-listed, *A. atricapillus ssp. atricapillus.*

The implications of this change are still unclear (Frank Doyle, pers. comm.). As it stands, it is possible and even likely that goshawks in Whistler will be effectively downlisted to Blue on the Provincial list (CDC) and Not At Risk on the Federal list (COSEWIC). In my opinion, this would be a mistake since goshawks on the BC mainland coast and Vancouver Island have been in steep decline for decades due to the loss of their old forest habitat.

Any references in the mapping to Northern Goshawk therefore now should be considered American Goshawk. To prevent future confusion and because there is only one kind of goshawk in the Whistler area, I intend to refer to them here simply as "goshawks," at least until their conservation status is confirmed.

[7] https://a100.gov.bc.ca/pub/eswp/search.do

6.8.5 Terminology and Advisories for Habitat Suitability (duplicated for Sections 6.8, 6.9, and 6.10)

Standardized Terminology:

The original modelling for the three habitat suitability maps used different terminology to rank suitability (Table 6-4). For example, MacHutchon (2020) scored best to worst habitat from 1 to 5, while Wilson (2023) reversed that order so that 5 indicated best habitat.

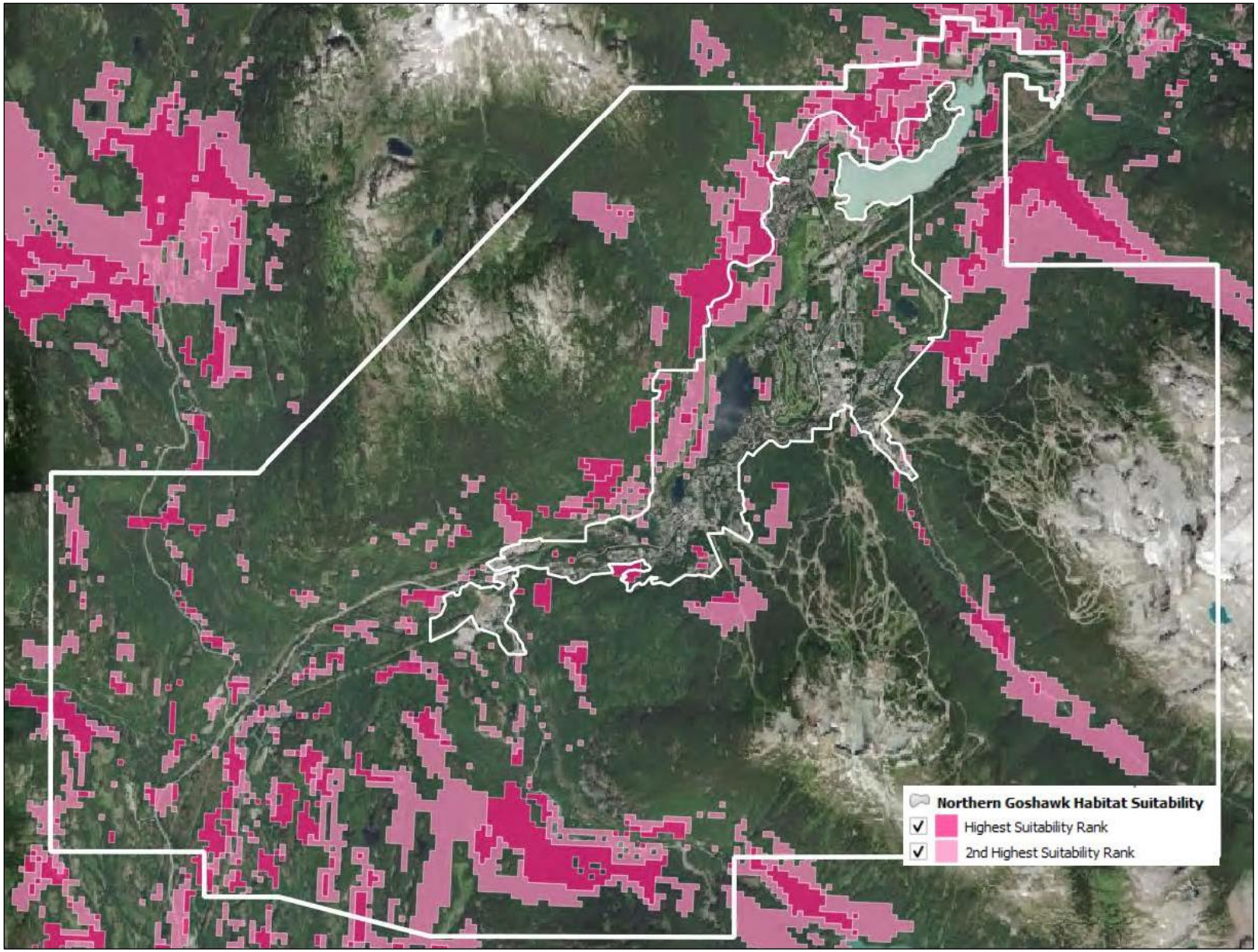
To standardize across the three and best convey the intent (that is, where is the best and next best habitat), two terms are applied to all: "Highest Suitability" and "2nd Highest Suitability." Comparisons to original terminology are summarized in Table 6-1. See additional fields in each layer that include original scoring and ranks, as well as original sources (Mahon et al. 2019; MacHuchon 2020; Wilson 2023). These standardized terms are included in the field "Rank_Name" in each layer.

Table 6-1. Comparison of terms used for suitability ranking. Note this table is also copied in Sections 6.9 (Grizzly Bears) and 6.10 (Mountain Goats).

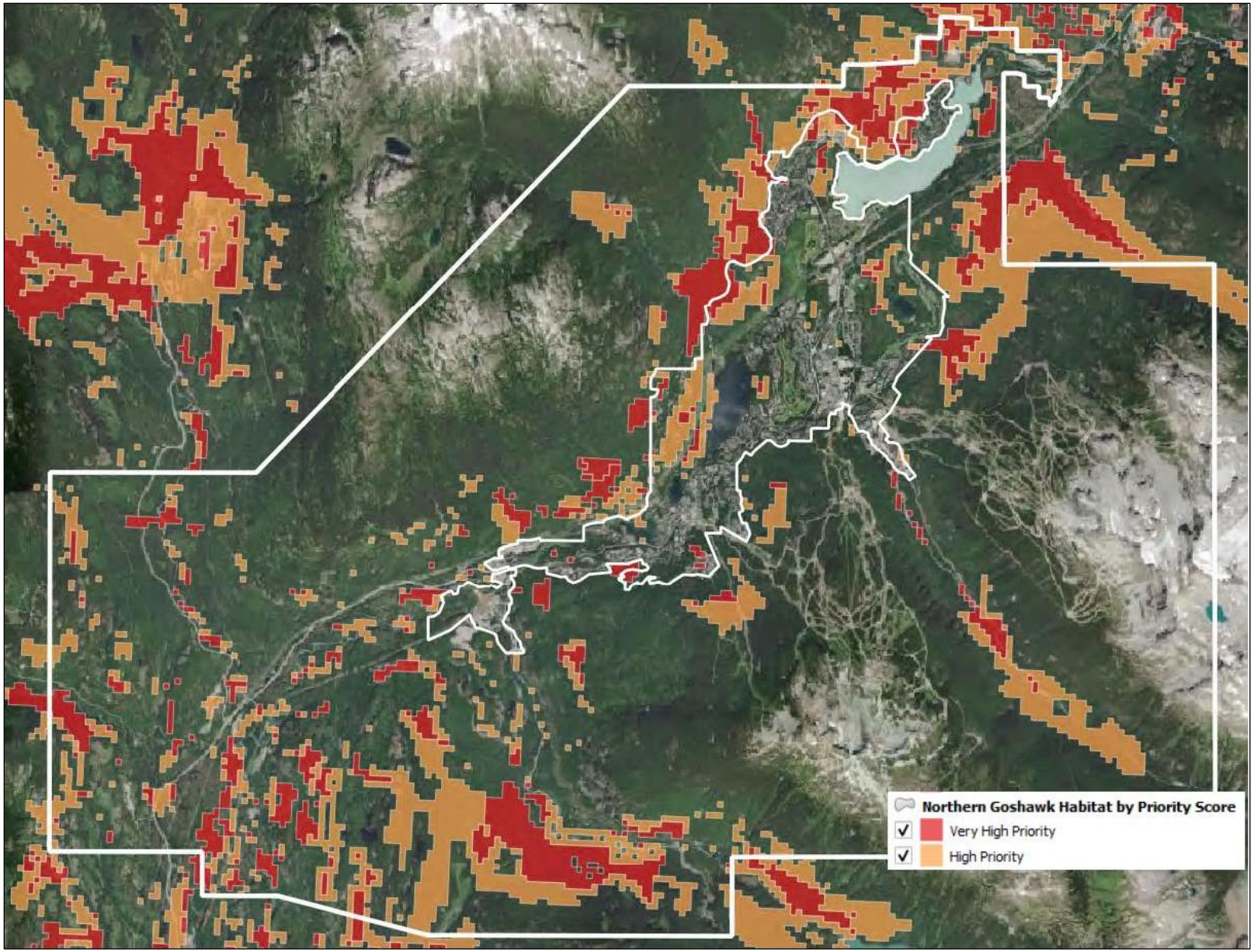
	Priority Habitat Mapping (this project)		**Mahon et al. (2019) terms for goshawks**		**MacHutchon's (2020) terms for Grizzly Bears**		**Wilson's (2023) terms for Mountain Goats**	
Generalized Rank	**Term**	**Priority Score**	**Score**	**Rank**	**Score**	**Rank**	**Score**	**Rank**
Highest	Highest Suitability Rank	Very High	n/a	High	1	High	5	Very High
2nd Highest	2nd Highest Suitability Rank	High	n/a	Moderate	2	Mod. High	4	High
3rd Highest	Not Mapped		n/a	Low	3	Moderate	3	Moderate

Advisory:

Note that the Goshawk Habitat Suitability map shows generalized habitat suitability based on models developed by Mahon et al. (2019) and reliant on the accuracy of the base data (VRI). Active and past nesting documented by Brett (Brett 2020; Snowline (2021, 2022, 2023, in prep.) have all been in areas shown as High or Very High habitat suitability. While these results demonstrate the validity of the modelling, it should not be used to presume actual occupancy by goshawks



5pecies Map 8a: Goshawk Habitat Suitability



5pecies Map 8b: Goshawk Habitat Suitability by Priority Score

6.9 Grizzly Bear Habitat Suitability

6.9.1 Description

The Grizzly Bear Habitat Suitability map (Species Map 9a) is based on MacHutchon's (2020) modelling of habitat suitability in the Rainbow-Sproatt area. This map shows the highest ranking of four scores in MacHutchon: spring/summer/fall foraging plus winter hibernation.

6.9.2 Rationale for Inclusion

Grizzly Bears (*Ursus horribilis*) are considered umbrella species (Simberloff 1997).[8] If grizzlies are present in the landscape, it means that there is enough appropriate habitat and connections between that habitat not only for them, but also many other species that also require that habitat and connectivity.

Habitat suitability modelling in the Sproatt-Rainbow area was conducted for the RMOW by MacHuchon (2020) and is summarized in this project. Since these higher elevation areas are unlikely to be logged or otherwise developed, the mapping is mainly meant to flag areas in which human use, notably recreation, needs managed to protect Grizzly Bear habitat. No data was available for the east side of Whistler Valley.

6.9.3 Scoring Criteria

This map shows the highest ranking of four scores in MacHutchon: spring/summer/fall foraging plus winter hibernation 4 (MacHutchon 2020; Table 6-2; Species Map 9b). Very High Priority = highest score of 5; High Priority = highest score of 4.

Table 6-2. Relative Grizzly Bear rating classes (Table 1 in MacHutchon 2020).

Class	Suitability/ Capability	Lower Limit (%)	Upper Limit (%)	Relative Quality
1	High	>75	≤100	Equivalent
2	Moderately High	>50	≤75	Slightly less
3	Moderate	>25	≤50	Moderately less
4	Low	>5	≤25	Substantially less
5	Very Low	>0	≤5	Much less
6	Nil	0	0	Habitat or attribute is absent

6.9.4 Terminology and Advisories for Habitat Suitability (duplicated for Sections 6.8, 6.9, and 6.10)

Standardized Terminology:

The original modelling for the three habitat suitability maps used different terminology to rank suitability (Table 6-4). For example, MacHutchon (2020) scored best to worst habitat from 1 to 5, while Wilson (2023) reversed that order so that 5 indicated best habitat.

To standardize across the three and best convey the intent (that is, where is the best and next best habitat), two terms are applied to all: “Highest Suitability” and “2nd Highest Suitability.” Comparisons to original terminology is summarized in Table 6-1. See additional fields in each layer that include original scoring and ranks, as well as original sources (Mahon et al. 2019; MacHuchon 2020; Wilson 2023). These standardized terms are included in the field “Rank_Name” in each layer.

[8] Michael Proctor. 2024. Landscape connectivity from a wildlife biologist’s perspective. Columbia Mountains Institute and Kootenay Conservation Program CREDTalks Webinar series. URL: https://www.youtube.com/watch?v=I68Dj9FTz-c.

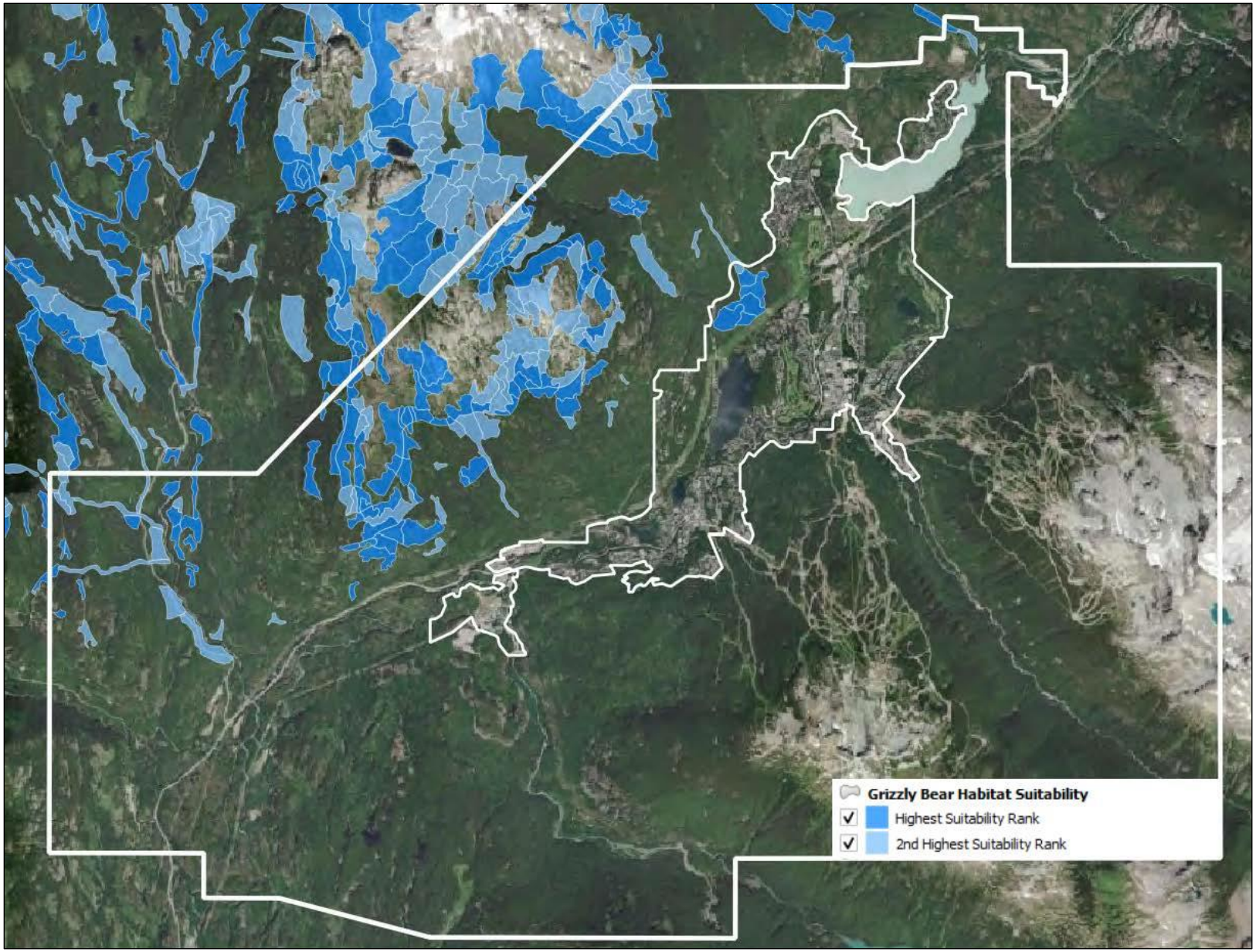
Table 6-3. Comparison of terms used for suitability ranking. Note this table is also copied in Sections 6.8 (Goshawks) and 6.10 (Mountain Goats).

