

CONSERVATION STATUS OF SPECIES AND ECOSYSTEMS IN THE THOMPSON–NICOLA REGION



Photo courtesy Robyn Reudink

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EXECUTIVE SUMMARY

The Thompson-Nicola region (T-N) is an important area to consider in the conservation of species and ecosystems at risk, both nationally and provincially. It contains important movement corridors for plants and animals; corridors along the Fraser River connect species to the Lower Mainland and the Cariboo, while the Shuswap corridor provides important connectivity to the Okanagan.

The ecosystems in the Thompson-Nicola have been summarized below at three scales, using coarse and fine filter approaches. For the purposes of this summary, the T-N is defined by the bounds of the Thompson-Nicola Regional District (TNRD).¹

At a coarse scale, the T-N has three Biogeoclimatic Zones that are at risk in British Columbia (BC): Bunchgrass (Red listed/Imperiled), Ponderosa Pine (Blue listed/Imperiled/Vulnerable) and Interior Douglas-fir (Blue listed/Vulnerable). Due to its high numbers of federally listed species at risk BC's Dry Interior (Bunchgrass, Ponderosa Pine and Dry Interior Douglas-fir) is one of 11 federal conservation priorities in Canada. The T-N includes the majority (67%) of the Bunchgrass Zone in BC and 45% of the Dry Interior in Canada.

At a medium scale, the T-N has nine sensitive ecosystems. These ecosystems are easy to recognize on the landscape and contain fine scale ecological communities. They also provide habitat for species at risk. Sensitive ecosystems include: Grassland, Riparian, Wetland, Broadleaf Woodland, Dry Coniferous Woodland, Old Forest, Rugged Terrain and Endangered Rivers.

Thirty-seven (37) ecological communities are at risk globally, indicating a global responsibility for their protection and management. Nine (9) globally listed communities are found in the Dry Interior. There are 145 ecological communities in the T-N that are provincially listed. Fifty-four (54) are Red listed, meaning they are Critically Imperiled or Imperiled. Ninety-one (91) are Blue listed, which means they are Imperiled/Vulnerable or Vulnerable. Fifty-eight (58) of these ecological communities are found in the Dry Interior (27 Red listed, 31 Blue listed).

Species at risk are summarized below at four scales: global, national, provincial and regional.

Twenty-three (23) species in the T-N are at risk globally, indicating a worldwide level of responsibility for conservation. Two are vertebrates, two are invertebrates, 14 are plants, and five are fungi. Some examples include the rusty cord-moss, whitebark pine, Little Brown Myotis (bat), and Spotted Owl.

There are 57 species in the T-N that are nationally at risk, in Canada. These species are listed under the Canadian Species at Risk Act (SARA). This includes 14 Endangered, 15

¹ While the Thompson-Nicola Regional District is not affiliated with this summary, their administrative boundary is used because it roughly encompasses the area of interest.

Threatened and 28 Special Concern (Vulnerable) species. Forty (40) species are vertebrates, five are invertebrates, nine are plants, and three are fungi. All but seven of these species are also Red or Blue listed provincially. The remaining seven species are yellow listed in BC. Forty-three (75%) of these species depend on habitats in the Dry Interior. A few examples include: Caribou, Burrowing Owl, Western Rattlesnake, Great Basin Spadefoot, American Badger, White Sturgeon, Olive Clubtail dragonfly, and toothcup (a flower). Critical habitat has been identified for 10 species under SARA.

The T-N has 175 provincially listed species at risk, including 41 Red listed, 127 Blue listed and seven Yellow listed species. Yellow listed species are not at risk provincially, but these seven species were included as at risk because they are listed under SARA. This provides one complete list of both provincially and federally listed species for ease of use. These listed species include: 63 vertebrates, 65 plants, 29 invertebrates, and 18 fungi. One hundred and twenty (120) of these species depend on the Dry Interior. Some examples include Sharp-tailed Grouse, Swainson's Hawk, Painted Turtle, and Great Blue Heron.

The Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) identifies all SARA listed species, bats, grassland birds and aerial insectivores, Mountain Goat, and Barrow's Goldeneye as regionally important. SARA listed species are actively managed in relation to federal legislation. Almost 50% of BC's 15 bat species are deemed at risk. Most of the remaining bat species are expected to be listed soon due to white-nose syndrome (an introduced fungal disease) and the impacts of windfarms.

As a group, in Canada, grassland birds declined by 57%, and aerial insectivores declined by 59% from 1970 to 2016. Some of these species are listed under SARA but managing them as a group may help to keep common species common. Most of the world's population of Mountain Goat and breeding Barrow's Goldeneye are found in BC. These species are not listed as globally at risk but proactive management may protect them from population declines and reduce the high cost of species recovery and associated restrictions that come with listing.

The TNRD is in the traditional territory of the Nle'kepmxc'in, Secwepemcstin (Shuswap), Statimcets (Lillooet) and Nsyilxcan (Okanagan) language groups. Most (90%) of the land in the T-N is administered by the provincial Crown and nearly 18% has been formally protected by the Crown and non-government conservancies (e.g., Nature Conservancy of Canada, the Nature Trust of BC). However, the Dry Interior has much less protection than other BC regions, with only 8% formally protected. The provincial Crown administers 61% of the Dry Interior and 45% of the Critically Imperiled Bunchgrass Zone. Much of the Dry Interior is also in the Agricultural Land Reserve (ALR). Although the ALR provides some protection from permanent land loss due to urban development, it allows for agricultural developments that may replace or alter natural ecosystems.

The International Union for the Conservation of Nature (IUCN) provides an international standard to quantify threats in 11 threat categories. This system is used in BC for

ecosystems and species. The main threat to many low elevation ecosystems and species is urban and agricultural development that can permanently alter natural habitats. Other low-level threats that can cumulatively result in much higher impacts include invasive species, livestock, recreation, fire/fire suppression climate change, road mortality, persecution, rodenticides, oil/gas drilling, windfarms, logging, utility corridors and dams.

Substantial work has already been done to identify important conservation sites and management approaches within the T-N. Government Land Use Plans, Grassland Conservation Council Priority Grasslands, Partners in Flight Bird Conservation Plans, Fishery Sensitive Watersheds, Important Bird Areas, Ungulate Winter Range, Old Growth Management Areas and the Nature Conservancy's Okanagan Ecoregion Assessment, all provide useful biodiversity information and land/water use guidance.

Conservation protecting biodiversity values is important for several reasons:

- Land conservation helps ensure representation, redundancy and resilience for ecosystems and species, helping to meet international commitments and legal expectations for species at risk recovery; also protects our economy
- Helps maintain ecosystem services such as oxygen production, carbon sequestration, water storage, water filtration and natural pest control by birds and bats
- Plants provide forage for domestic cattle and wild ungulates which are used for food.
- Non-consumptive uses of the environment support environmental tourism, wildlife viewing, photography, hiking and camping.
- Our wild spaces provide aesthetic, spiritual and social values.
- Maintaining natural landscapes protects important cultural areas, plants and animals that are important to First Nations communities for medicines, foods and ceremony
- Research confirms that natural places for recreation enhances human health by reducing anxiety and stress, lowering blood pressure, and increasing happiness.

The research literature recommends that conservation programs start by setting aspirational (non-legal) targets to conserve a minimum of 50% of the historic area of each ecosystem. This has become known as "Nature Needs Half." Conservation includes core areas of land that are formally protected (e.g., parks, private conservancy lands), and can include surrounding by a matrix of un-protected, multiple use land and waters managed in an environmentally sensitive way, e.g. through stewardship.

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INTRODUCTION

The Thompson-Nicola (T-N), for the purposes of this summary defined by the boundaries of the Thompson-Nicola Regional District, is an important conservation area for species and ecosystems at risk, nationally in Canada, provincially in BC, and regionally (Partners in Flight British Columbia/Yukon. 2003, Warman et al., 2004, Freemark et al., 2006, Southern Interior Grasslands Recovery Implementation Group 2009, Scudder 2010, FORREX 2010, Government of Canada 2018 and 2019, Fraser Basin Council 2020, Grasslands Conservation Council of BC 2020). The area also includes important, low elevation movement corridors for plants and animals. Corridors along the Fraser River connect species to the Lower Mainland and the Cariboo. The Shuswap provides a corridor to the Okanagan. It is also an area where increasing threats to ecosystems and species, mainly from urban and agricultural development, can be managed through strategic planning.

There is interest in developing a conservation strategy or program for this area (FORREX 2010), particularly in some of the most at risk areas of the Dry Interior (Government of Canada 2019). Well-planned conservation helps us to meet provincial and regional needs while meeting international and national obligations, like the United Nations Convention on Biodiversity (Government of Canada 2020), which led to the Species at Risk Act (SARA) (Government of Canada 1992). British Columbia has provincial obligations to species at risk recovery through the National Accord for the Protection of Species at Risk (Government of Canada 1996) and the Canada–British Columbia Agreement on Species at Risk (Government of Canada 2005). Planning can also “keep common species common,” rather than waiting until a species is legally listed, which dramatically increases costs and restrictions and makes recovery much more difficult and less likely to be effective.

Protecting biodiversity and ecological elements that humans use and value is important for many reasons. Land conservation helps to ensure representation, redundancy and resilience for ecosystems and species (Tear et al., 2005). Ecosystem conservation helps to maintain ecosystem services like oxygen production, carbon sequestration, water storage, and water filtration. Conserving plants and animals not only protects species at risk but helps to maintain economic values, like forage for domestic cattle and wild ungulates, which are used for food. It also supports species used for non-consumptive economic values, like wildlife viewing tourism, and natural pest control by birds and bats. For example, in 1996, \$1.9 billion was spent on nature related activities in BC (Environment Canada 2000), and bats provide \$23 billion annually in organic pest control to the United States agriculture industry (Boyles et al., 2011). Our wild spaces provide aesthetic, spiritual and social values, including maintaining landscapes, plants and animals that are important to First Nations communities for medicines, foods and ceremony. These natural landscapes also provide places for recreation and enhance human health by reducing anxiety and stress, lowering blood pressure, and increasing happiness (Frumkin et al., 2017).

Conserving biodiversity is also in the public interest. The BC Species at Risk Public Opinion Survey in 2008 reported 86% of respondents were in support for species at risk protection and 94% supported encouraging the public to restore at-risk habitat. Similar

survey numbers were reported by the South Okanagan Similkameen Conservation Program in 2004 and 2008, and by the Greater Vancouver and Fraser Valley Regional Districts in 2007.

Ecosystems and species at risk are threatened mainly by urban and agricultural development that permanently alters natural habitat. Additional threats include road mortality, invasive species, livestock, persecution, recreation, fire, pesticides, changes in predator dynamics, logging, dams, etc.

This report updates the conservation status of ecosystems and species at risk within the T-N boundary to identify biodiversity elements that are important to protect. This is the basic information needed to identify areas for protection and environmental stewardship.

Current literature recommends setting targets to conserve a minimum of 50% of the historic area of each ecosystem to maintain biodiversity (Noss et al., 2012, Locke 2014, Wilson 2016, Dinerstein et al., 2017). This has become known as “Nature Needs Half.” Conservation includes core areas of land that are formally protected (e.g., parks, private conservancies), that are surrounded by a non-protected matrix of multi-use land that is managed in an environmentally sensitive way through stewardship (Margules and Pressey 2000, Vold and Buffet 2008).

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STUDY AREA

The study area is the Thompson-Nicola Regional District (TNRD) boundary (Figure 1). The TNRD is located in south central BC and encompasses 45,464 square kilometres or 4,546,415 hectares (ha) of land (Ministry of Environment 2020). This large area includes parts of three Ecoprovinces: Southern Interior, Central Interior, and Southern Interior Mountains. It also includes portions of seven diverse Ecoregions: Fraser Plateau, Chilcotin Ranges, Interior Transition Ranges, Thompson Okanagan Plateau, Northern Columbia Mountains, Northern Cascade Ranges, and Columbia Highlands. Major rivers include the Fraser, Thompson, South and North Thompson, Nicola, and Clearwater Rivers. Major Lakes include Kamloops, Nicola, Adams, Bonaparte, Murtle, Clearwater, Azure, and Hobson.

The Thompson Region is the traditional territory of the Nleʔkepmxc'in, Secwepemcstin (Shuswap), Statimcets (Lillooet) and Nsyilxcən (Okanagan) language groups. First Nations in the region include Ashcroft, Boothroyd, Cook's Ferry, Kanaka Bar, Lytton, Nicomen, Oregon Jack Creek, Siska, Skuppah, Upper Nicola, Adams Lake, Bonaparte, Little Shuswap Lake, Neskonlith, Simpcw First Nation, Skeetchestn, Spallumcheen, Splots'in, Tk'emlups te Secwepemc, Whispering Pines, Cayoose Creek, Seton Lake,

Coldwater, Lower Nicola, Nooaitch, Shackan, High Bar, N'Quatqua, Bridge River, Ts'kw'aylaxw, T'it'q'et and Xax'lip (Fraser Basin Council 2020). There are 206 federal Indian Reserve parcels in the T-N.

