Rose Swanson Mountain

2024 Field Investigation of Species and Habitats

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1.0 INTRODUCTION

Hill Environmental Ltd was retained by the Armstrong Spallumcheen Trails Society (ASTS) to conduct field work on Rose Swanson Mountain (Rose Swanson) as a follow up to our desktop inventory dated July 31, 2024.

The desktop inventory focused on the collation of online data from several sources. The data consisted of existing and expected wildlife, vegetation and ecosystems at risk on and surrounding Rose Swanson. The inventory accomplished this by searching online databases such as iNaturalist, eBird hotspots, iMapBC and the BC Species and Ecosystems Explorer. The BC Species and Ecosystems Explorer database enables a user to search a BGC zone, resulting in a list of the species based on their expected habitats. A shortfall of Ecosystem database is that the new BGC zone assigned to Rose Swanson (ICHxm1) is not listed as an option. Therefore, search results were specifically for the pre 2021 BGC zone of IDFmw1. The outcome of the inventory report revealed that Rose Swanson is rich in animal species and vegetation biodiversity. The inventory report also revealed there are inconsistencies in the legislation to protect species and habitats. There is also an absence of considerations for climate change resiliency, inconsistencies in mature forest retention, absence of established buffers around water sources, absence of alternate considerations for fuel mitigation that incorporate the effects of climate change, absence of documented protected wildlife corridors and the consideration of hydrology and the downstream effects of harvesting in the headwaters in the BCTS forest harvesting plans.

In the Okanagan Valley we have experienced a heat dome, an atmospheric river, drought, flooding and wildfires in addition to the reduced snowpack in the mountains and lowered water table levels. Forested areas provide climate regulation such as, clean air due to respiration, carbon sequestration, soil moisture retention, numerous ecosystem services, cooler ambient temperatures, snow interception, protection from wind erosion and accelerated snowmelt and refuge for wildlife. With the effects of climate change, steps to ensure climate resiliency must be incorporated into plans to manage the area (Section 4.7).

Another outcome of the desktop inventory was the need for a field study to document habitats, wildlife, vegetation and potential species at risk to substantiate and expand upon the previously completed desktop inventory. The amalgamation of the desktop inventory data and the field data

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collected in July of 2024, filled in some data gaps (Section 4.8) and provided a better understanding of the species and habitats present on Rose Swanson as outlined in this report. Hill Environmental hiked several areas of Rose Swanson and visited features of interest to develop an understanding of the microhabitats, riparian features, seral stages, dominant tree canopy, wildlife corridors, and species in the eastern and northern portion of Rose Swanson. In addition, the recreational value of the existing trail network, ecosystems on Rose Swanson, and the ecosystem services Rose Swanson provides corroborate the desktop inventory results and together, provide documentation of what is present on Rose Swanson.

BC Timber Sales (BCTS) has developed harvesting plans for Rose Swanson and this field study will provide data to BCTS to guide harvesting plans. It is the aim of ASTS to incorporate documented observations, available habitats and the field and inventory results into the proposed BCTS harvesting plan.

2.0 Field Work Locations

Rose Swanson is in the Township of Spallumcheen, west of the City of Armstrong (Figure 1). Rose Swanson's location and intact mature forest canopy creates a refuge for a variety of wildlife and plant species and provides a corridor for wildlife movement between adjacent and seasonal habitats in addition to across the Okanagan Valley. Rose Swanson also has a historical network of trails, making it a popular recreational area for the Armstrong/Spallumcheen community and tourists.

As Rose Swanson and the surrounding areas will be affected by timber harvesting, the documentation of species, habitats and features on private and crown lands within and surrounding the BCTS operating area, offer valuable insights into the ecosystems and conditions of the mountain. The field work in combination with the desktop inventory data were used to highlight unique habitats and reveal species previously not confirmed on Rose Swanson.

Hill Environmental hiked a total of 24km of trails on Rose Swanson, which included the entirety of the eastern main trail network and several northern trails which covered the eastern and a portion of the northern section of Rose Swanson (Figures 2a & 2b). In addition to the trail network, several features of interest (springs, streams and wetlands) were accessed by foot/ 4x4 vehicle, including those on private land. In addition to field observations, drone footage of approximately 200ha was captured to review habitats that were not easily accessible by trail or vehicle. The drone captured

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imagery of a large blowdown area to the west of the eastern main trail network and confirmed several small waterbodies. The field observations and drone footage were used to stratify habitat types on Rose Swanson. The field work in 2024 covered the eastern and portions of the northern and southern extents of Rose Swanson. Future field work should focus on the western and the remainder of the northern and southern portions of Rose Swanson

Field work and direct access to habitats that are suitable to anticipated species, contributes to the knowledge of species and habitats that were not documented in the desktop inventory. The 2024 field work focused on the eastern and northern portions of Rose Swanson and was restricted to July when ambient temperatures were exceeding 30°C (heat dome). The abnormally high temperatures limited the timing of the field surveys to early mornings and afternoons when the ambient temperature was lower. Wildlife movement/ sightings were likely inhibited by the ambient temperatures and therefore the proposed follow up field sampling, in the spring of 2025, will focus on the remaining portions of Rose Swanson (north, western and central/southern) in addition to altering the season of the field sampling.

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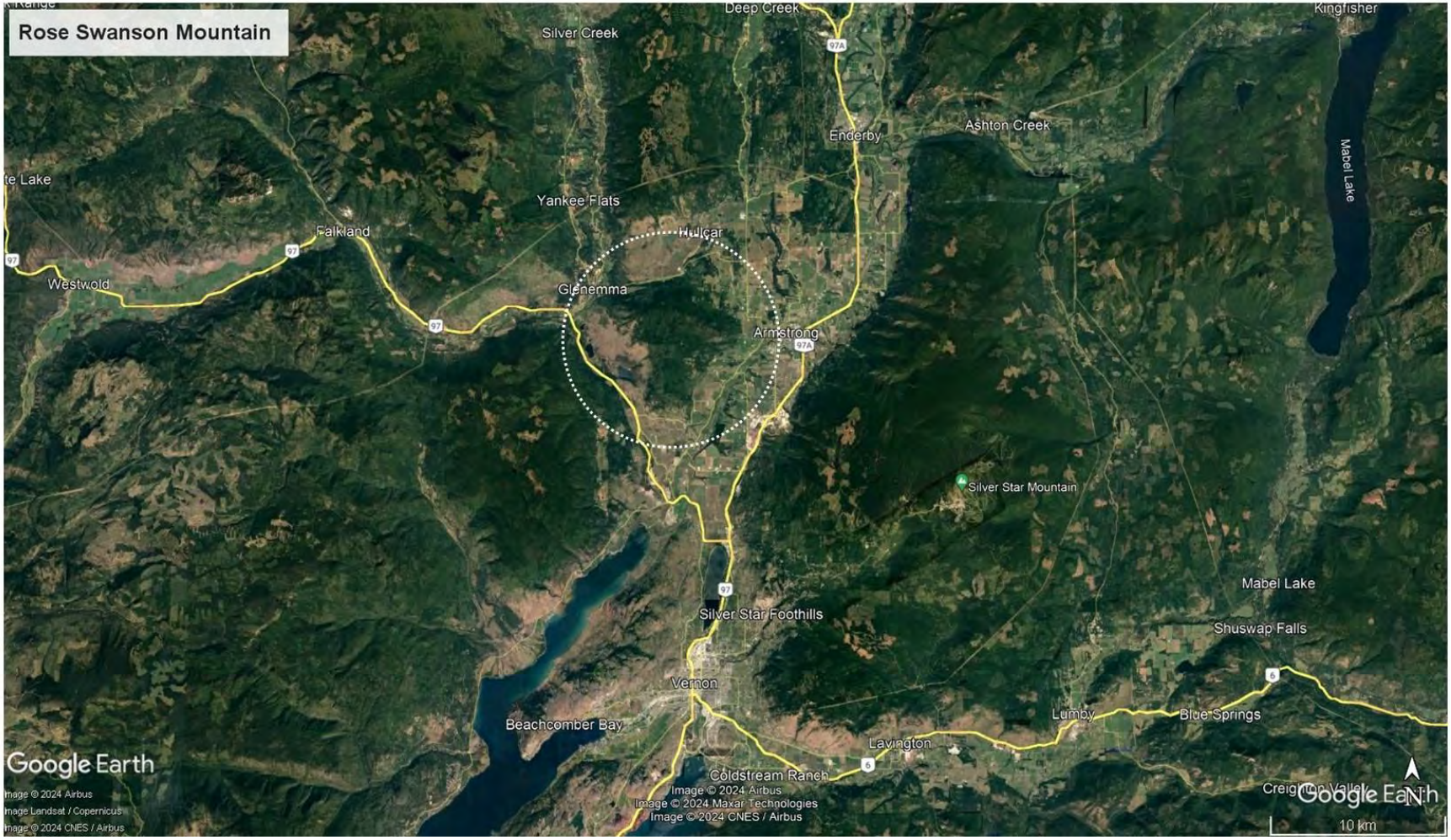

Figure 1 - Orthophoto of the location of Rose Swanson (circled) and the surrounding areas.

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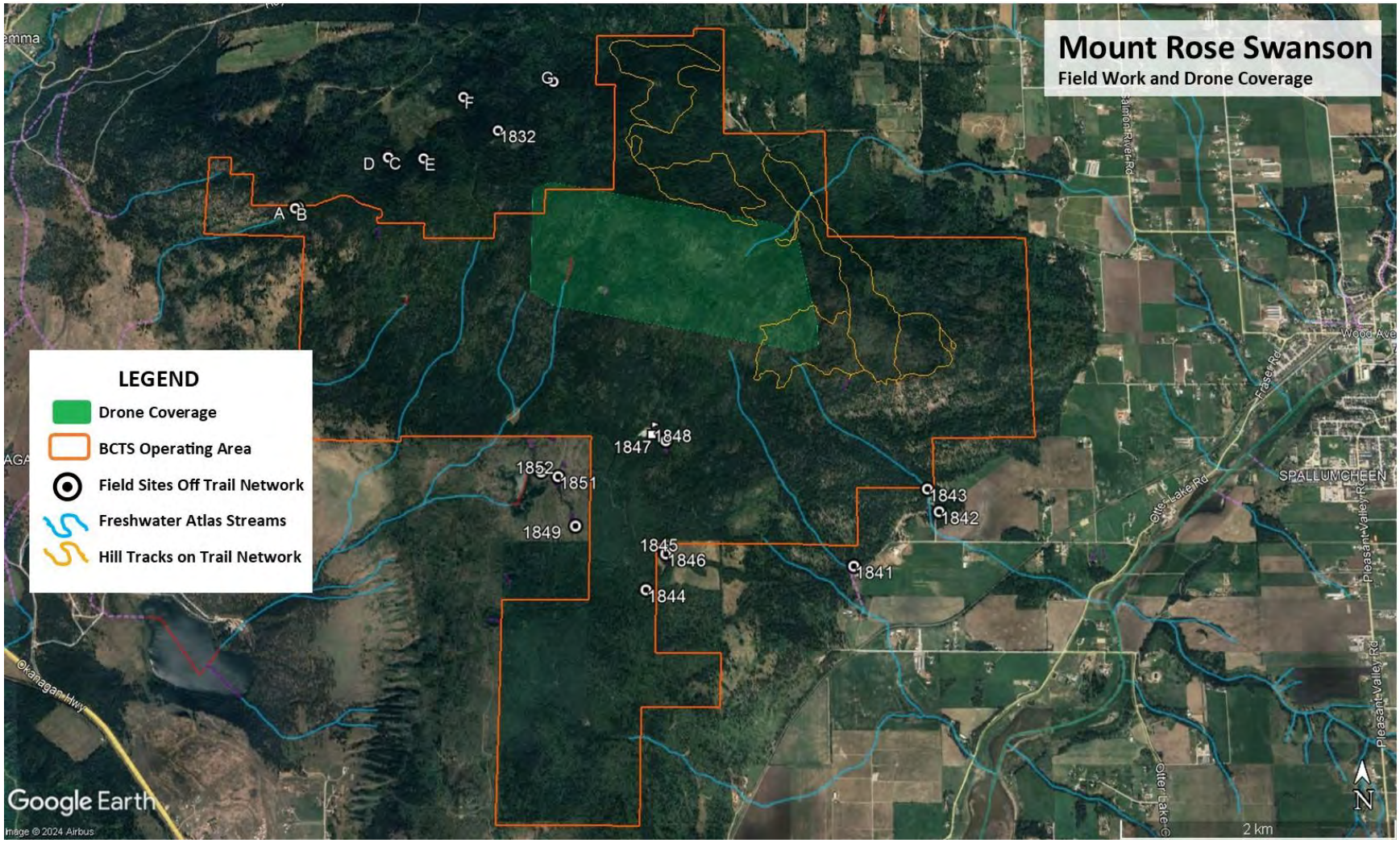

Figure 2a – Orthophoto of the trails hiked, features visited via foot/vehicle access, and the estimated area of drone coverage.

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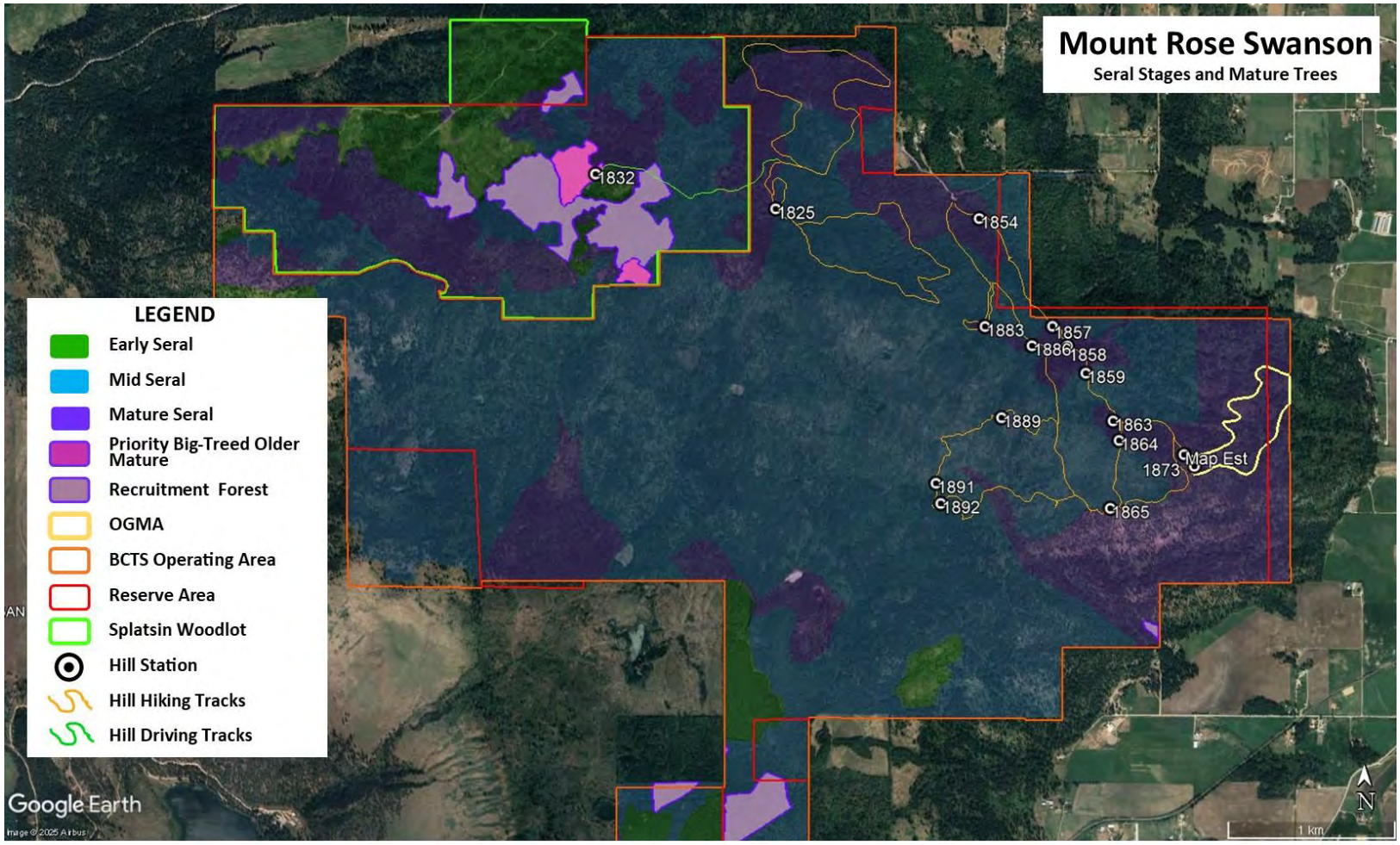

Figure 2b - Orthophoto of the trails hiked, features visited via foot/vehicle access and the Splatsin woodlot boundary

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3.0 FIELD WORK RESULTS

Field work was conducted between July 9 – 17, 2024 and drone footage was collected in July 2024. Field assessments and drone footage were utilized to ground truth the desktop inventory results and provide additional data with respect to specific habitat types, ecosystem function, connectivity of habitats, and species requirements. Rose Swanson was stratified into 6 habitat types after the field data and drone footage was collated. The 6 stratified habitats included:

1. seral stages and mapped old growth habitats
2. unique microhabitats with wildlife significance
3. riparian and aquatic features
4. evidence of wildlife usage,
5. deadfall area
6. Wildlife corridors.