	Priority Habitat Mapping (this project)		**Mahon et al. (2019) terms for goshawks**		**MacHutchon's (2020) terms for Grizzly Bears**		**Wilson's (2023) terms for Mountain Goats**	
Generalized Rank	**Term**	**Priority Score**	**Score**	**Rank**	**Score**	**Rank**	**Score**	**Rank**
Highest	Highest Suitability Rank	Very High	n/a	High	1	High	5	Very High
2nd Highest	2nd Highest Suitability Rank	High	n/a	Moderate	2	Mod. High	4	High
3rd Highest	Not Mapped		n/a	Low	3	Moderate	3	Moderate

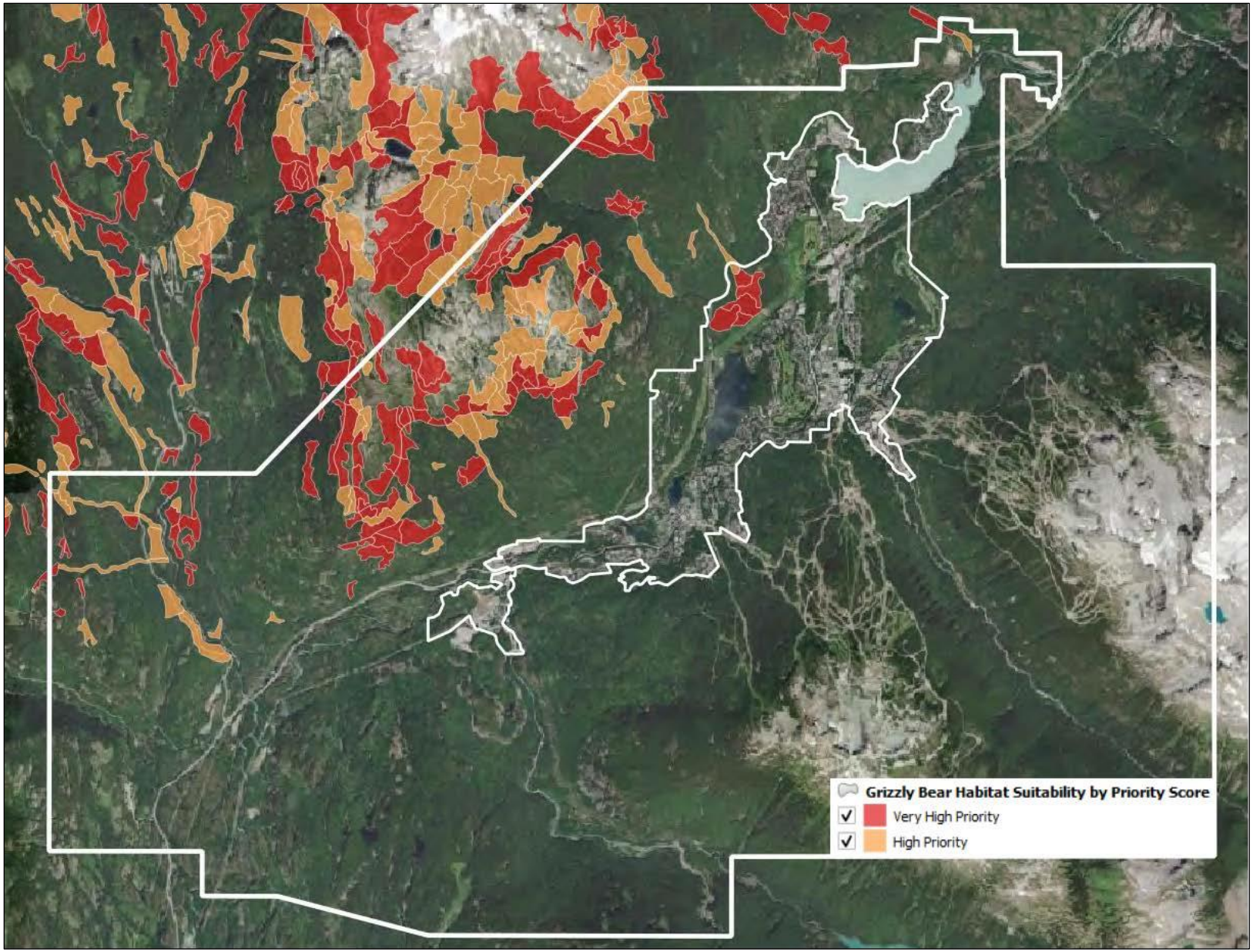
Advisory:
The habitat suitability modelling this mapping is based on predicts generalized patterns of habitat use at landscape scales. Actual use needs to be determined by field studies.

6.9.5 Data Challenges:

Habitat suitability modelling is not available for the east side of Whistler Valley. While there is no known permanent presence in that area at this time, it would be nonetheless helpful to assess the potential habitat.



5species Map 9a: Grizzly Bear Habitat Suitability



5species Map 9b: Grizzly Bear Habitat Suitability by Priority Score

6.10 Mountain Goat Habitat Suitability

6.10.1 Description

The Mountain Goat Habitat Suitability map (Species Map 10a) shows the Wilson's (2023) highest ranking of spring plus winter habitat suitability. Most areas ranked as Very High or High in/adjacent to the WUDCA or ski area were deleted for this project due to the unlikelihood of occupation by Mountain Goats (*Oreamnos americanus)*.

6.10.2 Rationale for Inclusion

BC government staff supplied habitat suitability modelling for Mountain Goats for the Whistler area, which mainly highlighted the Singing Pass and Sproatt-Rainbow areas. Since no recent records of actual habitat use by goats is known, this mapping is mainly meant to be a flag for the future in case goats recolonize those areas (both of which they inhabited within the last ~50 years).

6.10.3 Edits to Base Data

- Removed all occurrences in developed areas, e.g., valleybottom and the main frontside areas of Whistler/Blackcomb.
- Removed all Very Low, Low, Moderate polygons (Classes 1, 2, 3).
- Retained more winter than summer habitat polygons given the greater likelihood of habitat use in winter in areas such as mid/upper Blackcomb.
- Labelled all deleted polygons (Delete? = Yes). This labelling allows future reconsideration of these polygons.
- Summer Habitat Very High/High = 2
- Winter Habitat Very High = 1b; High = 2

6.10.4 Scoring Criteria

Moderate Priority when the highest scoring by Wilson (2023) = 5 or 4 (Species Map 10b). Note that Moderate Priority areas are not included in this Priority Habitat mapping. Also note this this map also includes three patches of Ungulate Winter Range for mountain goats near treeline on the east side of Rainbow Lake.

6.10.5 Terminology and Advisories for Habitat Suitability (duplicated for Sections 6.8, 6.9, and 6.10)

Standardized Terminology:

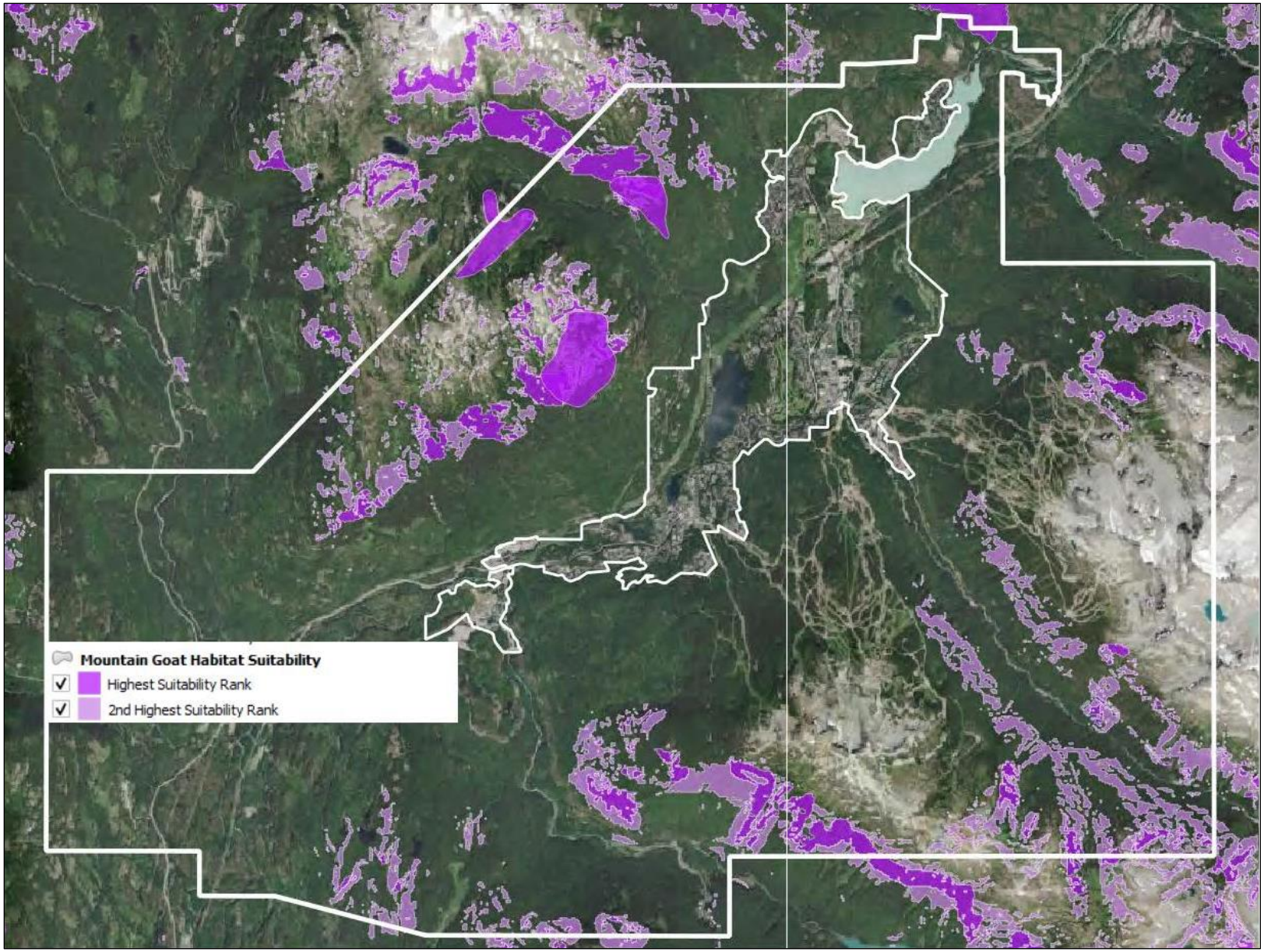
The original modelling for the three habitat suitability maps used different terminology to rank suitability (Table 6-4). For example, MacHutchon (2020) scored best to worst habitat from 1 to 5, while Wilson (2023) reversed that order so that 5 indicated best habitat.

To standardize across the three and best convey the intent (that is, where is the best and next best habitat), two terms are applied to all: “Highest Suitability” and “2nd Highest Suitability.” Comparisons to original terminology is summarized in Table 6-1. See additional fields in each layer that include original scoring and ranks, as well as original sources (Mahon et al. 2019; MacHuchon 2020; Wilson 2023). These standardized terms are included in the field “Rank_Name” in each layer.

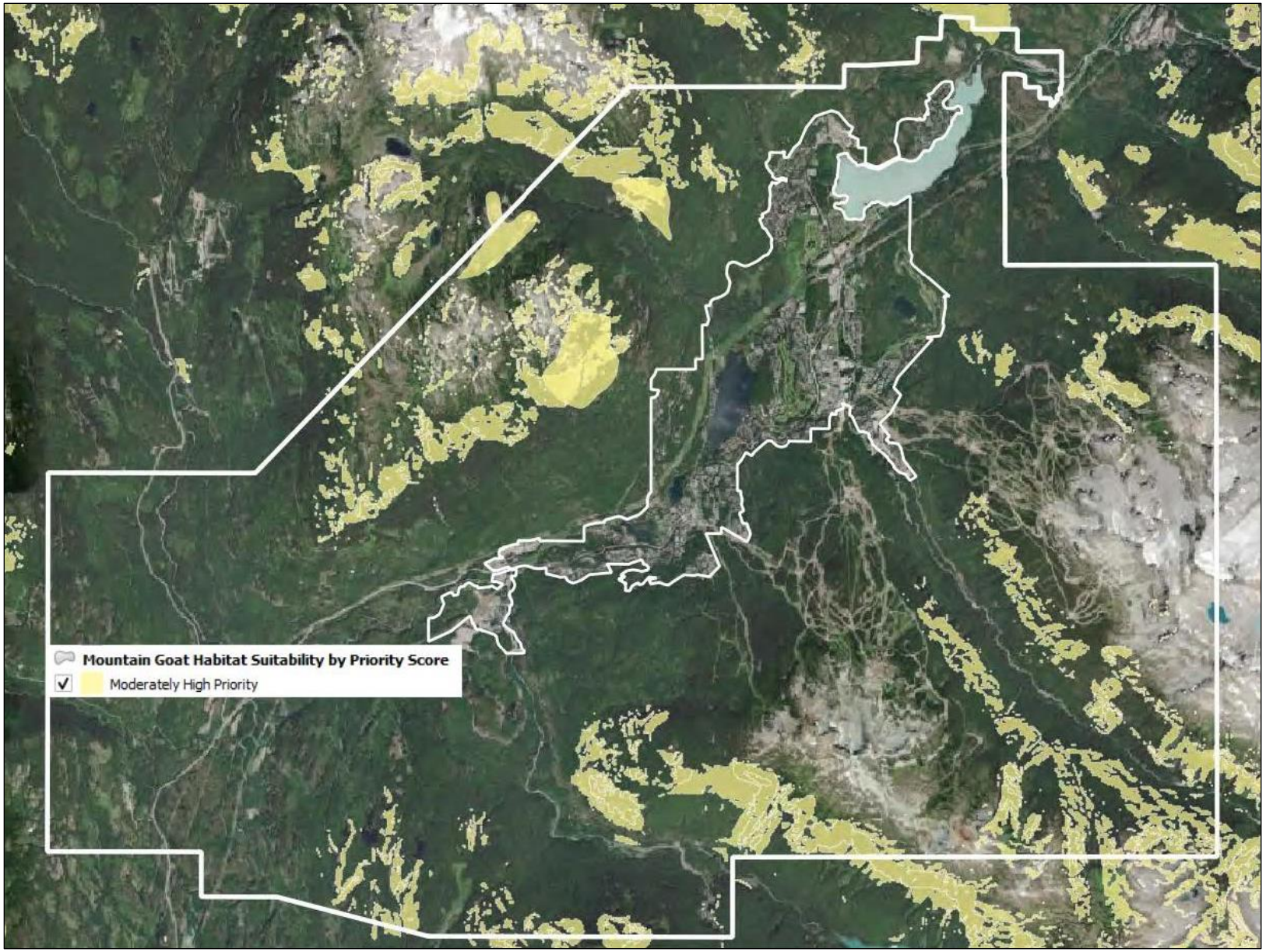
Table 6-4. Comparison of terms used for suitability ranking. Note this table is also copied in Sections 6.8 (Goshawks) and 6.9 (Grizzly Bears).

	Priority Habitat Mapping (this project)		**Mahon et al. (2019) terms for goshawks**		**MacHutchon's (2020) terms for Grizzly Bears**		**Wilson's (2023) terms for Mountain Goats**	
Generalized Rank	**Term**	**Priority Score**	**Score**	**Rank**	**Score**	**Rank**	**Score**	**Rank**
Highest	Highest Suitability Rank	Very High	n/a	High	1	High	5	Very High
2nd Highest	2nd Highest Suitability Rank	High	n/a	Moderate	2	Mod. High	4	High
3rd Highest	Not Mapped		n/a	Low	3	Moderate	3	Moderate

Advisory:
Licensed solely for use in 2024 Priority Habitats mapping. Original model from Wilson (2023); developed areas deleted by Snowline (2024). The models were designed to predict only generalized patterns of habitat at landscape scales.



5species Map 10a: Mountain Goat Habitat Suitability



5pecies Map 10b: Mountain Goat Habitat Suitability by Priority Score

6.11 Whitebark Pine (Estimated Locations)

6.11.1 Description

The Whitebark Pine map (Species Map 11a) shows known and likely locations of whitebark pine (*Pinus albicaulis*) based on Bob Brett's observations and interpretations. There is no current source of accurate locational data since the VRI does not include non-forested areas and the TEM does not list species. Even though the Federal Government through COSEWIC mapped proposed Critical Habitat areas for whitebark pine, this mapping is often incorrect. For example, the Critical Habitat mapping (Species Map 11a) shows whitebark pine at mid elevations on the south flank of Sproatt Mt. within the CWH Zone, a habitat type where whitebark pine is not found. Site level surveys, whether air- or ground-based, would be needed to confirm the actual location of this species.

6.11.2 Rationale for Inclusion

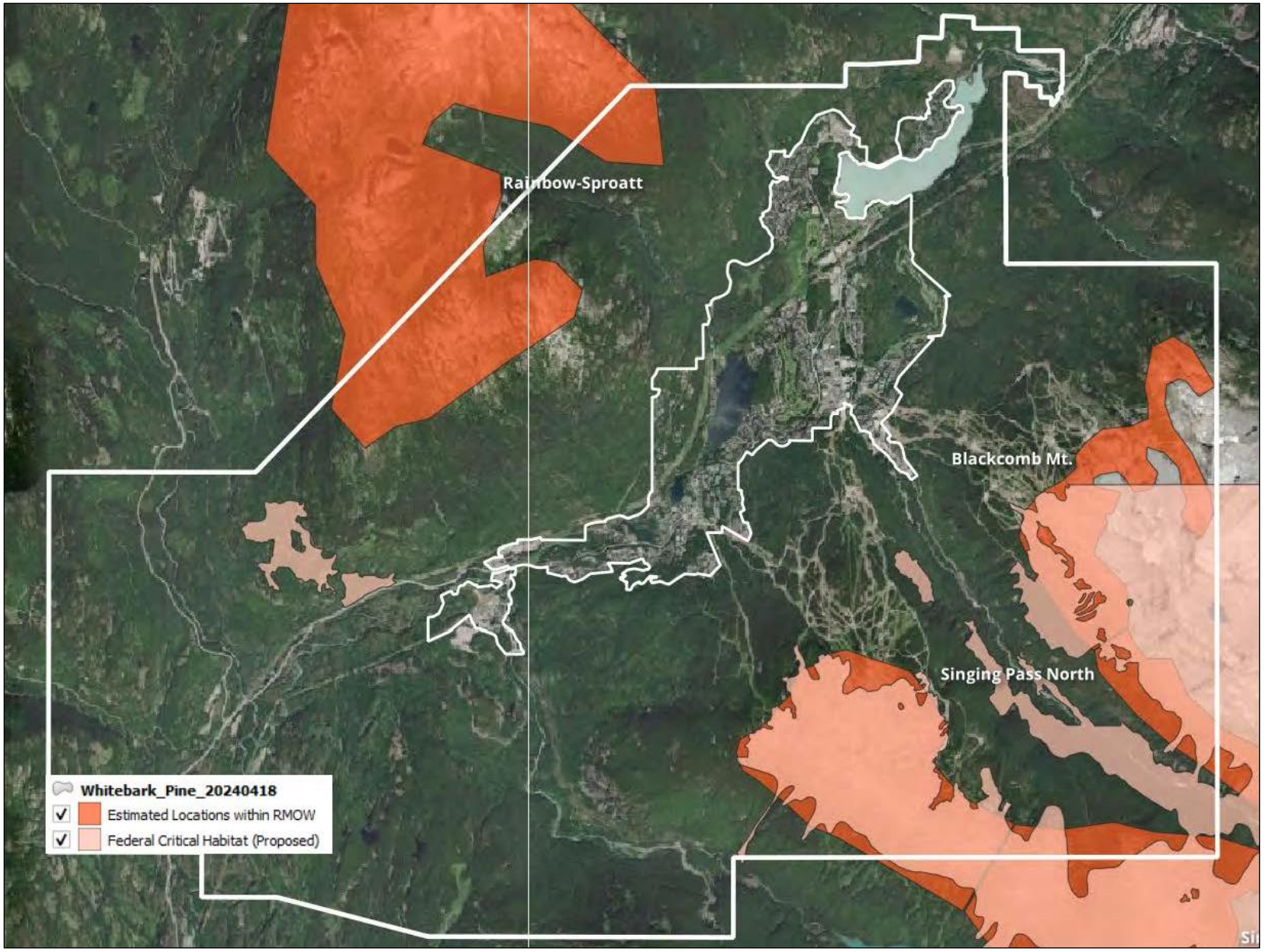
Whitebark pine is a BC Blue-listed species that is threatened by an invasive fungus that can kill trees before they reach cone-producing age (at 50 to 80 years). Even though the Federal Government has mapped proposed Critical Habitat for the species, the accuracy of that mapping is low (Species Map 11a). Field surveys would therefore be needed to confirm actual locations. Reasons to include whitebark pines in this project include: (i) as another indicator of high-elevation habitat; and (ii) as a flag in case mortality in local populations increases, that is, it becomes even rarer.