The T-N population was 132,663 in 2016 (Statistics Canada, 2020), mostly living within nine major cities: Kamloops, Merritt, Clinton, Clearwater, Lytton, Chase, Logan Lake, Ashcroft and Cache Creek. Kamloops is the major population centre with 90,280 people in 2016 (68% of the T-N population).

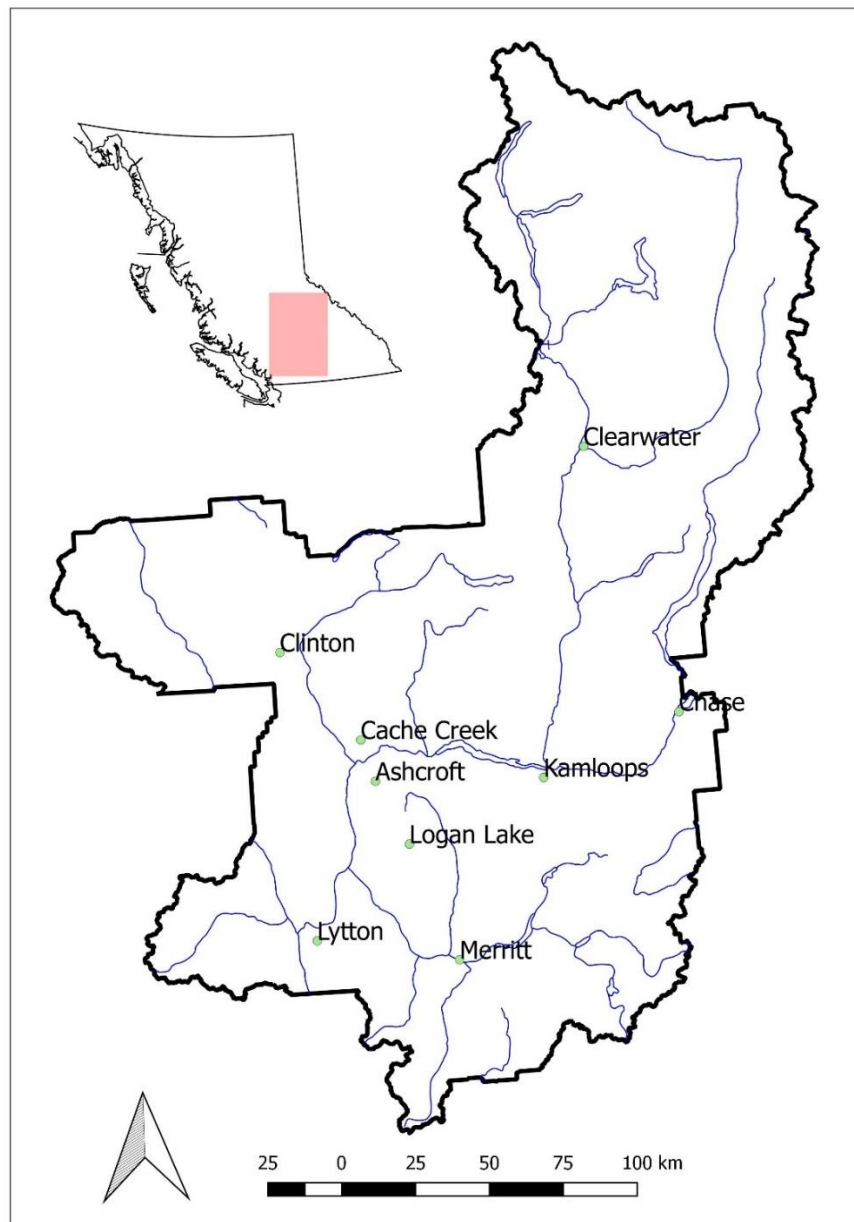


Figure 1: Study Area - Thompson-Nicola Regional District within British Columbia

METHODS

Biogeoclimatic Zone data was provided by the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRORD) (2020).

Data on the conservation status of species and ecosystems at risk within the Thompson Nicola Regional District boundary were downloaded using the BC Species and Ecosystem Explorer (BC Conservation Data Centre 2020). The data include global status ranks (worldwide, provided by NatureServe) and provincial ranks in BC for Red and Blue listed species (endangered, threatened and special concern), but not Yellow listed species (not at risk). It also includes national species designations for Canada from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and listings under the Species at Risk Act (SARA). Ecological community data includes global and provincial (B-C-) ranks for Red, Blue and Yellow listed communities. Ecological communities are not designated by COSEWIC or listed by SARA. Data was summarized using MSEXcel filters and pivot tables. A detailed glossary of ecosystem explorer terms is available here: <http://www.env.gov.bc.ca/atrisk/help/status.htm>

Data on land ownership and management were provided by FLNRORD (2020) and summarized using MSEXcel spreadsheets and mapped using QGIS.

RESULTS

This summary considers ecosystems and species at several scales, following guidance from Ecological Concepts, Principles and Applications to Conservation (Vold and Buffet 2008), and the BC Conservation Framework (Ministry of Environment 2009). Specifically, this includes using coarse and fine filter ecosystem approaches and the following goals from the BC Conservation Framework:

- Goal 1. To contribute to global efforts for species and ecosystems conservation.
- Goal 2. To prevent species and ecosystems from becoming at risk (“keeping common species common”).
- Goal 3. To maintain the full diversity of native species and ecosystems.

1. Ecosystems

1.1 Biogeoclimatic Zones

Biogeoclimatic (BEC) Zones combine similar vegetation, soils, topography and climate to describe ecosystems on a provincial or regional scale. Zone names are represented by the leading vegetation type (e.g., Bunchgrass Zone, Ponderosa Pine Zone).

The T-N has 13 BEC Zones and three of these zones are of conservation concern in BC (Table 1, Figure 2): Bunchgrass (BG), Ponderosa Pine (PP), Interior Douglas-fir (IDF). The Bunchgrass Zone is Red listed (Imperiled, S2); the Ponderosa Pine Zone is Blue listed (Imperiled/Vulnerable, S2/S3); and the Interior Douglas-fir Zone is Blue listed (Vulnerable, S3) (Austen et al., 2008). They are threatened mainly by habitat loss from

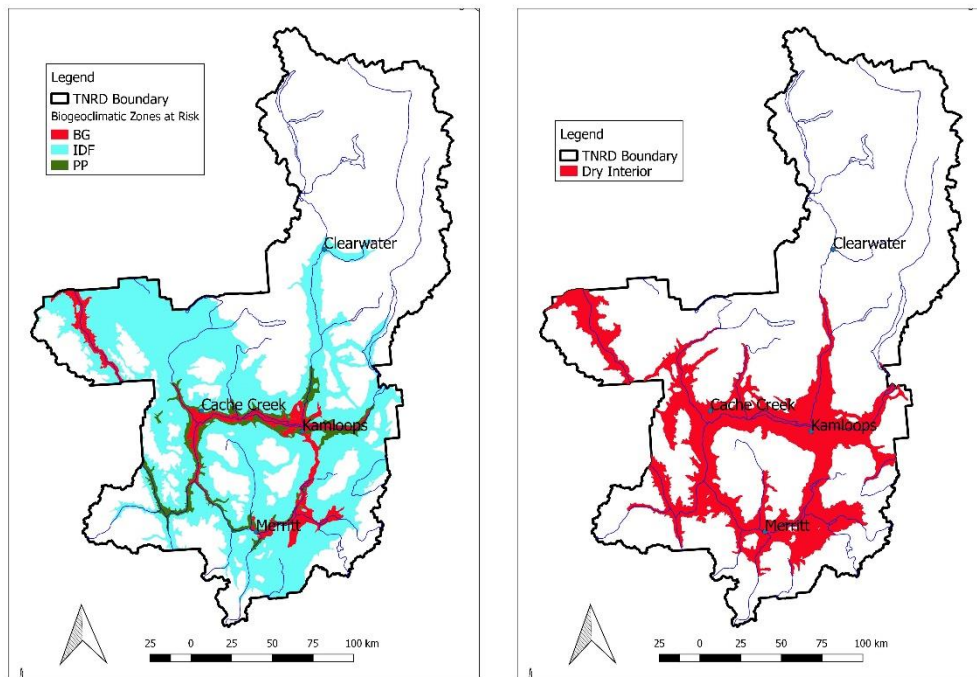
urban/rural development and agriculture (Austen et al., 2008).

The Bunchgrass Zone is only 4% of the T-N area but the study area includes the majority (67%) of this zone in BC (Table 1), giving the T-N a very high degree of responsibility for management of this zone, provincially. The Ponderosa Pine Zone in the T-N is 3% of the T-N area and 42% of this zone in BC. The Interior Douglas-fir Zone, including all subzones, is 35% of the T-N area and 35% of this zone in BC. The IDF dry subzones make up 11% of the T-N area and 42% of the IDF dry subzones in BC.

The Dry Interior area, including BG, PP and dry IDF (Table 1, Figure 2) is recognized by the Government of Canada as one of 11 national conservation priorities, due to high numbers of federally listed species at risk (Government of Canada 2019). The Dry Interior totals 806,677 ha (18% of the T-N and 45% of this area in BC).

Table 1: Biogeoclimatic Zones in the T-N that are at Risk in British Columbia

BEC Zone	Provincial Status	Provincial Rank	Area (ha)	% of T-N	% of BC
Bunchgrass (BG)	Imperiled	S2	172930	4%	67%
Ponderosa Pine (PP)	Imperiled/Vulnerable	S2/S3	123399	3%	42%
Interior Douglas-fir (IDF)	Vulnerable	S3	1580344	35%	35%
IDF (dry subzones only)	Unranked	?	510348	11%	42%
Dry Interior	Unranked	?	806677	18%	45%



BG PP IDF

Dry Interior (BG PP IDF dry subzones only)

Figure 2: Biogeoclimatic Zones in the T-N that are at Risk in British Columbia

1.2 Sensitive Ecosystems

“A Sensitive Ecosystem is one that is at risk or ecologically fragile in the provincial landscape” (Province of British Columbia 2006). Sensitive ecosystems describe communities at a finer scale than BEC and a coarser scale than ecological communities. They are used to provide greater detail than BEC and lump fine scale ecological communities into simpler summaries for communication. They are easier to recognize than ecological communities, which require specialized expertise to identify. However, they should not be used to quantify conservation targets because the coarse scale tends to mask the rarest and most at risk ecological communities (Dyer and Haney 2019).

Sensitive ecosystems in the T-N include: Grassland, Riparian, Wetland, Broadleaf Woodland, Dry Coniferous Woodland, Old Forest, Rugged Terrain, Endangered Rivers.

Grassland (including sagebrush steppe) is the rarest land cover type in BC and disproportionately supports about 33% of BC’s species at risk (Austen et. al, 2008). American Badger, Burrowing Owl, Sharp-tailed Grouse, Western Rattlesnake, and many other species at risk depend on this habitat. As a result of the provincial importance and high threats to this sensitive ecosystem, the Grassland Conservation Council of BC was formed to conserve grasslands. Substantial mapping and guidance on Priority Grasslands are available, including specific areas (e.g., Thompson Basin, Aberdeen and Lac du Bois) (Grasslands Conservation Council of BC 2020). Significant areas of grassland have been lost to urban and agricultural development (Table 2) and it is increasingly important to conserve and steward much of what remains (Grassland Conservation Council of BC mapping, Dyer 2006). Lower elevation grasslands are most threatened (Figure 3).

Ecosection	% Grassland Loss
Shuswap Basin	56%
Northern Thompson	
Upland	36%
Thompson Basin	23%
Guichon Upland	15%

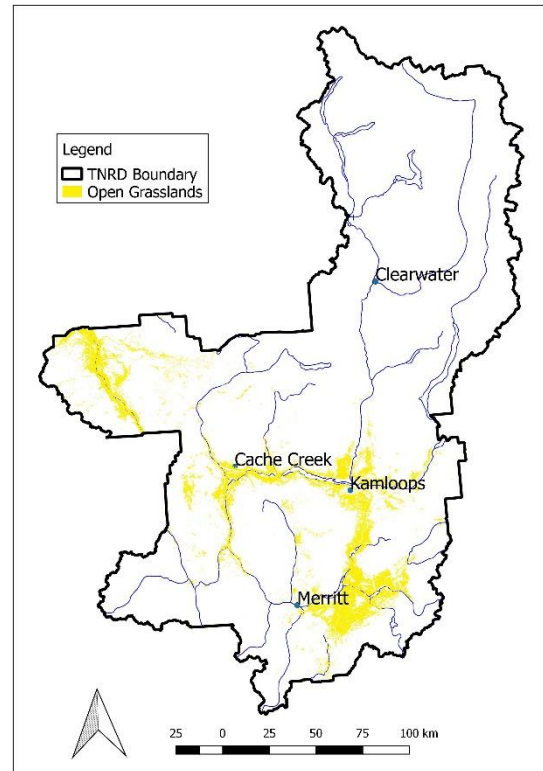


Table 2: Percentage of Grassland Loss by Ecosection in the T-N circa 2006

Figure 3: Open Grasslands in the T-N (GCC mapping 2015)

Riparian vegetation is a sensitive ecosystem that is associated with the increased moisture at lake, wetland and stream edges. Low elevation riparian habitats include cottonwood, some aspen communities, and may contain Red listed Waterbirch – Roses ecological community. Lewis’s Woodpecker and Western Screech-Owl (Figure 4), both threatened in Canada, depend on old cottonwoods (Figure 5) for nesting. These habitats also support migratory birds with annual declining population trends of ~1% per year (e.g., Veery, Yellow Warbler). These are focal species for recovery of cottonwood habitat (Partners in Flight 2003). This habitat is not well mapped in the T-N but is mainly associated with rivers, lakes and other water bodies. Habitat loss in the nearby Okanagan Valley is high (58%) (Lea 2008). Rates of loss in the T-N may be similar.



