



Ours to Save

The distribution, status & conservation needs of Canada's endemic species

June 4, 2020

Version 1.0



Ours to Save: The distribution, status & conservation needs of Canada's endemic species

Additional information and updates to the report can be found at the project website: natureconservancy.ca/ourstosave

Suggested citation:

Enns, Amie, Dan Kraus and Andrea Hebb. 2020. Ours to save: the distribution, status and conservation needs of Canada's endemic species. NatureServe Canada and Nature Conservancy of Canada.

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About NatureServe Canada

A registered Canadian charity, NatureServe Canada and its network of Canadian Conservation Data Centres (CDCs) work together and with other government and non-government organizations to develop, manage, and distribute authoritative knowledge regarding Canada's plants, animals, and ecosystems. NatureServe Canada and the Canadian CDCs are members of the international NatureServe Network, spanning over 80 CDCs in the Americas. NatureServe Canada is the Canadian affiliate of NatureServe, based in Arlington, Virginia, which provides scientific and technical support to the international network.

About the Nature Conservancy of Canada

The Nature Conservancy of Canada (NCC) works to protect our country's most precious natural places. Proudly Canadian, we empower people to safeguard the lands and waters that sustain life. Since 1962, NCC and its partners have helped to protect 14 million hectares (35 million acres), coast to coast to coast. NCC works in communities across Canada and has offices in all 10 provinces.

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Acknowledgements

Funding for the project was provided by the Crabtree Foundation, Echo Foundation and McLean Foundation.

The following experts from across Canada kindly contributed their time, knowledge and advice to support the project and this report:

Robert Anderson
Wasył Bakowsky
Aaron Bell
René Belland
Bruce Bennett
Joe Bennett
Rob Bennett
David Blades
Adam Burke
Syd Cannings
Suzanne Carriere
Paul Catling
Lars Crabo
Simon Dodsworth
Hume Douglas
Dan Farr

Justin Fulkerson
Lea Gelling
Daniel Gibson
Jamie Grimm
Crispin Guppy
Nancy Hébert
Patrick Henry
Rob Higgins
Virginia Hudson
Colin Jones
Jeff Keith
Joel Kits
John Klymko
Samantha Knight
Jacques Labrecque
Dwayne Lepitzki

Christie Macdonald
Nick Mandrak
J. D. McPhail
Randi Mulder
Stephen Murphy
Ryan Norris
Josh Noseworthy
Mike Oldham
Greg Pohl
Andrew K. Rasmussen
Justina Ray
John Riley
Michael Rudy
Cory Sheffield
Don Sutherland

NatureServe Canada is deeply grateful for the monetary and in-kind contributions of our members and partners. Thank you!

Alberta Conservation Information Management System
 Atlantic Canada Conservation Data Centre
 British Columbia Conservation Data Centre
 Centre de données sur le patrimoine naturel du Québec
 Environment and Climate Change Canada – Canadian Wildlife Service
 Fisheries and Oceans Canada
 Manitoba Conservation Data Centre
 NatureServe

Nature Conservancy of Canada
 Northwest Territories Conservation Data Centre
 Nunavut Conservation Data Centre
 Ontario Natural Heritage Information Centre
 Parks Canada Agency
 Saskatchewan Conservation Data Centre
 Yukon Conservation Data Centre



Summary

Endemic species can only be found in a specific geographical area, such as an ecological region or country. This restricted range can increase their vulnerability to extinction from both natural events and human-caused disturbance. NatureServe Canada and the Nature Conservancy of Canada (NCC), in consultation with experts from across the country, have developed the first comprehensive list of plants, animals and fungi that can only be found in Canada.

Based on a review of existing databases and literature, and supported by input from experts, we identified 308 species, subspecies and varieties that have only been documented from Canada. Nationally endemic species occur across Canada, with the highest numbers in British Columbia, Quebec and Yukon. British Columbia, Yukon and Nova Scotia have a high percentage of endemic species that only occur within their jurisdiction. The analysis also identified 27 concentrations of endemic species, many of which are associated with glacial refugia or unique habitats.

Many of Canada's endemic species are vulnerable. Currently only 10% of Canada's endemic species have been ranked by NatureServe as globally Secure or Apparently Secure. Almost one-third of Canadian endemic species do not have sufficient information to assign national ranks or have continued taxonomic uncertainty. Further study on these species is a high priority to develop conservation status ranks and facilitate future national and global assessments.