6.11.3 Scoring Criteria

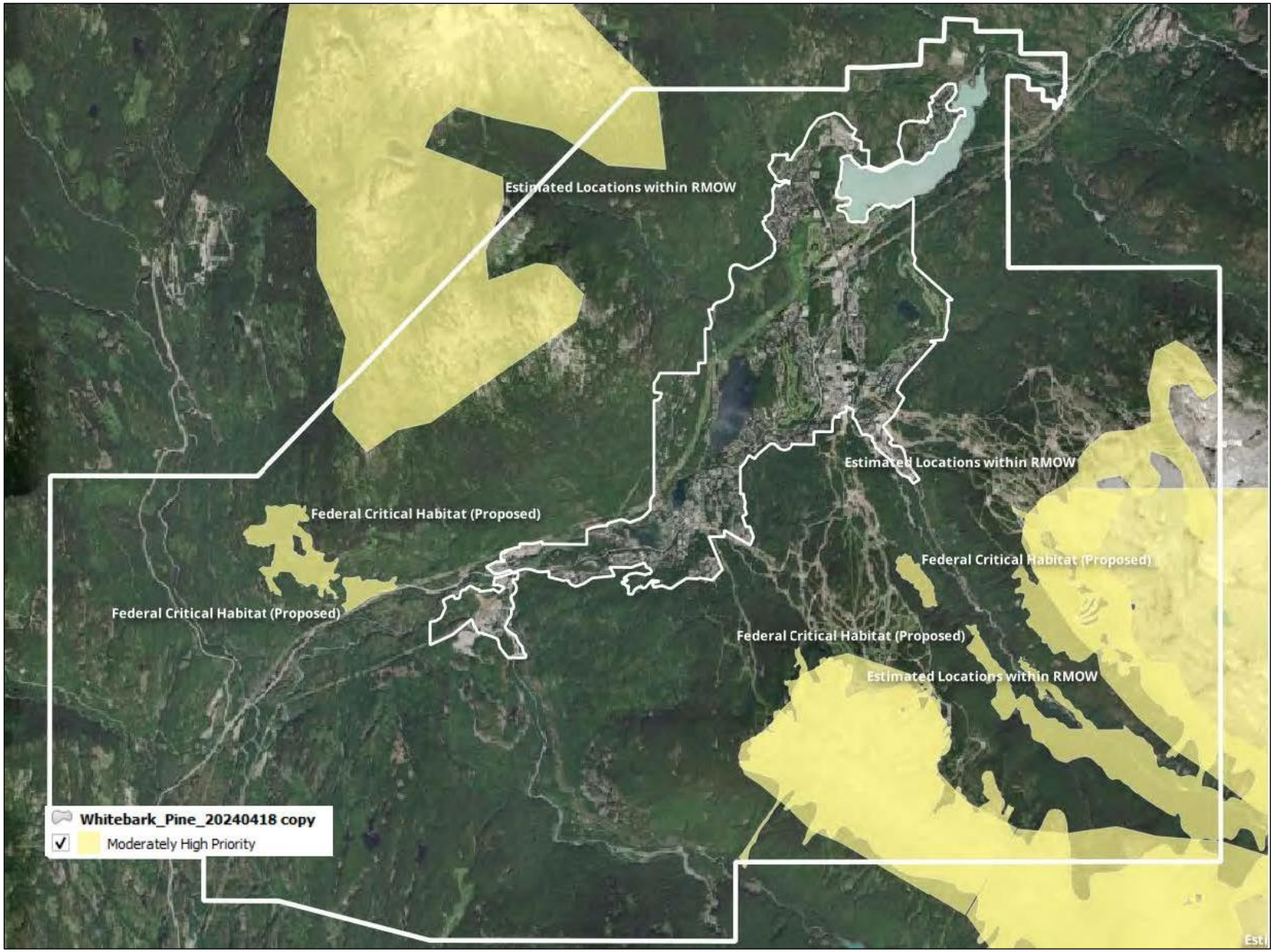
All = Moderate Priority. Since Moderate Priority is not included in this mapping, no areas are shown on the map showing whitebark pine by Priority Score (Species Map 11b).

6.11.4 Data Challenges:

As mentioned above, the actual distribution of whitebark pine in the Whistler area has not yet been accurately mapped. I am nonetheless confident that the estimated locations mapped here are generally correct.



5pecies Map 11a: Whitebark Pine (Estimated Locations) and proposed Critical Habitat



5pecies Map 11b: Whitebark Pine (Estimated Locations) by Priority Score

7.0 Non-Scoring Layers - Connectivity Mapping

7.1 Recruitment and Future Forests

7.1.1 Description

The Recruitment and Future Forests map (Connectivity Map 1) show how the connectivity and habitat value of second-growth (previously logged) forests will increase over time, in this case the next 30 years. It shows which second-growth forests will have matured by 2054, and therefore will have reestablished more connections within the forested landbase. Note that the terms "mature" and "maturity" are defined here as stands 80+ years old, which matches the standard definition in BC (BC MOFR and BC MOE 2010). As forests mature, their habitat value typically increases (see below). Ages are derived from the VRI.

Areas identified on this map have not been included in Priority Habitat rankings (i.e., Very High, High, and Moderate Priority), so do not contribute to the Scoring by Layer and Priority Habitat Overview. The goal is instead to identify areas that should be managed in a way that promotes reconnection of habitat and improved habitat for a range of priority species. Management activities could span a range from no action to restoration forestry that includes, e.g., fuel management or small-scale forestry that accelerate a return to old forest conditions. Whichever actions are chosen, they would ideally result in more and higher quality habitat over the coming decades.

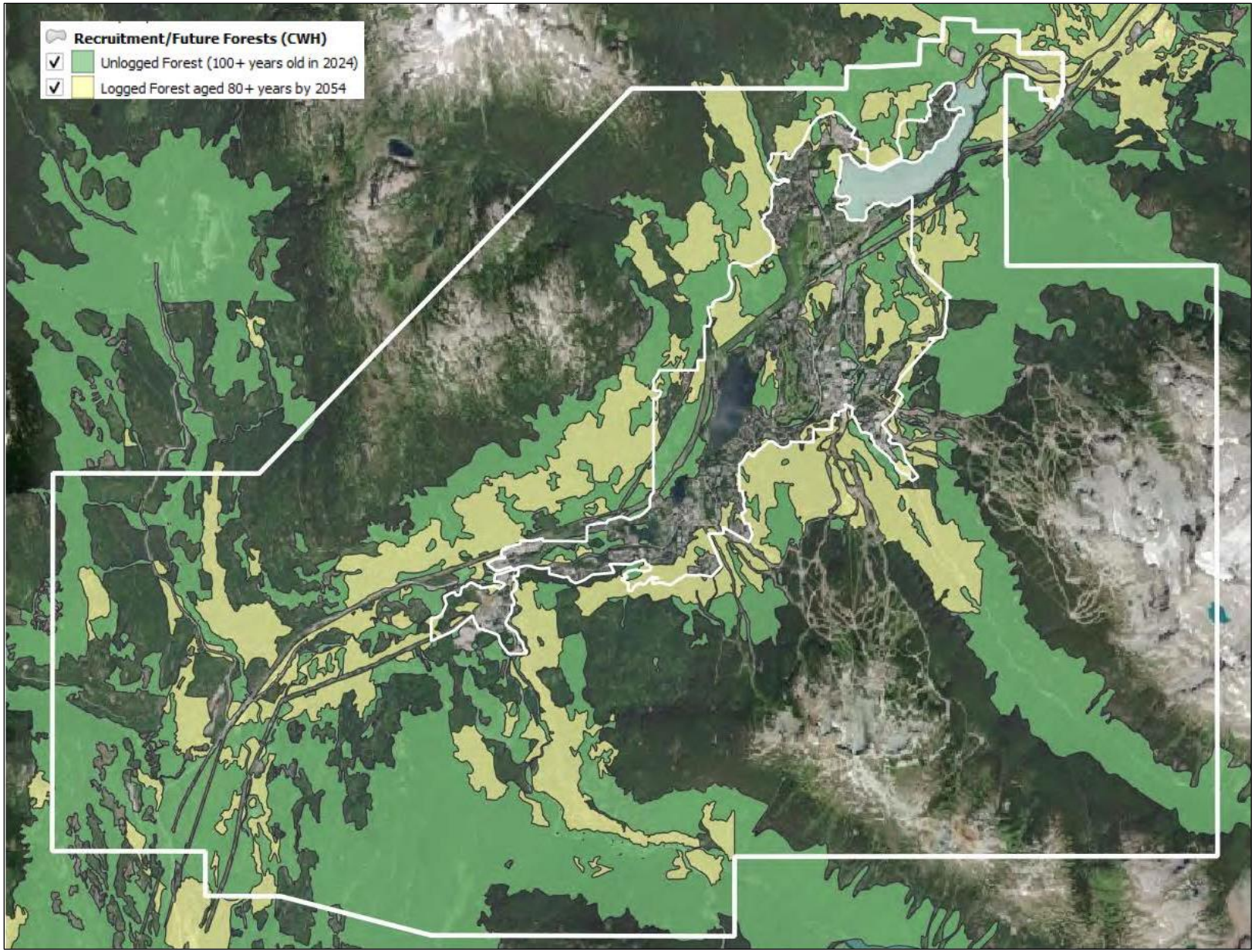
7.1.2 Rationale for Inclusion

The ranking of forests described above put the highest value on unlogged, old and ancient forests, especially in large patches (Sections 5.5, 5.6, 5.7, and 5.8). That approach is not meant to imply that logged (second-growth) forests do not also provide important habitat. As in many locations, logging in Whistler targetted the largest trees that were easiest to access, that is, low elevation forests in the Coastal Western Hemlock (CWH) Zone. The dense stands that have regrown since logging (mostly between the 1930s and 1960s), generally do have lower habitat value than unlogged stands at present. But if left undisturbed, the habitat value of these stands will continue to increase as they develop greater structural and species complexity.

One milestone of increased habitat value is when stands first reach maturity at about 80 years (as they do in Whistler's valleybottom forests). This stage occurs when some canopy trees, shaded out by their faster-growing neighbours, fall to the ground and thereby allow sunlight to again reach the forest floor. That new light allows more shade-tolerant trees to establish, as well as mosses and vascular plants. As this process continues, habitat value and species diversity continually increase. This mapping shows that almost all forests adjacent to the WUDCA will be at least 80 years old within 30 years, in 2054.

7.1.3 Scoring Criteria

Information layer only; not included in scoring.



Connectivity Map 1: Recruitment and Future Forest Habitat

7.2 Mountainside Greenbelts

7.2.1 Description

The Mountainside Greenbelts map (Connectivity Map 2) presents conceptual greenbelts in mostly-logged, low-elevations areas adjacent to the WUDCA, as shown by the second-growth forests mapped above (Connectivity Map 1).

Areas identified on this map have not been included in Priority Habitat rankings (i.e., Very High, High, and Moderately High Priority), so do not contribute to the Scoring by Layer and Priority Habitat Overview. The goal is instead to identify areas that should be managed in a way that promotes reconnection of habitat and improved habitat for a range of priority species. Management activities could span a range from no action to restoration forestry that includes, e.g., fuel management or small-scale forestry that accelerate a return to old forest conditions. Whichever actions are chosen, they would ideally result in more and higher quality habitat over the coming decades.

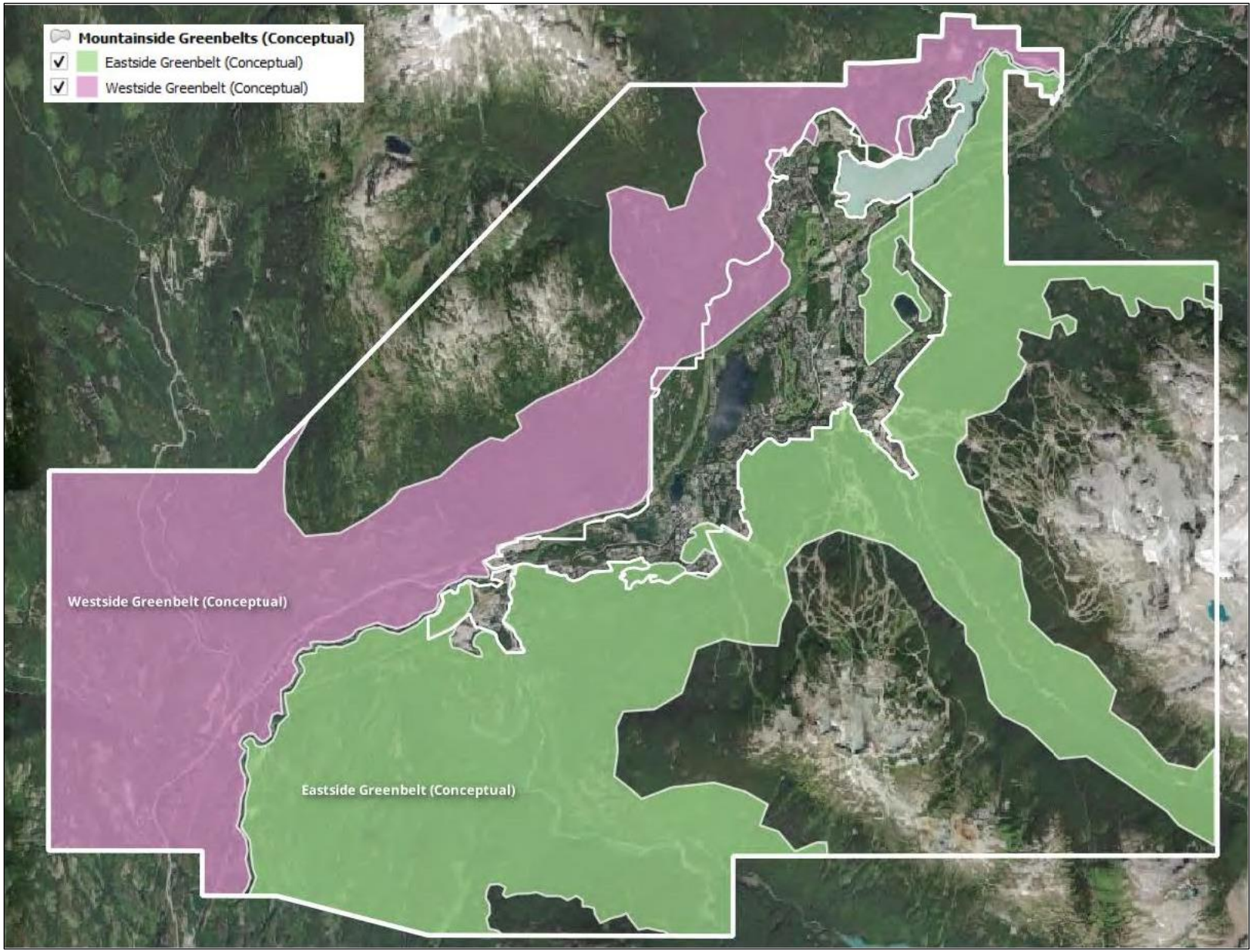
This layer shows conceptual greenbelts along elevational (mountainside) corridors. See the Cross-Valley Greenbelt layer for opportunities to protect/promote the connections across the valley, especially across Highway 99 and other major roads.

7.2.2 Rationale for Inclusion

The mapping of conceptual mountainside greenbelts is related to recruitment forests and to reconnecting habitat. A fragmented landscape limits biodiversity, especially for species that require interior habitat and/or species that need to move between habitats. These conceptual greenbelts are meant to highlight opportunities for identifying and protecting young forests that can contribute to a more connected landscape.

7.2.3 Scoring Criteria

Information layer only; not included in scoring.



Connectivity Map 2: Mountainside Greenbelts

7.3 Cross-Valley Greenbelts

7.3.1 Description

The Cross-Valley Greenbelts map (Connectivity Map 3) Presents potential sites for cross-valley connectivity, especially across Hwy 99. The goal would be to identify the highest-value sites and: (a) provide overpasses or underpasses; and/or (b) avoid infill development that precludes cross-valley movement.