Western Screech-Owl (*macfarlanei* ssp) is Threatened in Canada and Blue listed in BC. It depends mainly on large, old cottonwoods for nesting, large and dense patches of riparian vegetation for cover and open areas for foraging. Steve Cannings photo.

Figure 4: Western Screech-Owl



Riparian habitats are sensitive ecosystems with high rates of habitat loss. They include several Red listed ecological communities (e.g., Cottonwoods) and support several species at risk (e.g., Western Screech-Owl, Lewis's Woodpecker). Steve Cannings photo.

Figure 5: Cottonwood Riparian Sensitive Ecosystem

Wetlands are rare on the landscape and provide important habitats for amphibians like the Great Basin Spadefoot, waterfowl and shorebirds. They also support invertebrates that feed many animals, like the Endangered Little Brown Myotis (bat), both at the wetland itself and beyond, as winged adult invertebrates emerge from nymphs and disperse to other areas. Several studies suggest that low elevation wetlands, especially small shallow wetlands that are relatively easy to infill, have declined by ~80%. Lea (2008) reported 84% loss of wetlands in the South Okanagan. Despite protection under the Water Sustainability Act (Government of BC 2014), wetlands continue to be destroyed. Harrison and Moore (2013) reported a 38% loss of low elevation in the South Okanagan Valley between 1988 and 2010. Dyer and Haney (2019) reported a wetland loss of 39 ha. (4%) in the South Okanagan Valley between 2009 and 2019. It is likely that the T-N has experienced similar losses.

Broadleaf Woodlands are deciduous groves, mainly aspen copses in the T-N. They provide habitat for Endangered Williamson's Sapsucker, many cavity nesting birds and

other wildlife, including bats. They are at less risk to permanent habitat loss than some other habitats but are impacted by other threats.

Dry Coniferous Woodland includes ponderosa pine and interior Douglas fir trees. They are important for Lewis's Woodpecker (Threatened), Flammulated Owl (Special Concern) and other species at risk.

Old Forest is important for many species. The Endangered Spotted-Owl depends on large old trees for nesting and Threatened Mountain Caribou need this habitat because it grows lichens that are a major food source at a critical time of the year.

Rugged Terrain includes cliff, talus and rock outcrops. It is important for Peregrine Falcon (Special Concern) nest sites, Spotted Bat (Special Concern) roost sites, and Threatened snakes for hibernacula.

The Outdoor Recreation Council of BC compiles a list of BC's **Endangered Rivers** every 2 years. The Thompson and Fraser Rivers have been included on this list due to fishery declines, especially Steelhead. The Fraser supports Endangered White Sturgeon and the Thompson provides habitat for the Endangered Olive Clubtail dragonfly.

1.3 Ecological Communities

Ecological Communities are fine scale ecosystems that are monitored and ranked by the BC Conservation Data Centre. The Thompson Nicola Regional District contains 329 ecological communities (see Excel spreadsheets, provided separately). The spatial location of these ecosystems is not consistently mapped so cannot be displayed.

1.3.1 Global Status for Ecological Communities

Global (worldwide) conservation ranks are provided for 73 ecological communities; the remainder are not ranked. High Global Ranks suggest a high global responsibility for managing these ecological communities to prevent worldwide declines and possible extinction. Thirty-seven (37/329) ecological communities are at risk globally, meaning they are Critically Imperiled (G1), Imperiled (G2) or Vulnerable (G3) worldwide (Table 3, Appendix 1). The remainder are either globally secure, apparently secure, have questionable ranks or a range of uncertainty. Ten (10) of these ecosystems are Red listed, 27 are Blue listed and one has no provincial status. Four communities are listed as identified wildlife and four have landscape unit objectives under Higher Level Plans (Appendix 1).

Most of these communities are not spatially mapped so may be difficult to identify sites for protection. However, most of these communities are at higher elevations, primarily on provincial Crown Land, where risk of permanent habitat loss is lower and temporal impacts, such as industrial logging, have increased management control under the Forest and Range Practices Act. Only nine of these communities occur in the Dry Interior where there are higher risks of permanent habitat loss (Table 4). These ecological communities likely require increased management attention. Five communities occur within sensitive grasslands, three are low elevation sensitive riparian communities, and one is a forested

community.

Table 3: Ecological communities in the T-N that are at Globally at Risk

Global Rank	Red List	Blue List	No Status	Total
G1	1			1
G1G2	2			2
G2	4	2		6
G2G3		5	1	6
G2G4	1	2		3
G3	2	18		20
Total	10	27	1	38

Table 4: Ecological communities in the T-N Dry Interior that are Globally at Risk

English Name	Global Status	Prov Status	BC List
black cottonwood - Douglas-fir / common snowberry - red-osier dogwood	G1G2	S1S2	Red
big sagebrush / bluebunch wheatgrass	G2	S2	Red
trembling aspen / spreading needlegrass - old man's whiskers	G2	S2	Red
antelope-brush / needle-and-thread grass	G2	S1	Red
northern wormwood / short-awned porcupinegrass	G2	S3	Blue
sand dropseed - needle-and-thread grass	G2	S3	Blue
spreading needlegrass Herbaceous Vegetation	G3	S3	Blue
Douglas-fir / red-stemmed feathermoss - step moss	G3	S3	Blue
Bebb's willow / bluejoint reedgrass	G3	S3	Blue

1.3.2 Provincial Status of Ecological Communities

One hundred and forty-five (145/329, 44%) ecological communities in the T-N are Red or Blue listed provincially (Appendix 2). Fifty-four (54/329, 16%) are Red listed. This includes communities that are Critically Imperiled (S1) or Imperiled (S2) in BC. Ninety-one (91/329, 28%) are Blue listed, which means they are Imperiled/Vulnerable (S2/S3) or Vulnerable (S3). These ecological communities are at risk from a variety of threats and require additional protection and/or management. The remainder are Yellow listed (not at risk) or have no conservation status.

Fifty-eight (58) listed ecological communities are found in the Dry Interior, which is at greater risk than other parts of the T-N due to urban and agricultural development (Appendix 2). Twenty-seven (27) of these ecological communities are Red listed and 31 are Blue listed (Table 5).

Table 5: Red and Blue listed ecological communities in the Dry Interior of the T-N

Biogeoclimatic Zone	Red List	Blue List	Total
Bunchgrass	19	16	35
Ponderosa Pine	15	10	25
Interior Douglas Fir (dry only)	20	24	44

Note: there is overlap of ecological communities among BEC Zones so no Red/Blue list totals are provided to avoid duplication.

Table 6 provides examples of the most at risk ecological communities (Red list) in the most at risk BEC Zone (Bunchgrass), sorted by Sensitive Ecosystem, as an example of potential priorities for conservation. Eight of these communities are grassland / shrub-steppe communities, five are wetlands, four are riparian and two are forest communities. Some of these communities (e.g. antelope-brush) are very rare in the TNRD and some others (e.g. cottonwood), are relatively more common.

Table 6: Red listed ecological communities in the Bunchgrass Zone within the TNRD

English Name	Prov Status	Sensitive Ecosystem
antelope-brush / needle-and-thread grass	S1	Grassland
Baltic rush - field sedge	S1S2	Grassland
rough fescue - (bluebunch wheatgrass) - yarrow - clad lichens	S1S2	Grassland
Rocky Mountain Juniper - Big Sagebrush / Bluebunch Wheatgrass	S1S2	Grassland
big sagebrush / bluebunch wheatgrass	S2	Grassland
Nuttall's alkaligrass - foxtail barley	S2	Grassland
Idaho fescue - bluebunch wheatgrass - silky lupine - junegrass	S2	Grassland
giant wildrye Herbaceous Vegetation	S2	Grassland
seacoast bulrush Alkali Marsh	S1	Wetland
long-awned three-square bulrush Alkali Marsh	S1	Wetland
woolly sedge - arctic rush	S2	Wetland
Baltic rush - common silverweed	S2	Wetland
awned sedge Fen - Marsh	S2?	Wetland
water birch / roses	S1	Riparian
black cottonwood / common snowberry - roses	S1	Riparian
narrow-leaf willow Shrubland	S2	Riparian
trembling aspen / common snowberry / Kentucky bluegrass	S2	Riparian
trembling aspen / spreading needlegrass - old man's whiskers	S2	Forest
ponderosa pine / bluebunch wheatgrass - rough fescue	S2	Forest

1.3.3 Endemic Status

Ratings for endemism are provided for 119 of 329 communities. Ninety-one (91/28%) communities are endemic (occur only in BC) and 28 (9%) are probably endemic (likely occur only in BC). Fifteen (15) are Red listed, 32 are Blue listed, 27 are Yellow listed and 46 have no provincial listing. BC has a high degree of responsibility for endemic ecosystems because BC is the only jurisdiction that can protect or manage them. The high number of endemic ecosystems is likely due to BC's location in North America, glacial history, geography and climate that combine to create many unique ecosystems. A list of endemic ecosystems is not provided in this report but is available on request. The most at risk endemic ecosystems are likely captured in the provincial lists, so less focus was placed on this category of ranking.

2. Species at Risk

The Conservation Data Centre tracks 183 taxa (species and subspecies) that are federally or provincially at risk in the Thompson Nicola Regional District (see Excel spreadsheets, provided separately). At risk species include those listed as Endangered, Threatened or Special Concern, federally, or ranked as Red or Blue listed, provincially. Some records are duplicated to provide separate listings for species or subspecies. Duplications were removed from analysis by retaining the most relevant record (i.e., species or subspecies but not both) using the No Status rank in the BC List Column.

2.1 Global Status for Species at Risk

Global (worldwide) conservation ranks are provided for 183 taxa in the T-N. Twenty-three (23) of these taxa are at risk globally, meaning they are Critically Imperiled (G1), Imperiled (G2) or Vulnerable (G3) worldwide (Table 7, Appendix 3). The remainder are either globally secure, or apparently secure. Global ranks suggest a global responsibility for these taxa at risk to prevent worldwide declines and possible extinction. All globally at risk taxa are also listed federally, under SARA, or Red/Blue listed provincially. Two taxa are vertebrates, two are invertebrates, four are vascular plants, 10 are nonvascular plants and five are fungi. As examples, the rusty cord-moss and nugget moss are Critically Imperiled or Imperiled globally and Endangered in Canada. The Little Brown Myotis (bat), whitebark pine, and Spotted Owl are Vulnerable globally and Endangered in Canada.

Table 7: Provincial conservation ranks for Globally at Risk species in the T-N

Global Rank	Red List	Blue List	Yellow List	Total
G1	1	0	0	1
G1G3	0	1	0	1
G2?	1	0	0	1
G2G4	0	1	0	1
G3	0	5	1	6
G3?	0	1	0	1
G3G4	3	4	0	7
G3G5	1	4	0	5
Total	6	16	1	23

2.2 National Status – Species at Risk Act (SARA)

Duplications (where species and subspecies were included, only one was retained) were removed for Western Screech-Owl, Williamson’s Sapsucker, Painted Turtle, Gopher Snake, Peregrine Falcon, Caribou, and Wolverine. Sharp-tailed Snake was retained, despite the possibility that the single location record may be inaccurate due to limited surveys and the cryptic nature of this species.

Fifty-seven (57) taxa in the Thompson Nicola Regional District are listed under the Species at Risk Act (Government of Canada 2002). This includes 14 Endangered, 15 Threatened and 28 Special Concern Species (Table 8, Appendix 4). Forty (40) species are vertebrates, five are invertebrates, three are vascular plants, six are nonvascular plants (e.g., moss), and three are fungi. All but seven of these (57) species are also Red or Blue listed provincially. The remaining seven species are Yellow listed in BC.

A few examples include: Burrowing Owl, Western Rattlesnake, Great Basin Spadefoot, American Badger, White Sturgeon, Olive Clubtail dragonfly, toothcup (a flower), rusty cord moss, and the crumpled tarpaper fungus (for a complete list, see Appendix 4). Recovery plans are available for most of these species. Plans identify ongoing habitat loss as the main threat that impacts recovery. Recovery actions also are identified.

Forty-three (75%) of these 57 SARA listed taxa depend on habitats in the Dry Interior.