The results of this project can be used to prioritize conservation actions and to inspire public support for species and habitat protection in Canada. Protecting Canada's endemic species and their habitats supports national and international commitments to biodiversity conservation and is critical to maintain species diversity. Canada has full responsibility to conserve this special group of wildlife. The consequence of our failure to conserve these species is their extinction.

Introduction

Endemic species are restricted to a particular geographical area (IUCN, 2018), such as ecoregions or countries. Endemic species are not evenly distributed and, as with global patterns of species richness, there is a higher richness in the tropics than in temperate regions (Gaston, 2000). In tropical regions species evolution has taken place over a much longer timespan (Stephens & Wiens, 2003) and rates speciation may be faster in warmer temperatures (Brown, 2014). Endemic speciation in the tropics has also been partially driven by long-term climatic cycles that created stable ecological refugia that isolated populations in fragmented habitats, such as mountain tops (Smith, McCormack *et al.*, 2014). However, global patterns in endemism are not fully understood. Although habitat diversity is one of the strongest predictors of endemic speciation, this is not consistent in all regions, and other interacting variables are also driving speciation (Zuloaga, Currie *et al.*, 2019).

Canada and other northern nations have fewer endemic species compared to unglaciated regions (IUCN, 2019b). All species that currently occur in Canada either survived in glacial refugia, migrated here as the glaciers receded or speciated in the last 15,000 to 18,000 years since the end of the last glacial period (Pielou, 2008).

Glacial and post-glacial habitats influence the present diversity and distribution of Canada's endemic species. Glacial refugia were limited to a few regions of modern-day Canada (Fernald, 1925). The best known of these is the unglaciated Beringia region which extends from the Lena River in Russia to the Mackenzie River in the Northwest Territories (Hultén, 1937). This region formed a broad connection between Asia and North America during glacial advances of the Pleistocene Epoch. Refugia have also been described from sites in the western Canadian Arctic Archipelago (Dyke, 2004), Canada's west coast and islands, and possibly in the Rocky Mountains and Cypress Hills (Clark, Clague *et al.*, 1993; Marr, Allen *et al.*, 2008).

On both Canada's west and east coasts, glacial refugia likely occurred on the now submerged continental shelves that would have been exposed during the last glacial maximum period when sea levels were 125 metres lower than present (McAlpine, Huynh *et al.*, 2012). Species that survived in these glacial refugia became isolated for tens of thousands of years, and some evolved over time into new species before recolonizing the mainland after the glaciers retreated.

The origin of many endemic species is still not fully understood. The Vancouver Island Marmot (*Marmota vancouverensis*) may have colonized Vancouver Island after the retreat of the Cordilleran-Wisconsin glaciers 10,000 to 13,000 years ago (Nagorsen, 2005), or it may have survived the Pleistocene Epoch on Vancouver Island (Kerhoulas, Gunderson *et al.*, 2015). Lori's Water-lily (*Nymphaea loriiana*) may have originated during the Holocene climatic optimum about 6,000 years ago in a past contact zone of the parents American Water-lily (*Nymphaea odorata*) and Dwarf Water-lily (*Nymphaea leibergii*) (Borsch, Wiersema *et al.*, 2014). Some endemics on Haida Gwaii appear to be of relatively recent origin as a result of rapid evolution in post-glacial times, including carabid beetles of the genus *Nebria*

(Clarke, Levin *et al.*, 2001). However, some species of bryophytes (Schofield, 1989) and terrestrial gastropods (Ovaska, Chichester *et al.*, 2010) may be relic species that survived in glacial refugia.

Regardless of their origin, endemic species are often characterized by a limited geographical range or small population size, which can make them vulnerable to extinction through stochastic events, anthropogenic threats, and increasingly by climate change (Cahill, Aiello-Lammens *et al.*, 2013; Shaffer, 1981). There are many unfortunate examples of the vulnerability of small-range endemics, including the extinction of Macoun's Shining Moss (*Neomacounia nitida*) from eastern Ontario (COSEWIC, 2002) and the recent extinction of the Bramble Cay Melomys (*Melomys rubicola*) in Australia (Waller, Gynther *et al.*, 2017).

Nationally endemic species have been identified for many countries and regions of the globe, including the United States (Stein, 2002), central grasslands of North America (Locklear, 2017), Russia (Griffin, 1999), the Tuscan Archipelago in Italy (Foggi, Viciano *et al.*, 2014) and New Caledonia (Wulff, 2013). The International Union for Conservation of Nature (IUCN) also reports on Red List threatened species that are endemic to each country (IUCN, 2019b).