A comparison of the desktop inventory species and field assessments are summarized in Section 3.4. The following discussion focuses on the stratified habitat features and associated maps.

3.1 Seral Stages and Mapped Old Growth Habitats

3.1.1 Background of BEC/ BGC classification system and TAP

The **B**iogeoclimatic **E**cosystem **C**lassification **(BEC)** was established in the 1970's, renamed in 1990 and has been sequentially updated as additional information is collected with the latest update in 2021. BEC is an ecological classification system that groups similar ecosystems together by using vegetation, animals, microorganisms and the physical environment (climate) and its interactions to form an ecosystem unit. The **B**io**g**eoclimatic **C**lassification **(BGC)** mapping in the Thompson Okanagan was revised in 2006 (Version 6) and again in 2021 (Version 12). BGC stratifies the landscape into Zones, subzones and variants. The 14 Zones in British Columbia are based on the climax tree species and understory species when the climax tree species is similar. The subzones are geographically confined and include precipitation, temperature, vegetation and succession of seral stands as the parameters for consideration. Variants are a subdivision of a subzone and have similar climatic and geographic characteristics.

Both the BEC and the BGC classifications are the cornerstone used for many resource management activities in the Thompson/ Okanagan. The BGC classification for Rose Swanson Mountain is currently ICHxm1 (Interior Cedar Hemlock very dry mild Shuswap). The Rose Swanson BGC zone was updated in 2021 from IDFmw1 (Interior Douglas Fir moist warm Shuswap) to ICHxm1

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Interior Cedar Hemlock very dry mild Shuswap (BGC version 12) to reflect changes in the abundance of Western Red Cedar on zonal sites. The updated ICHxm1 occurs in the region covered by Land Management Handbook 75 and *ICHxm1 (regardless of variant) is specific to the Shuswap variant in the Province of BC* (Deb MacKillop, 2021). The previous IDFmw1 zone still exists in BC, just not with the Shuswap (1) variant. In addition, BC Species and Ecosystem Explorer has not been updated and does not recognize the new ICHxm1 zone therefore it is not an option in habitat searches.

The naming change from IDFmw1 to ICHxm1 indicates that the additional data collected between 2012 to 2021 shows a transition in the climax trees species from Douglas Fir to Western Red Cedar between the drier and moist climates (Deb MacKillop, 2021). The area surrounding Rose Swanson Mountain, outside of the BCTS operating area, has remained IDFmw1 due to its drier sub zones. The climax tree species in Rose Swanson are Douglas Fir and Western Red Cedar and are often found in mixed stands. The 2021 updates to the Field Guide to Ecosystem Classification and Identification, Boundary-Eastern Okanagan-Shuswap-Southern Arrow was announced in the 2012 Thompson Okanagan BEC update (Ryan, 2012). The biogeoclimatic zone of ICHxm1 is the transition zone between the moist warm and the dry mild variants. The BGC zone is the identifying characteristic that all management decisions related to wildlife species, habitats, stocking standards, mule deer winter range, species at risk, etc. is based upon.

The Old Growth Technical Advisory Panel (TAP) is tasked with mapping areas of old growth within each specified BGC zone based on the climax species in that BGC zone. In the absence of old growth forests, TAP allocates "deferral and retention areas" that are left to age and become an old growth forest. TAP uses spatial and vector data and does **not** include field verification of the climax tree species. Because TAP uses the existing BGC zone, the correct classification of the climax tree species is essential in assigning the old growth and deferral areas. Both the ICHxm1 climax species (Douglas Fir and Western Red Cedar) were used in TAP assessments and both zones have the same definitions for seral stages: Early (<40years), Mid (>40-<100years), Mature (>100 years), and Old (>250years).

Within the BCTS operating area on Rose Swanson, TAP mapping shows early, mid and mature seral stages (Figure 3). The majority of the forest canopy within the BCTS operating area is mapped as mid seral Western Red Cedar (40 to 100yrs) with smaller sections of early (<40 yrs)

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and mature seral (>100 years). **Field investigations revealed a discrepancy between the TAP mapped seral stage and the field observations. Some TAP mapped seral stages were different than the seral stages identified in the field assessments.**

TAP used the tree height and diameter to calculate the tree size of old forests remaining in each BEC zone and locate deferral areas[1]. Northwest and *outside* of the BCTS operating area, but within the Reserve area[2] of Rose Swanson, TAP mapping shows priority deferral big-treed older mature forests[3] in the mature seral stage (Figure 3). **Of note is that despite portions of the forest canopy *within* the BCTS operating area being mapped as mature seral (>100yrs), there are no TAP areas mapped for deferral harvesting within the BCTS operating area.**

TAP mapping identified large recruitment forests[4] outside of the BCTS operating area and a small recruitment forest within the BCTS Operating area to the south (Figure 2b). These forests are mapped in the mature seral stage (even though they could be mid >=80years) and were identified by TAP as being able to be "recruited" into old-growth forests in a short timeframe. Old growth seral stages are >250 years which means the recruitment trees will not become old growth forests in a short timeframe as defined by TAP. **Although these recruitment areas are recommended by TAP, there is no commitment by BCTS to defer harvesting of recruitment forests. In addition, the larger "recruited" forest is located outside of the BCTS operating area and within a known Woodlot 0338 (SDC) that will be harvested at a future time, thereby eliminating the potential for "recruitment".**

[1] Under TAP, 'deferral' aims to pause harvest pressure and *maintain at-risk old forests in the short-term* (2-4years).
[2] Reserve Area - Approximately 1780ha of Rose Swanson is designated as "reserve" under the Land Act. The Rose Swanson Reserve is specifically for the Use, Recreation and Enjoyment of the Public (UREP) (Province of British Columbia, 2024).
[3] Priority deferral big-treed older mature forests are to have deferred harvesting. They have the biggest remaining trees in each BEC variant. If a BEC variant did not have enough old growth to meet the TAP criteria*, older mature (>200years)* forests were incorporated (Old Growth Technical Advisory Panel, 2021).
[4] Recruitment forests are older than 80yrs and have been selected in areas with very little old forest remaining. There is *no commitment to defer harvesting in recruitment forests* (Old Growth Technical Advisory Panel, 2021).

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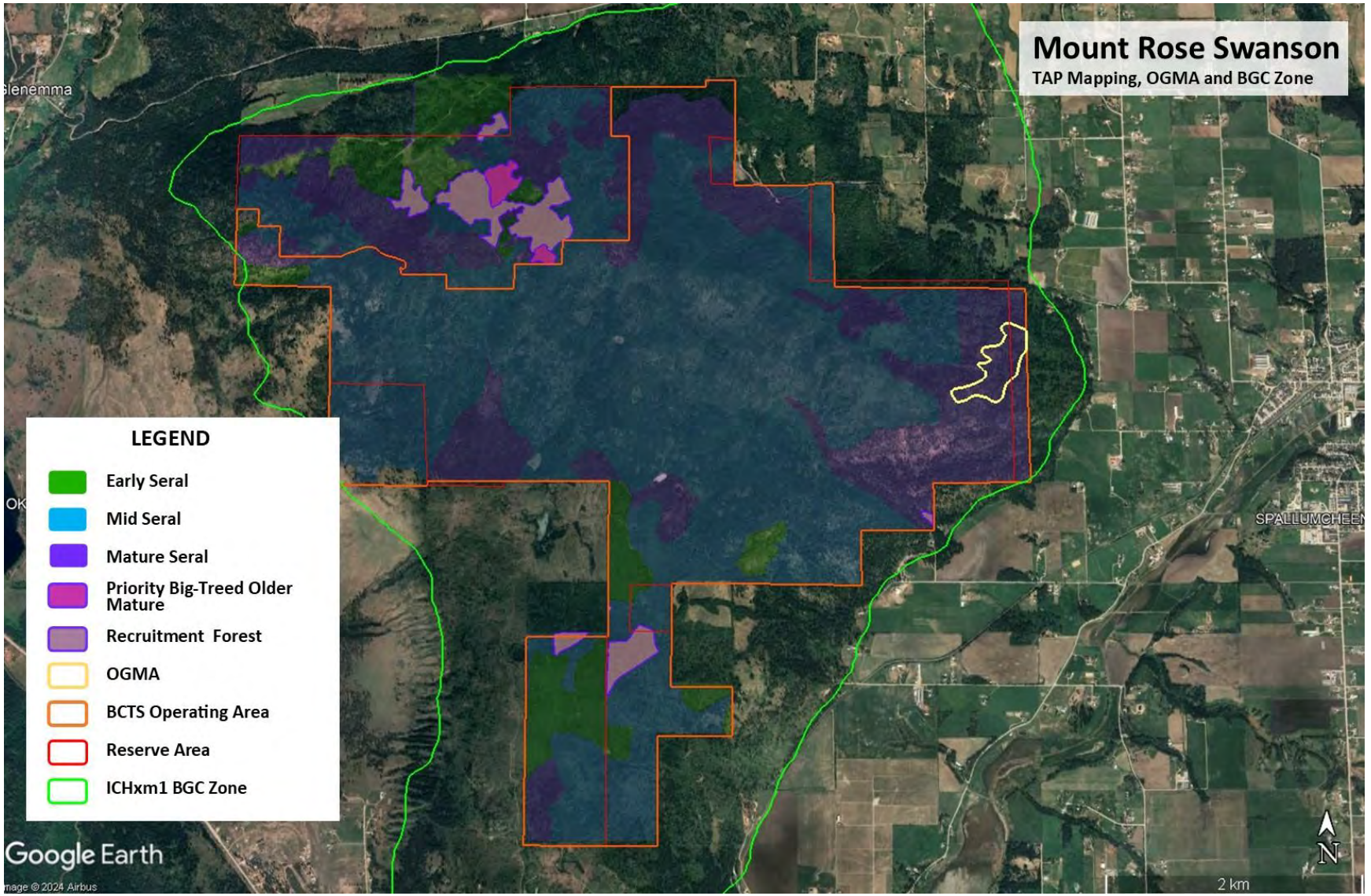

Figure 3 – Orthophoto of TAP seral stages, priority big-treed older mature and recruitment forests, the OGMA, and the border of the ICHxm1 BGC zone.

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3.1.2 Field Observations

Field observations confirmed the dominate tree species on Rose Swanson consisted of Douglas-fir (*Pseudotsuga. menziesii*) and Western redcedar (*Thuja plicata*), with patches of lodgepole pine (*Pinus contorta*), trembling aspen (*Populous tremuloides*), paper birch (*Betula papyrifera*), and ponderosa pine (*P. ponderosa*). These findings are consistent with the BGC classifications.

During the field assessments, the trail network and sites of interest were assessed and pictures taken of the forest canopy (Figures 4-15). Post field assessment, the dominant tree species were compared to the TAP mapping and the mapped Old Growth Management Area (OGMA) (Figure 16). Transitions in forest seral stage observed in the field tended to follow the mapped TAP transitions between mid and mature seral stages (Figures 7 & 8). However, some areas appeared to be an early seral stage (<40years) in what was mapped as mid seral (40-100yrs) (Stations 1880 & 1864) (Figures 4 & 7) which creates a discrepancy between what is mapped and what is field verified

For example, site 1881m (Figure 4) revealed the TAP mapped mid seral stage (40-100yrs) was observed in the field to be in an early successional stage (<40yrs). At Hill station 1832, the forest was dominated by mature seral stage>100 years of Douglas-fir (*Pseudotsuga menziesii*) with an understory of pinegrass (*Calamagrostis may rubescens*), soopalallie (*Sherpherdia canadensis*), birch-leaved spirea (*Spiraea betulifolia*), and Douglas maple (*Acer glabrum*) (Figure 9). TAP identified this area a priority big-treed older mature growth area (Western Red Cedar >250 years) Based on the **TAP definition of 'older mature' as >200years old**, it appears that this area has been overestimated in age.

Areas of Rose Swanson *within* the BCTS operating area contained large mature trees (Stations 1863 and 1883, Figures 14 & 15), however they were not designated by TAP as priority big-treed older mature growth and therefore, deferral has not been recommended by TAP in those areas.

Discrepancies between the TAP mapping and the field assessments were documented in Table 1.

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Table 1 - TAP mapped seral stage transitions, and large mature trees observed during field days on Rose Swanson. The large trees were measured for DBH and the age was estimated. (Fd- Douglas-fir, Cw- Western redcedar, Py- Ponderosa pine, Ep- Paper birch, At- Trembling aspen, Pl- Lodgepole pine).

Station	Species	DBH (cm)	TAP Mapped Seral	Figure #	Hill Field Observation
1880	Cw		Mid		Gully of Sutton Creek
1881	Cw		Mid	4	Gully of Sutton Creek. Pole sapling trees- **more suited to Early than Mid seral.**
1889	Pl		Mid		Young dense stand. **Early seral**
1891	Pl, Ep, Fd, At		Mid	5	Open Pl dominate stand with regen and windfall.
1892	Cw, At		Mid	6	Dense Cw and At stand.
1825	Cw		Mid-Mature		Edge of wildlife tree patch on border of **Mid-Mature seral**.
1864	Fd, Pl		Mature-Mid	7	Mapped and observed transition in seral. **Pole sapling trees- more suited to Early than Mid**. Figure of mapped Mid.
1865	Fd, Pl		Mid-Mature		Mapped and observed transition in seral stage.
1859	Fd, Ep, Cw		Mature-Mid	8	Mapped and observed transition in seral. **Pole sapling trees- more suited to Early than Mid seral**. Figure of transition.
1832	Fd		Big Treed Older Mature (200yrs)	9	TAP priority big-treed older mature (>200yrs). Outside BCTS operating area. Mature seral Fd in the stand.
1854	Cw, Fd		Mature	10	Mature Cw wildlife tree in Cw dominated stand. **Resembles Mid seral more than Mature**
1857	Cw, Fd		Mature	11	Transition from Cw to more Fd dominate stand.
Map Est	Fd, Py		Mature	12	Open mature forest of Py *near* OGMA.
1873	Py, Fd		Mature	13	**Mapped OGMA**. Open forest, large Py.
1858	Fd	82.7	Mature		Largest tree observed in immediate area. **Age est. 163yrs**
1863	Cw	91	Mature	14	Largest tree observed in immediate area. **Age est. 179yrs**
1883	Fd	87.5	Mature	15	Largest tree observed in immediate area. **Age estimated to be 172yrs**.Top end of Sutton Creek gully.
1886	Fd	95.5	Mature		Largest tree observed in immediate area. **Age est. 188yrs**.

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Figure 4 - View downstream the Sutton Creek gully of young Cw in the **TAP Mid seral** (Station 1881).

Figure 5 – View north of various tree species in the **TAP Mid seral** (Station 1891).

Figure 6 – View northeast of Cw and At in the **TAP Mid seral** (Station 1892).

Figure 7 – View south of young Fd/Pl in the **TAP Mid seral** (Station 1864).

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Figure 8 - View south of the transition from large Fd/Cw to young Fd/Ep at the **TAP change from Mature to Mid seral** (Station 1859).

Figure 9 - View west of mature Fd in the **TAP priority big-treed older mature growth** in **TAP Mature seral** (Station 1832).

Figure 10 - View of Cw wildlife tree in the **TAP Mature seral** (Station 1854).

Figure 11 - View of change from Cw to Fd in the **TAP Mature seral** (Station 1857).

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Figure 12 - View east of open Fd/Py stand in **TAP Mature seral** (Station Map Est.).

Figure 13 - View northeast of large Py in **OGMA** and **TAP Mature seral** (Station 1873).

Figure 14 - View of large Cw with 91cm DBH in **TAP Mature seral** (Station 1863).

Figure 15 - View of large Fd with 87.5cm DBH **in TAP Mature seral** (Station 1883).