Table 8: Summary of SARA listed species in the T-N

Species Group	Endangered	Threatened	Special Concern	Total
Birds	5	6	7	18
Mammals	2	1	5	8
Reptiles	1	2	3	6
Nonvascular Plants	2	2	2	6
Invertebrates	1	1	3	5
Fish	1	0	3	4
Amphibians	0	1	2	3
Vascular Plants	2	1	0	3
Fungi	0	1	2	3
Turtles	0	0	1	1
Total	14	15	28	57

2.2.1 Critical Habitat for Species at Risk

Critical habitat is a Government of Canada designation under the Species at Risk Act that spatially designates the habitat required for federally Endangered and Threatened species recovery. It does not apply to species of Special Concern. Critical habitat is described in Recovery Strategies and provided spatially by the Government of Canada (2020a). Protection of critical habitat is legally required on federal Crown land. Most provinces, including BC, have agreed to provide similar protections through the National Accord for the Protection of Species at Risk (Government of Canada 1996). BC also signed the Canada – British Columbia Agreement on Species at Risk (Government of Canada 2005). Spatial Data for critical habitat is provided by the Government of Canada to the Government of British Columbia (2020a). BC currently has chosen to implement protections for critical habitat through existing legislation but is considering a provincial Species at Risk Act (Government of British Columbia 2020b).

Critical habitat has been identified for only a portion of endangered and threatened species in BC. Critical habitat maps have been published for ten (10) species (Table 9, Figure 6) in the T-N, as of March 2020 (Government of British Columbia 2020b).

Table 9: Species with published critical habitat (CH) in the TNRD

Species	Status	Area (ha)
Caribou (S. Mt. Pop.)	Threatened	1,151,209
Williamson's Sapsucker	Endangered	26,203
Dun Skipper	Threatened	722
Great Basin Gopher snake	Threatened	460,973
Great Basin Spadefoot	Threatened	33,599
Lewis's Woodpecker	Threatened	94,590
Mexican Mosquito Fern	Threatened	113
Toothcup	Endangered	18
Western Rattlesnake	Threatened	See Gopher snake (snake CH is combined)
Whitebark pine	Endangered	534,875

Note: Critical habitat overlaps among some species, so to avoid duplication, no total area is provided.

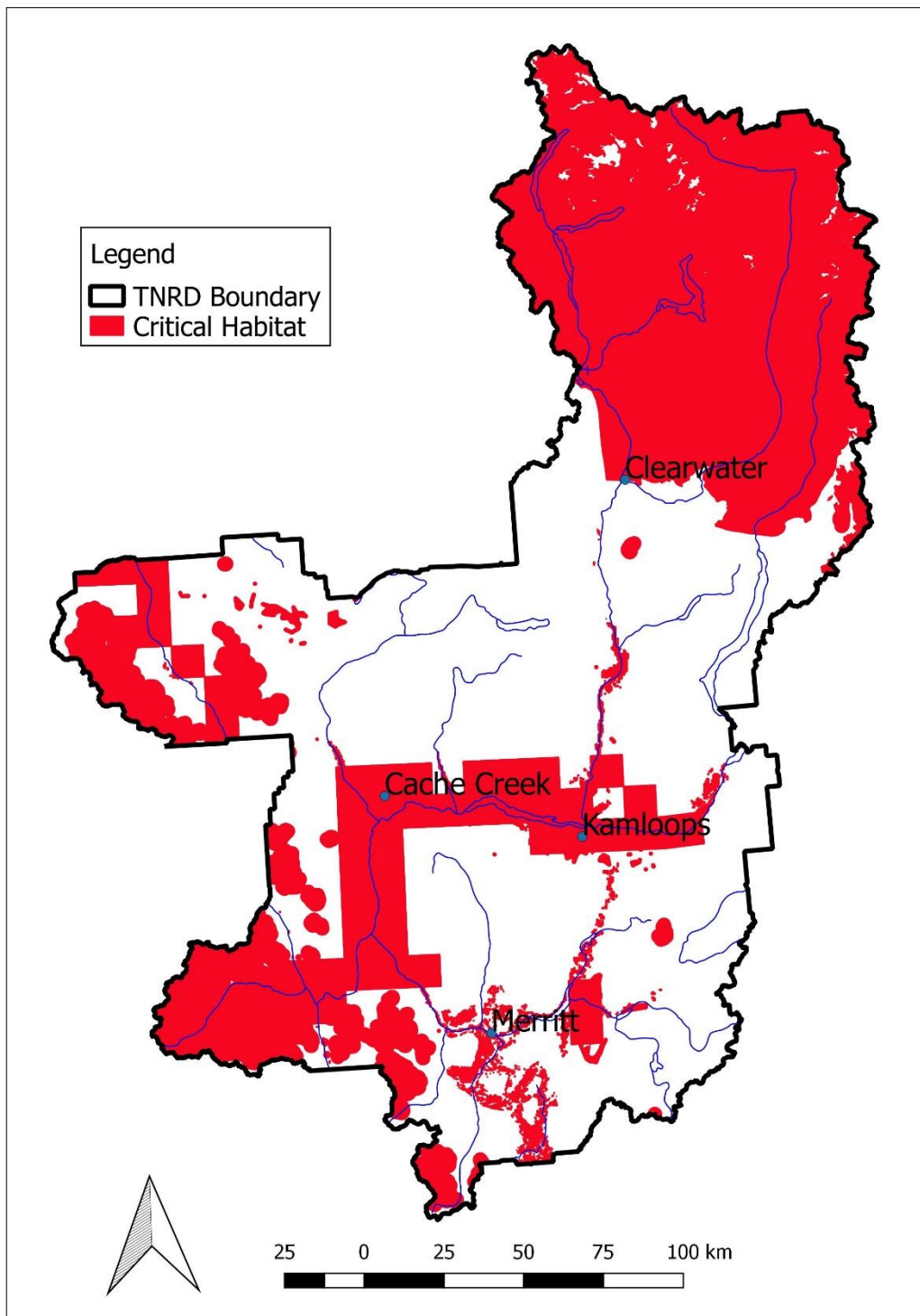


Figure 6: Critical Habitat in the T-N, March 2020

2.3 Provincial Status for Species at Risk

The BC Conservation Data Centre provides conservation ranks for species at risk in BC, based on international NatureServe standards. Provincial ranks are summarized into Red (Endangered or Threatened), Blue (Vulnerable) and Yellow (not at risk) lists provincially. Most Yellow listed species are not ranked, unless they are federally listed.

Provincial status ranks are provided for 183 taxa in the T-N, but only 175 species after removing duplicates (Appendix 5). Duplications were removed for Western Screech-Owl, Williamson’s Sapsucker, Painted Turtle, Gopher Snake, Peregrine Falcon, Caribou, Wolverine, and Cutthroat Trout (*clarkii* subspecies) due to limited confidence that it occurs in T-N (Conservation Data Centre 2020). Sharp-tailed Snake was retained, despite the possibility that the single location record may be inaccurate. White Sturgeon was retained, despite having no recorded BC listing in the current data and labelled as Red listed because of its S2 Provincial status. Seven Yellow listed species (not at risk provincially) were retained in Appendix 5 because they are federally listed under SARA, providing a complete list of species at risk from both jurisdictions in one list.

Of the 175 species at risk (including both provincial and federal species) in the T-N area, 41 are Red listed, 127 are Blue listed and seven are Yellow listed (Table 10). This includes 63 vertebrates, 34 vascular plants, 31 nonvascular plants, 29 invertebrates, and 18 fungi. One hundred and twenty (120) of these provincially listed species occur in the Dry Interior. Figure 7 shows Red and Blue listed Species locations and Figure 8 provides examples of listed species.

Table 10: Summary of provincially listed species in the TNRD

Species Group	Red list	Blue list	Yellow list	Total
Vascular Plants	9	25	0	34
Nonvascular Plants	12	19	0	31
Birds	6	22	2	30
Invertebrates	3	26	0	29
Mammals	4	12	2	18
Fungi	5	13	0	18
Reptiles	1	4	1	6
Fish	1	4	0	5
Amphibians	0	1	2	3
Turtles	0	1	0	1
Total	41	127	7	175

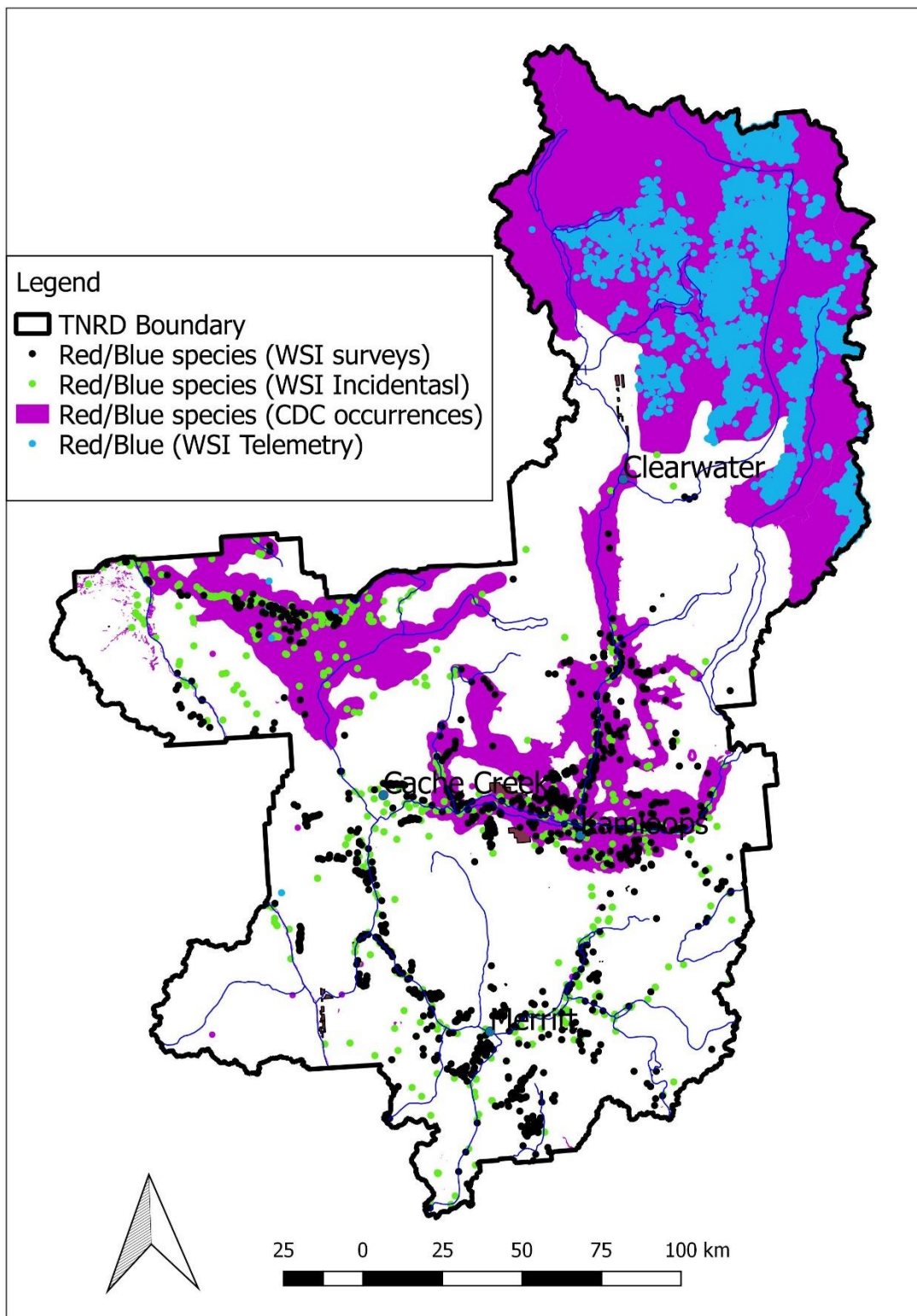


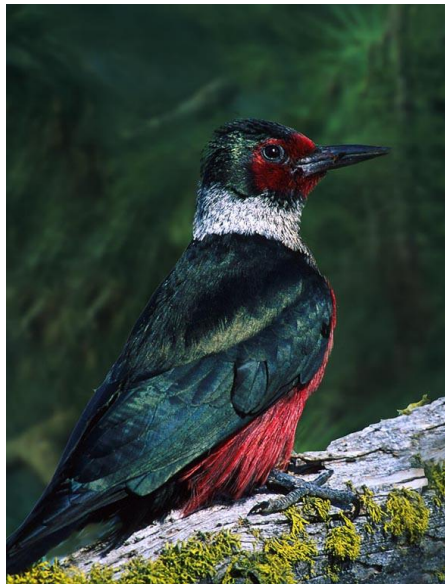
Figure 7: Red and Blue listed species locations (BC Conservation Data Centre and Wildlife Species Inventory Data)



Caribou (Southern Mountain population) is listed as Threatened in Canada and Red listed in BC. They depend on old growth sensitive ecosystems that produce lichen, their main forage species. Bevan Ernst photo.



Burrowing Owl is listed as Endangered in Canada and Red listed in BC. It depends on grasslands for burrows (nest sites) and food, mainly rodents. It was extirpated in BC, but The Burrowing Owl Conservation Society of BC has been captive breeding and reintroducing them as part of a recovery program. John Surgenor photo.



Lewis's Woodpecker is Threatened in Canada and Blue listed in BC. It depends on cottonwood riparian and open ponderosa pine forests for nest sites and open grassland and riparian areas for food, mainly insects and berries. Photo courtesy Ole Westby.



The Great Basin Spadefoot requires wetlands for breeding and grasslands for foraging. Friable soils allow them to dig or use existing burrows for safety, heat, regulation and overwintering. Ole Westby photo.