Previously a comprehensive list of Canadian endemics had not been prepared. Centres of Canadian plant endemism were identified in the 1970s (Kershaw & Morton, 1976; Kershaw, 1976; Mosquin & Suchal, 1977), and the most recent general status report on Canadian wildlife identified a subset of endemic species but did not include subspecies and varieties (CESCC, 2016).

Accounting for endemic species will help support biodiversity conservation in Canada. Endemic species are often identified as "target" species in conservation decision-making and planning (Groves, Beck *et al.*, 2003). They merit protection in and of themselves and often reflect unique ecological conditions and processes where they occur. They have been used to identify priority areas for biodiversity conservation globally (Myers, Mittermeier *et al.*, 2000) and within some Canadian ecoregions (e.g. Henson, Riley *et al.*, 2005). Regions with concentrations of endemic species are also likely to occur in geographies that have underlying physical and climatic drivers of evolution and species diversity. "Conserving the stage" of places that are catalysts for evolution is an important conservation strategy particularly during our current period of climate change and other stresses to species and ecosystems (Anderson & Ferree, 2010). The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) includes jurisdictional responsibility as a key element in prioritizing wildlife species for new assessments (COSEWIC, 2015). A comprehensive list of endemic species will support the prioritization of species assessments and conservation action (Raymond, Wen *et al.*, 2018) and efforts to identify Key Biodiversity Areas in Canada (IUCN, 2016). It will help guide sustainable development for resource industries, such as the identification of high-conservation-value areas (FSC Canada, 2018). Featuring endemic species within a particular region can also be useful in increasing public awareness about biodiversity and conservation (Meuser, Harshaw *et al.*, 2009).

Methods

A preliminary list of endemic species¹ was prepared by querying NatureServe's Biotics 5 (Central Biotics) (NatureServe, 2018) database of all North American species that only have records from Canada. Information on Canadian species in Biotics had been updated for Canada following the 2015 General Status Report of Wild Species (CESCC, 2016). This resulted in more complete accounting of Canadian species and their provincial/territorial distribution. The Biotics search was further stratified to also identify species that are limited to one province or territory.

Species and infraspecies (subspecies and varieties) that are restricted to Canada were included in the initial list, but not populations or other designatable units identified by COSEWIC that are included in Biotics. For example, the Ungava population of Grizzly Bear (*Ursus arctos*) or Caribou (*Rangifer tarandus*) - Central Mountain population were not included as endemic species. Hybrids were also excluded from our analysis.

Freshwater fishes that are currently included in Central Biotics as designatable units or infraspecies (e.g. Hadley Lake Limnetic Threespine Stickleback, *Gasterosteus* sp. 12) were not included on the list because freshwater fishes assessed by COSEWIC are undergoing a taxonomic update that will result in a reassignment of these infraspecies to designatable units (N.E. Mandrak, pers. comm., September 9, 2019).

Birds that have only been documented breeding in Canada were included, even if their migration and wintering habitat were outside of the country. While not strictly endemic, they are endemic to Canada for four to five months during the breeding and migration season. The current and historical breeding range was used to determine the provincial and territorial occurrences of migratory birds. Wildlife species that are subject to recovery and reintroduction efforts in the U.S., but only occur as experimental populations, were also included as Canadian endemics, although these species may occur as wild populations in the U.S. in the future.

The preliminary list of nationally endemic species was then refined by checking all the species in global biodiversity databases, such as the Global Biodiversity Information Facility (GBIF) (Table 1), to ensure they did not occur in the U.S. and had not been entered in Biotics, or occurred in jurisdictions not included in Biotics database for North America (primarily northern species also found in Greenland, Scandinavia or Russia). For example, Barren-ground Caribou (*Rangifer tarandus groenlandicus*) only occurs in Canada in Biotics data but is known from Greenland in GBIF. General internet searches using Google were also made for all species that occur near the U.S. border to determine if there had been any recent records that were not included in the biodiversity databases that we consulted.

¹ For this report, the term "species" refers to species, subspecies and varieties.

Extinct species and species based on historical accounts were included on the list so that the number and drivers of endemic species losses could be determined. The year 1500 is used by the IUCN to define modern extinction (IUCN, 2019a) and was applied for this study.