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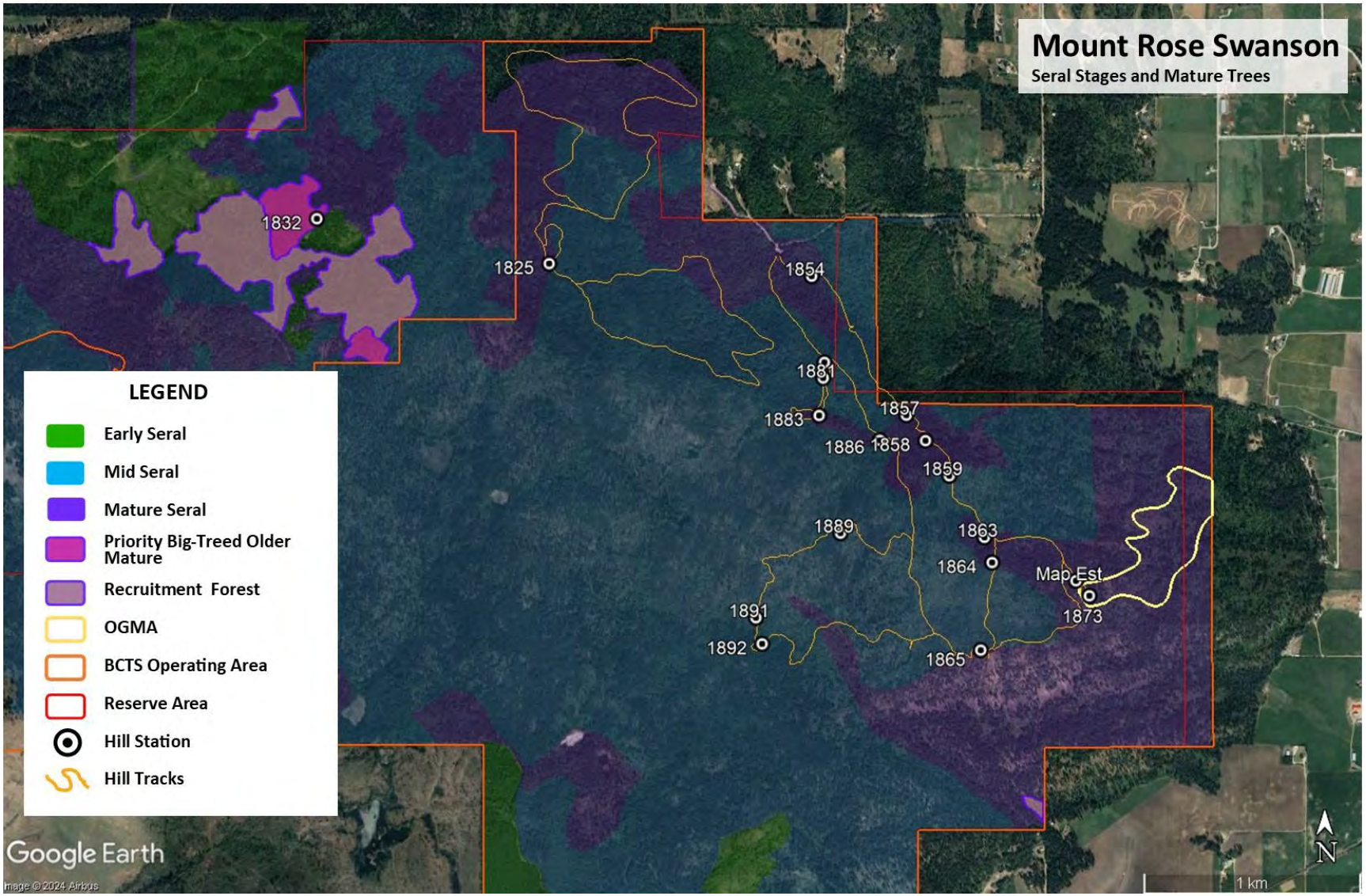

Figure 16 – Orthophoto with the TAP seral stages and deferral areas, the non-legal OGMA, and Hill stations.

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On the east side of the trail network, within the BCTS operating area and TAP mapped mature seral stage (>100years), is a 16.6ha Old Growth Management Area (OGMA) (Figure 16). This OGMA is non-legal, meaning that "the direction given… is policy only and is not legally enforceable" (Government of Canada, 2023). This means that despite the OGMA being designated by TAP, there is **no legal means to prevent harvesting in the OGMA**. In the Thompson-Okanagan, harvesting may occur in non-legal OGMAs for specific reasons, however the goal is to retain the original OGMA as much as possible (Integrated Land Management Bureau, 2007). OGMAs are managed to replace specific old growth attributes but rarely contain old growth trees (Forest Practices Code of British Columbia, 1995; Old Growth Technical Advisory Panel, 2021).

Field investigations of the mapped OGMA confirmed that the area contained large ponderosa pine (*P. ponderosa*) and Douglas-fir (*P. menziesii*) (Station 1873, Figure 13). Since a stand of large Ponderosa Pine offers unique habitats within a Douglas-fir (*P. menziesii*) and Western redcedar (*T. plicata*) dominated forest, the area has a higher habitat significance and should be protected. Also, the Ponderosa pine stand with Douglas fir and bluebunch wheatgrass is a blue listed ecological community (Hill Station 1873, Section 3.5 Ecological Communities, Table 18). It is likely that other listed ecological communities are present in and around Rose Swanson and should be included in the follow up field assessments.

Where trees stood out from the surrounding forest, because of their large size, the diameter at breast height (DBH) was measured to estimate the age of the tree. The trees species consisted of Western redcedar (179 years) and Douglas-fir (172, 163, 188 years) and all were located within the mapped TAP mature seral stage (>100 years) (Figures 14 & 15). The field verified ages of 163 to 188years were the largest trees in the area which suggests that the remainder of the trees in the stand were in the mid seral stage and not the mapped mature seral stage. The ages of these trees were estimated using the formula *DBH (in inches) x growth factor (5).*

The seral stage of the tree canopy directs which stand will be deferred for retention versus those that will be harvested. The correct determination of the seral stage of the harvested canopy is important to know in addition to the seral stage of the retention areas. For example, if the existing seral stage is underestimated as mature seral, the stand will be harvested as opposed to retained as an old growth stand. Also, the seral stage of a forest is

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of particular importance when correlating the habitat requirements of specific species as shown in table 2. For example, the Northern Goshawk requires long tracts of forest therefore retention of long tracts of forest is of significance if Northern Goshawk are known in an area. In addition, woodpeckers, owls and the other species listed in table 2 under "Old Forest and Veteran Trees" require old forest and veteran trees (trees that are older then the remainder of the stand) for their habitat requirements. **Without old forests with veteran trees, these animal species cannot survive.**

Table 2 – List of wildlife habitats and species they support according to LMH 75 and LMH 76. Within each habitat type, species listed under IDFxh1 (LMH 76) are highlighted with orange, species listed under ICHxm1 (LMH 75) are highlighted in green and non-highlighted species were listed under both. Asterisks indicate non-research grade iNaturalist observations.

Habitat Type	Species Name	Common Name	Documented on RS
Old forest and veteran trees	*Melanerpes lewis*	Lewis's woodpecker	
	Sphyrapicus thyroideus	Williamson's sapsucker	
	Megascops kennicottii	Western screech-owl	
	Psiloscops flammeolus	Flammulated owl	
	Ursus americanus	Black bear	Yes
	Buteo swainsoni	Swainson's hawk	
	Ardea herodias	Great blue heron	
	Myotis lucifugus	Little brown myotis	
Coniferous and mixed forests and winter range	*Odocoileus hemionus*	Mule Deer	Near / *
	Odocoileus virginianus	White-tailed deer	*
	Cervus canadensis	Elk	Yes
	Ovis canadensis	Bighorn sheep	
	Puma concolor	Cougar	Yes
	Alces alces	Moose	Yes
	Lynx rufus	Bobcat	Yes
	Oreamnos americanus	Mountain goat	
	Coccothraustes vespertinus	Evening grosbeak	Yes
Large tracts of forest	*Accipiter atricapillus*	Northern goshawk	Yes

3.2 Unique Microhabitats with Wildlife Significance

Microhabitats provide unique features that differ from the surrounding habitat and are heavily relied on by many species. The connection between microhabitats and adjacent corridors offers unique habitat complexes. Those documented on Rose Swanson in the field included wildlife trees, rock outcrops, wetted depressions and springs, and large woody debris. These areas in addition to linkages between unique habitats supports wildlife movement daily and seasonally.

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3.2.1 Wildlife Trees

Wildlife trees and standing dead trees provide essential habitat for foraging (various birds), perching (raptors), roosting (bats), nesting (mammals and birds), refuge (salamanders), and storage (squirrels) (Figure 17). While hiking the trails, the field crew documented high value wildlife trees adjacent to the trails. As evidenced by the number of high value wildlife trees adjacent to trails, there are likely a significant number of high value wildlife trees within the **Reserve Area of Rose Swanson**[5] (Figure 16). The Reserve Area generally follows the BCTS operating area and includes the northwest portion outside the BCTS operating area and within the adjacent Woodlot 0338. The Reserve Area covers 1780ha of Rose Swanson and designated as "Reserve" Status under the Land Act.

Table 3 lists the 19 documented high value wildlife trees along the trail networks (Figures 18-23). Four of the 19 trees were documented within the TAP mapped Mid seral (40-100 years) and 15 trees were documented inside the TAP mapped Mature seral (>100 years). The wildlife tree species included Western redcedar (14), ponderosa pine (1), and Douglas-fir (4). The presence of the wildlife trees and audio observations confirmed the presence of cavity using birds such as hairy woodpecker (*Dryobates villosus*), Northern flicker (*Colaptes auratus*), red-breasted nuthatch (*Sitta canadensis*) and brown creeper (*Certhia americana*) which were identified in the desktop inventory. These species rely on high value wildlife trees for feeding, nesting and cover. Several of the documented trees also had broken tops or large branches suitable for raptor perching and sloughing bark for bat roosting (Figures 20-22). **The ecosystem value of existing high value wildlife trees is lost if an arbitrary patch of trees is designated as a "wildlife patch" rather than retaining the highest value existing wildlife trees while ensuring the retention of mature trees as a future source of wildlife trees. If young seral stage trees are retained in patch retention, it will be decades before the trees are beginning the decay process to enable cavity nesters and secondary nesters to utilize these valuable habitats. There is no mechanism to duplicate these habitats in nature other than retaining existing high value wildlife trees.**

[5] Reserve Area as designated under the Land Act

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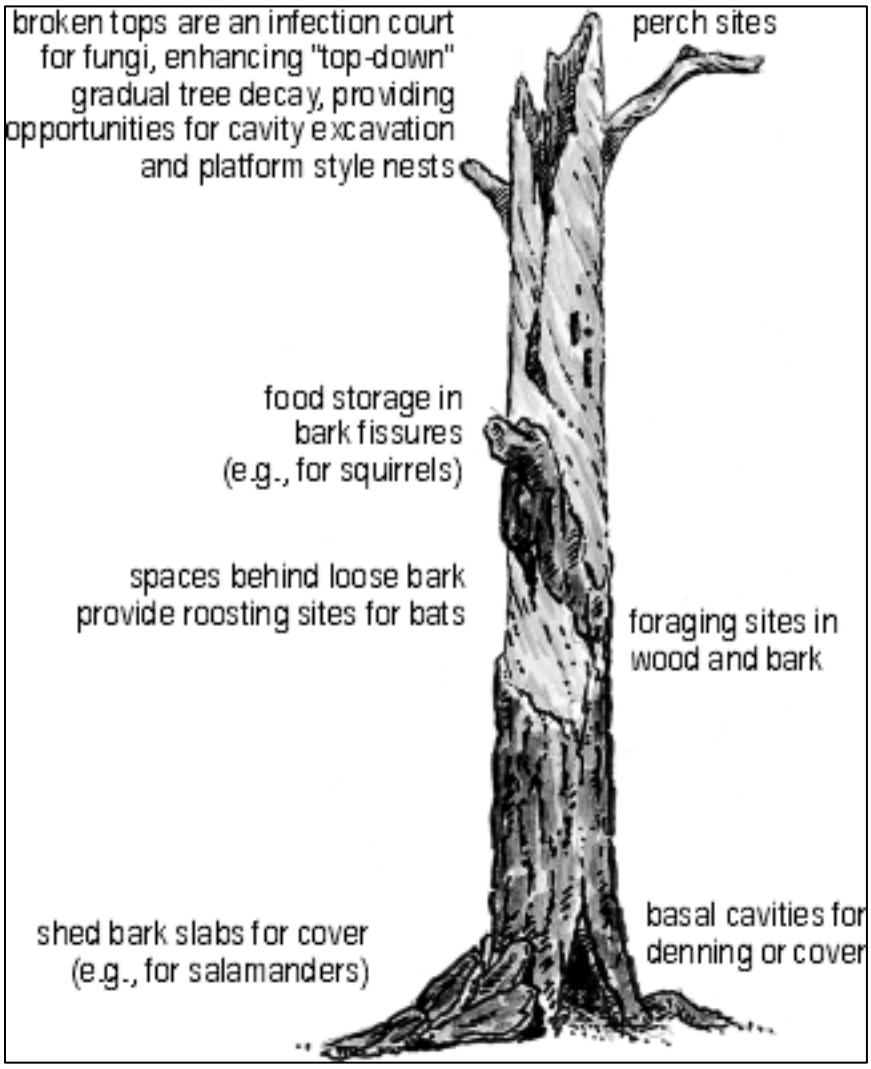

Figure 17 – Image showing the various uses and habitats that are provided by wildlife trees (Province of British Columbia, 2024).

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Table 3 – List of documented high value wildlife trees, their species, and benefits for wildlife. (Cw: Western redcedar, Fd: Douglas-fir, Py: Ponderosa pine).

Station	Species	Figure #	Hill Field Observation
1826	Cw		Feeding cavities
1828	Cw		Feeding cavities and broken stem
1830	Cw		Feeding cavities
1831	Cw	18	Feeding cavities
1835	Fd		Feeding cavities
1837	Cw		Feeding cavities
	Cw		Feeding cavities
1838	Cw		Feeding cavities
1839	Cw		Feeding cavities
1840	Cw	19	Feeding cavities
1854	Cw		Feeding cavities
1861	Cw		Feeding cavities
1863	Cw		1 feeding cavity near base
1870	Py	20	Feeding cavities, no bark, good perching
	Fd	21	Feeding cavities, broken top
1876	Fd	22	Sloughing bark, no cavities
1877	Fd		Feeding cavities, broken top
1878	Cw		Feeding cavities
1879	Cw		Feeding cavities

Figure 18 – View of Western redcedar wildlife tree with feeding cavities (Station 1831).

Figure 19 – View of Western redcedar wildlife tree with feeding cavities (Station 1840).

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Figure 20 - View of Ponderosa pine wildlife tree with cavities, no bark, and good perching branches (Station 1870).

Figure 21 - View of Douglas-fir wildlife tree with feeding cavities and broken top (Station 1870).

Figure 22 - View of Douglas-fir wildlife tree with sloughing bark (Station 1876).

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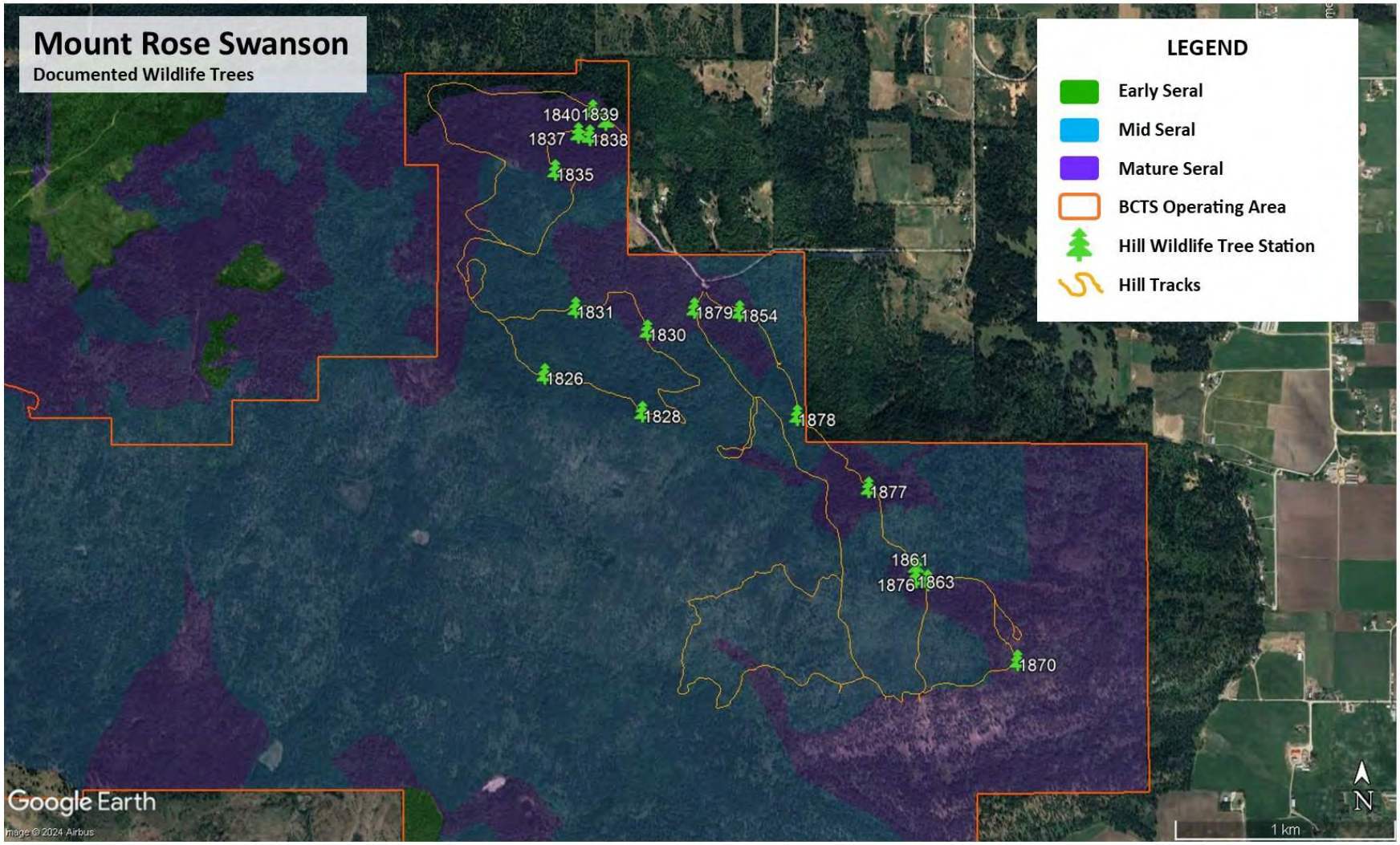

Figure 23 – Orthophoto of the high value wildlife tree stations documented on Rose Swanson, including the mapped TAP seral stages they are located within.