Areas identified on this map have not been included in Priority Habitat rankings (i.e., Very High, High, and Moderately High Priority), so do not contribute to the Scoring by Layer and Priority Habitat Overview. The goal is instead to identify areas that should be managed in a way that promotes reconnection of habitat and improved habitat for a range of priority species. Management activities could span a range from no action to restoration forestry that includes, e.g., fuel management or small-scale forestry that accelerate a return to old forest conditions. Whichever actions are chosen, they would ideally result in more and higher quality habitat over the coming decades.

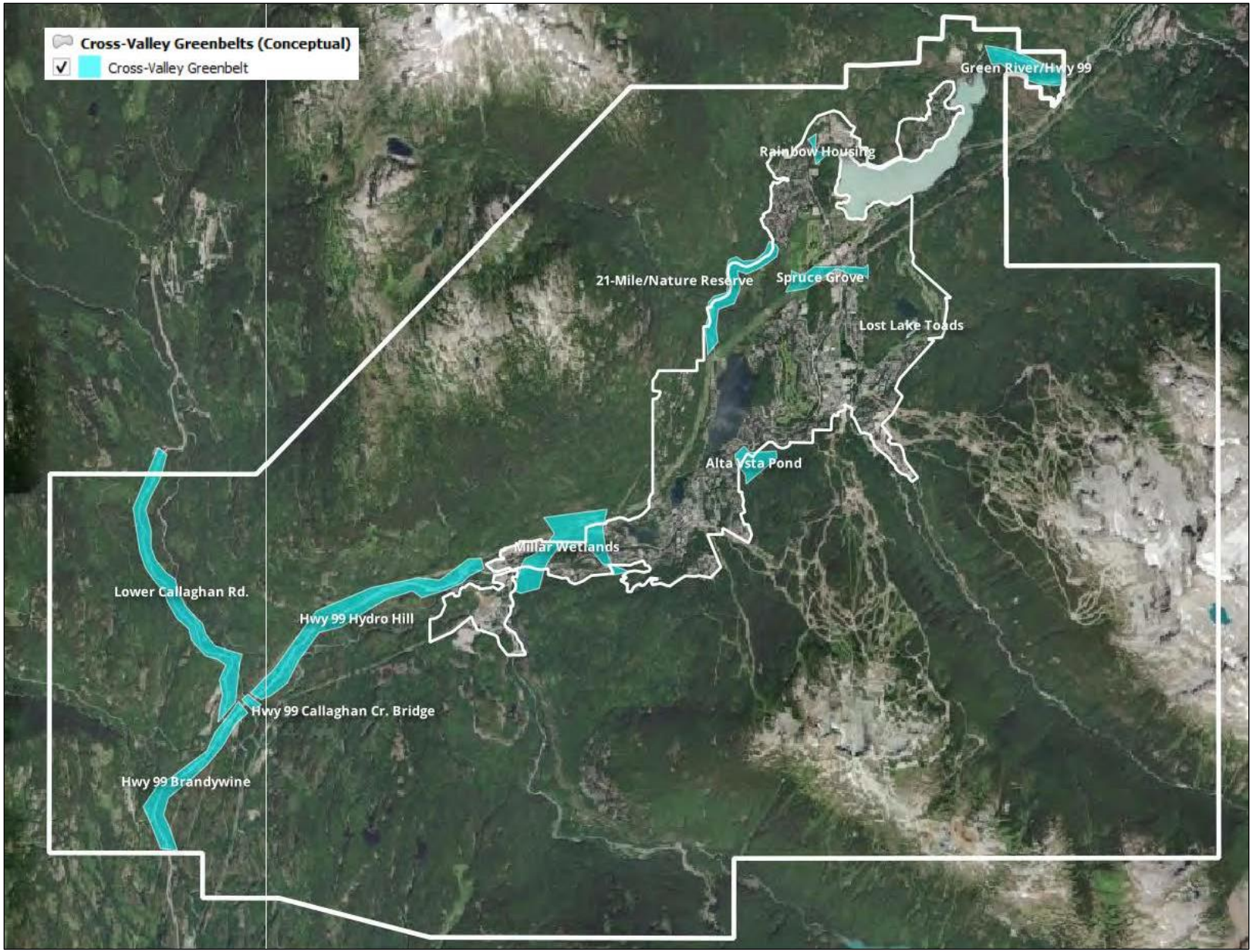
These areas represent the best opportunity to reconnect the forested landscape across the valley, especially across Highway 99 and other major roads. See the previous section for conceptual Mountainside Greenbelts.

7.3.2 Rationale for Inclusion

Logging and urban development in Whistler, as in many other areas, is concentrated in the valley bottom. Built structures and roads, especially Highway 99, act as hard barriers to the cross-valley movement of wildlife which can isolate populations, prevent movements between seasonal habitats, etc. This conceptual mapping identifies areas not completely blocked by existing developments. They therefore flag: (i) areas infill developments should potentially avoid; and (ii) potential candidates for structures such as over- and under-passes across Highway 99 and other roads.

7.3.3 Scoring Criteria

Information layer only; not included in scoring.



Connectivity Map 3: Cross-Valley Greenbelts

7.4 Existing Conservation Areas

7.4.1 Description

The Existing Conservation Areas (Conservation Map 1) shows conservation areas with some sort of legal protection.

Provincial designations include:

- Provincial Parks;
- Conservancies (BC Government 2008);
- Wildland Zones (BC Government 2008);
- Old-Growth Management Areas (via CCF); and
- Ungulate Winter Range (UWR)

Municipal designations include:

- PAN1, LCB1, and LP2 zoning.

The conservation impact of these designations is likely weakest for Ungulate Winter Range (UWR), mapped here as UWR for Mountain Goats. Designation as a UWR does not preclude logging or other resource extraction, but is nonetheless included here for two reasons:

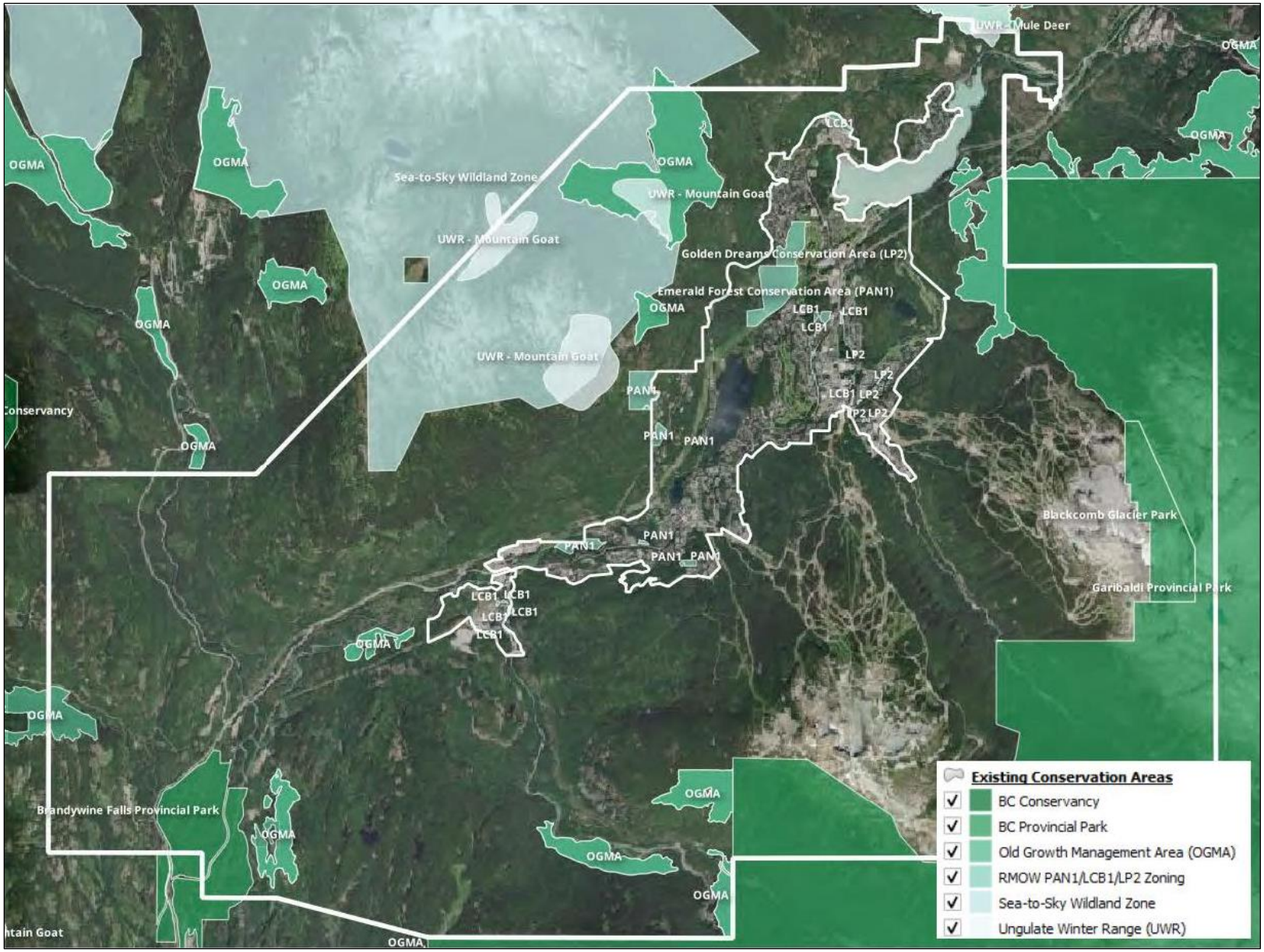
1. Most of the UWR is already enclosed within other designations such as Wildland Zone and/or OGMA which adds to potential conservation; and
2. It is meant to flag an additional consideration for recreation planning within the Twentyone-Mile Creek drainage.

7.4.2 Rationale for Inclusion

One of the next steps in the Priority Habitat Framework will be to conduct land use analysis of Priority Habitats to identify potential candidates for rezoning and/or other form of conservation. That process will require an assessment of existing conservation, both within the WUDCA (through municipal zoning) and in the rest of the RMOW (through municipal zoning or other conservation designation). This map only includes areas that have designations that (at least mostly) prevent significant alteration of habitat and are aligned with Federal standards of what comprises a protected or conserved area.

7.4.3 Scoring Criteria

Information layer only; not included in scoring.



Conservations Map 1: Existing Conservation Areas

8.0 Results and Next Steps

8.1 Hotspots Identified by 2024 Mapping

One of the immediate products of Priority Habitat mapping is to identify areas with obvious habitat value, both within and beyond the development footprint, or WUDCA (Figure 8-1; Table 8-2). Not only do some of the areas mapped as Very High Priority (red) stand out on their own, there are also many cases where mapping in this way shows how smaller patches ranked as Very High could potentially be grouped to create even more signification habitat protection.

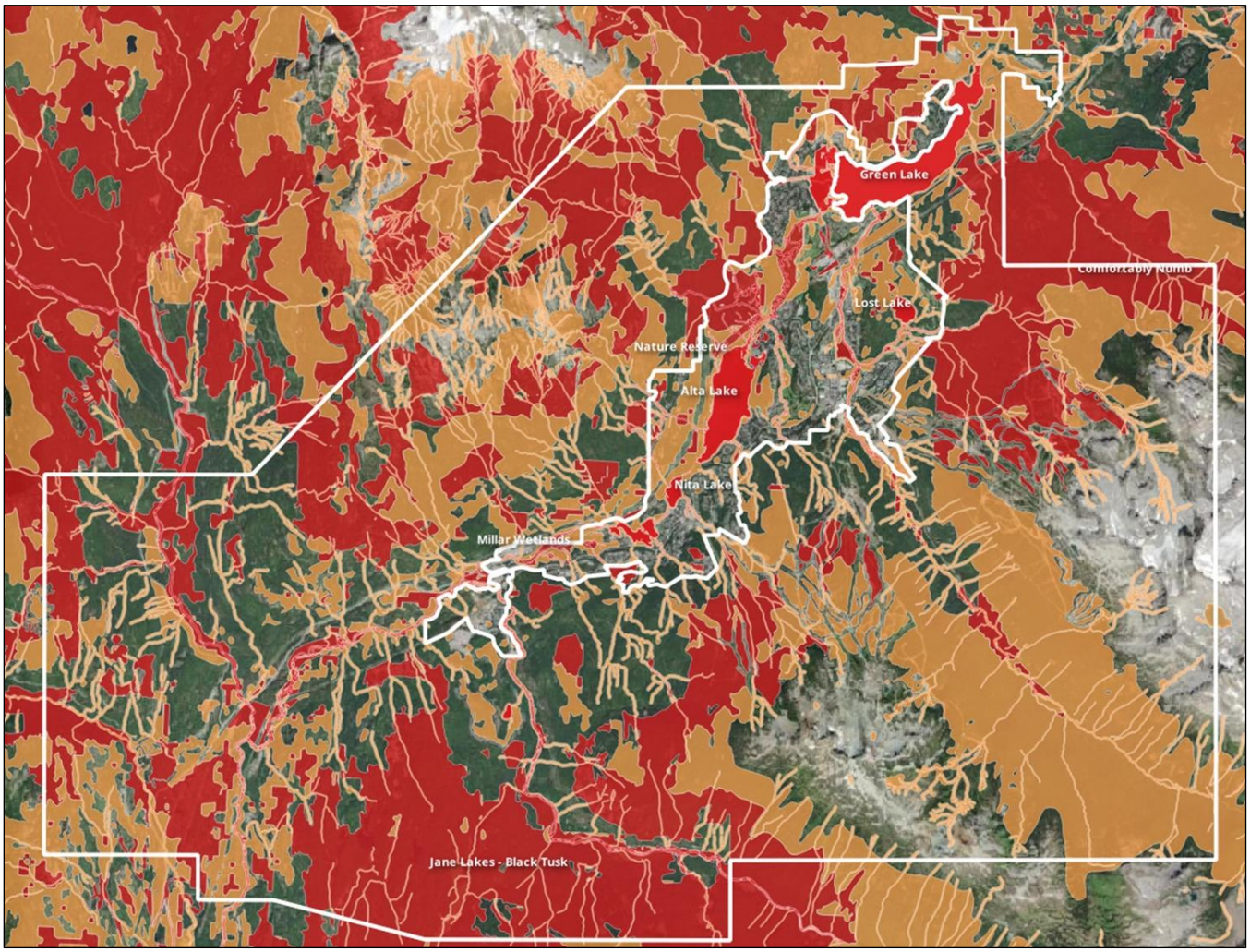


Figure 8-1. The Priority Habitats Overview map (Section 4) highlights a number of hotspots: (a) inside the WUDCA; and (b) within the greater RMOW, i.e., outside the WUDCA.

Table 8-2. Examples of hotspots evident in the Priority Habitats Overview.

Within WUDCA

- All fish-bearing lakes & streams
- Shallow shoreline habitats in local lakes
- ROGD corridor, Alta Lake to Green Lake
- Whistler Nature Reserve
- Emerald Forest
- Millar Creek Wetlands
- Edgewater & adjacent wetlands
- Fitzsimmons wetlands [Montebello area)

Beyond WUDCA

- Jane Lakes-Black Tusk ancient forest
- Blackcomb Mt. to Wedge Cr. (Comfortably Numb)
- 21-Mile Creek Corridor (Bob's Rebob to Rainbow Lake)
- Whistler Mt. ancient forests
- One Duck Lake area above Emerald Estates
- Callaghan Valley ancient forests
- Nineteen-Mile Creek corridor
- Upper Sproatt Mountain

8.2 Very High and High Priority Habitats in Context

This mapping process mapped approximately 19% of the WUDCA and 29% of the RMOW as a whole as Very High Priority Habitat (Table 8-1). The maps presented here therefore demonstrate that there is still undeveloped areas even within the development footprint boundary (WUDCA) that is worth protecting.

Table 8-1. Data summary of Priority Habitats (as mapped in the Priority Habitats Overview map; Section 4).

		WUDCA		**RMOW**	
	Area (Ha)	2,550		24,586	
Total Area (excluding lakes)		**Area (Ha)**	**% of WUDCA**	**Area (Ha)**	**% of RMOW**
Very High Priority		328	**13%**	6,969	28%
High Priority		766	30%	8,586	35%
	Total	1,094	**43%**	15,554	**63%**
Total Area (including lakes)		**Area (Ha)**	**% of WUDCA**	**Area (Ha)**	**% of RMOW**
Very High Priority		488	19%	7,349	30%
High Priority		749	29%	8,548	35%
	Total	1,237	**49%**	15,897	65%
Existing Conservation Areas		**Area (Ha)**	**% of WUDCA**	**Area (Ha)**	**% of RMOW**
Very High Priority		66	3%	1,925	8%
High Priority		44	2%	3,168	13%
		110	**4%**	5,092	21%
Wetland Habitats		Area (Ha)	% of WUDCA	Area (Ha)	% of RMOW
Total Area		229	9%	381	2%
Very High Priority		150	65%	190	50%
High Priority		79	35%	191	50%
	Wetland Total	229	**9%**	381	100%
RMOW Conservation Zoning (PAN1, LP2, LCB1)		Area (Ha)	% of WUDCA	% of RMOW	
Very High Priority		82	3%	0.3%	
High Priority		52	2%	0.2%	
	Total	134	**5%**	0.5%	
Forested Habitat		Area (Ha)	% of WUDCA	Area (Ha)	% of RMOW
Total Area		871	**34%**	18,425	75%
Forests <100 Years (Logged)		Area (Ha)	% of Forest	Area (Ha)	% of Forest
Very High Priority		138	16%	369	2%
High Priority		288	33%	1,497	8%
	Logged Total	426	**49%**	1,865	**10%**
Unlogged Forests (Old & Ancient)		Area (Ha)	% of Forest	Area (Ha)	% of Forest
Very High Priority		56	6%	6,058	33%
High Priority		140	16%	6,129	33%
	Unlogged Total	196	**23%**	12,187	**66%**
All Forested Habitat		Area (Ha)	% of Forest	Area (Ha)	% of Forest
Very High Priority		194	22%	6,427	35%
High Priority		428	49%	7,626	41%
	Total	622	**71%**	14,052	**76%**

8.3 Addressing Data Gaps

Many data gaps have been included in earlier sections of this reported. There are three common themes: (1) problems with VRI data, especially for forest stand ages; (2) potential improvements to a future TEM; and (3) inadequate availability of data and mapping of ecosystems and species.