Figure 8: Examples of provincially listed species in the TNRD

2.4 Forest and Range Practices Act: Identified Wildlife

Twenty-six (26) species (Appendix 6) in the T-N are listed under the Forest and Range Practices Act, Identified Wildlife Management Strategy (IWMS) (Ministry of Environment and Climate Change Strategy 2004). The IWMS provides additional protection from forestry and oil/gas activities for identified species through defined General Wildlife Measures on provincial Crown land. The list includes 19 federally listed species: four are Endangered, six Threatened and nine are Special Concern. All 26 species are provincially listed (Table 11): six Red listed, nineteen Blue listed and one Yellow listed species. American Badger and Western Rattlesnake are examples of IWMS listed species (Figure 9).

Table 11: Summary of Identified Wildlife in the T-N by species group and status

Species Group	Endangered	Threatened	Special Concern	Provincially Listed	Total
Birds	3	2	3	3	11
Mammals	1	1	3	3	8
Reptiles	0	2	1	0	3
Fish	0	0	1	1	2
Amphibians	0	1	1	0	2
Total	4	6	9	7	26



American Badger is Endangered in Canada and Red listed in BC. It depends on grasslands and open forest, from the Bunchgrass Zone to the Alpine, with deep soils for digging burrows and ground squirrels for food. Ole Westby photo.



Western Rattlesnake is Threatened in Canada and Blue listed in BC. It lives in grasslands and low elevation forests, with rodents for food and dens in rock crevices or talus. Road mortality to this species is now a greater threat than habitat loss. Ole Westby photo.

Figure 9: Examples of IWMS listed species in the T-N

2.5 Regionally Important Wildlife at Risk

There is no formal list of regionally important wildlife in the Thompson Okanagan FLNRORD region (J. Surgenor, pers. comm., 2020). Informally, regionally important

species include all SARA listed species, bats, declining populations of grassland birds and aerial insectivores, Mountain Goat, and Barrow's Goldeneye (J. Surgenor, pers. comm., 2020). These species are priorities for wildlife management.

SARA listed species are actively managed in relation to federal legislation and agreements between the Governments of Canada and British Columbia.

Almost 50% of BC's 15 bat species are currently at risk. In addition, several species are highly susceptible to white-nose syndrome (WNS), an introduced fungal disease which can cause catastrophic population declines. WNS occurs in nearby Washington State and is expected to impact BC bat populations soon (BC Bat Action Team 2019). When WNS arrives, we expect nearly all of our province's bat will be at risk.

Several species of grassland birds and aerial insectivores have severe population declines (Partners in Flight 2003, Rosenberg et al., 2016). As a group, grassland bird populations declined by 57% and aerial insectivores declined by 59%, from 1970 to 2016 in Canada (Environment and Climate Change Canada 2019). Western Meadowlark, a grassland bird, declined by an average of 0.84% per year between 1966 and 2015 in BC, but the rate of decline worsened to 1.74% per year from 2005 to 2015. Common Nighthawk (Figure 10) is an aerial insectivore that declined by an average of 2.97% per year between 1966 and 2015 in BC. Killdeer (Figure 10), Barn Swallow, and Cliff Swallow, declined by 3.59%, 4.89% and 4.79% per year on average, respectively, between 1966 and 2015 in BC (U.S. Geological Survey 2020).



Common Nighthawk is Threatened in Canada and Yellow listed in BC. It nests in grasslands and open forests and is an aerial insectivore, foraging over a variety of habitats at night. Ole Westby photo.



Killdeer is not at risk in BC, but with a 3.59% per year decline, is a good example of the importance of good management to "keep common species common." Ole Westby photo.

Figure 10: Examples of Regional Priority Species in the T-N

Over half of the world's Mountain Goats and a large portion of Barrow's Goldeneye occur in BC, requiring a higher degree of regional responsibility for the global population. These species are not listed as globally at risk.

3. Land Ownership/Management

The T-N is in the traditional territory of the Nl̓eʔkepmxc'in, Secwepemcstín (Shuswap), Statimcets (Lillooet) and Nsyilxcən (Okanagan) language groups. Most (90%) of the land in the T-N is administered by the provincial Crown, with ~8% in private ownership and ~2% in Indian Reserve (Table 12). This provides substantial control over conservation on a Regional District scale. However, ownership in the Dry Interior is 61% provincial Crown, with ~30% in private land and ~9% in Indian Reserve (Table 13). The percentage of provincial Crown in the Bunchgrass Zone drops even lower to 45%, with 43% in private land and 12% in Indian Reserve. This requires increased stewardship with private landowners and First Nations in the most at risk areas.

Table 12: Land tenure in T-N

Land Tenure	Hectares	% of T-N
Crown	4104600	90.28%
Federal	1894	0.04%
IR	77035	1.69%
Private	361507	7.95%
Unknown	1379	0.03%
Total	4546415	100.00%

Table 13: Land tenure in the Dry Interior of the T-N in hectares

Tenure	BG	PP	IDF (dry only)	Total (ha)	% of Dry Interior in T-N
Crown	77664 (45%)	76624	336301	490590	60.82%
Federal	390 (<1%)	354	263	1007	0.12%
IR	20506 (12%)	16422	31602	68529	8.50%
Private	74170 (43%)	29670	141763	245603	30.45%
Unknown	200 (<1%)	329	418	948	0.12%
Total	172930	123399	510348	806677	100.00%

Substantial work has been done to protect important ecosystems in the T-N. About 18% of the provincial Crown Land and ~0.05% of the private land is formally protected (Table 14, Figure 11). Additional protections occur in weaker tenures such as Map Reserves, Designated Use Area and Notations under the Land Act and by management of some activities (e.g., forest and range) under the Identified Wildlife Management Strategy.

Table 14: Protected conservation lands in the T-N

Conservation Type	Crown (ha)	Private (ha)
Ecological Reserve	2291	0
Protected Area	66540	0
Provincial Park	728947	0
Recreation Area	9	0
Conservancy	2	0
Wildlife Management Area	5970	0
Acquisition	557	0
Order in Council	7	0
Transfer of Administration	9	0
Private Conservancy		
NCC	0	2190
Private Conservancy TNT	0	95
The Land Conservancy	0	48
Total	804333	2333
% of T-N protected	17.69%	0.05%

Land is less protected by formal conservation tenures in the Dry Interior of the T-N, despite greater threats and higher numbers of species at risk. The Crown has protected 28%, 8%, and 10% of the provincial Crown Bunchgrass, Ponderosa Pine and Dry Interior Douglas-fir Zones in the Dry Interior within the T-N, respectively (Table 15). This is a total of 13% of the Dry Interior in the T-N. The Nature Conservancy of Canada, the Nature Trust and the Land Conservancy have protected 1% of private land in the Dry Interior. In total, Crown and Private Conservation Lands have protected 8% of the Dry Interior (13% in BG, 5% in PP, 7% in IDF).

Table 15: Protected Conservation Lands in the T-N Dry Interior in hectares

Type of Tenure Protected	BG	PP	IDF (dry)	Total (ha)
Crown Protected	22109	5867	35041	63018
Private Protected	589	22	1384	1995
Total Protected	22698	5890	36425	65013
% of Dry Interior Crown Protected	28%	8%	10%	13%
% of Dry Interior Private Protected	1%	0%	1%	1%
% of Dry Interior Protected in Crown and Private Conservation Lands	13%	5%	7%	8%

The Agricultural Land Reserve (ALR) provides some protection from permanent land loss due to urban development but encourages agricultural developments that may alter and replace natural ecosystems. A substantial amount of ALR is on Crown land where risks of development may be lower. Most ALR that is on private land, and therefore more likely to be at risk from agricultural development, occurs between Kamloops and Merritt in the threatened Dry Interior (Figure 12).

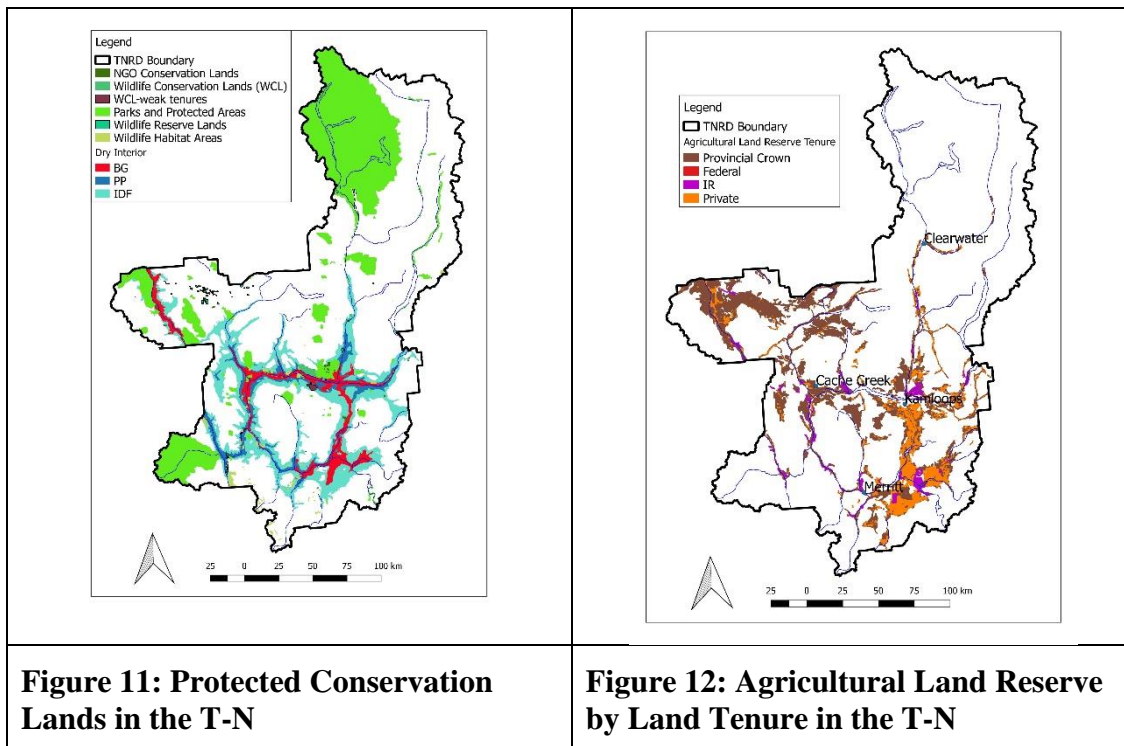


Figure 11: Protected Conservation Lands in the T-N

Figure 12: Agricultural Land Reserve by Land Tenure in the T-N

4. Threats

Threats are quantified using International Union for the Conservation of Nature (IUCN) standards within 11 threat categories ([Ministry of Environment and Climate Change Strategy 2014](#)). They are compiled with teams of subject experts for ecological communities by the BC Conservation Data Centre (CDC), and for species by recovery teams. Threats for ecological communities are available from the CDC on request. Threats for species are available in published recovery strategies.

Threats vary widely, depending on the ecological community or species, rarity, elevation, location, vulnerability, resource use, etc. Ecosystems and species are often affected by multiple threats, sometimes at low impact levels. However, several low impact threats have a cumulative effect that may result in a moderate or even high overall impact. This makes identification of a few priority threats difficult. However, in highly impacted, low elevation areas with already high rates of habitat loss, urban and agricultural development has caused the largest, permanent impact. Examples are provided below.

Big Sagebrush / Bluebunch Wheatgrass communities are most impacted by invasive species, agricultural development, and livestock, but also impacted at a low level by urban development, recreation, fire/fire suppression and climate change, resulting in a cumulative very high impact.

The main threat to Great Basin Gopher Snake is road mortality, but it is also impacted at a low level by urban and agricultural development, livestock, persecution, recreation, fire,

invasive species, and rodenticides which may cause secondary poisoning.

Caribou are most threatened by problematic native species (e.g., predators), fire/fire suppression and oil/gas drilling, but also impacted at a medium level by logging and utility corridors, and at a low level by dams, urban and agricultural development, livestock, mining, wind energy, recreation and work/other activities.

5. Additional Mapping and Designations for Consideration in Conservation planning.

Several other approaches have been used to identify high priority areas for conservation or management. Several examples are shown in Figure 13. The Kamloops Land and Resource Management Plan (LRMP) (Government of British Columbia 1995) covers most of the T-N. Three other LRMPs include small parts of the T-N.

The Okanagan Ecoregion Assessment is particularly useful for identifying optimal conservation selections. The Nature Conservancy (Pryce et al., 2006) developed abundance and spatial distribution goals needed to adequately conserve 430 ecosystem and species conservation targets in the Okanagan Ecoregion, stretching from north-central Washington State to south-central BC. This detailed and peer reviewed assessment involved many experts and used Marxan software to select an optimal portfolio of priority conservation areas that would address the combined goals for all targets. It is important to consider this and other important information sources within the T-N.