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3.2.2 Rock Outcrops

Rocky outcrops provide important refuge, hibernation and basking habitat for reptiles, such as the alligator lizard (*Elgaria coerulea*), Northern rubber boa (*Charina bottae*), and the SARA[6] listed Western skink (*Plestiodon skiltonianus*). All these species were documented on Rose Swanson in the desktop inventory and their habitats were confirmed during the field assessment. These rocky outcrops primarily occurred along the southern edge of the eastern main trail network (Table 4, Figures 24-28). Evidence of deer (pellets) were also documented amongst the rock outcrops as evidence of foraging opportunities. There were Saskatoon (*Amelanchier alnifolia*) growing along the outcrops, providing food for deer and other berry and seed eating wildlife near cover (mature stands). The south facing rock outcrop will be the first to melt providing foraging while the mature canopy is under snow cover. In summer months, reptiles will use the rocks to bask to thermoregulate and provide protection in the crevices. The rock crevices may also contain hibernaculum for reptiles. **A transition of mature trees adjacent to the rock outcrop will maintain connectivity to treed cover and wildlife corridors.**

Table 4 – List of documented rock outcrops, including their aspect, on Rose Swanson.

Station	Figure #	Hill Field Observation
1866		Bedrock surrounded by small boulders. SW facing
1867	24	Large outcrop with draw in middle, lots of crevices, S facing
1868		Bedrock and boulders, deer pellets, S facing
Lookout	25	Steep outcrops and bedrock below tower, S facing
1869		Bedrock, SE facing
1872	26	Bedrock, crevices, SE facing
1887	27	Bedrock, open area on trail summit

The desktop inventory also revealed a list of species that rely on rock outcrops for their habitat (Table 5). In total there are 3 bats, 5 snakes, one marmot, and 6 bird species that are likely to be present in and around Rose Swanson based on their habitat needs. Of those species, four were confirmed present on Rose Swanson.

[6] Species at Risk Act

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Table 5 - List of wildlife habitats and species they support according to LMH 75 and LMH 76. Within each habitat type, species listed under IDFxh1 (LMH 76) are highlighted with orange, species listed under ICHxm1 (LMH 75) are highlighted in green and non-highlighted species were listed under both. Asterisks indicate non-research grade iNaturalist observations.

Habitat Type	Species Name	Common Name	Documented on RS
Rock-dominated	*Corynorhinus townsendii*	Townsend's big-eared bat	
	Crotalus oreganus	Western rattlesnake	
	Coluber constrictor	North American racer	Near
	Plestiodon skiltonianus	Western skink	Yes
	Pituophis catenifer	Gopher snake	
	Marmota flaviventris	Yellow-bellied marmot	
	Euderma maculatum	Spotted bat	
	Myotis ciliolabrum	Western small-footed myotis	
	Hirundo rustica	Barn swallow	Near
	Falco peregrinus	Peregrine falcon	
	Falco mexicanus	Prairie falcon	
	Catherpes mexicanus	Canyon wren	
	Aeronautes saxatalis	White-throated swift	
	Cypseloides niger	Black swift	
	Northern Rubber Boa	Northern rubber boa	Yes

Figure 24 – View of the of the rocky outcrop on the east side of the draw (Station 1867).

Figure 25 – View east of the steep rock outcrop area below the lookout tower (Station Lookout).

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Figure 26 – View south of rocky outcrop (Station 1872).

Figure 27 – View southwest of rocky outcrop in open summit area (Station 1887).

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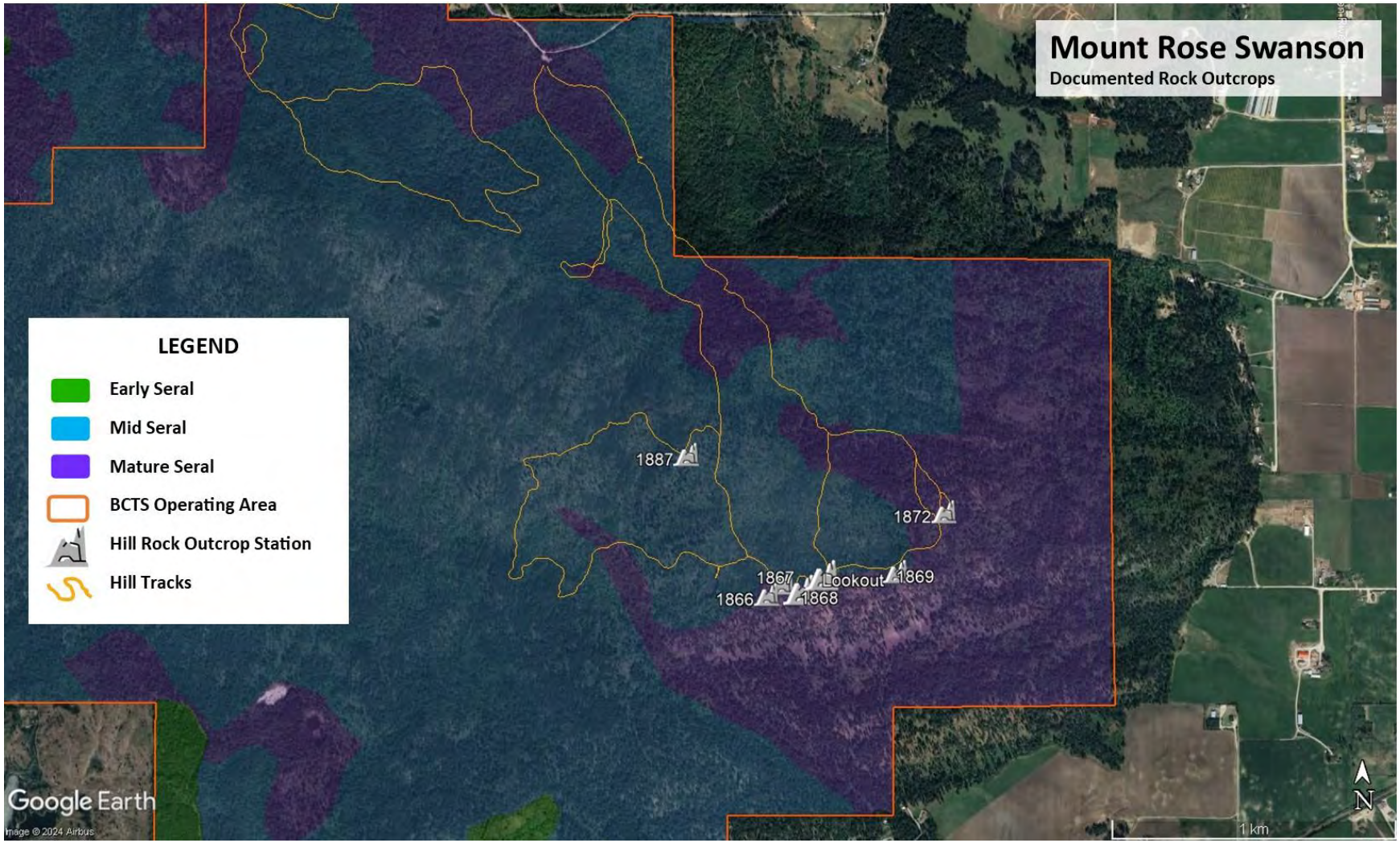

Figure 28 – Orthophoto of the rocky outcrops documented on Rose Swanson.

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3.2.3 Wetted Depressions and Springs

Isolated wetted depressions and springs provide unique breeding and rearing habitats for amphibians such as the documented Pacific chorus frog (*Pseadacris regilla*), Long-toed salamander (*Ambystoma macrodactylum*), and Western toad (*Anaxyrus boreas*). These 3 species were documented on Rose Swanson and the field assessment confirmed the presence of the Pacific chorus frog. The isolated wetted depressions and springs are an important source of water, and breeding habitats for the nymph/ larval stages of insects, which are a primary food source for other wildlife including insectivorous bird species, reptiles, amphibians, and bats. Several such depressions and springs were documented on Rose Swanson both within and outside of the BCTS operating area (Table 6, Figures 29-33). They ranged in size from small muddy areas to larger pools. As shown in Figure 34, the observed wetted depressions and springs were identified to the northwest and the east side of Rose Swanson during field assessments, however, there are likely more elsewhere on Rose Swanson. **The available sources of water are significant to wildlife with the effects of droughts and climate change at the forefront of species management. Wildlife require water to survive and there are limited water sources on Rose Swanson. The seven natural springs identified in the field assessment are located north of the BCTS operating area. Reserve zones have not been established around the identified springs to provide protection for groundwater sources and enable continued use by wildlife. Damage to headwater springs will remove important sources of water during drought conditions, which are essential to wildlife.** The Lance tipped darner (provincially blue listed) is in the dragonfly family and is documented on or near Rose Swanson and requires habitats near water for its survival.

In addition to the wildlife value of headwater springs and water sources, the map below shows a significant number of wells and aquifers that surround Rose Swanson (Figure 35). The impacts of harvesting on the existing wells and aquifers must be considered in the proposed forest harvest plans to ensure adequate drinking water for all water users surrounding the mountain.

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Table 6 – List of documented wetted depressions and springs, both in and outside of the BCTS operating area

Station	Figure #	Hill Field Observation
1844		Adjacent to road, evidence of cattle use
1871	29	Long wet area with dead fall, wildlife prints in mud
1874	30	No surface water but muddy with riparian plants, ephemeral
1875		No surface water, but muddy with riparian plants, ephemeral
A		Possible source of unnamed mapped stream
B		Possible source of unnamed mapped stream
C	31	Headwater, vegetated draw with algae growth, outside BCTS operating area
D		Water intake on spring, downstream of C, outside BCTS operating area
E	32	Seepage at base of slope, outside BCTS operating area
F	33	Small pool, outside BCTS operating area

Figure 29 – View north of long wet area with deadfall and evidence of wildlife use (Station 1871).

Figure 30 – View north of muddy depression with riparian plant species (Station 1874).

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Figure 31 – View of vegetated draw/ spring with algae growth (Station C).

Figure 32 – View of seepage at base of slope (Station E).

Figure 33 – View of small pool (Station F).

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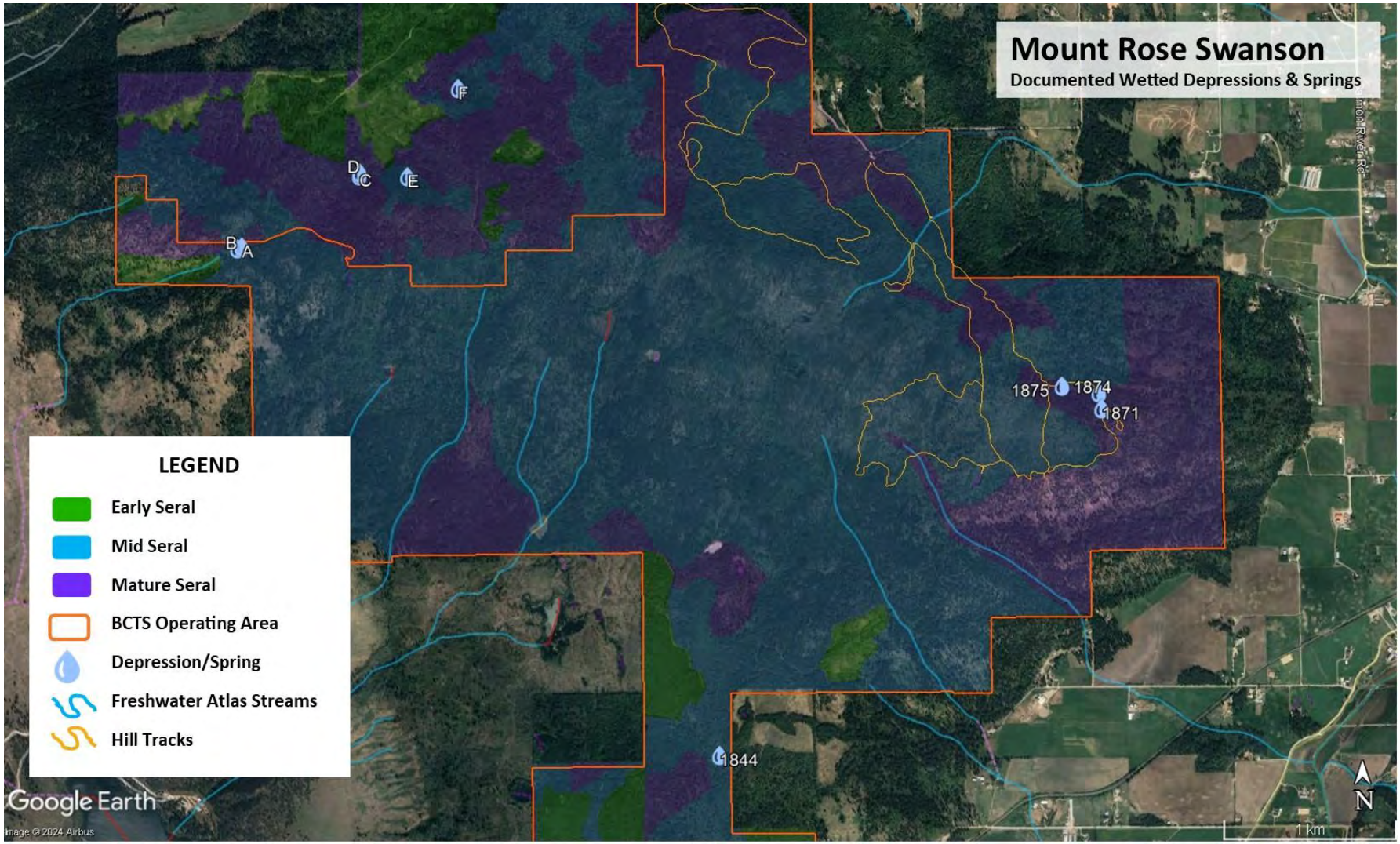

Figure 34 – Orthophoto of the documented wet depressions and springs both inside and outside of the BCTS operating area.

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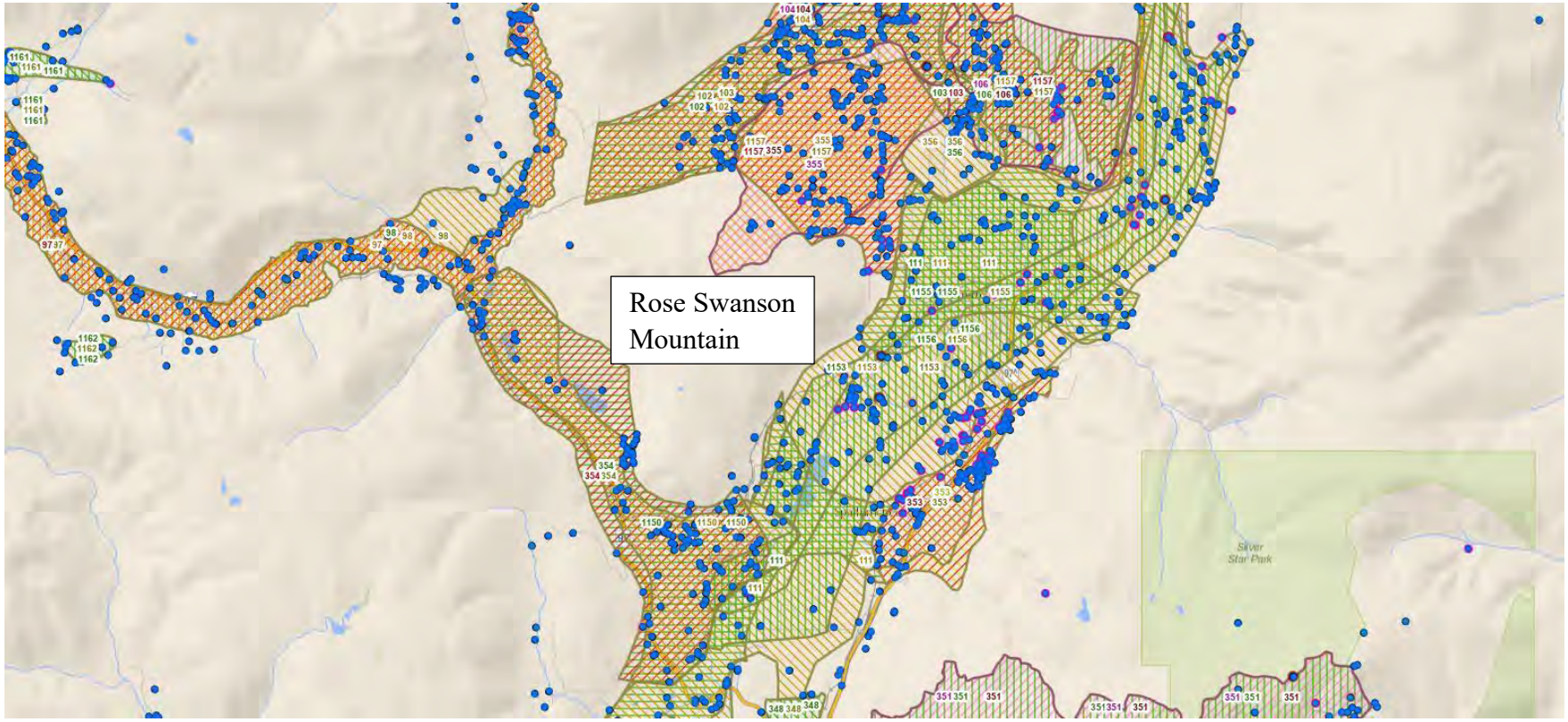

Figure 35 - Map of Aquifers and wells surrounding Rose Swanson, hatched are aquifers, blue dots are wells (iMAP BC).