Challenges with data currently available in the VRI and TEM are discussed in Section 2 and throughout this report. In a perfect world, there would be one master map database that collates all data currently available in the VRI and TEM, provides the ability to correct existing data and add new data, and is based on common polygons. While this may not be possible, it is essential for future planning that:

- Ideally the VRI would be updated for such areas outside the timber landbase since the VRI remains the de facto base data for habitat mapping and other conservation applications by the BC Government. Without those updates, areas that have already been developed will continue to show as suitable habitat, for example, Alpine Meadows and Emerald Forests are shown as suitable habitat for goshawks by Provincial modelling that is based on the VRI (Mahon et al. 2019).
- The main limitation of the VRI, in my opinion, is that the age data it contains for unlogged forests is so inaccurate that it impairs conservation planning. This problem is exacerbated by the fact that there seems to be no way to correct age data in the VRI, even when coring has shown it to be wrong.
- The TEM needs to be updated and improved for a number of reasons, not least because the aerial photos it was based on were from 1994 or earlier, and because the RMOW boundary has expanded since it was finished.
- The useability of the TEM could also be improved, especially if it is delivered in a more user-friendly way than currently required by Provincial standards. The 2004 TEM (Green 2004) already went beyond those standards to include non-forested ecosystems and was therefore ahead of its time. A future TEM would ideally build on the useability of the mapping in a way that further aids conservation and other planning.
- The current TEM (Green 2004) does not have a way to "age" the forest inventory which means that Stand Structure and Successional Stage fields in it will be outdated, especially in second-growth forests. Ideally, a new TEM would include ages for forest stands that would aid users in interpreting and updating those fields.
- Related to the last point, a master map that loads TEM and VRI data into merged polygons would be ideal. To retain the ability to update the map with Provincial data, this master data would include unique identifiers for each polygon listing which VRI (and TEM) polygons it is related to.

Ecosystem- and species-level surveys are also needed to better document which habitats occur in Whistler, and which and how species use them. There are a number of initiatives that are currently working towards that goal, including work by the RMOW Climate and Environment team, the RMOW Ecosystems and Species Monitoring Project (e.g., Snowline 2023, in prep.), Whistler Naturalists, AWARE, and others. It would be helpful to assemble a working group to determine which information is still lacking, and how it could be addressed.

8.4 Envisioning a Future Landscape

The 20 maps used in Priority Scoring (Sections 5 and 6) and the 4 maps presented as background information (Section 7) all help envision a future landscape in which Priority Habitats and the species they support are protected. As presented, the Priority Habitats Overview map may give the casual observer the impression that only undisturbed/undeveloped areas are priorities. The Connectivity Maps in Section 7 are included to underscore the concept that second-growth forests and other areas not included as priorities in the 2024 version of this mapping also have habitat value. More importantly, those Connectivity Maps demonstrate there are opportunities to make decisions that will allow the habitat value of those areas to increase over time, and thereby help reconnect the currently fragmented landscape.

8.5 Testing the Mapping

If time and budgets allow, it could be helpful for RMOW staff to test this new mapping tool. One way to test it would be to use a current example and evaluate the usefulness of Priority Habitat mapping. I mentioned an example in which online TEM mapping incorrectly labelled a property --- it coded the mostly forested area around Pine Point Park as "Urban" (Section 2.2.3; Figures 2-2 and 2-3). Similar testing of the new Priority Habitats mapping may find similar mistakes that could be addressed in future versions.

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Data Dictionary 1: Edits to TEM (Whistler Terrestrial Ecosystem Mapping)

2024 Field - Short	2024 Field - Full	Description	2003 TEM Field	2003 TEM Sort
NewWhis_	NewWhis_	TEM unique identifier	NEWWHIS_	3
BEC	BEC_Variant	From 2003 TEM	BGCUNIT	10
#_Subunits	Number_of_Subunits_(Deciles)	Number of subunits (Deciles) in polygon	n/a	n/a
#_of_SGs	Number_of_Site_Groups	Number of Site Groups in polygon	n/a	n/a
SG_Primary	Primary_Site_Group	Usually from dominant subunit (Decile 1)	n/a	n/a
Wetland	Wetland	Composite of possible wetland polygons from TEM; Some changes possible from 2003 TEM	n/a	n/a
WetlandTyp	WetlandTyp	From TEM or derived from ortho.; Some changes possible from 2003 TEM	n/a	n/a
Wetland_%	Wetland_%	Percent of polygon = wetland	n/a	n/a
Wetland_Ha	Wetland_Ha	Derived from shapefile from this project (not from original TEM)	n/a	n/a
Floodplain	Floodplain	Composite of possible floodplain polygons from TEM; Some changes possible from 2003 TEM	n/a	n/a
Floodp_Typ	Floodp_Typ	From TEM or derived from ortho.; Some changes possible from 2003 TEM	n/a	n/a
Floodpl_%	Floodpl_%	Percent of polygon = Floodplain	n/a	n/a
Riparian	Riparian	Composite of "Riparian" "Ravine" and "Fan" from TEM; Some changes possible from 2003 TEM	n/a	n/a
AT_Talus	AT_Talus	Composite of possible talus & avalanche polygons from TEM	n/a	n/a
AT_Talus_%	AT_Talus_%	Percent of polygon = Talus or AT	n/a	n/a
Unit1_%	Subunit_1_%	Percent of polygon occupied by 1st Subunit (Decile 1)	n/a	n/a
Unit1_SG1	Subunit_1_Site_Group_1	Subunit 1 Site Group - primary; Some changes possible from 2003 TEM	n/a	n/a
Unit1_SG2	Subunit_1_Site_Group_2	Subunit 1 Site Group - secondary; Some changes possible from 2003 TEM	n/a	n/a
Unit1_SG3	Subunit_1_Site_Group_3	Subunit 1 Site Group - tertiary; Some changes possible from 2003 TEM	new	n/a
Unit1Plant	Subunit_1_Plant_Association	Subunit 1 Plant Association (for CDC ranking)	new	n/a
CDC_Rank	Subunit_1_CDC_Rank	Subunit 1 CDC rank (Red, Blue, Yellow)	new	n/a
Struc_TEM	Subunit_1_Structure_Class_2003	Subunit 1 stand structural class from 2003 TEM; updated structure 7a/7b (BC MOFR 2010)	ECO1_STR	22
Struc_2024	Subunit_1_Structure_Class_2024	Subunit 1 stand structural class; with revisions from Priority Habitats	new	n/a
Age_2024	Age_2024	Age estimated from Forest Cover, VRI, my coring, visual/field inspection	new	n/a
Unit2_%	Subunit_2_%	Percent of polygon occupied by 2nd Subunit (Decile 2)	n/a	n/a
Unit2_SG1	Subunit_2_Site_Group_1	Subunit 2 Site Group - primary; Some changes possible from 2003 TEM	n/a	n/a
Unit2_SG2	Subunit_2_Site_Group_2	Subunit 2 Site Group - secondary; Some changes possible from 2003 TEM	n/a	n/a
Unit2_SG3	Subunit_2_Site_Group_3	Subunit 2 Site Group - tertiary; Some changes possible from 2003 TEM	ECO2_SS	25
Unit3_%	Subunit_3_%	Percent of polygon occupied by 3rd Subunit (Decile 3)	n/a	n/a
Unit3_SG1	Subunit_3_Site_Group_1	Subunit 3 Site Group - primary; Some changes possible from 2003 TEM	Unit3_SG1	n/a
Unit3_SG2	Subunit_3_Site_Group_2	Subunit 3 Site Group - secondary; Some changes possible from 2003 TEM	Unit3_SG2	n/a
Unit3_SG3	Subunit_3_Site_Group_3	Subunit 3 Site Group - tertiary; Some changes possible from 2003 TEM	ECO3_SS	32

Notes	Notes	Includes notes about polygon for editing or future analysis, otherwise blank.	Notes	n/a
SG_2003TEM	Site_Group_2003_TEM	Site Group as shown in 2003 TEM	SG	16
ECO1_DEC	ECO1_DEC	From 2003 TEM (unchanged)	ECO1_DEC	17
ECO1_SS	ECO1_SS	From 2003 TEM (unchanged)	ECO1_SS	18
ECO1_SM1	ECO1_SM1	From 2003 TEM (unchanged)	ECO1_SM1	19
ECO1_SM2	ECO1_SM2	From 2003 TEM (unchanged)	ECO1_SM2	20
ECO1_SM3	ECO1_SM3	From 2003 TEM (unchanged)	ECO1_SM3	21
ECO1_STD	ECO1_STD	From 2003 TEM (unchanged)	ECO1_STD	23
ECO2_DEC	ECO2_DEC	From 2003 TEM (unchanged)	ECO2_DEC	24
ECO2_SS	ECO2_SS	From 2003 TEM (unchanged)	ECO2_SS	25
ECO2_SM1	ECO2_SM1	From 2003 TEM (unchanged)	ECO2_SM1	26
ECO2_SM2	ECO2_SM2	From 2003 TEM (unchanged)	ECO2_SM2	27
ECO2_SM3	ECO2_SM3	From 2003 TEM (unchanged)	ECO2_SM3	28
ECO2_STR	ECO2_STR	From 2003 TEM (unchanged)	ECO2_STR	29
ECO2_STD	ECO2_STD	From 2003 TEM (unchanged)	ECO2_STD	30
ECO3_DEC	ECO3_DEC	From 2003 TEM (unchanged)	ECO3_DEC	31
ECO3_SS	ECO3_SS	From 2003 TEM (unchanged)	ECO3_SS	32
ECO3_SM1	ECO3_SM1	From 2003 TEM (unchanged)	ECO3_SM1	33
ECO3_SM2	ECO3_SM2	From 2003 TEM (unchanged)	ECO3_SM2	34
ECO3_SM3	ECO3_SM3	From 2003 TEM (unchanged)	ECO3_SM3	35
ECO3_STR	ECO3_STR	From 2003 TEM (unchanged)	ECO3_STR	36
ECO3_STD	ECO3_STD	From 2003 TEM (unchanged)	ECO3_STD	37
Aspect	Aspect	copied from 2003 TEM	ASP	11
Area	Area	From 2003 TEM (unchanged)	AREA	1
Perimeter	Perimeter	From 2003 TEM (unchanged)	PERIMETER	2
excluded	excluded	2003 TEM field - Unstable slopes	INSTAB	38
excluded	excluded	Pine leading	PINE	39
excluded	excluded	Basalt	BASALT	40
excluded	excluded	Secondary polygon identified (use NEWWHIS_ instead)	NEWWHIS_ID	4
excluded	excluded	Secondary polygon identified (use NEWWHIS_ instead)	POLY_NBR	5
excluded	excluded	ArcGIS reference number	FCODE	6
excluded	excluded	Included in 2003 data, but not referenced in report	ECP_TAG	7
excluded	excluded	Air, Ground, Photo Interpretation, Visual inspection	SOURCE	8
excluded	excluded	Included in 2003 data, but not referenced in report	DIST_BG	9
excluded	excluded	Fuel loading class - crown	FUEL_CR	12
excluded	excluded	Fuel loading class - surface	FUEL_SU	13
excluded	excluded	Fuel loading class - ladder	FUEL_LD	14
excluded	excluded	Fuel loading class - total	FUEL_AL	15

Data Dictionary 2: Edits to VRI (Vegetation Resource Inventory 2022)

2024 Field - Short	2024 Field - Full	Description	2022 VRI Field	2022 VRI Sort
Feature_ID	Feature_ID		FEATURE_ID	2
BEC	BEC_Variant	Combines 3 fields in VRI; updated from Callaghan/Soo TEMs	n/a	new
Tree_Sp	Tree_Species		LINE_3_TREE_SPECIES	73
2024_Age	2024_Age_Updated	Mostly = VRI; some edits from FC, coring, visual inspection	n/a	new
Updated?	Updated?	Yes if changed from VRI	n/a	new
Source	Source_of_Update	E.g., Forest Cover, Coring, Visual/Field Inspection	n/a	new
2024_AClass	2024_Age_Class_Updated	New classes per "2024 Priority Habitat age classes.xls"	n/a	new
Estab_Year	Stand_Establishment_Year	Derived from 2024 - "2024_Age"	n/a	new
Est.Yr_Src	Stand_Est_Year_Update_Source	VRI calculation; Forest Cover, 2024_Age	n/a	new
Stand_Type	Stand_Type	Regrowth, YF,MF,OF,AF per "2024 Priority Habitat age classes.xls"	n/a	new
Struct_Est	2024_Stand_Structure	Estimated from age per "2024 Priority Habitat age classes.xls"	n/a	new
VRI_Age	VRI_Age_Update_to_2024	Age from VRI updated to 2024	new	new
VRI_AClass	VRI_AClass	Age Class based on VRI-AGE in standard classes (1 to 9)	new	new
Logged?	Logged?	Updated where possible	OPENING_IND	5
Logging_Yr	Logging_Year	Updated where possible	HARVEST_DATE	96
2074_Age	2074_Age	Age	n/a	new
2074_AClass	2074_Class	Estimated from age per "2024 Priority Habitat age classes.xls"	n/a	new
2074_Struc	2074_Structure	Estimated from age per "2024 Priority Habitat age classes.xls"	n/a	new
2124_Age	2124_Age		n/a	new
2124_Aclass	2124_Class	Estimated from age per "2024 Priority Habitat age classes.xls"	n/a	new
2124_Struc	2124_Structure	Estimated from age per "2024 Priority Habitat age classes.xls"	n/a	new
2174_Age	2174_Age		n/a	new
2174_Aclass	2174_Class	Estimated from age per "2024 Priority Habitat age classes.xls"	n/a	new

2174_Struc	2174_Structure	Estimated from age per "2024 Priority Habitat age classes.xls"	n/a	new
SS_VRI_est	Site_Series_est_from_VRI	Estimated from BEC, SMR, SNR	n/a	new
Species_1	Species_1	Leading species	SPECIES_CD_1	119
Species1_%	Species_1_%		SPECIES_PCT_1	120
Species_2	Species_2	2nd most common species	SPECIES_CD_2	121
Species2_%	Species_2_%		SPECIES_PCT_2	122
Species_3	Species_3	3rd most common species	SPECIES_CD_3	123
Species3_%	Species_3_%		SPECIES_PCT_3	124
Species_4	Species_4	4th most common species	SPECIES_CD_4	125
Species4_%	Species_4_%		SPECIES_PCT_4	126
Species_5	Species_5	5th most common species	SPECIES_CD_5	127
Species5_%	Species_5_%		SPECIES_PCT_5	128
Species_6	Species_6	6th most common species	SPECIES_CD_6	129
Species6_%	Species_6_%		SPECIES_PCT_6	130
Act_Total%	Cottonwood_Act_Total%	Total cottonwood from above	n/a	56
Fd_Total%	Douglas_Fir_Fd_Total%	Total Douglas-fir from above	n/a	19
Yc_Total_%	Yellow_Cedar_Yc_Total_%	Total yellow cedar from above	n/a	17
Soil_SMR	Soil_Moisture_Regime		SOIL_MOISTURE_REGIME_1	15
Soil_SNR	Soil_Nutrient_Regime		SOIL_NUTRIENT_REGIME	16
Mesoslope	Mesoslope		SITE_POSITION_MESO	136
SurfaceExp	Surface_Expression		SURFACE_EXPRESSION	137
Modif_Proc	Modifying_Process		MODIFYING_PROCESS	110
Dist_Type	Disturbance_Type		EARLIEST_NONLOGGING_DIST_TYPE	92
Dist_Year	Disturbance_Year		EARLIEST_NONLOGGING_DIST_DATE	93
Vert_Compl	Vertical_Complexity		VERTICAL_COMPLEXITY	118
Project_Ht	Projected_Height		PROJ_HEIGHT_1	112
Ht_Class	Height_Class		PROJ_HEIGHT_CLASS_CD_1	107
Site_Index	Site_Index		SITE_INDEX	108
Basal_Area	Basal_Area_per_Ha		BASAL_AREA	114
C_Closure	Crown_Closure_%		CROWN_CLOSURE	n/a
CC_Class	Crown_Closure_Class		CROWN_CLOSURE_CLASS_CD	142
Stems_Ha	Stems_per_Ha		VRI_LIVE_STEMS_PER_HA	145
Volume_m2	Volume_m2	Total volume from below	n/a	148
Vol_Class	Volume_Class	By 100 m2 classes	n/a	151
Vol_Sp_1	Volume_Species_1		LIVE_VOL_PER_HA_SPP1_175	154
Vol_Sp_2	Volume_Species_2		LIVE_VOL_PER_HA_SPP2_175	28
Vol_Sp_3	Volume_Species_3		LIVE_VOL_PER_HA_SPP3_175	37
Vol_Sp_4	Volume_Species_4		LIVE_VOL_PER_HA_SPP4_175	9

Vol_Sp_5	Volume_Species_5	LIVE_VOL_PER_HA_SPP5_175	135
Ref_Year	Reference_Year	REFERENCE_YEAR	20
Proj_Year	Projected_Year	PROJECTED_DATE	26
Inv_Std	Projected_Year_Source	INVENTORY_STANDARD_CD	100
Age_Source	Age_Source	Age_Data_Source	27
Eco_Source	Ecosystem_Source	ECOSYS_Data_Source	1
Interp_Yr	Interp_Yr	INTERPRETATION_DATE	4
Intrp_Srce	Intrp_Srce	INTERPRETED_DATA_SRC_CD	3
Project	Project	PROJECT	10
Object_ID	Object_ID	OBJECTID	6
Polygon_ID	Polygon_ID	POLYGON_ID	7
Map_ID	Map_ID	MAP_ID	8
Area_Ha	Area_Ha	POLYGON_AREA	11