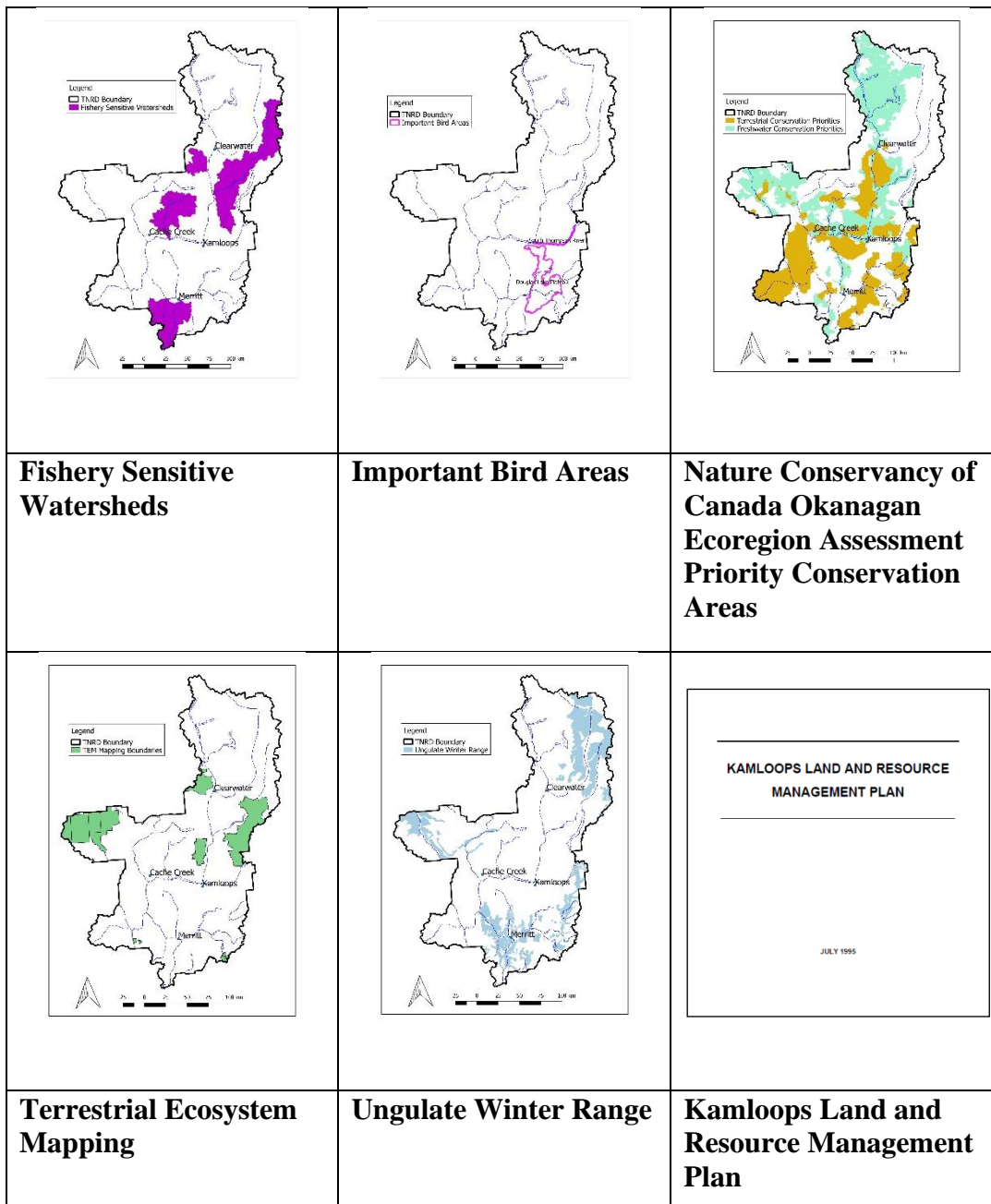


Figure 13: Additional approaches for identifying important conservation areas

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APPENDICES

Appendix 1: Ecological Communities in the T-N that are at risk globally

English Name	Global Status	Prov Status	BC List	Provincial FRPA	Land Use Objectives
hybrid white spruce / foam lichens	G1	S1	Red		
Sitka spruce / salmonberry Dry	G1G2	S1S2	Red		Central +North; South
black cottonwood - Douglas-fir / common snowberry - red-osier dogwood	G1G2	S1S2	Red		Central Coast
big sagebrush / bluebunch wheatgrass	G2	S2	Red		
trembling aspen / spreading needlegrass - old man's whiskers	G2	S2	Red		
antelope-brush / needle-and-thread grass	G2	S1	Red	Y (Jun 2006)	
Sitka willow - Pacific willow / skunk cabbage	G2	S2	Red		
northern wormwood / short-awned porcupinegrass	G2	S3	Blue		
sand dropseed - needle-and-thread grass	G2	S3	Blue		
lodgepole pine / few-flowered sedge / peat-mosses	G2G3	S2S3	Blue		
western redcedar - Douglas-fir / vine maple	G2G3	S2S3	Blue	Y (Jun 2006)	
tufted clubbrush / golden star-moss	G2G3	S2S3	Blue		
western hemlock - amabilis fir / step moss	G2G3	S2S3	Blue		
western hemlock - Douglas-fir / electrified cat's-tail moss	G2G3	S2S3	Blue	Y (Jun 2006)	
Dry Submaritime 1	G2G3	S2S3	No Status		
timber oatgrass Herbaceous Vegetation	G2G3	SNR	Status		
Douglas-fir - lodgepole pine / kinnikinnick Dry	G2G4	S2	Red		Central +North; South
Submaritime	G2G4	S2	Red		Central Coast

western redcedar / devil's club	G2G4	S2S3	Blue	Y (Jun 2006)	Central +North; South Central Coast
Sitka spruce / salmonberry Moist Submaritime	G3	S1S2	Red		Central and North Coast
lodgepole pine / Altai fescue / foam lichens	G3	S1S2	Red		
subalpine fir - whitebark pine / common juniper	G3	S3	Blue		
subalpine fir / black huckleberry / ragged-mosses	G3	S3	Blue		
spreading needlegrass Herbaceous Vegetation	G3	S3	Blue		
mountain alder / common horsetail	G3	S3	Blue		
slender sedge / common hook-moss	G3	S3	Blue		
shore sedge - buckbean / hook-mosses	G3	S3	Blue		
shore sedge - buckbean / peat-mosses	G3	S3	Blue		
narrow-leaved cotton-grass - shore sedge	G3	S3	Blue		
buckbean - slender sedge	G3	S3	Blue		
buckbean - seaside arrow-grass	G3	S3	Blue		
lodgepole pine / water sedge / peat-mosses	G3	S3	Blue		
lodgepole pine - black spruce / red-stemmed feathermoss	G3	S3	Blue		
Douglas-fir / red-stemmed feathermoss - step moss	G3	S3	Blue		
Labrador-tea / peat-mosses	G3	S3	Blue		
Bebb's willow / bluejoint reedgrass	G3	S3	Blue		
Drummond's willow / bluejoint reedgrass	G3	S2S3	Blue		
MacCalla's willow / beaked sedge	G3	S3	Blue		
Sitka willow / Sitka sedge	G3	S3	Blue		

Appendix 2: Ecological Communities in the T-N that are Red or Blue Listed Provincially

English Name	Global Status	Prov Status	BC List	FRPA	Dry Interior	BG	PP	IDFx	Endemic
hybrid white spruce / foam lichens	G1	S1	Red						Yes
antelope-brush / needle-and-thread grass	G2	S1	Red	Yes	Yes	Yes	Yes	Yes	
trembling aspen / common snowberry / mountain sweet-cicely	G3?	S1	Red		Yes			Yes	
water birch / roses	G3G4	S1	Red	Yes	Yes	Yes	Yes	Yes	
seacoast bulrush Alkali Marsh	GNR	S1	Red		Yes	Yes	Yes	Yes	
tamarack / low birch / bluejoint reedgrass - sedges / peat-mosses	GNR	S1	Red						Yes
black cottonwood / common snowberry - roses	GNR	S1	Red		Yes	Yes	Yes	Yes	
bluebunch wheatgrass - western pasqueflower	GNR	S1	Red						
long-awned three-square bulrush Alkali Marsh	GNR	S1	Red		Yes	Yes	Yes	Yes	
western redcedar - Douglas-fir / false Solomon's seal	GNR	S1	Red		Yes			Yes	
western hemlock / velvet-leaved blueberry - falsebox	GNR	S1	Red						
Sitka spruce / salmonberry Dry	G1G2	S1S2	Red						Yes
black cottonwood - Douglas-fir / common snowberry - red-osier dogwood	G1G2	S1S2	Red		Yes		Yes	Yes	Yes
Sitka spruce / salmonberry Moist Submaritime	G3	S1S2	Red						Yes
lodgepole pine / Altai fescue / foam lichens	G3	S1S2	Red						Yes
Baltic rush - field sedge	G3G4	S1S2	Red		Yes	Yes	Yes	Yes	
rough fescue - (bluebunch wheatgrass) - yarrow - clad lichens	GNR	S1S2	Red		Yes	Yes	Yes	Yes	
Rocky Mountain Juniper - Big Sagebrush / Bluebunch Wheatgrass	GNR	S1S2	Red		Yes	Yes			
hybrid white spruce / soopolallie - falsebox	GNR	S1S2	Red						Probable
big sagebrush / bluebunch wheatgrass	G2	S2	Red		Yes	Yes	Yes		Yes

trembling aspen / spreading needlegrass - old man's whiskers	G2	S2	Red	Yes	Yes	Yes	Yes	
Sitka willow - Pacific willow / skunk cabbage	G2	S2	Red					Yes
Douglas-fir - lodgepole pine / kinnikinnick Dry Submaritime	G2G4	S2	Red					Yes
Nuttall's alkaligrass - foxtail barley	G3?	S2	Red	Yes	Yes	Yes	Yes	
western hemlock / queen's cup	G3G4	S2	Red					
tufted hairgrass Community	G4	S2	Red					
narrow-leaf willow Shrubland	G5	S2	Red	Yes	Yes			Unknown
mountain sagebrush / pinegrass	GNR	S2	Red	Yes				
scrub birch / sedges / peat-mosses	GNR	S2	Red					
woolly sedge - arctic rush	GNR	S2	Red	Yes	Yes			
three-way sedge	GNR	S2	Red					
few-flowered spike-rush / hook-mosses	GNR	S2	Red					
Idaho fescue - sulphur buckwheat - thread-leaved sandwort	GNR	S2	Red					
Idaho fescue - bluebunch wheatgrass - silky lupine - junegrass	GNR	S2	Red	Yes	Yes	Yes	Yes	
Baltic rush - common silverweed	GNR	S2	Red	Yes	Yes	Yes	Yes	
common juniper / bluebunch wheatgrass	GNR	S2	Red					
giant wildrye Herbaceous Vegetation	GNR	S2	Red	Yes	Yes			
hybrid white spruce - water birch / northern gooseberry	GNR	S2	Red	Yes			Yes	
hybrid white spruce / devil's club / step moss	GNR	S2	Red					Probable
lodgepole pine / Labrador-tea - velvet-leaved blueberry	GNR	S2	Red					Probable
ponderosa pine / bluebunch wheatgrass - rough fescue	GNR	S2	Red	Yes	Yes	Yes		
trembling aspen / common snowberry / Kentucky bluegrass	GNR	S2	Red	Yes	Yes	Yes	Yes	
black cottonwood / Sitka willow - thimbleberry	GNR	S2	Red					
Douglas-fir / Douglas maple - red-osier dogwood	GNR	S2	Red	Yes			Yes	