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3.2.4 Large Woody Debris (LWD)

Large woody debris (downed logs) are used by a variety of wildlife species for foraging, nesting, and refuge (amphibians, reptiles, insects, small mammals, etc). The desktop inventory revealed 73 invertebrate species matching the habitat types available and 34 of those species were confirmed on Rose Swanson. Screening those species that are provincially ranked as red listed (endangered) or blue listed (special concern) resulted in two species. The Okanagan hammertail (*Efferia okanagan*) is red listed and the Lance-tipped darner (*Aeshna constricta*) is blue listed. The Lance tipped darner is in the dragonfly family and requires habitats near water.

As logs decay and are consumed by detritivores and decomposers, nutrients and moisture are returned to the soil, resulting in a healthy organic layer. Moisture retention and shading the soil can help prevent the soil drying out, which is a fire risk. The large woody debris observed during the field assessment was primarily paper birch (*B. payrifera*) and was observed during each field day at different locations on Rose Swanson (Figures 36-38). Coniferous trees have a longer life span when compared to deciduous species. Therefore, the retention of coniferous species that will be a future source of large woody debris is an important factor in maintaining soil moisture. Drone footage was used to survey a large area of lodgepole pine (*P. contorta*) blowdown near the center of the BCTS operating area (Refer to Section 3.6). The blowdown area is an even aged stand of timber that has fallen over and resembles a pile of matchsticks. The timber is difficult to maneuver for many wildlife species however provides protection for moose from predators. Moose tracks and pellets were identified in this area (pers comm ASTS) and were a documented species in the desktop inventory in addition to elk, white tailed deer, mule deer, coyote, Grey Wolf, Bobcat, Cougar, black bear and grizzly bear. Future field work in this area will provide information regarding habitats available for wildlife. The proximity of the blowdown area to the adjacent wetlands provides forage and cover habitats for moose (Figure 57). The blowdown is a large source of large woody debris however there is no canopy to provide protection from the sun. Therefore, snowmelt will be accelerated which will result in overland flow as opposed to a slow melt to recharge groundwater sources.

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Figure 36 – View upslope of LWD in drainage (Station 1856).

Figure 37 – View of LWD in forest surrounding wildlife tree (Station 1878).

Figure 35 – View of LWD on forest floor (Station 1884).

3.3 Riparian and Aquatic Features

A combination of Ortho imagery, drone footage and field assessments were used to identify 12 wetlands, lakes, and ponds (Figure 56). Of those 12 aquatic features, two were confirmed during field assessments and five more confirmed with drone footage for a total of 7 within the BCTS operating boundary (Table 7). Five wetland features were identified with drone footage (Stations 1-5). Two were classified on iMap as a swamp and a marsh (Stations 1 and 2) and the other three appeared interconnected and have not been formally classified (Stations 3-5) (Figures 41 & 42).

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The three wetland features to the east appeared ephemeral. The two classified wetlands in the west are near the blowdown area and are likely integral feeding habitats for moose in the area.

The five sites on private land were investigated during the field assessment. Access to private property enabled the field crew to visit five small lakes outside the BCTS operating area. The first was in a previously logged cattle pasture and appeared manmade (Station 1845). Based on orthophotos, the logging occurred approximately 20 years ago. The lake was open with no riparian vegetation buffer and may dry out periodically, as per orthophoto imagery (Figure 43). Directly to the north, a second small lake had a narrow treed riparian buffer (Station 1846, Figure 44). A common garter snake (*Thamnophis sirtalis*) was observed at the southern lake (Station 1845). No inlet or outlet channels are mapped nor were observed in the field.

Another small lake and wetland were assessed during the field work outside of the BCTS operating area. The small lake (Station 1847, Figure 39) contained cattails, bulrushes and shrubs around its perimeter. A mature stand of trees around the lake provided a transition between the riparian and upland habitats. Multiple waterfowl species were observed on the lake. The small wetland (Station 1894) contained a mixture of willow, red osier dogwood and alder shrubs around its perimeter. The vegetation surrounding the wetland was dense and emergent vegetation consisting of sedges and grasses were identified (Figure 40).

Three remaining lakes were accessed by vehicle and then on foot and appear interconnected on orthophoto imagery. The lakes were within a recently logged area on private property (Stations 1849, 1851 and 1852) (Figures 45 & 46). The lakes were utilized by various waterfowl during the field visit (species undetermined). Based on orthophoto imagery, the logging occurred within the previous year and there was sparse to no riparian buffer on the lakes. According to ASTS, there was evidence that the area was heavily used by moose in recent history, prior to logging.

The wetlands, ponds and lakes on Rose Swanson are important ecosystems for mammals, birds, amphibians, reptiles, invertebrates. With the increasing drought effects in the region, these ponds, lakes and wetlands provide important refuge and habitats that are becoming scarce. The retention of surface water is important for climate resiliency.

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Riparian Areas are the most productive ecosystems in terms of species diversity and require protection. Proposed harvesting plans must include a treed riparian buffer around each wetland complex/ lake to protect the riparian area and the pond/ wetland.

Table 7 – List of the documented waterbodies, their classification (if any), their surface area either from iMap or a map estimate, and whether they are inside or outside the BCTS operating area.

Station	Type	Method	Area (m^2)	Figure #	Hill Field Observation
1	Swamp	Drone	24,422	40	Mapped headwaters of stream flows into Round Lake, inside BCTS, drone image
2	Marsh	Drone	4,977	40	Inside BCTS, drone image
3	not classified	Drone	2,440 (est)	41	Inside BCTS, drone image
4	not classified	Drone	1,326 (est)	41	Inside BCTS, drone image
5	not classified	Drone	1,975 (est)	41	Inside BCTS, drone image
1845	Lake	Field	1,619	42	No riparian buffer, outside BCTS
1846	Lake	Field	1,940 (est)	43	Treed riparian buffer, outside BCTS
1847	Lake	Field	5,089	39	Inside BCTS, waterfowl
1849	Lake	Field	6,549 (est)	44	Outside BCTS, in private cutblock
1851	Lake	Field	2,407 (est)		Outside BCTS, in private cutblock
1852	Lake	Field	43,621	45	Mapped to outflow channel into Round Lake, outside BCTS, in cutblock
1894	Swamp	Field	3,295	38	Inside BCTS operating area

The desktop inventory identified 10 species that have habitat requirements that match the wetlands and ponds found in and around Rose Swanson. Of the 10 species likely to inhabit Rose Swanson, there were 3 amphibians, one reptile and six birds (Table 8).

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Table 8 – List of wildlife habitats and species they support according to LMH 75 and LMH 76. Within each habitat type, species listed under IDFxh1 (LMH 76) are highlighted with orange, species listed under ICHxm1 (LMH 75) are highlighted in green and non-highlighted species were listed under both. Asterisks indicate non-research grade iNaturalist observations.

Habitat Type	Species Name	Common Name	Documented on RS
Wetland and ponds	*Spea intermontane*	Great Basin spadefoot	Near
	Anaxyrus boreas	Western toad	Yes
	Chrysemys picta	Painted turtle	
	Hirundo rustica	Barn swallow	
	Icteria virens	Yellow-breasted chat	
	Ambystoma mavortium	Tiger salamander	
	Riparia riparia	Bank swallow	
	Aechmophorus occidentalis	Western grebe	
	Euphagus carolinus	Rusty blackbird	
	Phalaropus lobatus	Red-necked phalarope	

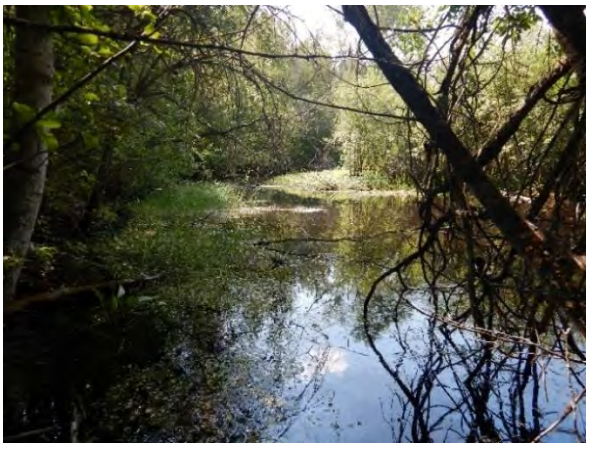

Figure 36 – View south of the mapped swamp wetland at Station 1894.

Figure 41 – Drone imagery of the swamp (left) and marsh (right) at Stations 1 & 2.

Figure 40 – View west of the mapped lake at Station 1847.

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Figure 42 – Drone imagery of the interconnected waterbodies at Stations 3-5 (bottom to top).

Figure 43 – View southeast of the open portion of the lake at Station 1845.

Figure 44 – View south of the treed portion of the lake at Station 1846.

Figure 45 – View north of the small lake in the private cutblock (Station 1849).

Figure 46 - View southwest of the larger lake within the private property that was recently logged (Station 1852).

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In addition to the ponds, wetlands and lakes, there are 11 streams/drainages mapped within the BCTS operating area. Hill Environmental and ASTS members hiked to several of these features to document the habitat quality and condition (Figure 56). Apart from one, all the streams and drainages were dry (Figures 47-55). It is expected that they are ephemeral, only flowing during freshet. The headwaters and the lower reaches of Sutton Creek on Rose Swanson, for example, contained no alluvium or evidence of a scoured channel and leaf litter and vegetation was growing within the channel bed (Figures 47-48). The lower reaches of an unnamed stream at the base of Rose Swanson as well as the headwaters and both were dry (Figures 49-50). All but one of the 10 drainages was dry (Table 9). **In dry regions like Rose Swanson, access to water is an essential feature for wildlife.**

Forest harvesting in the headwaters may have negative hydrological effects downstream that should be investigated in the planning stages. The Okanagan Valley has experienced drought conditions due to climate change and altering the hydrology of the headwaters may result in unforeseen impacts downstream. Since the proposed harvesting is at the top of the mountain, in terms of headwater streams, will the removal of the tree canopy impact the hydrology of the groundwater sources? Unforeseen impacts may include a loss of water in the downstream channels and, decreased lag times for source waters to enter the streams after rainfall events, leading to flash flooding.

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Table 9 - List of the mapped streams and unmapped drainages documented on Rose Swanson and where they are within the BCTS operating area.

Station	Type	Figure #	Wet or Dry	Hill Field Observation
				Mapped Streams
1855	Sutton Creek	46	Dry	Dry, min scour and alluvium, crosses trail- no culvert, inside BCTS
1884	Sutton Creek	47	Dry	Upstream of 1855, end of gully, crosses trail- no culvert, inside BCTS
1893	Unnamed stream	48	Dry	Mapped upstream end, dry, no evidence of scour or alluvium, crosses trail- no culvert, inside BCTS
1843	Unnamed stream	49	Dry	Downstream of 1893, dry, evidence of a streambed, outside BCTS
1842	Unnamed stream		Dry	Downstream of 1843, dry, where channel is diverted into culvert, outside BCTS
1841	Trib to Sherban Brook	50	Dry	Dry, some evidence of a streambed, outside BCTS (headwaters inside)
				Unmapped
G	Drainage	51	Wet	Water present, likely spring fed, not mapped, outside BCTS
1856	Drainage	52	Dry	Dry gully, crosses trail- no culvert
1885	Drainage	53	Dry	Upstream of 1856, dry gully, crosses trail- no culvert
1862	Drainage	54	Dry	Dry gully, crosses trail- footbridge

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Figure 47 – View upstream of where Sutton Cr crosses trail (Station 1855).

Figure 48 - View upstream at the apparent upstream end of Sutton Creek (Station 1884).

Figure 49 - View downstream of the mapped stream from the trail (Station 1893).

Figure 50 - View of the stream bed at the base of Rose Swanson downstream of Station 1893 (Station 1843).

Figure 51 - View of the evidence of a stream bed at the base of Rose Swanson (Station 1841).

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Figure 52 - View of the wetted spring-headed channel (Station G).

Figure 53 - View upstream of the drainage gully (Station 1856).

Figure 54 - View upstream of the drainage gully upstream of Station 1856 (Station 1885).

Figure 55 - View upstream footbridge over drainage gully (Station 1862).

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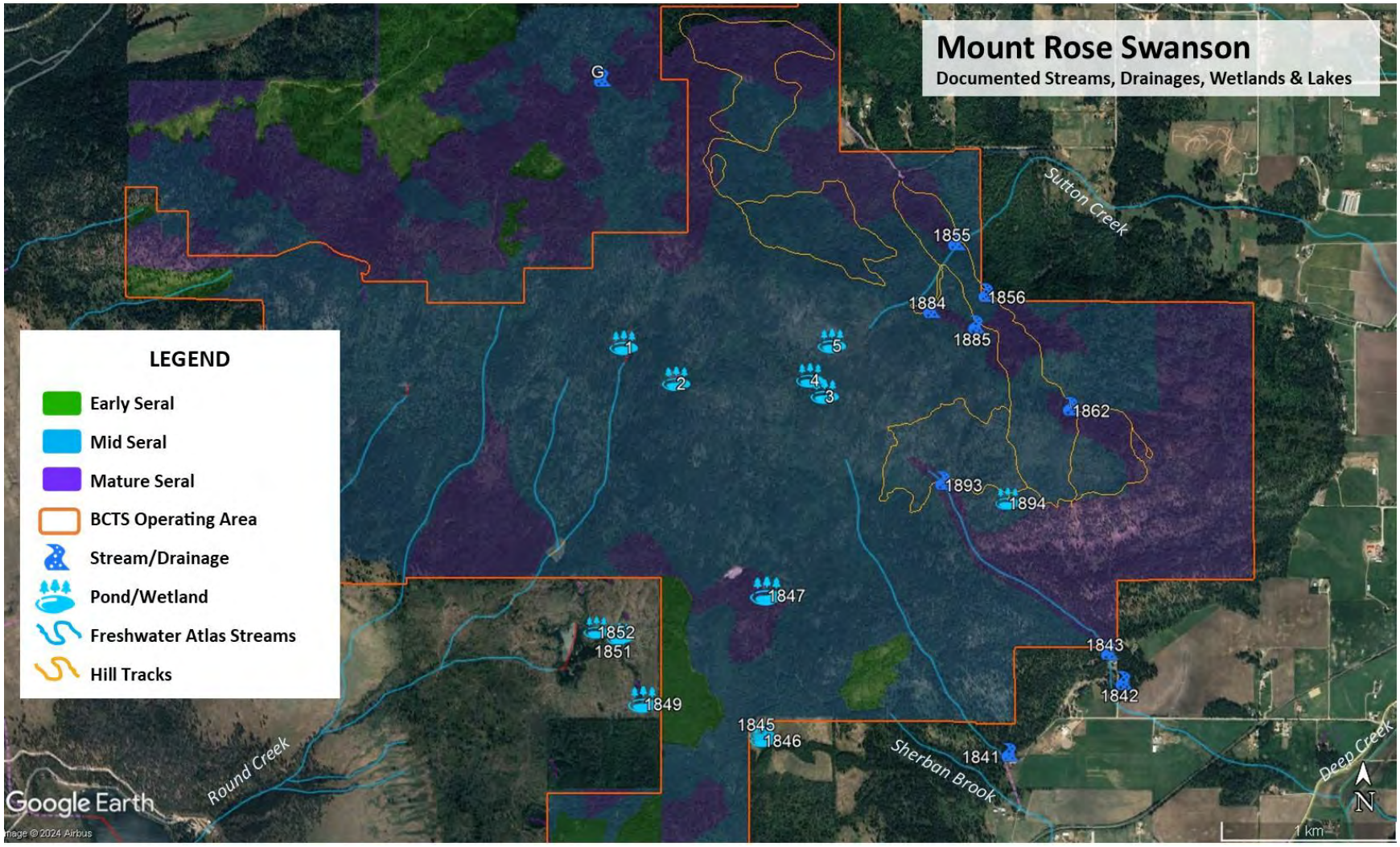

Figure 56 - Orthophoto of the mapped streams, drainages, wetlands, and lakes documented on Rose Swanson.

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3.4 Evidence of Wildlife Usage

During the field investigation, there were 41 wildlife observations including one amphibian, 2 reptiles, 33 birds, and 5 mammals., (Table 10, Figure 57).

Table 10 – List of wildlife species that were documented on Rose Swanson during 2024 field assessments.

Category	Common Name	Latin Name	Evidence
Amphibian	Pacific chorus frog	*Pseudacris regilla*	visual
Reptile	Aligator Lizard	*Elgaria coerulea*	visual
Reptile	Common Gartersnake	*Thamnophis sirtalis*	visual
Bird	Hummingbird	species undetermined	visual, audio
Bird	Chipping sparrow	*Spizella passerina*	call
Bird	Hermit thrush	*Catharua guttatus*	call
Bird	Song sparrow	*Melospiza melodia*	call
Bird	Cedar waxwing	*Bombycilla cedrorum*	call, visual
Bird	Hammond's flycatcher	*Empidonax hammondii*	call
Bird	Rock wren	*Salpinctes obsoletus*	call
Bird	Dusky flycatcher	*Empidonax oberholseri*	call
Bird	Townsend's solitaire	*Myadests townsendi*	call, visual, audio
Bird	America goldfinch	*Spinus tristis*	call
Bird	Sooty grouse	*Dendragapus fuliginosus*	call
Bird	Great gray owl	*Strix nebulosa*	call
Bird	Mallard	*Anas platyrhynchos*	visual
Bird	various waterfowl	species undetermined	visual
Bird	Dark-eyed junco	*Junco hyemalis*	call, visual
Bird	Swainson's thrush	*Catharus ustulatus*	call, audio
Bird	Red-breasted nuthatch	*Sitta canadensis*	call, visual
Bird	Brown creeper	*Certha americana*	call
Bird	Pine siskin	*Spinus pinus*	call
Bird	Golden crowned kinglet	*Regulus satrapa*	call
Bird	Cassin's vireo	*Vireo cassinii*	call
Bird	American robin	*Turdus migratorius*	call

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Table 10 – (continued) List of wildlife species that were documented on Rose Swanson during 2024 field assessments.