Data Dictionary 3: Priority Habitats Overview

Title	Field	Length	Type	Field Content
Priority Habitats Overview	Name			Place names (Bob to add)
	Notes	5	String	Summary map (vector) showing areas ranked as Very High or High Priority, and based on the highest score shown on "Scoring by Layer". See that map for individual scoring.
	Source	6	String	2024 RMOW Priority Habitats (Snowline 2024)
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Title	Field	Length	Type	Field Content
Scoring by Layer	Notes	5	String	Summary map (raster) used to calculate the highest score per 5m x 5m area. The first band shows highest score. The additional 20 bands show scores for 8 Habitat maps and 12 Species maps.
	Source	6	String	2022 VRI
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Band 1			1. Scoring by Layer (Summary)
	Band 2			2. BC Red-Listed Ecosystems
	Band 3			3. Beaver-Affected Wetlands
	Band 4			4. Big Tree Habitat
	Band 5			5. Cottonwood & Screech-Owl Habitat
	Band 6			6. Floodplain Habitat
	Band 7			7. Red-Legged Frog & Western Toad Ponds
	Band 8			8. Grizzly Bear Habitat
	Band 9			9. Lake & Wetland Habitat
	Band 10			10. Largest Old Forest Patches
	Band 11			11. Mountain Goat Habitat
	Band 12			12. Goshawk Habitat
	Band 13			13. Old & Ancient Forest Habitat
	Band 14			14. Riparian Habitat
	Band 15			15. Salmonid Fish in Lakes & Wetlands
	Band 16			16. Salmonid Fish in Streams
	Band 17			17. Shorebirds at Risk
	Band 18			18. Stream Habitat
	Band 19			19. Tailed Frog Streams
	Band 20			20. Whitebark Pine Stands
	Band 21			21. Yellow Cedar Ancient Forest

Data Dictionary 4: Priority Habitat Maps by Ecosystem

Title	Field	Length	Type	Field Content
Lake & Wetland Habitat	PriorityID	10	Integer	Unique identifier for this map.
	Name	4	String	Name from RMOW, plus some additions
	Type	4	String	Lake, Wetland, Shallow Shoreline
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	Very High = 1; High = 2
	Scoring	7	String	Very High = Shallow Shorelines at north end of Alpha and Alta Lakes, south end of Green Lake, and north/south ends of Lost Lake; Else = High
	Area_Ha	7	Decimal	Calculated from shape.
	WetlandTyp	10	String	Bog, Fen, Marsh, Swamp, Shallow Water, Shallow Shoreline [duplicate from above]
	Unit1_SS	8	String	Unit 1 Site Series (=TEM Unit1_SG3)
	Unit2_SS	8	String	Unit 1 Site Series (=TEM Unit2_SG3)
	Unit3_SS	8	String	Unit 1 Site Series (=TEM Unit3_SG3)
	TEMPolygon	10	Integer	TEM polygon number (=TEM NewWhis_)
	TEMPoly_%	9	Integer	Wetland% from TEM
	Notes	5	String	Lakes and wetlands based on RMOW GIS (2023) and TEM (Green 2004), plus additions/corrections by this project from the 2023 orthophoto. NB: For this project, open water >1 ha = lake; open water <1 ha = wetland.
	Source	6	String	Most from Whistler TEM (Green 2004) and RMOW GIS (2023) with refinements made by Bob Brett and Silvi Cafarella (Snowline 2024).
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Title	Field	Length	Type	Field Content
Stream Habitat	PriorityID	10	Integer	Unique identifier for this map.
	Name	4	String	Name from RMOW, plus additions where available.
	Watershed	9	String	Name from RMOW, plus additions where available.
	Type	4	String	Main Stem, Tributary
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	High = 2
	Scoring	7	String	All = High
	Salmonids	9	String	Yes if + Class A or A0 (Woodruff 2006). Shown in more detail in Fish Habitat layer (Snowline 2024).
	TailedFrog	10	String	Yes if tadpoles detected in system. See Tailed Frog layer (Snowline 2024) for more detail.
	Notes	5	String	Stream layer that joins separate RMOW GIS (2023) layers for streams and rivers. Some clean-up of data by Bob Brett and Silvi Cafarella (Snowline 2024).
	Source	6	String	Original data from RMOW GIS (2023). Grouping to watershed and deletion of random line segments by Bob Brett and Silvi Cafarella (Snowline 2024).
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett (Snowline Ecological Research) and Silvi Cafarella
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Title	Field	Length	Type	Field Content
Riparian Habitat	PriorityID	10	Integer	Unique identifier for this map.
	Name	5	String	
	Type	4	String	Habitat Maps 1 and 2 (Snowline 2024); plus Ravines from TEM (=Lake, Wetland, Shallow Shoreline, Stream, or Ravine)
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	High = 2
	Scoring	7	String	All = High
	Area_Ha	7	Decimal	Calculated from shape.
	Notes	5	String	30 m buffers applied to streams, lakes, wetlands; 10 m applied to ravines (per BC RAPR). Buffers are approximate and would need to be field-verified.
	Source	6	String	From Streams layer and Lakes and Wetlands. Ravines as identified in the RMOW TEM (Green 2003).
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	YYYY/MM/DD	Date
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Title	Field	Length	Type	Field Content
Floodplain Habitat	PriorityID	10	Integer	Unique identifier for this map.
	Name	4	String	Floodplain Habitat
	Type	4	String	Forested, Wetland, Forest/Wetland Complex
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	High = 2
	Scoring	7	String	All = High
	Area_Ha	7	Decimal	Calculated from shape
	Unit1_SS	8	String	Unit 1 Site Series
	Unit2_SS	8	String	Unit 1 Site Series
	Unit3_SS	8	String	Unit 1 Site Series
	Ravine?	7	String	Ravine, as mapped by TEM
	TEM_Polgon	10	Integer	
	TEMPoly_%	9	Integer	
	Notes	5	String	Floodplain forests based on TEM mapping: RMOW (Green 2004), Callaghan and Soo LUs (Timberline 2007a/b), and Whistler LU (Green 2010). Interpreted and edited by Snowline (2024).
	Source	6	String	Floodplain forests based on TEM mapping: RMOW (Green 2004), Callaghan and Soo Lus (Timberline 2007a/b), and Whistler LU (Green 2010). Interpreted and edited by Snowline (2024).
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Title	Field	Length	Type	Field Content
Old & Ancient Forest Habitat	PriorityID	10	Integer	Unique identifier for this map.
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	Very High = 1; High = 2
	Scoring	7	String	Very High (2024_Age >399); High (2024_Age 100-399)
	AgeGroup			Logged (<100 years), Unlogged Mature Forest (100-249 years), Old Forest (250-399 years), Ancient Forest (400+ years)
	YcUnlogged			Yes = yellow cedar in canopy; age > 99 years
	Yc_Total%			Percent of yellow cedar in canopy layer (2022 VRI)
	Yc_Notes			Yellow cedar is shade tolerant and slow-growing. Its presence in the canopy layer of unlogged stands usually means age >400 yrs even if VRI data shows as younger (Brett unpubl. data; Brett and Ruddy 2020). These stands are thus mapped as Ancient Forest.
	BEC_2024	8	String	BEC Variant From Combined TEM (updated from VRI per Klassen 2024)
	Area_Ha	7	Decimal	Calculated from shape
	Age_2024	8	Integer	Age_2024 (VRI); Usually-= Age_VRI with some edits based on coring data (Brett and Ruddy 2020; Brett unpubl. data).
	AClass2024	10	Integer	Age class in 2024. Mainly based on standard BC classes 1 to 9, but adds age class 10 (400-599), 11 (600-799), 12 (800-999) and 13 (1000+).
	Age_VRI	7	Integer	Age_VRI (VRI)
	Notes	5	String	Based on VRI data that often under-reports total age in unlogged stands. Logging began in Whistler ~100 ys ago. All stands >99 years old therefore assumed to be unlogged. Old = 250-399 years; Ancient = 400+ years. Also see Yc_Notes.
	Source	6	String	Most age data from 2022 VRI (BC Govt), with some age corrections from coring data (Brett unpubl. data; Brett and Ruddy 2020).
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	ObjectID	8	Decimal	Identifying number from VRI (2022)
	Feature_ID	10	Integer	Identifying number from VRI (2022)
	Polygon_ID	10	Integer	Identifying number from VRI (2022)
	Map_ID	6	String	Identifying number from VRI (2022)

Title	Field	Length	Type	Field Content
Yellow Cedar Ancient Forest	PriorityID	10	Integer	Unique identifier for this map.
	BEC_2024	8	String	BEC Variant From Combined TEM (updated from VRI)
	ForestZone	10	String	
	Yc_Total%	9	Integer	Percent yellow cedar (from VRI)
	Age_2024	8	Integer	
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	Very High = 1
	Scoring	7	String	Very High = unlogged stands with yellow cedar in canopy layer (2024_Age > 99 and Yc_Total_% > 0)
	Area_Ha	7	Decimal	Calculated from shape.
	Tree_Sp.	8	String	Tree species from 2022 VRI
	Species_1	9	String	From 2022 VRI
	Species_1%	10	Integer	From 2022 VRI
	Species_2	9	String	From 2022 VRI
	Species_2%	10	Integer	From 2022 VRI
	Species_3	9	String	From 2022 VRI
	Species_3%	10	Integer	From 2022 VRI
	Species_4	9	String	From 2022 VRI
	Species_4%	10	Integer	From 2022 VRI
	Species_5	9	String	From 2022 VRI
	Species_5%	10	Integer	From 2022 VRI
	Species_6	9	String	From 2022 VRI
	Species_6%	10	Integer	From 2022 VRI
	Notes	5	String	The presence of yellow cedar in the canopy of unlogged stands is a strong indicator that the stand is ancient (>400 years) since this species grows more slowly and is longer-lived than other local species (Brett, unpubl. Data; Brett & Ruddy 2019).
	Source	6	String	2022 VRI
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	ObjectID	8	String	Polygon ID from VRI

Title	Field	Length	Type	Field Content
Big Tree Habitat	PriorityID	10	Integer	Unique identifier for this map.
	BEC_2024	8	String	BEC Variant From Combined TEM (updated from VRI per Klassen 2024)
	ForestZone	10	String	General Area (Snowline 2024)
	Vol_Class	9	String	Classed by 100 m3
	Volume_m3	9	String	Stand volume From VRI (m3/ per hectare)
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	Very High = 1; High = 2
	Scoring	7	String	Very High (>699 m3); High (500-699)
	Area_Ha	7	Integer	Calculated from shape
	Tree_Spec	9	String	Tree species from VRI
	2024_Age	8	Integer	Age from VRI
	Updated?	8	String	Yes if age corrected from coring data
	Fd_Total%	9	Integer	Percent Douglas-fir from VRI
	Yc_Total_%	10	Integer	Percent Yellow Cedar from VRI
	C_Closure	9	Integer	Percent canopy closure from VRI
	Stems_Ha	8	Integer	Number of trees per ha from VRI
	Vert_Compl	10	Integer	Vertical Complexity from VRI
	Height_m	8	Integer	Projected height (m) from VRI "Proj_Ht"
	Site_Index	10	Integer	Site Index at 50 years from VRI
	Basal_Area	10	Integer	Basal area (m2/ha) from VRI
	Species_1	9	Integer	Volume (m3) 1st leading species from VRI
	Vol_Sp_1	8	Integer	Volume (m3) 1st leading species from VRI
	Species_2	9	Integer	Volume (m3) 2nd leading species from VRI
	Vol_Sp_2	8	Integer	Volume (m3) 2nd leading species from VRI
	Species_3	9	Integer	Volume (m3) 3rd leading species from VRI
	Vol_Sp_3	8	Integer	Volume (m3) 3rd leading species from VRI
	Vol_Sp_4	8	Integer	Volume (m3) 4th leading species from VRI
	Species_4	9	Integer	Volume (m3) 4th leading species from VRI
	Species_5	9	Integer	Volume (m3) 5th leading species from VRI
	Vol_Sp_5	8	Integer	Volume (m3) 5th leading species from VRI
	Polygon_ID	10	String	From VRI (additional identifier)
		5	String	Timber volume in cubic metres (m3) per hectare (VRI 2022). Volume per hectare is used as a surrogate for total habitat available to forest-dwelling species since volume is correlated with tree size.
	Notes			
	Source	6	String	2022 VRI
	Citation	8	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	OBJECTID	8	String	Polygon ID from VRI
	Polygon_ID	10	String	From VRI (additional identifier)

Title	Field	Length	Type	Field Content
Largest Old Forest Patches (CWH)	PriorityID	10	Integer	Unique identifier for this map.
	Name	4	String	General area
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	Very High = 1; High = 2
	Scoring	7	String	Very High (>1000 ha); High (50-999 ha)
	Area_Ha	7	Decimal	Calculated from shape. Area in hectares.
	Perimeter	9	Decimal	Calculated from shape. Perimeter in kilometres.
	Notes	5	String	Calculated from contiguous (joined) patches of forest stands in the Coastal Western Hemlock (CWH) Zone that are 250+ years old.
	Source	6	String	2022 VRI.
	Citation	8	String	2022 VRI (BC Govt), Bob Brett and Silvie Cafarella (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvie Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Title	Field	Length	Type	Field Content
BC Red-Listed Ecosystems	PriorityID	10	Integer	Unique identifier for this map.
	BEC_2024	8	String	BEC Variant from Combined TEM (updated from VRI)
	Unit1_%	7	String	Percentage of sub-unit 1 (largest area)
	Unit1_SS	8	String	BEC Site Series, Unit 1
	Unit1Plant	10	String	CDC Ecological Community (Plant Association)
	CDC_Rank	8	String	Based on BC CDC, last summarized in Brett (2022). Only Red-listed ecosystems shown on map, but other listings (Blue, Yellow, Not Ranked) are included in this field.
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	Very High = 1; High = 2; Moderately High = 3
	Scoring	7	String	Red-listed = Very High; Otherwise not ranked
	Area_Ha	7	Decimal	Calculated from shape.
	Floodplain	10	String	"Floodplain" if yes
	Floodp_Typ	10	String	E.g,. "Forested"
	Unit2_%	0	String	Percentage of sub-unit 2 (largest area)
	Unit2_SS	0	String	BEC Site Series, Unit 2
	Unit3_%	0	String	Percentage of sub-unit 3 (largest area)
	Unit3_SS	0	String	BEC Site Series, Unit 3
	TEMProject	10	String	RMOW (Green 2004), Callaghan LU and Soo LU (Timberline 2007a,b), or Whistler LU (Green 2010).
	Notes	5	String	Only BC Conservation Data Centre red-listed ecosystems shown (https://a100.gov.bc.ca/pub/eswp/; summarized in Brett 2022). Blue-listed ecosystems not included since they cover most of the rest of the forested landbase.
	Source	6	String	Based on four TEM projects from this area: RMOW (Green 2004), Callaghan LU and Soo LU (Timberline 2007a,b), and Whistler LU (Green 2010).
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	OBJECTID	8	String	Polygon ID from VRI
	Unique_ID	9	String	TEM project + polygon number from that project
	NEWWHIS_	8	String	2003 RMOW TEM unique identifier