Table 1: Biodiversity databases consulted to refine results from NatureServe Biotics

Database	Website
Global Biodiversity Information Facility	http://www.gbif.org/species
Integrated Taxonomic Information System	http://www.itis.gov
Canadian Biodiversity Information Facility, Species	http://www.cbif.gc.ca
Encyclopedia of Life	http://eol.org/
BOLD Systems	http://www.boldsystems.org/
BirdLife International	http://datazone.birdlife.org/species/search
Antwiki	http://www.antwiki.org
FishBase	http://www.fishbase.org
Canadensys	http://data2.canadensys.net/
Flora of the Canadian Arctic Archipelago	https://nature.ca/aaflora/data/index.htm

The final preliminary list was then reviewed and updated based on input from experts within the Canadian network of Conservation Data Centres. The final draft list of nationally endemic species from Canada was then circulated to taxa and regional experts for final review. Feedback was received from 19 external experts from across Canada.

During the expert review species that are potentially endemic to Canada were also identified. These are species that have very limited distribution information and have a reasonable probability of also occurring in adjacent U.S. states if targeted surveys were conducted. These are primarily arthropods that have only been collected from a few locations in southern Canada and Yukon. These “potential endemics” were not included on the list of national endemics for this report but are made available to encourage further investigation of these species.

Endemic species can also be based on non-political geographies, such as ecoregions. While the purpose of this report is to catalogue nationally endemic species, a preliminary list of species that have been identified as endemic to a single ecoregion was also prepared. For example, Lakeside Daisy (*Tetraneuris herbacea*) is restricted to the shores of Lake Huron and Lake Erie in the Great Lakes ecoregion, but occurs in both Canada and the U.S. Many of these ecoregional endemic species are also of global conservation concern (Rainer, Bennett *et al.*, 2017).

The final list of nationally endemic species along with status and range information from Biotics was prepared in an Excel spreadsheet and used to develop metrics on the numbers of nationally endemic species by taxonomic group, province and territory and conservation status.

Point and polygon spatial data for each species was assembled based on the final list of endemic species (Table 2). Locations for some species were manually created based on comments in Central Biotics or information in the literature.

Table 2: Spatial information used in the analysis of Canada’s nationally endemic species

Source	Date Type and Date
NatureServe Canada (Central Biotics) ¹	10 ² -kilometre grid 2019-07-04
Centre de données du patrimoine naturel du Québec, Gouvernement du Québec	Polygons 2019-04-25
Atlantic Canada Conservation Data Centre	Points 2019-05-17
Atlantic Canada Conservation Data Centre – Newfoundland and Labrador	Points 2019-05-31
Global Biodiversity Information Facility (GBIF) ² occurrence download	Points 2019-08-01
Government of the Northwest Territories	Polygons 2019-06-17
Nature Conservancy of Canada species observations	Points 2019-05-21
Environment and Climate Change Canada Critical Habitat for Species at Risk	10-kilometre grid 2014-07-20
Primary literature/Central Biotics comments If no other spatial information existed, locations identified in the literature or from the comments in Central Biotics were used to assign locations.	Points Variable dates

¹Conservation Data Centres included in the Central Biotics data: Alberta Conservation Information Management Centre, British Columbia Conservation Data Centre, Manitoba Conservation Data Centre, Northwest Territories Conservation Data Centre, Nunavut Conservation Data Centre, Ontario Natural Heritage Information Centre, Saskatchewan Conservation Data Centre, Yukon Conservation Data Centre.

²GBIF data included occurrence with records based on human observations, literature, living specimen, machine observations, material samples, observations, preserved specimen and unknown.

The following types of spatial records were excluded to reduce uncertainty:

- Element Occurrences² (EO) having EO Ranks: failed to find (F), extirpated (X) and possibly extirpated (X?) from NatureServe and Centre de données du patrimoine naturel du Québec (CDPQN) data.
- Atlantic Canada Conservation Data Centre data with spatial uncertainty of more than six kilometres (precision = 4.0).
- CDPQN data with a precision of >8,000 metres.
- Observation of bird species outside the breeding range.
- GBIF data with a coordinate uncertainty >10,000 metres.
- GBIF data with fossil specimens as the basis of record.

² An Element Occurrence (EO) is an area of land and/or water in which a species is, or was, present.