Category	Common Name	Latin Name	Evidence
Bird	Hairy woodpecker	*Dryobates villosus*	call
Bird	Western tanager	*Piranga ludoviciana*	call
Bird	Yellow-rumped warbler	*Setophaga coronata*	call
Bird	Black-capped chickadee	*Poecile atricapillus*	call, audio, visual
Bird	Pacific wren	*Troglodytes pacificus*	call
Bird	Nashville warbler	*Leiothlypis ruficapilla*	call
Bird	Red crossbill	*Loxia curvirostra*	call
Bird	Northern flicker	*Colaptes auratus*	call
Bird	Turkey vulture	*Cathartes aura*	visual
Bird	Mountain chickadee	*Poecile gambeli*	call
Bird	House wren	*Troglodytes aedon*	call
Mammal	Moose	*Alces alces*	pellets
Mammal	Skunk	*Mephitis mephitis*	visual
Mammal	Deer	*Odocoileus spp.*	pellets
Mammal	Rabbit/hare	*Lepus spp.*	carcass
Mammal	Black bear	*Ursus americanus*	visual

3.4.1 Amphibians

The Pacific chorus frog was the only amphibian species documented in the inventory results and confirmed in the field. Two additional amphibian species were confirmed in the inventory and two more have habitat requirements similar to those on Rose Swanson. The two species confirmed in inventory results are the long-toed salamander (*Ambystoma macrodactylum*) and western toad (*Anaxyrus boreas*). In addition, the Great Basin spadefoot toad (*Spea intermontana*), has been documented north of Rose Swanson with iMapBC and the Western Tiger Salamander (*Ambystoma mavortium*) and the Northern Leopard Frog (*Lithobates pipiens*) have the potential to occur on Rose Swanson based on their habitats (BC Explorer).

Pacific chorus frogs (*Pseudacris regilla*) were documented on the northern trails in proximity to the large woody debris on the forest floor (Table 11). Preferred habitats for the Pacific chorus frog include ponds, wetlands, lakes in addition to riparian and forest habitats.

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Table 11 – List of amphibian species that were documented on Rose Swanson. 'New' column indicates if they were *already confirmed* on Rose Swanson with the inventory results (C) or are a *new observation* from field work (Y).

Category	Common Name	Latin Name	Evidence	New
Amphibian	Pacific chorus frog	*Pseudacris regilla*	visual	C

3.4.2 Reptiles

Ten species of reptiles were documented in the inventory search of which three of the species were documented on Rose Swanson with iNaturalist or iMapBC. The species were common gartersnake (*Thamnophis sirtalis*), western skink (*Plestiodon skiltonianus*), and northern rubber boa (*Charina bottae*). Of the remaining seven species in the inventory, two are unlikely to occur on Rose Swanson based on the existing habitats. Aquatic habitats are limited to small, isolated ponds for painted turtles (*Chrysemys picta pop. 2*), and desert nightsnake (*Hypsiglena chlorophaea*) has rarely been documented north of the arid regions in the southern Okanagan (Province of British Columbia, 2023). The remaining five species were documented near Rose Swanson on iMapBC and/or could potentially occur on Rose Swanson based on BC Explorer search criteria. They include the North American racer (*Coluber constrictor)*, Western rattlesnake (*Crotalus oreganos)*, gophersnake (*Pituophis catenifer deserticola)*, terrestrial gartersnake (*Thamnophis elegans)* and northern alligator lizard (*Elgaria coerulea)*.

One of the new observations was an alligator lizard (*Elgaria. coerulea*), which was documented in the area in the inventory results, but not on Rose Swanson itself. The alligator lizard (*Elgaria. coerulea*) was observed basking on the trail at station 1895. It is likely that the rocky outcrops are used by this and other reptile species. and a common garter snake (*Thamnophis sirtalis)* was documented in the waterbody at Station 1845 (Table 12).

Table 12 – List of all reptile species that were documented on Rose Swanson. 'New' column indicates if they were *already confirmed on* Rose Swanson with the inventory results (C) or are a *new observation* from field work (Y).

Category	Common Name	Latin Name	Evidence	New
Reptile	Alligator lizard	*Elgaria coerulea*	visual	Y
	Common garter snake	*Thamnophis sirtalis*	visual	C

3.4.3 Invertebrates

There were 34 invertebrate species that were documented on Rose Swanson in the desktop inventory. Those results were screened for those species that are ranked provincially as red (endangered) or blue (special concern) and are documented on or near Rose Swanson. The results revealed that the Okanagan hammertail (*Efferia okanagana*) is red listed and the Lance-tipped

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darner (*Aeshna constricta*) is blue listed, and both were documented near Rose Swanson. No new invertebrate species were documented in the field.

3.4.4 Mammals

The desktop inventory revealed a total of 33 mammal species with the potential to occur in or around Rose Swanson based on habitat requirements. Fifteen of those species have been documented on Rose Swanson (Table 13).

Table 13 - List of documented and potential mammal species on Rose Swanson. Bolded species have been documented on Rose Swanson with iMapBC or iNaturalist. The results are organized by BC rank then alphabetically by species name.

Species Name	Common Name	IDF	ICH	Rank [a]	COSEWIC [b]	SARA [c]	FRPA	Source
Lepus townsendii	White-tailed Jackrabbit	X	X	Red				BC Explorer
Pekania pennanti pop.5	Fisher – Columbian Population	X	X	Red			Y	BC Explorer
Sorex preblei	Preble's Shrew	X		Red				BC Explorer
Taxidea taxus	American Badger	X	X	Red	E	1-E (2018)	Y	iMap, BC Explorer
Corynorhinus townsendii	Townsend's Big-eared Bat	X	X	Blue				BC Explorer
Euderma maculatum	Spotted Bat	X		Blue	SC	1-SC (2005)	Y	BC Explorer
Gulo gulo luscus	Wolverine, *luscus*	X	X	Blue	SC	1-SC (2018)	Y	BC Explorer
Lasiurus cinereus	Hoary Bat	X	X	Blue	E			BC Explorer
Myotis ciliolabrum	Western Small-footed Myotis	X		Blue				BC Explorer
Myotis lucifugus	Little Brown Myotis	X	X	Blue	E	1-E (2014)		BC Explorer
Myotis thysanodes	Fringed Myotis	X	X	Blue	DD	3 (2005)	Y	BC Explorer
Myotis yumanensis	Yuma Myotis	X	X	Blue				BC Explorer
Neotamias ruficaudus simulans	Red-tailed Chipmunk, *simulans*		X	Blue				BC Explorer
Perognathus parvus	Great Basin Pocket Mouse	X		Blue				BC Explorer
Reithrodontomys megalotis	Western Harvest Mouse	X		Blue	E	1-SC (2009)		BC Explorer
Sylvilagus nuttallii	Nuttall's Cottontail	X		Blue	SC	1-SC (2007)		BC Explorer
Synaptomys borealis artemisiae	Northern Bog Lemming, *artemisiae*	X		Blue				BC Explorer

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Table 13 continued - List of documented and potential mammal species on Rose Swanson. Bolded species have been documented on Rose Swanson with iMapBC or iNaturalist. The results are organized by BC rank then alphabetically by species name. Asterisks indicate non-research grade observations from iNaturalist for common species likely to occur on Rose Swanson.

Species Name	Common Name	IDF	ICH	Rank [a]	COSEWIC [b]	SARA [c]	FRPA	Source
Ursus arctos	Grizzly Bear	X	X	Blue	SC	1-SC (2018)	Y	BC Explorer
Alces alces	**Moose [d]**			Yellow			Y	iMap, iNaturalist
Canis latrans	**Coyote**			Yellow				iMap, iNaturalist
Canis lupus	**Grey Wolf**			Yellow	NAR			iNaturalist
Cervus canadensis	**Elk [d]**			Yellow			Y	iMap, iNaturalist
Lepus americanus	**Snowshoe Hare**			Yellow				iNaturalist
Lynx rufus	**Bobcat**			Yellow				iNaturalist
Mephitis mephitis	**Striped Skunk**			Yellow				iNaturalist
Mustela frenata	Long-tailed weasel			Yellow				iMap
Neotamias amoenus	**Yellow-pine Chipmunk**			Yellow				iNaturalist
Odocoileus hemionus	**Mule Deer [d]**			Yellow				iMap, iNaturalist*
Odocoileus virginianus	**White-tailed Deer [d]**			Yellow				iNaturalist*
Peromyscus sonoriensis	**Western Deer Mouse**			Yellow				iNaturalist
Puma concolor	**Cougar**			Yellow				iNaturalist
Tamiasciurus hudsonicus	**American Red Squirrel**			Yellow				iNaturalist
Thomomys talpoides	**Northern Pocket Gopher**			Yellow				iNaturalist
Ursus americanus	**Black Bear**			Yellow	NAR			iNaturalist

a: Red- threatened, Blue- special concern, Yellow - secure.
b: E- Endangered, T- Threatened, SC- Special Concern, NAR- Not at Risk, DD- Data Deficient
c: Digit indicates the schedule under SARA, letter definitions the same as in b, and year is the date it was last reviewed.
d: ungulate species for which a winter range may be required for winter survival as identified by FRPA

The field results confirmed sightings and sign of Black Bear, hare, deer, moose and striped skunk (Table 14). Patches of black huckleberry (*Vaccinium membranaceum*) and blueberry (*Vaccinium ovalifolium*) were located along the Jackpine trail where the black bear (*Ursus americanus*) sighting later occurred (station 1888). A hare (*Lepus spp.*) carcass was documented on the Douglas-fir trail and appeared to be a recent kill, but the predator was undetermined. Deer and moose pellets were documented in various locations and striped skunks were documented near a lake. **The**

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species listed in the inventory are expected in and around Rose Swanson and management practices must include mitigations for these species. For example, the huckleberry and blueberry patches, adjacent to the trail where the black bear and deer pellets were located, are a hotspot for wildlife foraging and should be retained with a treed buffer.

Table 14 – List of all mammal species that were documented on Rose Swanson. 'New' column indicates if they were *already confirmed on* Rose Swanson with the inventory results (C) or are a *new observation* from field work (Y).

Category	Common Name	Latin Name	Evidence	New
Mammal	Moose	*Alces alces*	pellets	C
	Skunk	*Mephitis mephitis*	visual	C
	Deer	*Odocoileus spp.*	pellets	C
	Rabbit/hare	*Lepus spp.*	carcass	C
	Black bear	*Ursus americanus*	visual	C

3.4.5 Birds

The inventory data revealed 98 bird species of which 48 were documented on Rose Swanson and 5 species documented near Rose Swanson (Table 15). The remaining 44 species are unlikely to occur on Rose Swanson but were included in the list because they may be present during migrations, while foraging/ hunting and nesting.

Table 15 - List of documented and potential bird species on Rose Swanson, including those listed under the Migratory Bird Convention Act (MBCA). Bolded species have been documented on Rose Swanson with iMapBC, iNaturalist, or eBird. The results are organized by BC rank then alphabetically by species name.

Species Name	Common Name	IDF	ICH	Rank [a]	COSEWIC [b]	SARA [c]	FRPA	MBCA	Source
Aechmophorus occidentalis	Western Grebe	X	X	Red	SC	1-SC (2017)		Y	BC Explorer
Ammodramus savannarum	Grasshopper Sparrow	X		Red			Y	Y	BC Explorer
Athene cunicularia	Burrowing Owl	X		Red	E	1-E (2003)	Y		BC Explorer
Bartramia longicauda	Upland Sandpiper	X	X	Red				Y	BC Explorer
Buteo swainsoni	Swainson's Hawk	X	X	Red					BC Explorer
Coccyzus americanus	Yellow-billed Cuckoo		X	Red				Y	BC Explorer
Dolichonyx oryzivorus	Bobolink	X	X	Red	SC	1-T (2017)		Y	BC Explorer
Dryobates albolarvatus	White-headed Woodpecker	X	X	Red	E	1-E (2003)	Y	Y	BC Explorer
Eremophila alpestris merrilli	Horned Lark, merrilli	X	X	Red				Y	BC Explorer

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Species Name	Common Name	IDF	ICH	Rank [a]	COSEWIC [b]	SARA [c]	FRPA	MBCA	Source
Falco mexicanus	Prairie Falcon	X	X	Red	NAR		Y		BC Explorer
Falco peregrinus anatum	Peregrine Falcon, *anatum*	X		Red	NAR				BC Explorer
Icteria virens	Yellow-breasted Chat	X	X	Red	E	1-E (2003)	Y	Y	BC Explorer
Limnodromus griseus	Short-billed Dowitcher	X	X	Red				Y	BC Explorer
Nycticorax nycticorax	Black-crowned Night-Heron	X	X	Red				Y	BC Explorer
Oreoscoptes montanus	Sage Thrasher	X	X	Red	E	1-E (2003)	Y	Y	BC Explorer
Strix occidentalis	Spotted Owl	X		Red	E	1-E (2003)	Y		BC Explorer
Accipiter atricapillus	**Northern Goshawk**	X	X	Blue	NAR				iNaturalist, BC Explorer
Aeronautes saxatalis	White-throated Swift	X	X	Blue				Y	BC Explorer
Ardea herodias herodias	Great Blue Heron, herodias	X	X	Blue			Y	Y	BC Explorer
Asio flammeus	Short-eared Owl	X	X	Blue	T	1-SC (2012)	Y		BC Explorer
Botaurus lentiginosus	American Bittern	X	X	Blue				Y	BC Explorer
Buteo lagopus	Rough-legged Hawk	X	X	Blue	NAR				BC Explorer
Calcarius pictus	Smith's Longspur	X		Blue				Y	BC Explorer
Catherpes mexicanus	Canyon Wren	X	X	Blue	NAR			Y	BC Explorer
Chondestes grammacus	Lark Sparrow	X	X	Blue				Y	BC Explorer
Chordeiles minor	**Common Nighthawk**	X	X	Blue	SC	1-SC (2023)		Y	iNaturalist, BC Explorer
Cygnus columbianus	Tundra Swan			Blue				Y	iMap
Cypseloides niger	Black Swift	X	X	Blue	E	1-E (2019)		Y	BC Explorer
Empidonax wrightii	Gray Flycatcher	X		Blue	NAR			Y	BC Explorer
Falco rusticolus	Gyrfalcon	X	X	Blue	NAR				BC Explorer
Megascops kennicottii macfarlanei	Western Screech-Owl, macfarlanei	X	X	Blue	T	1-T (2005)	Y		BC Explorer

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Species Name	Common Name	IDF	ICH	Rank [a]	COSEWIC [b]	SARA [c]	FRPA	MBCA	Source
Melanerpes lewis	Lewis's Woodpecker	X	X	Blue	T	1-T (2005)	Y	Y	BC Explorer
Nannopterum auritum	Double-crested Cormorant	X	X	Blue	NAR				BC Explorer
Patagioenas fasciata	Band-tailed Pigeon	X	X	Blue	SC	1-SC (2011)		Y	BC Explorer
Phalaropus lobatus	Red-necked Phalarope	X	X	Blue	SC	1-SC (2019)		Y	BC Explorer
Pluvialis dominica	American Golden-Plover	X	X	Blue				Y	BC Explorer
Progne subis	Purple Martin		X	Blue				Y	BC Explorer
Psiloscops flammeolus	Flammulated Owl	X		Blue	SC	1-SC (2003)	Y		BC Explorer
Recurvirostra americana	American Avocet	X	X	Blue				Y	BC Explorer
Sphyrapicus thyroideus	Williamson's Sapsucker	X	X	Blue	E	1-E (2006)	Y	Y	BC Explorer
Spizella breweri breweri	Brewer's Sparrow, breweri	X		Blue			Y	Y	BC Explorer
Tympanuchus phasianellus columbianus	Sharp-tailed Grouse, columbianus	X		Blue			Y		BC Explorer
Tyto alba	Barn Owl	X	X	Blue	T	1-T (2018)			BC Explorer
Anas platyrhynchos	**Mallard**			Yellow				Y	iNaturalist
Antigone canadensis	**Sandhill Crane**	X	X	Yellow	NAR		Y	Y	iNaturalist
Aquila chrysaetos	Golden Eagle			Yellow	NAR				iMap
Bombycilla garrulus	**Bohemian Waxwing**			Yellow				Y	iNaturalist
Bonasa umbellus	**Ruffed Grouse**			Yellow					iNaturalist, eBird
Branta canadensis	**Canada Goose**			Yellow				Y	iNaturalist
Bubo Virginianus	Great Horned Owl			Yellow					iMap
Buteo jamaicensis	**Red-tailed Hawk**			Yellow	NAR				iNaturalist
Cathartes aura	**Turkey Vulture**			Yellow					iNaturalist
Catharus ustulatus	**Swainson's Thrush**			Yellow				Y	iNaturalist

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Table 15 continued - List of documented and potential bird species on Rose Swanson, including those listed under the Migratory Bird Convention Act (MBCA). Bolded species have been documented on Rose Swanson with iMapBC, iNaturalist, or eBird. The results are organized by BC rank then alphabetically by species name.