Data Dictionary 5: Priority Habitat Maps by Species - Wet Habitats

Title	Field	Length	Type	Field Content
Beaver-Affected Wetlands	PriorityID	10	Integer	Unique identifier for this map.
	Name	4	String	Beaver-affected Wetland name
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	Very High = 1
	Scoring	7	String	All = Very High
	Area_Ha	7	Decimal	Calculated from shape.
	Perimeter	9	Integer	Perimeter in kilometres
	Notes	5	String	Wetlands created, modified, and/or maintained by beavers. Data from annual surveys originated by the Whistler Biodiversity Project in 2007. First mapping by Palmer and Snowline (2019) and updated by Snowline (2023).
	Source	6	String	Bob Brett (Whistler Biodiversity Project, Palmer and Snowline 2016-2020; Snowline 2021-2023)
	Citation	8	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Created_By	10	String	Bob Brett and Brodie Elder (Palmer and Snowline 2018); Updated for the RMOW Ecosystems Monitoring Program (Snowline 2023).
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Title	Field	Length	Type	Field Content
Salmonid Fish (Streams)	PriorityID	10	Integer	Unique identifier for this map.
	Name	4	String	From Streams layer
	Watershed	9	String	From Streams layer
	Type	4	String	Main Stem, Tributary
	Salmonids	9	String	Yes if salmonids confirmed in system, i.e., Classes A and A(0)in Woodruff 2006)
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	Very High = 1
	Scoring	7	String	Very High if Salmonids = Yes. (Based on Class A or A(0) salmonid presence; Woodruff 2006).
	Fish_Class	10	String	Class A: Year-round presence; Class A(0): Presence in spring freshet or high water; Class B: Significant food/nutrient value. No salmonids documented; Class C: Other. (Per Woodruff 2006.)
	Notes	5	String	Salmonid presence per Woodruff (2006): Class A: Year-round presence); Class A(0): Presence in spring freshet or high water; Class B: Significant food/nutrient value. Class C: No salmonids documented.
	Source	6	String	Base data from RMOW GIS (2023). Fish presence classification based on Woodruff (2006). Additional fish data from Tara Schaufele and Hillary Williamson (RMOW) and Eric Crowe. Compiled and edited by Bob Brett and Silvi Cafarella (Snowline 2024).
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett (Snowline Ecological Research) and Silvi Cafarella
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Title	Field	Length	Type	Field Content
Salmonid Fish (Lakes & Wetlands)	PriorityID	10	Integer	Unique identifier for this map.
	Name	4	String	From Lakes and Wetlands layer
	Type	4	String	Lake, Wetland
	Salmonids	9	String	Yes if salmonids confirmed in system, i.e., Classes A and A(0)in Woodruff 2006)
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	Very High = 1
	Scoring	7	String	Very High if Salmonids = Yes. (Based on Class A or A(0) salmonid presence; Woodruff 2006).
	Fish_Class	10	String	Class A: Year-round presence); Class A(0): Presence in spring freshet or high water; Class B: Significant food/nutrient value. No salmonids documented; Class C: Other. (Per Woodruff 2006.)
	Notes	5	String	Salmonid presence per Woodruff (2006): Class A: Year-round presence); Class A(0): Presence in spring freshet or high water; Class B: Significant food/nutrient value. Class C: No salmonids documented.
	Source	6	String	Base data from RMOW GIS (2023). Fish presence classification based on Woodruff (2006). Additional fish data from Tara Schaufele and Hillary Williamson (RMOW) and Eric Crowe. Compiled and edited by Bob Brett and Silvi Cafarella (Snowline 2024).
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett (Snowline Ecological Research) and Silvi Cafarella
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Title	Field	Length	Type	Field Content
Red-legged Frog & Western Toad Ponds	PriorityID	10	Integer	Unique identifier for this map.
	Name	4	String	Name of waterbody
	Species	7	String	Red-legged Frog or Western Toad
	WetlandTyp	10	String	Lake, Pond (if <1 ha)
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	Very High = 1; Moderately High = 3
	Scoring	7	String	Current habitat = Very High; Historic (Cheakamus Crossing) = Moderately High
	Area_Ha	7	Decimal	Calculated from shape.
	Notes	5	String	Shows ponds with current or historic breeding activity per Whistler Biodiversity Project (starting in 2005) and RMOW EMP (2019 to 2023).
	Source	6	String	Whistler Biodiversity Project (Brett 2024); RMOW EMP (2019 to 2023); RMOW (unpubl. reports).
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Title	Field	Length	Type	Field Content	
Shorebirds At Risk	PriorityID	10	Integer	Unique identifier for this map.	
	Name	4	String		
	Type	4	String	Shallow Shoreline	
	eBird_info			ebird Hotspot ID	
	Priority	8	String	From "Scoring" criteria detailed below	
	PH_Score	8	String	Very High = 1	
	Scoring	7	String	All = Very High	
	Area_Ha	7	Decimal	Calculated from shape.	
	Calif_Gull	10	String	California Gull (Yes or blank)	California Gull (BC Red)
	Casp_Tern	9	String	Caspian Tern (Yes or blank)	Caspian Tern (BC Blue)
	EaredGrebe	10	String	Eared Grebe (Yes or blank)	Eared Grebe (BC Blue)
	GB_Heron	8	String	Great Blue Heron (Yes or blank)	Great Blue Heron (BC Blue, SARA SC, IDW)
	GreenHeron	10	String	Green Heron (Yes or blank)	Green Heron (BC Blue)
	HornedGreb	10	String	Horned Grebe (Yes or blank)	Horned Grebe (SARA SC)
	Killdeer	8	String	Killdeer (Yes or blank)	Killdeer (BC Blue)
	LYellowleg	10	String	Lesser Yellowlegs (Yes or blank)	Lesser Yellowlegs (BC Blue, COSEWIC T)
	LB_Curlew	9	String	Long-billed Curlew (Yes or blank)	Long-billed Curlew (SARA SC, IDW)
	LongT_Duck	10	String	Long-tailed Duck (Yes or blank)	Long-tailed Duck (BC Blue)
	RNPhalarop	10	String	Red-necked Phalarope (Yes or blank)	Red-necked Phalarope (BC Blue, SARA SC)
	SurfScoter	10	String	Surf Scoter (Yes or blank)	Surf Scoter (BC Blue)
	TundraSwan	10	String	Tundra Swan (Yes or blank)	Tundra Swan (BC Blue)
	West_Grebe	10	String	Western Grebe (Yes or blank)	Western Grebe (BC Red, SARA SC)
	Ybill_Loon	10	String	Yellow-billed Loon (Yes or blank)	Yellow-billed Loon (BC Blue)
	Notes	5	String	Presence of at-risk shorebirds. Rankings (if any) shown in following order: BC, Federal (SARA or COSEWIC), Identified Wildlife. SC = Special Concern; T = Threatened. NB. All shorebirds seasonal or migratory.	
	Source	6	String	Karl Ricker (pers. comm. Feb/2024), Ricker et al. (2022), and iBird (https://ebird.org/home). Compiled and edited by Bob Brett and Silvi Cafarella (Snowline 2024).	
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)	
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)	
	Last_Edit	9	Date	YYYY/MM/DD	
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)	

Title	Field	Length	Type	Field Content
Tailed Frog Streams	PriorityID	10	Integer	Unique identifier for this map.
	Name	4	String	Stream Name
	Watershed	9	String	
	Type	4	String	
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	High = 2
	Scoring	7	String	Tailed Frogs Present = High
	Salmonids	9	Integer	
	TailedFrog	10	Integer	Tailed Frog tadpoles detected (Yes or blank)
	Notes	5	String	Based on tadpole surveys since 2005 by Whistler Biodiversity Project (2005-2010) and RMOW Ecosystems Monitoring Program (Cascade 2013-2015; Palmer and Snowline 2016-2020; Snowline 2021-2023).
	Source	6	String	Whistler Biodiversity Project (Brett 2007-2023); RMOW EMP (2013-2023)
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Data Dictionary 6: Priority Habitat Maps by Species - Forested Habitats

Title	Field	Length	Type	Field Content
Cottonwoods & Screech-Owl Habitat	PriorityID	10	Integer	Unique identifier for this map.
	OBJECT_ID	9	Integer	from VRI
	Cottonwd%	9	Integer	from VRI; Act >=5%
	Tree_Sp.	8	String	Tree species in canopy layer (from 2022 VRI)
	2024_Age	8	Integer	from VRI; Age >=80 years
	BEC_2024	8	String	BEC Variant From Combined TEM (updated from VRI)
	Soft_Edge?	10	String	Yes if polygon Is not adjacent to pavement, buildings, etc.
	Area_Ha	7	Decimal	Calculated from shape.
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	Very High = 1; High = 2; Moderately High = 3
	Scoring	7	String	Very High (highest suitabilty); High (other polygons with Soft Edge = Yes; Moderately High (Soft Edge = Partial or No)
	Notes	5	String	Cottonwood presence in stands <800m based on VRI (2022) with interpretation by Bob Brett (Snowline 2024). Estimated screech-owl habitat suitability based on presence of soft edge and distance from disturbance (per Jared Hobbs, pers. comm).
	Source	6	String	VRI (2022); Jared Hobbs (pers. comm); Visual inspection (Snowline 2024)
	Citation	8	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Title	Field	Length	Type	Field Content
Northern Goshawk Habitat Suitability	PriorityID	10	Integer	Unique identifier for this map.
	Advisory	8	String	Original model from Mahon et al. (2019). The models were designed to predict only generalized patterns of habitat at landscape scales.
	Area_Ha	7	Decimal	Calculated from shape.
	BEC_2024	8	String	BEC Variant From Combined TEM (updated from VRI)
	Hab_Suitab	10	String	Goshawk habitat suitability modelling per Mahon et al. (2019).
	Rank_Name	9	String	Two ranks are mapped: "Highest Suitability Rank" (Hab_Suitab = High); and "2nd Highest Suitability Rank" (Hab_Suitab = Moderate). Rank_All is the highest habitat use score by polygon. The terms "Highest" and "2nd Highest Suitability Rank" are used to standardize terms across goshawk, Grizzly Bear, and Mountain Goat habitat suitability modelling.
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	Very High = 1; High = 2
	Scoring	7	String	Very High = High suitability; High = Moderate suitability
	Elevation	9	Integer	For future addition from DEM
	Excl_HabRk	10	String	Areas deleted from original map, e.g., subdivisions.
	Notes	5	String	Based on BC Govt. habitat suitability modelling (Mahon et al. 2019). Some deletions by Snowline (2024) in developed areas.
	Source	6	String	Mahon et al. 2019 via BC Govt. Some deletions by Snowline (2024) in developed areas.
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Data Dictionary 7: Priority Habitat Maps by Species - High-Elevation Habitats

Title	Field	Length	Type	Field Content
Grizzly Bear Habitat Suitability	PriorityID	10	Integer	Unique identifier for this map.
	Name	4	String	
	Advisory	8	String	The habitat suitability model this mapping is based on (MacHuchon 2020) predicts generalized patterns of habitat use at landscape scales. Actual use needs to be determined by field studies.
	BEC_2024	8	String	BEC Variant From Combined TEM (updated from VRI)
	Area_Ha	7	Decimal	Calculated from shape.
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	Very High = 1; High = 2
	Scoring	7	String	Very High if Rank_All=1; High if Rank_All=2. Lower ranks not scored.
	Rank_Name	9	String	Two ranks are mapped: "Highest Suitability Rank" (Rank_All=1); and "2nd Highest Suitability Rank" (Rank_All=2). Rank_All is the highest habitat use score by polygon. The terms "Highest" and "2nd Highest Suitability Rank" are used to standardize terms across goshawk, Grizzly Bear, and Mountain Goat habitat suitability modelling.
	Rank_All	8	String	Highest score for foraging and hibernation by polgyon.
	Forag_Spri	10	String	"MURAR_PFD" Spring foraging score (MacHuchon 2020)
	Forag_Summ	10	String	"MURAR_SFD" Summer foraging score (MacHuchon 2020)
	Forag_Fall	10	String	"MURAR_FFD" Fall foraging score (MacHuchon 2020)
	Forage_Tot	10	String	"MURAR_FD_H" Highest foraging score (MacHuchon 2020)
	Winter_Hib	10	String	"MURAR_WHI" Winter hibernation score (MacHuchon 2020)
	Score_All	9	Integer	Highest score for foraging and hibernation (new)
	Score_Spri	10	Integer	"MURAR_PFD" Spring foraging score (MacHuchon 2020)
	Score_Summ	10	Integer	"MURAR_SFD" Summer foraging score (MacHuchon 2020)
	Score_Fall	10	Integer	"MURAR_FFD" Fall foraging score (MacHuchon 2020)
	Forag_Tot	9	Integer	"MURAR_FD_H" Highest foraging score (MacHuchon 2020)
	Score_Wint	10	Integer	"MURAR_WHI" Winter hibernation score (MacHuchon 2020)

Notes	5	String	Based on MacHutchon's (2020) modelling of habitat suitability in the Rainbow-Sproatt area. This map shows the highest ranking of four scores in MacHutchon: spring/summer/fall foraging plus winter hibernation.
Source	6	String	Based on MacHuchon (2020). Original field: “MURAR_PFD/SFD/FFD" =spring/summer/fall foraging score; _FD_H=highest score; _WHI= hibernation score. “TotalScore”=highest score for foraging + hibernation.
Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
Last_Edit	9	Date	YYYY/MM/DD
LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Title	Field	Length	Type	Field Content
Mountain Goat Habitat Suitability	PriorityID	10	Integer	Unique identifier for this map.
	Advisory	8	String	Licensed solely for use in 2024 Priority Habitats mapping. Original model from Wilson (2023); developed areas deleted by Snowline (2024). The models were designed to predict only generalized patterns of habitat at landscape scales.
	Area_Ha	7	Decimal	Calculated from shape.
	Rank_Name	9	String	Two ranks are mapped: "Highest Suitability Rank" (High_Score=5); and "2nd Highest Suitability Rank" (High_Score=4). The terms "Highest" and "2nd Highest Suitability Rank" are used to standardize terms across goshawk, Grizzly Bear, and Mountain Goat habitat suitability modelling.
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	Moderately High = 3
	Scoring	7	String	Moderately High if "High_Score" = 4 or 5 (inc. Ungulate Winter Range)
	High_Score	10	String	The highest habitat suitability score by polygon. Derived from Wilson (2023)
	High_Rank	9	String	The highest habitat suitability rank by polygon. Derived from Wilson (2023)
	SummerScor	10	String	Wilson (2023)
	SummerRank	10	String	Wilson (2023)
	WinterScor	10	String	Wilson (2023)
	WinterRank	10	String	Wilson (2023)
	UWR?	4	String	Yes if shape includes Ungulate Winter Range (UWR)
	Notes	5	String	This map shows the Wilson's (2023) highest ranking of spring plus winter habitat suitability. Most areas ranked as Very High or High in/adjacent to the WUDCA or ski area were deleted for this project due to the unlikelihood of occupation by goats.
	Source	6	String	Steven Wilson (2023); some interpretation by Snowline (2024), e.g., deletion of developed areas.
	Citation	8	String	Steven Wilson (2023) in 2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Title	Field	Length	Type	Field Content
Whitebark Pine (Estimated Locations)	PriorityID	10	Integer	Unique identifier for this map.
	Priority	8	String	From "Scoring" criteria detailed below
	PH_Score	8	String	Very High = 1; High = 2; Moderately High = 3
	Scoring	7	String	All = Moderately High except apparent mapping error (low elevation proposed CH in Callaghan Valley)
	Priority	8	String	All = Moderately High except apparent mapping error (low elevation proposed CH in Callaghan Valley)
	PH_Score	8	String	All = 1
	Area_Ha	7	Decimal	Calculated from shape.
	Notes	5	String	The Federal Govt. proposed Critical Habitat areas for whitebark pine, but the mapping in this area seems inaccurate. This map shows includes likely locations based on local knowledge (Brett). Site level surveys would be needed to confirm.
	Source	6	String	BC and Federal Critical Habitat mapping via RMOW GIS (2023), with local interpretations by Bob Brett
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Data Dictionary 8: Connectivity Maps

Title	Field	Length	Type	Field Content
Recruitment and Future Forests (CWH)	PriorityID	10	Integer	Unique identifier for this map.
	Area_Ha	7	Decimal	
	Perimeter	9	Decimal	
	Age_Label	9	String	"Unlogged Forest (100+ years old in 2024)" or "Logged Forest >80 years old in 2054". The former is from "2024_CWH_100"; the latter is from "2074_CWH_080".
	Notes	5	String	Shows: (a) unlogged forests, i.e., >100 years; and (b) previously logged forests that will have reached an age of 80+ years by 2054 (i.e., in 30 years). Ages from 2022 VRI.
	Source	6	String	Base data from VRI (2022 L1). Modified and analyzed by Bob Brett and Silvi Cafarella (Snowline 2024).
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Title	Field	Length	Type	Field Content
Mountainside Greenbelts (Conceptual)	PriorityID	10	Integer	Unique identifier for this map.
	Name	4	String	
	Type	4	String	
	Area_Ha	7	Decimal	
	Perimeter	9	Decimal	
	Notes	5	String	Presents conceptual greenbelts in heavily-logged low-elevations areas adjacent to the WUDCA (see Recruitment/Future Forests map). These areas represent the best opportunity to reconnect the forested landscape in the future.
	Source	6	String	Created by Bob Brett (Snowline 2024).
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

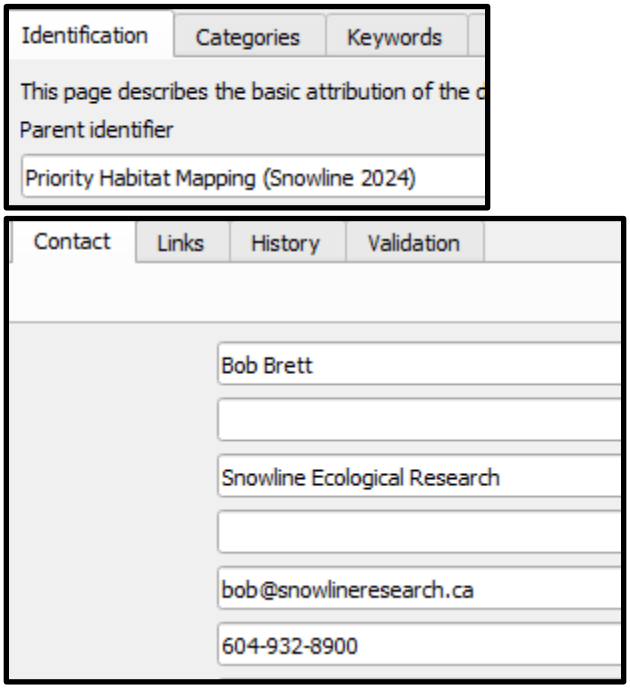
Title	Field	Length	Type	Field Content
Cross-Valley Greenbelts (Conceptual)	PriorityID	10	Integer	Unique identifier for this map.
	Name	4	String	
	Type	4	String	
	Area_Ha	7	Decimal	
	Perimeter	9	Decimal	
	Notes	5	String	Presents potential sites for cross-valley connectivity, especially across Hwy 99. The goal would be to identify the highest-value sites and: (a) provide overpasses or underpasses; and/or (b) avoid infill development that precludes cross-valley movement.
	Source	6	String	Created by Bob Brett (Snowline 2024).
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Data Dictionary 9: Existing Conservation Areas

Title	Field	Length	Type	Field Content
Existing Conservation Areas	PriorityID	10	Integer	Unique identifier for this map.
	Name	4	String	
	Type	4	String	Type of conservation area (e.g., BC Provincial Park)
	Type_2	6	String	Further detail (e.g., Class A)
	Protection	10	String	Ranking of perceived level of protection from disturbance (Moderate to Very High)
	Zoning	6	String	From RMOW GIS
	ZoneType	8	String	From RMOW GIS
	Species	7	String	From Provincial mapping
	Area_Ha	7	Decimal	Calculated from area
	Legal	5	String	From Provincial mapping
	UWR_Tag	7	String	From Provincial mapping
	Unit_No	7	String	From Provincial mapping
	Feat_Notes	10	String	From Provincial mapping
	Harvest	7	String	From Provincial mapping
	Notes	5	String	Shows conservation areas with legal protection, either by the Province (Provincial Parks, Conservancies, Wildland Zones, Old-Growth Management Areas, and Ungulate Winter Range) or RMOW (PAN1, LCB1, LP2 zoning).
	Source	6	String	RMOW GIS (2024), BC Government (2024), Cheakamus Community Forest (2023).
	Citation	8	String	2024 RMOW Priority Habitats (Snowline 2024)
	Created_By	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)
	Last_Edit	9	Date	YYYY/MM/DD
	LastEditor	10	String	Bob Brett and Silvi Cafarella (Snowline 2024)