Douglas-fir / Douglas maple / Hooker's fairybells	GNR	S2	Red					
Douglas-fir / Rocky Mountain juniper / kinnikinnick	GNR	S2	Red					
Douglas-fir / prickly rose / wild sarsaparilla	GNR	S2	Red	Yes				Yes
Douglas-fir / common snowberry - saskatoon	GNR	S2	Red	Yes			Yes	
Douglas-fir / western snowberry / bluebunch wheatgrass	GNR	S2	Red	Yes				Yes
western redcedar / skunk cabbage / peat-mosses	GNR	S2	Red					
western redcedar - hybrid white spruce / black twinberry / soft-leaved sedge	GNR	S2	Red					
seaside arrow-grass Marsh	GNR	S2	Red					
awned sedge Fen - Marsh	G3G5	S2?	Red	Yes		Yes		Yes
lodgepole pine / falsebox / pinegrass	GNR	S2?	Red					Probable
lodgepole pine / few-flowered sedge / peat-mosses	G2G3	S2S3	Blue					Yes
western redcedar - Douglas-fir / vine maple	G2G3	S2S3	Blue	Yes				Yes
tufted clubrush / golden star-moss	G2G3	S2S3	Blue					Yes
western hemlock - amabilis fir / step moss	G2G3	S2S3	Blue					Yes
western hemlock - Douglas-fir / electrified cat's-tail moss Dry Submaritime 1	G2G3	S2S3	Blue	Yes				Yes
western redcedar / devil's club	G2G4	S2S3	Blue	Yes				
Drummond's willow / bluejoint reedgrass	G3	S2S3	Blue					
alkali saltgrass - foxtail barley	GNR	S2S3	Blue	Yes	Yes	Yes	Yes	Yes
needle-and-thread grass - prairie sagewort	GNR	S2S3	Blue		Yes	Yes		
hybrid white spruce / falsebox / knight's plume	GNR	S2S3	Blue					Probable
hybrid white spruce / black gooseberry - devil's club	GNR	S2S3	Blue					
hybrid white spruce / prickly rose / palmate coltsfoot	GNR	S2S3	Blue	Yes				Yes
lodgepole pine / clad lichens - juniper haircap moss	GNR	S2S3	Blue					Probable

black cottonwood / willows Dry Submaritime	GNR	S2S3	Blue				
Douglas-fir / Rocky Mountain juniper / bluebunch wheatgrass	GNR	S2S3	Blue	Yes		Yes	
Douglas-fir / common snowberry - birch-leaved spirea	GNR	S2S3	Blue	Yes		Yes	Yes
western redcedar - paper birch / oak fern	GNR	S2S3	Blue				
northern wormwood / short-awned porcupinegrass	G2	S3	Blue	Yes	Yes	Yes	Yes
sand dropseed - needle-and-thread grass	G2	S3	Blue	Yes	Yes		Yes
subalpine fir - whitebark pine / common juniper	G3	S3	Blue				Yes
subalpine fir / black huckleberry / ragged-mosses	G3	S3	Blue				Yes
spreading needlegrass Herbaceous Vegetation	G3	S3	Blue	Yes	Yes	Yes	Yes
mountain alder / common horsetail	G3	S3	Blue				
slender sedge / common hook-moss	G3	S3	Blue				Yes
shore sedge - buckbean / hook-mosses	G3	S3	Blue				Yes
shore sedge - buckbean / peat-mosses	G3	S3	Blue				Yes
narrow-leaved cotton-grass - shore sedge	G3	S3	Blue				Yes
buckbean - slender sedge	G3	S3	Blue				Yes
buckbean - seaside arrow-grass	G3	S3	Blue				Yes
lodgepole pine / water sedge / peat-mosses	G3	S3	Blue				Yes
lodgepole pine - black spruce / red-stemmed feathermoss	G3	S3	Blue				Yes
Douglas-fir / red-stemmed feathermoss - step moss	G3	S3	Blue	Yes		Yes	Yes
Labrador-tea / peat-mosses	G3	S3	Blue				Yes
Bebb's willow / bluejoint reedgrass	G3	S3	Blue	Yes	Yes		
MacCalla's willow / beaked sedge	G3	S3	Blue				Yes
Sitka willow / Sitka sedge	G3	S3	Blue				Yes
amabilis fir - western redcedar / devil's club Moist Submaritime	G3G4	S3	Blue				

mountain alder / red-osier dogwood / lady fern	G3G4	S3	Blue						
scrub birch / water sedge	G4	S3	Blue						Yes
Lyngbye's sedge - Douglas' water-hemlock	G4	S3	Blue						
swamp horsetail - beaked sedge	G4	S3	Blue	Yes	Yes	Yes	Yes		
northern mannagrass Fen	G4	S3	Blue						
hard-stemmed bulrush Deep Marsh	G5	S3	Blue	Yes	Yes	Yes	Yes		Probable
common cattail Marsh	G5	S3	Blue	Yes	Yes	Yes	Yes		
amabilis fir - western redcedar / oak fern	GNR	S3	Blue						
subalpine fir / reindeer lichens - clad lichens	GNR	S3	Blue						
subalpine fir / white-flowered rhododendron / sitka valerian	GNR	S3	Blue						
big sagebrush / bluebunch wheatgrass - sand dropseed	GNR	S3	Blue	Yes	Yes				
common spike-rush Herbaceous Vegetation	GNR	S3	Blue	Yes	Yes		Yes		
hybrid white spruce / pinegrass / step moss	GNR	S3	Blue						Probable
hybrid white spruce / horsetails / leafy mosses	GNR	S3	Blue	Yes			Yes		
hybrid white spruce / red-stemmed feathermoss - ragged-mosses	GNR	S3	Blue						
hybrid white spruce / black gooseberry	GNR	S3	Blue						
hybrid white spruce / black huckleberry - falsebox	GNR	S3	Blue						Probable
black spruce / buckbean / peat-mosses	GNR	S3	Blue						
black spruce - lodgepole pine / kalmias / peat-mosses	GNR	S3	Blue						
whitebark pine / junegrass	GNR	S3	Blue						
lodgepole pine / common juniper - falsebox	GNR	S3	Blue						
lodgepole pine / birch-leaved spirea / pinegrass	GNR	S3	Blue						
lodgepole pine / dwarf blueberry / peat-mosses	GNR	S3	Blue						
ponderosa pine / red three-awn	GNR	S3	Blue	Yes	Yes	Yes			

ponderosa pine / bluebunch wheatgrass	GNR	S3	Blue	Yes	Yes	Yes	
black cottonwood - red alder / salmonberry	GNR	S3	Blue				
bluebunch wheatgrass - arrowleaf balsamroot	GNR	S3	Blue	Yes		Yes	Yes
bluebunch wheatgrass - junegrass	GNR	S3	Blue	Yes	Yes	Yes	Yes
Douglas-fir / common juniper / clad lichens	GNR	S3	Blue	Yes	Yes		Yes
Douglas-fir / Rocky Mountain juniper / prairie sagewort	GNR	S3	Blue	Yes			Yes
Douglas-fir / Rocky Mountain juniper / shrubby penstemon	GNR	S3	Blue	Yes			Yes
Douglas-fir - hybrid white spruce / electrified cat's-tail moss	GNR	S3	Blue				Probable
Douglas-fir - hybrid white spruce / thimbleberry	GNR	S3	Blue				Probable
Douglas-fir - lodgepole pine / kinnikinnick Moist Submaritime	GNR	S3	Blue				
Douglas-fir - lodgepole pine / clad lichens	GNR	S3	Blue				Probable
Douglas-fir - ponderosa pine / pinegrass	GNR	S3	Blue	Yes			Yes
Douglas-fir - ponderosa pine / snowbrush	GNR	S3	Blue	Yes			Yes
Douglas-fir - ponderosa pine / Idaho fescue	GNR	S3	Blue	Yes			Yes
Douglas-fir - ponderosa pine / bluebunch wheatgrass	GNR	S3	Blue	Yes			Yes
Douglas-fir - ponderosa pine / bluebunch wheatgrass - pinegrass	GNR	S3	Blue	Yes			Yes
Douglas-fir / bluebunch wheatgrass - pinegrass	GNR	S3	Blue				
Douglas-fir / bluebunch wheatgrass / step moss	GNR	S3	Blue	Yes	Yes		
Douglas-fir - western redcedar / beaked hazelnut	GNR	S3	Blue				
Douglas-fir - western hemlock / falsebox	GNR	S3	Blue				
tall willows / Sartwell's sedge	GNR	S3	Blue				
common snowberry - prairie rose	GNR	S3	Blue	Yes	Yes	Yes	Yes
western redcedar / oak fern - bunchberry	GNR	S3	Blue				
western redcedar / falsebox	GNR	S3	Blue				

western redcedar - Douglas-fir / red-osier dogwood	GNR	S3	Blue	Yes	Yes
western hemlock / vine maple - falsebox	GNR	S3	Blue		
western hemlock / common juniper - falsebox	GNR	S3	Blue		
western hemlock - western redcedar / clad lichens	GNR	S3	Blue		
western redcedar - Sitka spruce / skunk cabbage	G3?	S3?	Blue		
lodgepole pine / velvet-leaved blueberry / clad lichens	GNR	S3?	Blue		Probable

Appendix 3: Globally at Risk Species in the T-N

English Name	Global Status	Prov Status	BC List	SARA
crumpled tarpaper	G1	S2	Red	Threatened
rusty cord-moss	G1G3	S2S3	Blue	Endangered
nugget moss	G2?	S2	Red	Endangered
tiny tassel	G2G4	S3	Blue	Special Concern
Magnum Mantleslug	G3	S2S3	Blue	Special Concern
Wind River draba	G3	S2S3	Blue	
alkaline wing-nerved moss	G3	S3	Blue	Threatened
mountain moonwort	G3	S3	Blue	
puckered rocktripe	G3	S3	Blue	
Little Brown Myotis	G3	S4	Yellow	Endangered
whitebark pine	G3?	S2S3	Blue	Endangered
Spotted Owl	G3G4	S1	Red	Endangered
northwest waterfan	G3G4	S2	Red	Special Concern
no common name	G3G4	S2	Red	
Columbian carpet moss	G3G4	S2S3	Blue	Special Concern
no common name	G3G4	S2S3	Blue	
two-spiked moonwort	G3G4	S3?	Blue	
Widelip Pondsnaail	G3G4	S3S4	Blue	
no common name	G3G5	S1S3	Red	
no common name	G3G5	S2S3	Blue	
no common name	G3G5	S3	Blue	
blistered toad	G3G5	S3	Blue	
pebbled paw	G3G5	S3	Blue	

Appendix 4: SARA Listed Species in the T-N

Scientific Name	English Name	BC List	SARA
<i>Acipenser transmontanus</i>	White Sturgeon	Red	Endangered
<i>Stylurus olivaceus</i>	Olive Clubtail	Red	Endangered
<i>Athene cunicularia</i>	Burrowing Owl	Red	Endangered
<i>Contia tenuis</i>	Sharp-tailed Snake	Red	Endangered
<i>Oreoscoptes montanus</i>	Sage Thrasher	Red	Endangered
<i>Rotala ramosior</i>	toothcup	Red	Endangered
<i>Strix occidentalis</i>	Spotted Owl	Red	Endangered
<i>Taxidea taxus</i>	American Badger	Red	Endangered
<i>Microbryum vlassovii</i>	nugget moss	Red	Endangered
<i>Entosthodon rubiginosus</i>	rusty cord-moss	Blue	Endangered
<i>Sphyrapicus thyroideus thyroideus</i>	Williamson's Sapsucker	Blue	Endangered
<i>Pinus albicaulis</i>	whitebark pine	Blue	Endangered
<i>Cypseloides niger</i>	Black Swift	Blue	Endangered
		Yello	
<i>Myotis lucifugus</i>	Little Brown Myotis	w	Endangered
<i>Bartramia halleriana</i>	Haller's apple moss	Red	Threatened
<i>Euphyes vestris</i>	Dun Skipper	Red	Threatened
<i>Rangifer tarandus</i> pop. 1	Caribou	Red	Threatened
<i>Collema coniophilum</i>	crumpled tarpaper	Red	Threatened
<i>Dolichonyx oryzivorus</i>	Bobolink	Blue	Threatened
<i>Hirundo rustica</i>	Barn Swallow	Blue	Threatened
<i>Azolla mexicana</i>	Mexican mosquito fern	Blue	Threatened
<i>Spea intermontana</i>	Great Basin Spadefoot	Blue	Threatened
<i>Melanerpes lewis</i>	Lewis's Woodpecker	Blue	Threatened
<i>Crotalus oreganus</i>	Western Rattlesnake	Blue	Threatened
<i>Pituophis catenifer deserticola</i>	Gopher Snake	Blue	Threatened
<i>Contopus cooperi</i>	Olive-sided Flycatcher	Blue	Threatened
	alkaline wing-nerved		
	moss	Blue	Threatened
<i>Pterygoneurum kozlovii</i>		Blue	Threatened
<i>Megascops kennicottii macfarlanei</i>	Western Screech-Owl	Blue	Threatened
		Yello	
<i>Chordeiles minor</i>	Common Nighthawk	w	Threatened
			Special
<i>Falco peregrinus anatum</i>	Peregrine Falcon	Red	Concern
			Special
<i>Peltigera gowardii</i>	northwest waterfan	Red	Concern
			Special
<i>Catostomus platyrhynchus</i>	Mountain Sucker	Blue	Concern
			Special
<i>Euphagus carolinus</i>	Rusty Blackbird	Blue	Concern
			Special
<i>Reithrodontomys megalotis</i>	Western Harvest Mouse	Blue	Concern

<i>Gulo gulo luscus</i>	Wolverine	Blue	Special Concern
<i>Ursus arctos</i>	Grizzly Bear	Blue	Special Concern
<i>Cottus hubbsi</i>	Columbia Sculpin	Blue	Special Concern
<i>Danaus plexippus</i>	Monarch	Blue	Special Concern
<i>Psiloscops flammeolus</i>	Flammulated Owl	Blue	Special Concern
<i>Asio flammeus</i>	Short-eared Owl	Blue	Special Concern
<i>Bryoerythrophyllum columbianum</i>	Columbian carpet moss	Blue	Special Concern
<i>Euderma maculatum</i>	Spotted Bat	Blue	Special Concern
<i>Numenius americanus</i>	Long-billed Curlew	Blue	Special Concern
<i>Plestiodon skiltonianus</i>	Western Skink	Blue	Special Concern
<i>Argia vivida</i>	Vivid Dancer	Blue	Special Concern
<i>Crossidium seriatum</i>	tiny tassel	Blue	Special Concern
<i>Patagioenas fasciata</i>	Band-tailed Pigeon	Blue	Special Concern
<i>Oncorhynchus clarkii lewisi</i>	Cutthroat Trout	Blue	Special Concern
<i>Chrysemys picta pop. 2</i>	Painted Turtle	Blue	Special Concern
<i>Nephroma occultum</i>	cryptic paw	Blue	Special Concern
<i>Coluber constrictor mormon</i>	North American Racer	Blue	Special Concern
<i>Magnipelta mycophaga</i>	Magnum Mantleslug	Blue	Special Concern
<i>Coccothraustes vespertinus</i>	Evening Grosbeak	Yello w	Special Concern
<i>Anaxyrus boreas</i>	Western Toad	Yello w	Special Concern
<i>Aplodontia rufa</i>	Mountain Beaver	Yello w	Special Concern
<i>Ascaphus truei</i>	Coastal Tailed Frog	Yello w	Special Concern
<i>Charina bottae</i>	Northern Rubber Boa	Yello w	Special Concern