Species Name	Common Name	IDF	ICH	Rank [a]	COSEWIC [b]	SARA [c]	FRPA	MBCA	Source
Certhia americana	**Brown Creeper**			Yellow				Y	iNaturalist, eBird
Coccothraustes vespertinus	**Evening Grosbeak**	X	X	Yellow	SC	1-SC (2019)		Y	iNaturalist, BC Explorer
Colaptes auratus	**Northern Flicker**			Yellow				Y	iNaturalist
Contopus cooperi	Olive-sided Flycatcher	X	X	Yellow	SC	1-SC (2023)		Y	BC Explorer
Contopus sordidulus	**Western Wood-Pewee**			Yellow				Y	iNaturalist
Corthylio calendula	**Ruby-crowned Kinglet**			Yellow				Y	iNaturalist
Corvus brachyrhynchos	**American Crow**			Yellow					eBird
Corvus corax	**Common Raven**			Yellow					iNaturalist, eBird
Dendragapus obscurus	**Dusky Grouse**			Yellow					iNaturalist
Dryobates pubescens	**Downy Woodpecker**			Yellow				Y	iNaturalist
Dryobates villosus	**Hairy Woodpecker**			Yellow				Y	iNaturalist, eBird
Dryocopus pileatus	**Pileated Woodpecker**			Yellow				Y	iMap, iNaturalist, eBird
Geothlypis tolmiei	**MacGillivray's Warbler**			Yellow				Y	iNaturalist
Glaucidium gnoma	**Northern Pygmy-Owl**			Yellow					iNaturalist
Haliaeetus leucocephalus	**Bald Eagle**			Yellow	NAR				iNaturalist
Hirundo rustica	Barn Swallow	X	X	Yellow	SC	1-T (2017)		Y	iMap, BC Explorer
Ixoreus naevius	**Varied Thrush**			Yellow				Y	iNaturalist
Junco hyemalis	**Dark-eyed Junco**			Yellow				Y	iNaturalist, eBird
Leiothlypis celata	**Orange-crowned Warbler**			Yellow				Y	iNaturalist
Leiothlypis ruficapilla	**Nashville Warbler**			Yellow				Y	iNaturalist
Loxia curvirostra	**Red Crossbill**			Yellow				Y	iNaturalist, eBird
Loxia leucoptera	**White-winged Crossbill**			Yellow				Y	iNaturalist, eBird

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Table 15 continued - List of documented and potential bird species on Rose Swanson, including those listed under the Migratory Bird Convention Act (MBCA). Bolded species have been documented on Rose Swanson with iMapBC, iNaturalist, or eBird. The results are organized by BC rank then alphabetically by species name.

Species Name	Common Name	IDF	ICH	Rank [a]	COSEWIC [b]	SARA [c]	FRPA	MBCA	Source
Numenius americanus	Long-billed Curlew	X	X	Yellow	SC	1-SC (2005)	Y	Y	BC Explorer
Perisoreus canadensis	**Canada Jay**			Yellow					iNaturalist
Pica hudsonia	**Black-billed Magpie**			Yellow					iNaturalist, eBird
Pinicola enucleator	**Pine grosbeak**			Yellow				Y	eBird
Pipilo maculatus	**Spotted Towhee**			Yellow				Y	iNaturalist
Piranga ludoviciana	**Western Tanager**			Yellow				Y	iNaturalist
Poecile atricapillus	**Black-capped Chickadee**			Yellow				Y	iNaturalist, eBird
Poecile gambeli	**Mountain Chickadee**			Yellow				Y	eBird
Regulus satrapa	**Golden-crowned Kinglet**			Yellow				Y	iNaturalist, eBird
Setophaga coronata	**Yellow-rumped Warbler**			Yellow				Y	iNaturalist
Sitta canadensis	**Red-breasted Nuthatch**			Yellow				Y	iNaturalist, eBird
Sphyrapicus nuchalis	**Red-naped Sapsucker**			Yellow				Y	iNaturalist
Spinus pinus	**Pine Siskin**			Yellow				Y	iNaturalist, eBird
Strix varia	**Barred Owl**			Yellow					iMap, iNaturalist, eBird
Tachycineta thalassina	**Violet-green Swallow**			Yellow				Y	iMap
Troglodytes pacificus	**Pacific Wren**			Yellow				Y	iNaturalist
Turdus migratorius	**American Robin**			Yellow				Y	iNaturalist
Vireo cassinii	**Cassin's Vireo**			Yellow				Y	iNaturalist
Vireo gilvus	**Warbling Vireo**			Yellow				Y	iNaturalist
Buteo regalis	Ferruginous Hawk	X		Unknown	SC	1-T (2010)			BC Explorer
Falco peregrinus	Peregrine Falcon	X	X		SC	1-SC			BC Explorer

a: Red- threatened, Blue- special concern, Yellow - secure.

b: E- Endangered, T- Threatened, SC- Special Concern, NAR- Not at Risk, DD- Data Deficient

c: Digit indicates the schedule under SARA, letter definitions the same as in b, and year is the date it was last reviewed.

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Thirteen of the new observations were birds identified by call, and some were confirmed visually (Table 16). Despite a list of 98 potential bird species identified in the desktop inventory, an additional 13 species were identified during the field assessments despite adverse weather.

The field work took place in the morning to early afternoon, therefore species that are obvious during morning hours (songbirds) were easily detected, while nocturnal and cryptic species were not identified. The temperatures of the field days were relatively high (>35°C), and it is expected that many wildlife species were seeking refuge and avoiding the heat of the day.

Table 16 – List of bird species that were documented on Rose Swanson. 'New' column indicates if they were *already confirmed* on Rose Swanson with the inventory results (C) or are a *new observation* from field work (Y).

Category	Common Name	Latin Name	Evidence	New
Amphibian	Pacific chorus frog	*Pseudacris regilla*	visual	C
Bird	Hummingbird	species undetermined	visual, audio	Y
	Chipping sparrow	*Spizella passerina*	call	Y
	Hermit thrush	*Catharua guttatus*	call	Y
	Song sparrow	*Melospiza melodia*	call	Y
	Cedar waxwing	*Bombycilla cedrorum*	call, visual	Y
	Hammond's flycatcher	*Empidonax hammondii*	call	Y
	Rock wren	*Salpinctes obsoletus*	call	Y
	Dusky flycatcher	*Empidonax oberholseri*	call	Y
	Townsend's solitaire	*Myadests townsendi*	call, visual, audio	Y
	America goldfinch	*Spinus tristis*	call	Y
	Sooty grouse	*Dendragapus fuliginosus*	call	Y
	House wren	*Troglodytes aedon*	call	Y
	Great gray owl	*Strix nebulosa*	call	Y
	Mallard	*Anas platyrhynchos*	visual	C
	various waterfowl	species undetermined	visual	-
	Dark-eyed junco	*Junco hyemalis*	call, visual	C
	Swainson's thrush	*Catharus ustulatus*	call, audio	C
	Red-breasted nuthatch	*Sitta canadensis*	call, visual	C
	Brown creeper	*Certha americana*	call	C
	Pine siskin	*Spinus pinus*	call	C
	Golden crowned kinglet	*Regulus satrapa*	call	C
	Cassin's vireo	*Vireo cassinii*	call	C
	American robin	*Turdus migratorius*	call	C
	Hairy woodpecker	*Dryobates villosus*	call	C
	Western tanager	*Piranga ludoviciana*	call	C
	Yellow-rumped warbler	*Setophaga coronata*	call	C
	Black-capped chickadee	*Poecile atricapillus*	call, audio, visual	C

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Table 16 – (continued) List of bird species that were documented on Rose Swanson. 'New' column indicates if they were *already confirmed* on Rose Swanson with the inventory results (C) or are a *new observation* from field work (Y).

	Common Name	Latin Name	Evidence	New
	Pacific wren	*Troglodytes pacificus*	call	C
	Nashville warbler	*Leiothlypis ruficapilla*	call	C
	Red crossbill	*Loxia curvirostra*	call	C
	Northern flicker	*Colaptes auratus*	call	C
	Turkey vulture	*Cathartes aura*	visual	C
	Mountain chickadee	*Poecile gambeli*	call	C

3.4.6 Vegetation species

Vegetation species present in and around Rose Swanson are important to document. Not only does the forest canopy provide a link to the habitats available, but they are also indicators of the species used for foraging, nesting, cover and other habitat requirements. The field assessment included documenting tree and shrub species while walking along the trails (Table 17)

Table 17 – Trees and shrub species documented in the field assessment July 2024

Layer	Common Name	Scientific Name	Field and inventory
Tree	Douglas Fir	*Pseudotsuga menziesii*	Y
	Western Red Cedar	*Thuja plicata*	Y
	Paper Birch	*Betula papyrifera*	Y
	Trembling Aspen	*Populus tremuloides*	New
	Lodgepole Pine	*Pinus contorta*	Y
	Ponderosa Pine	*Pinus ponderosa*	Y
Shrub	Thimbleberry	*Rubus parviflorus*	Y
	Snowberry	*Symphoricarpos albus*	Y
	Douglas Maple	*Acer glabrum*	Y
	Birch leaved spirea	*Spirea betulifolia*	Y
	Prickly Rose	*Rosa Acicularis*	New
	Wild Rose	*Rosa gymnocarpa*	Y
	soopallalie	*Shepherdia canadensis*	Y
	Falsebox	*Paxistima myrsinites*	Y
	Red Osier Dogwood	*Cornus sericea*	Y
	Mountain Alder	*Alnus glutinosa*	New
	Mullein	*Verbascum thapsus*	New
	Black raspberry	*Rubus occidentalis*	New

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Table 17 – Trees and shrub species documented in the field assessment July 2024

Layer	Common Name	Scientific Name	Field and inventory
Shrub	Wild strawberry	*Fragaria vesca*	New
	willow	*Salix sp.*	New
Herb	pinegrass	*Calamagrostis rubescens*	Y
	sedges	*Cyperaceae sp.*	New

Of note is that the tree canopy and understory species that are listed under the IDFmw1 are the same as those canopy and understory species listed under the new 2021 ICHxm1. The differences in the mix of these species varies between variants of both BGC zones.

3.5 Ecological Communities

The desktop inventory revealed 28 ecological communities that occur within the IDFmw1 BGC zone. The 2021 revised ICHxm1 BGC zone is not yet available in Ecosystems Explorer. The following table lists the ecological communities of significance in and around Rose Swanson (Table 18). When referencing the trees and shrubs documented in the field assessment, it is reasonable to infer that the red and blue listed ecological communities of significance are likely present on Rose Swanson. The field assessment confirmed the combination of vegetation communities.

Table 18 - List of ecological communities that have the potential to occur on Rose Swanson based on BC Explorer. Bolded communities have had all their component species documented on Rose Swanson with iNaturalist. The results are organized by BC rank then alphabetically by species name.

Species	Common Name	mw1	xh1	Rank [a]
Populus trichocarpa - Pseudotsuga menziesii / Acer glabrum - Symphoricarpos albus	**black cottonwood - Douglas fir / Douglas maple - common snowberry**	X	X	Red
Populus trichocarpa - Pseudotsuga menziesii / Symphoricarpos albus - Cornus sericea	**black cottonwood - Douglas-fir / common snowberry - red-osier dogwood**		X	Red
Populus trichocarpa / Symphoricarpos albus - Rosa spp.	**black cottonwood / common snowberry - roses**	X	X	Red
Pseudotsuga menziesii / Acer glabrum - Cornus sericea	**Douglas-fir / Douglas maple - red-osier dogwood**		X	Red
Symphoricarpos albus – Rosa woodsii	**common snowberry - prairie rose**	X	X	Blue
Pseudotsuga menziesii - Pinus ponderosa / Pseudoroegneria spicata	**Douglas-fir - ponderosa pine / bluebunch wheatgrass**		X	Blue
Pseudotsuga menziesii / Symphoricarpos albus - Spiraea betulifolia	**Douglas-fir / common snowberry - birch-leaved spirea**		X	Blue

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Table 18 (continued) - List of ecological communities that have the potential to occur on Rose Swanson based on BC Explorer. Bolded communities have had all their component species documented on Rose Swanson with iNaturalist. The results are organized by BC rank then alphabetically by species name.

Species	Common Names	mw1	xh1	Rank [a]
Thuja plicata - Pseudotsuga menziesii / Cornus stolonifera	**western redcedar - Douglas-fir / red-osier dogwood**		X	Blue
Typha latifolia Marsh	common cattail Marsh	X	X	Blue

3.6 Deadfall Area – Drone Footage

A drone was used to capture imagery of approximately 200ha including a large blowdown area on the northern portion of Rose Swanson, within the BCTS operating area (Figure 58). This area provides a unique habitat for moose (*Alces alces*) in terms of cover from prey species. The deadfall is easily maneuvered by moose however predators will have a difficult time. This provides protection from predators in the summer and winter months. The open canopy provides sunlight that will allow regeneration of deciduous species that moose will forage on such as trembling aspen. There is an adjacent wetland to the southwest (1) and to the south (2) that will provide a corridor between the deadfall and wetland habitats. Also, the depth of the deadfall retains moisture in the soil during the decay process.

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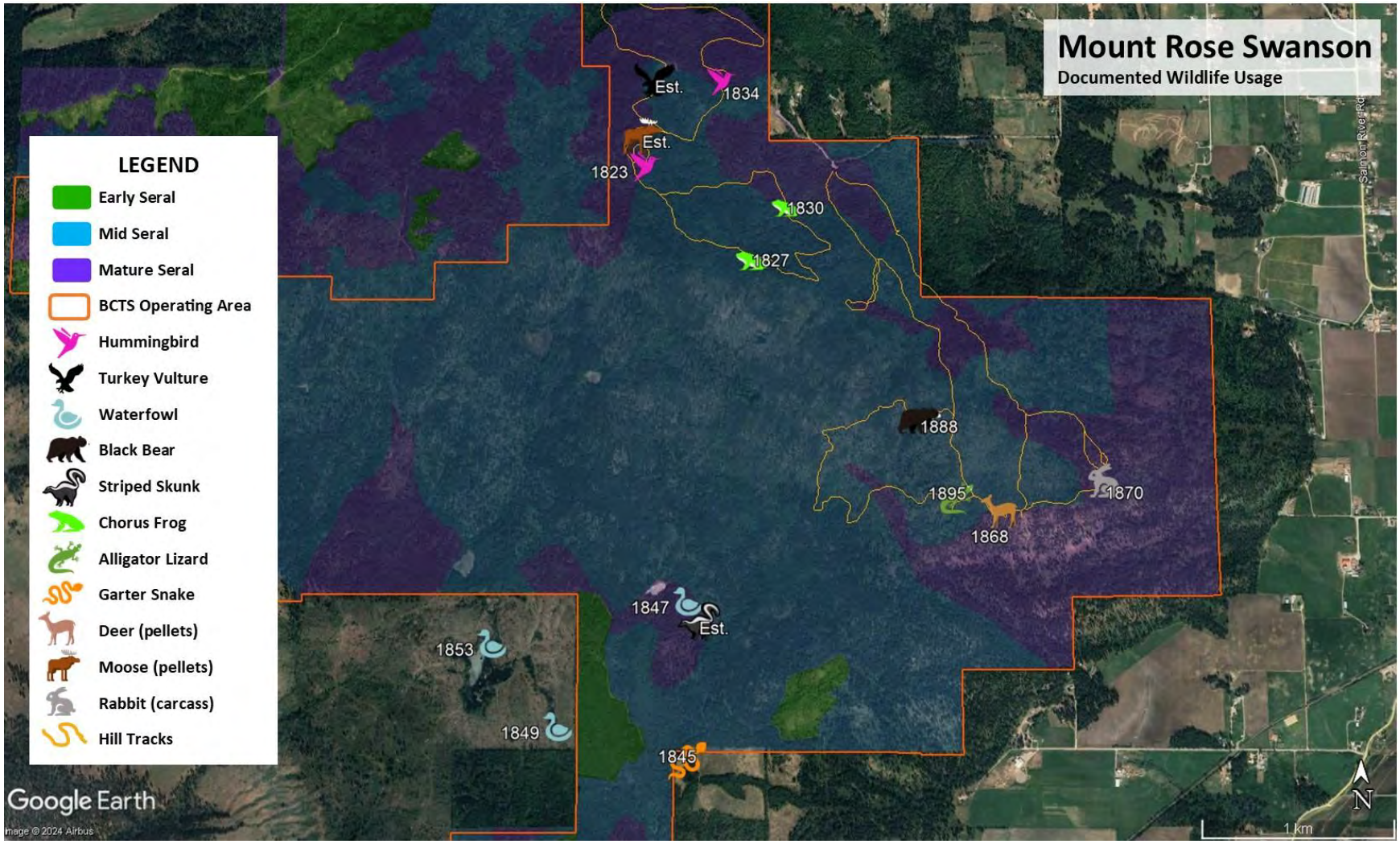

Figure 57 - Orthophoto of the wildlife observations on Rose Swanson. Stations numbers were assigned in the field, while 'Est.' are based on the approximate location encountered in the field. (Note: Most bird species were documented all over Rose Swanson using the Merlin app and were not assigned a station number. See Table 7 for bird list).