Appendix A: Metadata by Map Layer

A.1 Standard Metadata on each layer



A.2 Metadata by Layer

PH Summaries	**Priority Habitats Overview**	Summary map (vector) showing areas ranked as Very High or High Priority, and based on the highest score shown on "Scoring by Layer". See that map for individual scoring. Methods: 1. Priority Scores were calculated for 20 base maps -- 9 that focus on Habitat and 11 that focus on Species. These were all based on shapefiles (vector-based maps). 2. Priority Scores for the 20 base maps were collated in the "Scoring by Layer" raster layer. A raster map can only store integers within a given area (pixel). The pixel size used was 5m x 5m. 3. The highest Priority Score within each 5m x 5m pixel are presented in “Scoring by Layer”. This map also shows individual scoring for each map (shown as individual bands of data), i.e., it shows results from rasterizing the original base maps. 4. The summary data from Scoring by Layer was then transformed back into a vector layer (Priority Habitats Overview) to allow better presentation and easier analysis of the data. 5. Note that some of the 20 contributing layers include a third Priority Score (Moderately High) which is not include in the Scoring by Layer or Priority Habitat Overview. This decision was made to highlight only the highest priority areas.
Habitats	**Lake & Wetland Habitat**	Lakes and wetlands based on RMOW GIS (2023) and TEM (Green 2004), plus additions/corrections by this project from the 2023 orthophoto. NB: For this project, open water >1 ha = lake; open water <1 ha = wetland. Changes from source mapping: 1. Reclassified all open water waterbodies as: (1) lake if >1ha; or (2) wetland if <1 ha. This classification results in 9 waterbodies classified as lakes within RMOW boundaries: Green, Lost, Alta, Nita, Alpha, Loggers, and three Jane Lakes. 2. The RMOW TEM (Green 2004) classified wetlands into five categories: bog, fen, swamp, marsh, and shallow shorelines. Some of these wetlands surrounded open water ponds, i.e., areas deeper than approximately 2 metres (too deep for emergent vegetation). There is no consistent definition of pond vs. lake and available mapping was not at a scale that allowed differentiating them well, hence the use of an arbitrary cut-off of 1 hectare. For the purposes of this project, the distinction did not matter since all wetlands and lakes were ranked at a minimum priority of High. 3. Many previously unmapped wetlands were added in the Brandywine basalt pond area, within Brandywine Falls Provincial Park. Other wetlands were added where visible on available orthophotos. NB, the 2023 RMOW orthophoto was used for these additions since it was at a higher resolution than previous imagery and therefore showed small wetlands/ponds more clearly.

Stream Habitat

Stream layer that joins separate RMOW GIS (2023) layers for streams and rivers. Some clean-up of data by Bob Brett and Silvi Cafarella (Snowline 2024).

Changes from source mapping:
- Some stream segments were deleted if they appeared to be in error, e.g., appeared to flow back uphill, were discontiguous, etc.
- Streams were grouped into watershed to allow more accurate naming. This process resulted in far fewer line segments labelled as "Stream" rather than by name of watershed.
- Original RMOW data mapped streams and rivers separately due to software constraints. That is, streams were mapped as lines and larger rivers were mapped as polygons, and ArcGIS software does not allow two different shapes (lines and polygons) in the same file. Rivers were therefore redigitized as lines to merge the two features.

Riparian Habitat (30m Buffers)

30 m buffers applied to streams, lakes, wetlands; 10 m applied to ravines (per BC RAPR). Buffers are approximate and would need to be field-verified.

Floodplain Habitat

Floodplain forests based on TEM mapping: RMOW (Green 2004), Callaghan and Soo LUs (Timberline 2007a/b), and Whistler LU (Green 2010). Interpreted and edited by Snowline (2024).
Note that source mapping includes up to three sub-units per polygon, which may mean that a polygon could be mapped as, for example, both floodplain and wetland.

Old and Ancient Forests

Based on VRI data with changes to approximately 30 polygons whose age has been corrected (to much older) based on coring data (Brett and Ruddy 2020; Brett unpublished data). Note that the VRI is a timber-based inventory that often under-reports the age of unlogged stands. See notes under the descriptions of age groups below.

Logged (<100 years):
- Industrial logging did not start in Whistler until the 1920s, with most logging from the 1930s through mid 1970s. Stands (polygons) with VRI <100 years therefore assumed to be previously logged.
- While age data for logged stands is generally accurate, the VRI data does not accurately differentiate between logged and unlogged stands younger than 100 years (the latter could include burned areas, treeline stands, etc.). This class could therefore include young stands that have not been logged.

Unlogged Mature Forest (100-249 years):
- At least some (and probably most) polygons shown in the VRI within this age range are actually older, unlogged stands, i.e., >250 years. This statement is based on coring data (Brett and Ruddy 2020; Brett unpubl. data). Further work would be needed to clarify the actual ages of these and other stands.
- To complicate classification, many low-elevation stands were high-graded (partially cut), especially for western redcedar.

Old = 250-399 years:

- The accuracy of age data in the VRI for older unlogged stands is variable. For low-elevation stands with shade-tolerant canopy trees (mainly Douglas-fir in our region), ages are fairly accurate in most cases. (There are, however, some Douglas-fir stands >500 years old that are not shown in the VRI).
- The ages of stands with shade-tolerant species in the canopy layer are meanwhile typically underestimated in the VRI, often by many centuries. This is due to the methodology used to produce age data in the VRI: mainly air photo interpretation, with higher-resolution data from helicopter-based analysis, and some coring in the field. Accurate ages of trees in these very old/ancient stands cannot be determined without multiple cores analyzed under a microscope -- a process which was rare if ever applied to local stands in the VRI.

Ancient = 400+ years (including Yellow Cedar forests):

- Notes above apply here also.
- Based on coring data (Brett and Ruddy 2020; Brett unpublished data), ancient forests are far more common than shown in the VRI, especially in north-south valleys such as Brandywine, Callaghan, Twenty-one Mile, Nineteen Mile, and Cheakamus. There are also extensive ancient forests on Whistler and Blackcomb Mountains.
- Yellow cedar is slow-growing, shade-tolerant, and exceptionally long-lived, e.g., numerous coring locations included trees>800 years and even >1300 years.
- In the absence of coring data for each polygon, the presence of yellow cedar in the canopy layer is therefore the best indicator that a forest stand is ancient. Polygons with yellow cedar in the canopy layer (656 polygons in the study area) are therefore classed as Ancient within this map. For transparency, they are duplicated in the “Yellow Cedar Ancient Forest” layer. See additional notes in that map.
- Further coring work is needed to improve the accuracy of age data in all stands, but especially ones dominated by shade-intolerant species that include western hemlock, western redcedar, mountain hemlock, and amabilis fir. These stands are most likely to be in "climax" or ancient stage, that is, uneven-aged, multi-generational forests.

Yellow Cedar Ancient Forests

The data in this layer duplicates polygons added to the Ancient Forest class within the Old and Ancient Forest layer. It is based on coring data (Brett and Ruddy 2020; Brett unpublished data) and the characteristics of yellow cedar which is a slow-growing, shade-tolerant, and exceptionally long-lived species. Numerous coring locations included trees>800 years and even >1,300 years. In the absence of coring data for each polygon, the presence of yellow cedar in the canopy layer is therefore the best available indicator that a forest stand is ancient. A total of 656 polygons meeting these criteria are duplicated here from the Old and Ancient Forest Habitat map. Also see notes in the metadata for that layer.

	Big Tree Habitat	Timber volume in cubic metres (m3) per hectare (VRI 2022). Volume per hectare is used as a surrogate for total habitat available to forest-dwelling species since volume is correlated with tree size.
	Largest Old Forest Patches (CWH)	Calculated from contiguous (joined) patches of forest stands in the Coastal Western Hemlock (CWH) Zone that are 250+ years old.
	BC Red-Listed Ecosystems	This map shows only Red-listed ecosystems shown (BC Conservation Data Centre; https://a100.gov.bc.ca/pub/eswp/; summarized in Brett 2022). Other polygons with Blue- or Yellow-listed ecosystems, or ecosystems not yet ranked by the CDC are included in the dataset but not shown since they cover most of the rest of the forested landbase. That is, only the most threatened ecosystems are shown.
Species (Wet)	**Beaver-Affected Wetlands**	Wetlands created, modified, and/or maintained by beavers. Data from annual surveys originated by the Whistler Biodiversity Project in 2007 (Brett 2007). First mapping by Bob Brett (in Palmer and Snowline 2019) and updated most recently in 2023 (Snowline 2023).
	Red-Legged Frog and Western Toad Ponds	Shows ponds with current or historic breeding activity per Whistler Biodiversity Project (starting in 2005) and RMOW EMP (2019 to 2023).
	Salmonid Fish (Lakes & Wetlands)	Lakes and wetlands with confirmed salmonid presence per Woodruff (2006). Woodruff classified waterbodies as: Class A: Year-round presence); - Class A(0): Presence in spring freshet or high water [only Jordan Creek is mapped in this class]; - Class B: Significant food/nutrient value; - Class C: No salmonids documented. - Only Class A and A(0) are shown on the map, but the other classes are included under the field “Fish_Class”. **Advisories**: - Note that the data in this map may be incomplete or out of date. Consult the RMOW Environmental Stewardship Department for more information. - The mapping software does not allow streams to be shown on the same layer as lakes and wetlands (the former are lines and the latter are polygons, and only one geometry type is permitted per layer). Therefore, also refer to the Salmonid Fish (Streams) layer to see all available data.
	Salmonid Fish (Streams)	- Streams with confirmed salmonid presence per Woodruff (2006). Woodruff classified waterbodies as: Class A: Year-round presence); - Class A(0): Presence in spring freshet or high water [only Jordan Creek is mapped in this class]; - Class B: Significant food/nutrient value; - Class C: No salmonids documented.

		- Only Class A and A(0) are shown on the map, but the other classes are included under the field "Fish_Class". **Advisories**: - Note that the data in this map may be incomplete or out of date. Consult the RMOW Environmental Stewardship Department for more information. - The mapping software does not allow streams to be shown on the same layer as lakes and wetlands (the former are lines and the latter are polygons, and only one geometry type is permitted per layer). Therefore, also refer to the Salmonid Fish (Lakes & Wetlands) layer to see all available data.
	Shorebirds At Risk	Presence of at-risk shorebirds. Rankings (if any) shown in following order: BC, Federal (SARA or COSEWIC), Identified Wildlife. SC = Special Concern; T = Threatened. NB. All shorebirds seasonal or migratory.
	Tailed Frog Streams	Based on tadpole surveys since 2005 by Whistler Biodiversity Project (2005-2010); and RMOW Ecosystems Monitoring Program (Cascade 2013-2015; Palmer and Snowline 2016-2020; Snowline 2021-2023).
Species (Forest)	**Cottonwoods and Western Screech-Owl Habitat**	Cottonwood presence in stands <800m based on VRI (2022) with interpretation by Bob Brett (Snowline 2024). Estimated Western Screech-owl (*Megascops kennicottii kennicottii*) habitat suitability based on presence of soft edge and distance from disturbance (per Jared Hobbs, pers. comm. to Bob Brett). Note that the data available for both cottonwoods and Western Screech-owls is not complete or entirely accurate. Further stand-level surveys would be needed to assess stands mapped here and to determine the location of other cottonwood stands.
	Goshawk Habitat Suitability	Based on BC Govt. habitat suitability modelling (Mahon et al. 2019). Some deletions by Snowline (2024) in developed areas, i.e., where the VRI base data showed forest habitat that is no longer present. **Terminology**: Common terminology (I.e. "Highest Suitability" and "2nd Highest Suitability") is used in three maps that are based on habitat suitability modelling: 1. Goshawks. 2. Grizzly Bears, and 3. Mountain Goats.

		The goal of standardizing terms is to simplify and lend consistency to the varying terms used in these models to describe relative suitability. See additional fields in each layer that include original scoring and ranks, as well as original sources (Mahon et al. 2019, MacHuchon 2020, and Wilson 2023, respectively). These standardized terms are included in the field "Rank_Name" in each layer. **Advisory**: Note that this map shows generalized habitat suitability based on models developed by Mahon et al. (2019) and reliant on the accuracy of the base data (VRI). Active and past nesting documented by Brett (2019) and Snowline (2019 to 2023) have all been in areas shown as High habitat suitability. While these results demonstrate the validity of the modelling, it should not be used to presume actual occupancy by goshawks.
Species (High Elevation)	**Grizzly Bear Habitat Suitability**	Based on MacHutchon's (2020) modelling of habitat suitability in the Rainbow-Sproatt area. This map shows the highest ranking of four scores in MacHutchon: spring/summer/fall foraging plus winter hibernation. **Terminology**: Common terminology (I.e. "Highest Suitability" and "2nd Highest Suitability") is used in three maps that are based on habitat suitability modelling: 1. Goshawks. 2. Grizzly Bears, and 3. Mountain Goats. The goal of standardizing terms is to simplify and lend consistency to the varying terms used in these models to describe relative suitability. See additional fields in each layer that include original scoring and ranks, as well as original sources (Mahon et al. 2019, MacHuchon 2020, and Wilson 2023, respectively). These standardized terms are included in the field "Rank_Name" in each layer. **Advisory**: The habitat suitability model this mapping is based on predicts generalized patterns of habitat use at landscape scales. Actual use needs to be determined by field studies.
	Mountain Goat Habitat Suitability	This map shows the Wilson's (2023) highest ranking of spring plus winter habitat suitability. Most areas ranked as Very High or High in/adjacent to the WUDCA or ski area were deleted for this project due to the unlikelihood of occupation by goats. **Terminology**: Common terminology (I.e. "Highest Suitability" and "2nd Highest Suitability") is used in three maps that are based on habitat suitability modelling:

		1. Goshawks. 2. Grizzly Bears, and 3. Mountain Goats. The goal of standardizing terms is to simplify and lend consistency to the varying terms used in these models to describe relative suitability. See additional fields in each layer that include original scoring and ranks, as well as original sources (Mahon et al. 2019, MacHuchon 2020, and Wilson 2023, respectively). These standardized terms are included in the field "Rank_Name" in each layer. **Advisory**: Licensed solely for use in 2024 Priority Habitats mapping. Original model from Wilson (2023); developed areas deleted by Snowline (2024). The models were designed to predict only generalized patterns of habitat at landscape scales.
	Whitebark Pine	The Federal Govt. has mapped Critical Habitat for whitebark pine, but the mapping for the Whistler area is inaccurate. Whitebark pine is most common near treeline, especially n warm aspect slopes where the species can descend into closed forest. On other sites, it is mostly restricted to exposed sites near treeline or as krummholz above treeline. The map shows more likely locations based on Bob Brett's local knowledge. Site level surveys would be needed to confirm actual locations.
Connectivity	**Recruitment/Future Forests (CWH)**	The goal of this map is to show how logged forests will develop over the next 30 years at lower elevations, i.e., in the CWH (Coastal Western Hemlock) Zone. The term "recruitment forest" refers to young stands that are protected so that they can develop into older forests, especially within landscapes in which old forest is below conservation targets. The term future forest is somewhat synonymous, but is more generally concerned with projecting what forests will be present on a landscape in the future. Two forest types are shown: (1) Unlogged forests, i.e., >100 years; and (2) Previously logged forests that will have reached an age of 80+ years by 2054 (i.e., in 30 years). Ages from 2022 VRI. See additional metadata notes in the Old and Ancient Forest Habitat layer that describe challenges with VRI age data.
	Mountainside Greenbelts (Conceptual)	Presents conceptual greenbelts in previously-logged low-elevations areas adjacent to the WUDCA (see Recruitment/Future Forests map). These areas represent the best opportunity to reconnect the forested landscape in the future.

		Areas identified on this map have not been included in Priority Habitat rankings (i.e., Very High, High, and Moderately High Priority), so do not contribute to the Scoring by Layer and Priority Habitat Overview. The goal is instead to identify areas that should be managed in a way that promotes reconnection of habitat and improved habitat for a range of priority species. Management activities could span a range from no action to restoration forestry that includes, e.g., fuel management or small-scale forestry that accelerate a return to old forest conditions. Whichever actions are chosen, they would ideally result in more and higher quality habitat over the coming decades. This layer shows conceptual greenbelts along elevational (mountainside) corridors. See the Cross-Valley Greenbelt layer to opportunities to protect/promote the connections across the valley, especially across Highway 99 and other major roads.
	Cross-Valley Greenbelts (Conceptual)	Presents potential sites for cross-valley connectivity, especially across Hwy 99. The goal would be to identify the highest-value sites and: (a) provide overpasses or underpasses; and/or (b) avoid infill development that precludes cross-valley movement. This layer shows conceptual cross-valley greenbelts. For greenbelts along elevational corridors, see the Mountainside Greenbelts (Conceptual) layer.
ECAs	**Existing Conservation Areas**	Shows conservation areas with legal protection, either by the BC Government (Provincial Parks, Conservancies, Wildland Zones, Old-Growth Management Areas, and Ungulate Winter Range) or RMOW (PAN1, LCB1, LP2 zoning). Note that levels of protection vary, even within these designations. There are other land-based designations, e.g., Wildlife Habitat Areas, that prescribe if and how logging and other activities can occur. Since they are a lower overall level of protection, they are not included here. One exception shown on this map is Ungulate Winter Range (UWR) for mountain goats. Since most of the mapped areas are enclosed within other designations (e.g., Wildland Zone and/or OGMA), they have been included. The main purpose of that inclusion relates to winter recreational use, especially in the Rainbow/Sproatt area and related Twentyone-mile Creek drainage.