Appendix 5: Provincially Listed Species in the T-N

Species Name	Prov Status	BC List	SARA	Dry Interior
toothcup	S1	Red	Endangered	Yes
Spotted Owl	S1	Red	Endangered	
Caribou (Southern Mountain Population)	S1	Red	Threatened	
low hawksbeard	S1	Red		Yes
<i>Hilpertia velenovskyi</i>	S1	Red		Yes
Merriam's Shrew	S1	Red		Yes
Prairie Falcon	S1	Red		Yes
satinflower	S1?	Red		Yes
Burrowing Owl	S1B	Red	Endangered	Yes
Sage Thrasher	S1B	Red	Endangered	Yes
Sharp-tailed Snake	S1S2	Red	Endangered	
<i>Didymodon brachyphyllus</i>	S1S2	Red		Yes
blue-blue vinyl	S1S2	Red		
Preble's Shrew	S1S2	Red		Yes
<i>Sphagnum jensenii</i>	S1S2	Red		
western centaury	S1S2	Red		Yes
powder-lined rock-olive	S1S3	Red		Yes
<i>Plagiobryum demissum</i>	S1S3	Red		Yes
mutton grass	S1S3	Red		Yes
American Badger	S2	Red	Endangered	Yes
White Sturgeon	S2	Red	Endangered	Yes
nugget moss	S2	Red	Endangered	Yes
Olive Clubtail	S2	Red	Endangered	Yes
Haller's apple moss	S2	Red	Threatened	
crumpled tarpaper	S2	Red	Threatened	
Dun Skipper	S2	Red	Threatened	Yes
northwest waterfan	S2	Red	Special Concern	
<i>Atrichum tenellum</i>	S2	Red		
fence-rail pixie	S2	Red		
<i>Coscinodon cribrosus</i>	S2	Red		Yes
western low hawksbeard	S2	Red		Yes
<i>Grimmia plagiopodia</i>	S2	Red		Yes
<i>Hygroamblystegium noterophilum</i>	S2	Red		
scarlet gaura	S2	Red		Yes
<i>Orthotrichum hallii</i>	S2	Red		Yes
<i>Warnstorfia tundrae</i>	S2	Red		
Peregrine Falcon, <i>anatum</i> subspecies	S2?	Red	Special Concern	Yes
Swainson's Hawk	S2B	Red		Yes
Familiar Bluet	SH	Red		
northern swamp willowherb	SH	Red		
white western groundsel	SH	Red		Yes
Western Rattlesnake	S2S3	Blue	Threatened	Yes
rusty cord-moss	S2S3	Blue	Endangered	Yes
whitebark pine	S2S3	Blue	Endangered	Yes
Vivid Dancer	S2S3	Blue	Special Concern	Yes
Columbian carpet moss	S2S3	Blue	Special Concern	Yes
Magnum Mantleslug	S2S3	Blue	Special Concern	
North American Racer	S2S3	Blue	Special Concern	Yes
Cutthroat Trout, <i>lewisi</i> subspecies	S2S3	Blue	Special Concern	

Lance-tipped Darner	S2S3	Blue		Yes
<i>Brachythecium holzingeri</i>	S2S3	Blue		
<i>Bryum uliginosum</i>	S2S3	Blue		
lesser brown sedge	S2S3	Blue		
saw-leaved sedge	S2S3	Blue		
heart-leaved springbeauty	S2S3	Blue		Yes
British Columbia bugseed	S2S3	Blue		Yes
Eastern Tailed Blue	S2S3	Blue		
quilted stippleback	S2S3	Blue		Yes
Wind River draba	S2S3	Blue		
slender-leaf sundew	S2S3	Blue		
Golden Fossaria	S2S3	Blue		Yes
<i>Grimmia mollis</i>	S2S3	Blue		
jujube vinyl	S2S3	Blue		
<i>Mnium arizonicum</i>	S2S3	Blue		
Western Small-footed Myotis	S2S3	Blue		Yes
near navarretia	S2S3	Blue		Yes
erupting toad	S2S3	Blue		Yes
Umbilicate Sprite	S2S3	Blue		Yes
<i>Schistidium heterophyllum</i>	S2S3	Blue		Yes
Herrington Fingernailclam	S2S3	Blue		Yes
Northern Bog Lemming, <i>artemisiae</i> ssp	S2S3	Blue		
Sharp-tailed Grouse, <i>columbianus</i> ssp	S2S3	Blue		Yes
Black Swift	S2S3B	Blue	Endangered	Yes
Lewis's Woodpecker	S2S3B	Blue	Threatened	Yes
American Avocet	S2S3B	Blue		Yes
Hairy-necked Tiger Beetle	S2S4	Blue		Yes
blue-footed pixie	S2S4	Blue		Yes
Western Screech-Owl, <i>macfarlanei</i> ssp	S3	Blue	Threatened	Yes
Gopher Snake, <i>deserticola</i> subspecies	S3	Blue	Threatened	Yes
Great Basin Spadefoot	S3	Blue	Threatened	Yes
Mexican mosquito fern	S3	Blue	Threatened	Yes
alkaline wing-nerved moss	S3	Blue	Threatened	Yes
Wolverine, <i>luscus</i> subspecies	S3	Blue	Special Concern	
Columbia Sculpin	S3	Blue	Special Concern	Yes
tiny tassel	S3	Blue	Special Concern	Yes
cryptic paw	S3	Blue	Special Concern	
Western Harvest Mouse	S3	Blue	Special Concern	Yes
Cascade rockcress	S3	Blue		
mountain moonwort	S3	Blue		
<i>Bryum gemmiparum</i>	S3	Blue		
Immaculate Green Hairstreak	S3	Blue		Yes
two-coloured sedge	S3	Blue		
strip-tease pixie	S3	Blue		
slender hawksbeard	S3	Blue		Yes
Montana larkspur	S3	Blue		
Englemann's spike-rush	S3	Blue		Yes
Alkali Bluet	S3	Blue		Yes
<i>Encalypta intermedia</i>	S3	Blue		Yes
<i>Encalypta spathulata</i>	S3	Blue		Yes
Rocky Mountain willowherb	S3	Blue		
mountain oakmoss	S3	Blue		
spreading stickseed	S3	Blue		
Pale Jumping-slug	S3	Blue		Yes

<i>Hygroamblystegium fluviatile</i>	S3	Blue		
sulphur lupine	S3	Blue		Yes
hairy water-clover	S3	Blue		Yes
slender muhly	S3	Blue		
blistered toad	S3	Blue		Yes
pebbled paw	S3	Blue		Yes
Jutta Arctic, <i>chermocki</i> subspecies	S3	Blue		Yes
Sinuuous Snaketail	S3	Blue		Yes
Mountain Goat	S3	Blue		Yes
Columbia Plateau Pocket Mouse	S3	Blue		Yes
greater eye shadow	S3	Blue		Yes
Common Sootywing	S3	Blue		Yes
exuberant rosette	S3	Blue		Yes
<i>Physcomitrium pyriforme</i>	S3	Blue		
abbreviated bluegrass	S3	Blue		
peach-leaf willow	S3	Blue		Yes
California Hairstreak	S3	Blue		Yes
<i>Tetradontium brownianum</i>	S3	Blue		
<i>Tortula obtusifolia</i>	S3	Blue		Yes
electric rocktripe	S3	Blue		
puckered rocktripe	S3	Blue		
<i>Weissia brachycarpa</i>	S3	Blue		
Fringed Myotis	S3	Blue		Yes
Fisher	S3	Blue		Yes
Grizzly Bear	S3?	Blue	Special Concern	
Mountain Sucker	S3?	Blue	Special Concern	Yes
Painted Turtle - Rocky Mountain Population	S3?	Blue	Special Concern	Yes
cut-leaved water-parsnip	S3?	Blue		Yes
two-spiked moonwort	S3?	Blue		
Canyon Wren	S3?	Blue		Yes
Horned Lark, <i>merrilli</i> subspecies	S3?	Blue		Yes
<i>Funaria muhlenbergii</i>	S3?	Blue		Yes
Prairie Fossaria	S3?	Blue		Yes
<i>Platyhypnidium riparioides</i>	S3?	Blue		
diverse-leaved cinquefoil	S3?	Blue		
Great Blue Heron, <i>herodias</i> subspecies	S3?	Blue		Yes
Bighorn Sheep	S3?	Blue		Yes
Williamson's Sapsucker	S3B	Blue	Endangered	Yes
Bobolink	S3B	Blue	Threatened	Yes
Long-billed Curlew	S3B	Blue	Special Concern	Yes
Flammulated Owl	S3B	Blue	Special Concern	Yes
Monarch	S3B	Blue	Special Concern	Yes
Eared Grebe	S3B	Blue		Yes
American Bittern	S3B, SNRN	Blue		Yes
Short-eared Owl	S3B,S2N	Blue	Special Concern	Yes
Spotted Bat	S3S4	Blue	Special Concern	Yes
Band-tailed Pigeon	S3S4	Blue	Special Concern	
Western Skink	S3S4	Blue	Special Concern	Yes
Northern Goshawk, <i>atricapillus</i> subspecies	S3S4	Blue		Yes
Sagebrush Tiger Beetle	S3S4	Blue		Yes
Townsend's Big-eared Bat	S3S4	Blue		Yes
Dusky Fossaria	S3S4	Blue		Yes
Star Gyro	S3S4	Blue		Yes
Nevada Skipper	S3S4	Blue		Yes

Clodius Parnassian, <i>pseudogallatinus</i> ssp	S3S4	Blue		
Striated Fingernailclam	S3S4	Blue		Yes
Widelip Pondsnaill	S3S4	Blue		Yes
Autumn Meadowhawk	S3S4	Blue		
Bull Trout	S3S4	Blue		Yes
Olive-sided Flycatcher	S3S4B	Blue	Threatened	Yes
Barn Swallow	S3S4B	Blue	Threatened	Yes
Rusty Blackbird	S3S4B	Blue	Special Concern	Yes
White-throated Swift	S3S4B	Blue		Yes
Lark Sparrow	S3S4B	Blue		Yes
Sunset Phyllis	S3S5	Blue		Yes
Little Brown Myotis	S4	Yellow	Endangered	Yes
Common Nighthawk	S4B	Yellow	Threatened	Yes
Coastal Tailed Frog	S4	Yellow	Special Concern	
Western Toad	S4	Yellow	Special Concern	Yes
Mountain Beaver	S4	Yellow	Special Concern	
Northern Rubber Boa	S4	Yellow	Special Concern	Yes
Evening Grosbeak	S5	Yellow	Special Concern	Yes

Appendix 6: Identified Wildlife in the T-N

English Name	BC List	Provincial FRPA	SARA
Spotted Owl	Red	Y (May 2004)	Endangered
Burrowing Owl	Red	Y (May 2004)	Endangered
Sage Thrasher	Red	Y (May 2004)	Endangered
American Badger	Red	Y (May 2004)	Endangered
Caribou (Southern Mt. Population)	Red	Y (May 2004)	Threatened
Western Rattlesnake	Blue	Y (Jun 2006)	Threatened
Lewis's Woodpecker	Blue	Y (May 2004)	Threatened
Western Screech-Owl, <i>macfarlanei</i> ssp	Blue	Y (May 2004)	Threatened
Gopher Snake, <i>deserticola</i> subspecies	Blue	Y (May 2004)	Threatened
Great Basin Spadefoot	Blue	Y (May 2004)	Threatened
North American Racer	Blue	Y (Jun 2006)	Special Concern
Cutthroat Trout, <i>lewisi</i> subspecies	Blue	Y (Jun 2006)	Special Concern
Wolverine, <i>luscus</i> subspecies	Blue	Y (May 2004)	Special Concern
Short-eared Owl	Blue	Y (May 2004)	Special Concern
Long-billed Curlew	Blue	Y (May 2004)	Special Concern
Flammulated Owl	Blue	Y (May 2004)	Special Concern
Grizzly Bear	Blue	Y (May 2004)	Special Concern
Spotted Bat	Blue	Y (May 2004)	Special Concern
Coastal Tailed Frog	Yellow	Y (May 2004)	Special Concern
Prairie Falcon	Red	Y (Jun 2006)	
Sharp-tailed Grouse, <i>columbianus</i> ssp	Blue	Y (Jun 2006)	
Fringed Myotis	Blue	Y (May 2004)	
Fisher	Blue	Y (Jun 2006)	
Great Blue Heron, <i>herodias</i> ssp	Blue	Y (Jun 2006)	
Bighorn Sheep	Blue	Y (Jun 2006)	
Bull Trout	Blue	Y (Jun 2006)	