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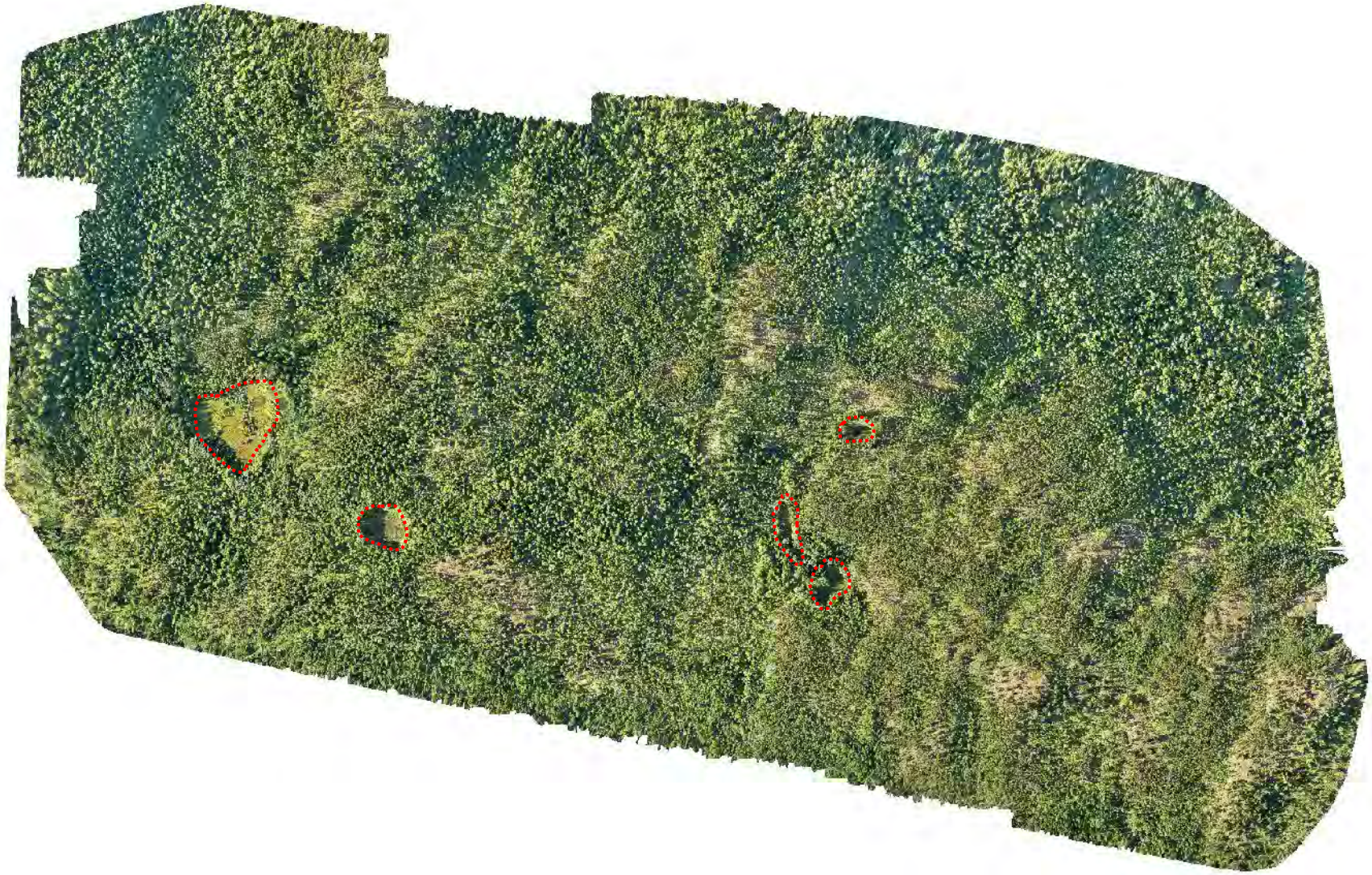

Figure 37 – Drone imagery of approximately 200ha on Rose Swanson. The five waterbodies (Stations 1-5) are outlined in red.

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3.7 Wildlife Corridors

The Okanagan Collaborative Conservation Program (OCCP) has established an ecosystem connectivity project in the Okanagan because of the essential nature of wildlife corridors. This designated wildlife corridor is located between the west side of Okanagan Lake, east of Kalamalka Lake and north towards Shuswap Lake.

It would be prudent to have the wildlife corridor continued through the forested area of Rose Swanson and connect with adjacent habitats and the OCCP designated wildlife corridor. Enabling safe movement between habitat types is essential for wildlife to thrive. If wildlife corridors are damaged/ disturbed, they are difficult to reinstate until decades later when the trees reach maturity and provide cover.

3.8 Critical Habitats

The desktop inventory identified critical habitat for Great Basin Spadefoot (*S. intermontana*) to the north and south of Rose Swanson and the American Badger (*T. taxus*) has mapped critical habitat on the west and south of Rose Swanson (Figure 59). SARA only applies to Federal Lands therefore it is important that the BCTS protect SARA identified Critical habitats and maintain the connection between other habitats in those species' life cycles.

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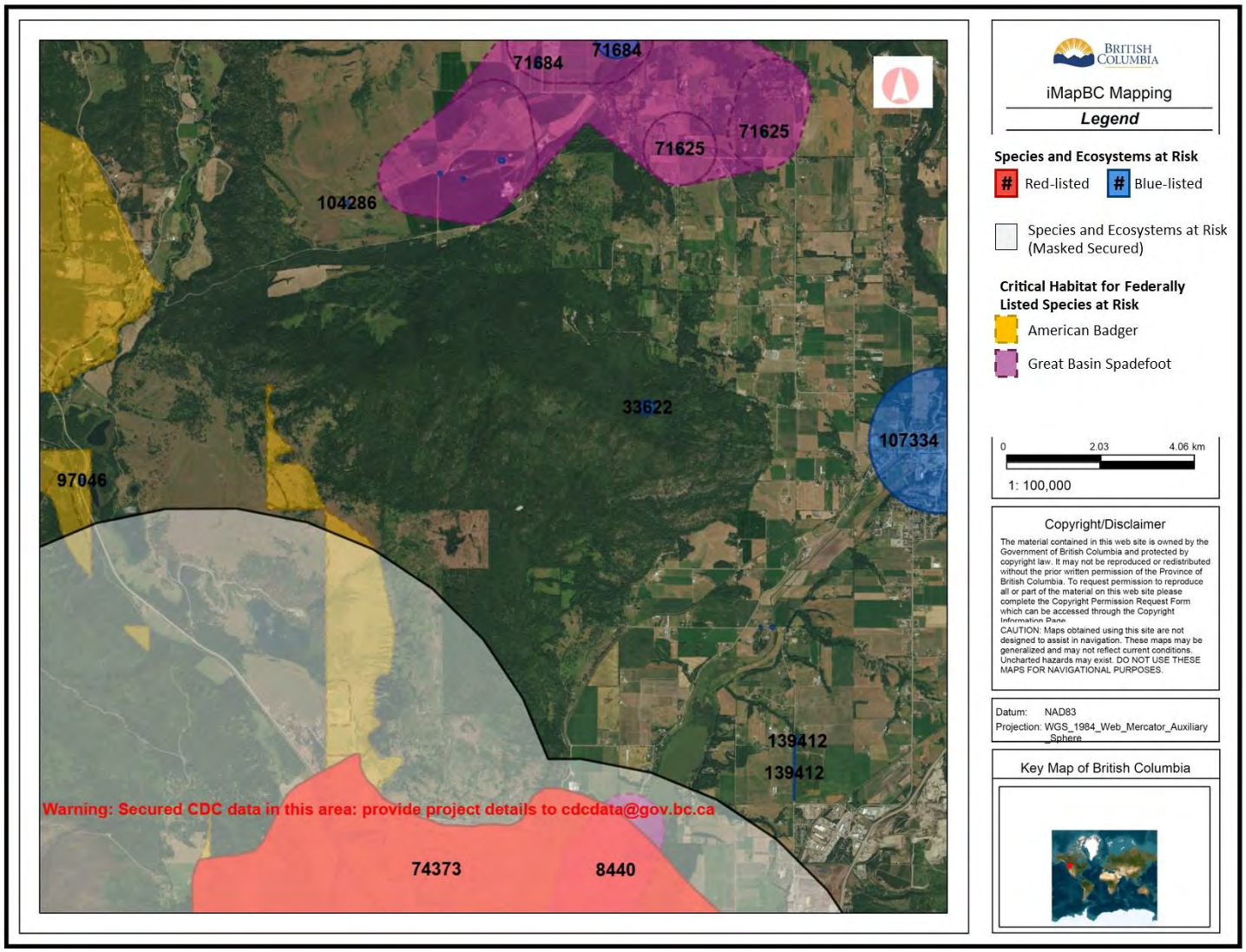

Figure 59 - iMapBC results for critical habitat for federally listed species, masked occurrences, and mapped species at risk. Species at risk shape IDs are #97046 and #107334 for western painted turtle (*C. picta*), #33622 for western skink (*P. skiltonianus*), #74373 for American badger (*T. taxus*), #104286 for North American racer (*C. constrictor*), #71684, #71733, #71625, and #8440 for Great Basin spadefoot (*S. intermontana*), and #139412 for dark green hawthorn (*Crataegus atrovirens).*

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4.0 CONCLUSIONS

The field work on Rose Swanson confirmed that the mountain has valuable microhabitats, large mature trees and young forests, aquatic features, and supports multiple wildlife species. Though an exhaustive search for wildlife was not conducted, field work confirmed several of the species that were documented in the desktop exercises and documented several additional species that were not. Additionally, the presence of habitat features that many species rely on were confirmed, which indicates the likelihood that many more species are active on Rose Swanson.

It is important that forest harvesting plans:

- **incorporate field studies and missing information into harvesting plans,**
- **Assess the proximity to other forest harvesting activities such as Woodlot 0338 and community forests,**
- **Delineate mapped canopy retention areas,**
- **Delineate mapping of ungulate winter range habitats,**
- **Delineate protection and reserves around headwater streams, wetlands and headwater springs that are the source water for lakes, wetland and streams downslope of the proposed forest activities,**
- **maintain wildlife corridors,**
- **maintain existing high value wildlife trees within wildlife tree retention areas,**
- **replant with tree/ shrub species to retain the integrity of the pre-harvest forests for wildlife,**
- **incorporate fire risk mitigations into plans,**
- **incorporate climate resiliency for wildlife and ecosystems**
- **document the seral stages and climax canopy species within the forest pre-harvest.**

4.1 Field Studies to Document Gap in Desktop Inventory

Habitats that were confirmed included high value wildlife trees, wetted depressions/springs, rock outcrops, large woody debris, mature and young seral stage forests and aquatic features. The number of species expected to inhabit Rose Swanson is far greater than the number of species identified from the field surveys (221 vs 41). The field work was not exhaustive and did not cover

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all of Rose Swanson. Also, the field days occurred in the heat of the day during the summer, thereby making it unlikely/impossible to document cryptic species, nocturnal activity, or wildlife that are in other areas for the season.

4.2 The current BGC classification and climax tree species

As of 2021, Rose Swanson has a unique BGC zone (ICHxm1) Shuswap variant that does not occur anywhere else in the Province of B.C. The BGC zone, pre 2021 (IDFmw1) Shuswap variant, occurs all over the Province of BC with the exception of the Shuswap variant. The climax trees of the ICHxm1 and the IDFmw1 are identical and document the unique habitats that mark the transition between the IDF and the ICH BGC zones. The field work confirmed the climax trees species documented in the field were a mix of Western Red Cedar and Douglas Fir.

4.3 Retention of Big-treed Older Mature Forests

TAP recommends deferring the harvesting of the Big-treed Older Mature forests. These mapped areas are NOT within the BCTS operating area. The TAP mapped deferral area is in Woodlot #0338 that will be harvested in the future and hence does not serve as a retention area.

TAP states their specific recruitment forests will become future values as the existing mature and young seral stages mature into big treed older mature trees which contradicts the location of its deferral area outside of the BCTS operating area and inside **Woodlot #0338** scheduled for harvest.

Benefits of old growth forests include:

- Unique conditions and processes that are important to the conservation of biodiversity.
- Banks of genetic material for future use or adaptation strategies.
- Resistance to fire
- Interception and storage of water.
- High carbon sequestration capacity.
- Botanical forest products, including medicinal, edible, decorative, and ceremonial plants.
- Fish and wildlife habitats, including essential attributes for nesting or denning, thermal protection and refuge from predators.
- Spiritual and cultural uses, including carvings, canoes, and ceremonial poles.
- Aesthetics such as resident viewing and tourism.
- Non-commercial recreation, hiking, snowshoeing, natural area adventures
  (Old Growth Technical Advisory Panel, 2021)

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4.4 Retention areas incorporated into Harvesting Plans

Now that we have a better understanding of the species utilizing Rose Swanson during their life cycles, we can recommend varying retention levels and patterns to those species. The impacts to tree removal of Rose Swanson include:

- Loss of canopy cover and mature trees (coniferous and deciduous)
- Loss of understory vegetation
- Increased sun exposure due to loss of shade cover leading to: Reduced soil and fuel moisture linked to the potential increase in wildfire risk
- Drying of wetted areas and wetlands
- Increased runoff and sedimentation to streams.

4.5 Maintain Riparian Buffers

The mapped streams on Rose Swanson were dry and are considered ephemeral streams. Therefore, the streams flow during freshet and are otherwise dry. The riparian buffers within Rose Swanson were dense however downstream on private land, the buffers on the streams were absent or sparce which exacerbates the single high flows and then drying out. Ensuring the streams are provided a riparian buffer despite the absence of fish will increase drought resiliency, reduce the transport of sediment to downstream reaches and maintain healthy headwater sources for streams, wetlands and lakes.

4.6 Maintain Wildlife Corridors

The retention of wildlife corridors is integral to species accessing various habitats daily, seasonally and throughout their life cycle. The discussion of wildlife corridors was emphasized throughout the body of this report. Some highlights of corridors between important habitat include:

1. Deadfall and wetlands to southwest (1) and south (2)
2. Rock outcrops
3. Wetted depressions and springs – source of water for wildlife
4. LWD – unique microhabitats, need a future source of LWD.
5. Wetlands

4.7 Steps to ensure climate resiliency

In the Okanagan Valley we have experienced a heat dome, an atmospheric river, drought, flooding and wildfires in addition to the reduced snowpack in the mountains and lowered water table levels.

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Forested areas provide climate regulation, clean air due to respiration, carbon sequestration, soil moisture retention, ecosystem services, cooler ambient temperatures, snow interception, protection from wind erosion and accelerated snowmelt and refuge for wildlife. With the effects of climate change, steps to ensure climate resiliency must be incorporated into plans to manage the area. Snow accumulation and retention in the mountains will result in the natural filtration of groundwater to replenish wells/ aquifers in the valley bottom. Cooler ambient temperatures and moisture retention in soils are a valuable ecosystem function of forested areas. If the forest canopy is not present, soil moisture is lost and there is an increased potential for overland flow and surges of water into streams at lower elevations. Surface and groundwater are connected and must be assessed together and not independently. High elevation wetlands and streams, as documented in Rose Swanson, are critical storage areas when rainfall and snowpack is low. Investigation into the effect of harvesting on source water and the effects on groundwater should be assessed.

4.8 Gaps filled with field assessments

Some gaps in the desktop inventory were filled with the results of the field data. Some species not identified or expected, were confirmed during the field assessments. The climax forest canopy and the revised BGC zone of ICHxm1 makes sense. Several wetlands, lakes and ponds were also identified in addition to riparian and unique habitats such as wildlife trees, rock outcrops, wetted depressions and springs. Future field assessments are expected to provide additional information that can be used to incorporate ecosystem services into the harvesting plan.

4.9 Additional field investigations

Previously, the field work was scheduled in July which occurred during a heat wave with extreme temperatures. As a mitigation, field assessments began in the cooler mornings until early afternoon however with the extreme temperatures, many species remained sedentary. In 2025, sampling is recommended in the spring to capture the timing of amphibian hatches, cooler temperatures to document wildlife movement and alternate habitats. Areas to be investigated include:

1. Visit Splatsin Woodlot 0338 to the northwest, within the TAP old growth recruitment forest (Figure 2b)
2. West side of mountain
3. Crown land at Grandview Flats in South (telus tower fire)

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4. Grasslands and dry open forests to look for species in Table 19
5. Western rattlesnake (juvenile) sighted, reported to Penticton Ministry office, northernmost sighting in the Okanagan Valley.

Table 19 – List of wildlife habitats and species they support according to LMH 75 and LMH 76. Within each habitat type, species listed under IDFxh1 (LMH 76) are highlighted with orange, species listed under ICHxm1 (LMH 75) are highlighted in green and non-highlighted species were listed under both. Asterisks indicate non-research grade iNaturalist observations.

Habitat Type	Species Name	Common Name	Documented on RS
Grasslands and dry open forest	*Taxidea taxus*	American badger	Near
	Buteo swainsoni	Swainson's hawk	
	Numenius americanus	Long-billed curlew	
	Eremophila alpestris	Merrill's horned lark	
	Grasshopper Sparrow	Grasshopper sparrow	
	Asio flammeus	Short-eared owl	
	Perognathus parvus	Great Basin pocket mouse	
	Chondestes grammacus	Lark sparrow	
	Dolichonyx oryzivorus	Bobolink	
	Chordeiles minor	Common nighthawk	Yes
	Hirundo rustica	Barn swallow	Near
	Dolichonyx oryzivorus	Prairie falcon	
	Buteo lagopus	Rough-legged hawk	

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