The individual point and polygon species data were spatially joined to a 10²-kilometre grid that was overlaid across Canada. The individual grids were then merged into one data layer, representing all species occurrences. Unique fields were created combining the 10²-kilometre grid with the national scientific name. These data were then summarized by these unique fields to produce a count of occurrences of each species within each grid square. The resulting tables were further summarized by grid ID to produce a number of unique species per 10²-kilometre grid square. For the ecoregion level, the 10²-kilometre grid was intersected with ecoregions (ECCC, 2019) and the final count summarized. A 100²-kilometre grid was also created to report the results at a less detailed scale.

Hotspots were based on the number of species within each 10²-kilometre grid. To determine initial sites, grid cells with three or more endemic species were selected and reviewed. These initial sites were then expanded to include adjacent grid cells with one or more endemic species. Each site was then buffered by 5-km to create the hotspot boundary. In some cases, the final boundary of the hotspots was adjusted based on ecological features, coastlines or expert review. Hotspots were assigned names based on place names and local features.

Summaries were prepared for each province and territory and by taxonomic group and conservation status based on information in NatureServe's Central Biotics. Rounded rank was used to distinguish between full species and sub-species/varieties. Details on NatureServe's methodology for assessing conservation status can be found in Appendix A (Master, Faber-Langendoen *et al.*, 2012).

Results

There are 308 plants, animals and fungi documented by this analysis that are found nowhere else outside of Canada (Appendix B). Just over 67% of these are species, and the remainder are subspecies and varieties. This includes 36 species of vertebrates (mammals, birds and fishes). Over 80% of Canada's nationally endemic species are invertebrates (primarily insects) and vascular plants (Table 3).

Table 3: Number of Canadian Endemic Species by Taxonomic Group

Taxonomic Group	Total Number	Species	Subspecies & Varieties
Invertebrates	149	120	29
Vascular plants	109	64	45
Mammals	21	5	16
Birds	11	3	8
Mosses and liverworts	9	8	1
Lichens and fungi	5	5	0
Freshwater and anadromous fishes	4	3	1
Total	308	208	100

Taxa

Almost half of Canada's endemic species are invertebrates. Just over 80% of these are full species. Invertebrates are less likely to have been assessed by COSEWIC or have NatureServe ranks compared to other species. Taxonomic groups with the greatest number of endemic species are dominated by better-studied groups such as moths, butterflies and skippers, and freshwater snails (Table 4). There are over 150 invertebrate species on the list of the potential endemics, including species of leafhoppers, beetles and spiders and their relatives (and many more moths), that require further study.

Table 4: Number of Nationally Endemic Invertebrates

Taxonomic Group*	Number of Nationally Endemic Species
Amphipods	3
Ants, wasps and sawflies	7
Black flies	1
Bumble bees	1
Butterflies and skippers	21
Caddisflies	5
Dragonflies and damselflies	1
Freshwater mussels	1
Freshwater snails	9
Grasshoppers	3
Ground beetles	3
Katydid and crickets	1
Mason bees	1
Mayflies	5
Millipedes and centipedes	2
Other bees	4
Other beetles	16
Other flies and keds	2
Other insects	6
Other moths	34
Papaipema moths	1
Predaceous diving beetles	2
Robber flies	1
Spiders and other chelicerates	1
Stoneflies	6
Terrestrial snails	3
Tiger beetles	3
Tiger moths	5
Worms, leeches and other annelids	1

*Taxonomic groups are based on categories used in Central Biotics.

There are 109 nationally endemic plants in Canada. Almost 60% are full species and the remainder are subspecies and varieties. Only 12 are ranked by NatureServe as globally Secure or Apparently Secure. These secure plants include species with restricted ranges that are abundant and not threatened, such as Ogilvie Range Locoweed (*Oxytropis nigrescens* var. *lonchopoda*) in Yukon, and species that are more widespread but their global range is restricted to Canada. This includes Limestone Scurvygrass (*Cochlearia tridactylites*) and Limestone Willow (*Salix calcicola* var. *calcicola*). Ten plants are Unranked or Unrankable by NatureServe. Twenty-three species have been assessed as at risk by COSEWIC. Four additional species have been assessed as Not at Risk by COSEWIC: Yukon Wormwood (*Artemisia woodii*), Yukon Goldenweed (*Nestotus macleanii*), Tyrrell's Willow (*Salix tyrrellii*) and Lake Athabasca Starwort (*Stellaria longipes* ssp. *arenicola*). Similar to Ogilvie Range Locoweed, these species have highly restricted ranges, but are not subject to any significant current threats. Endemic plants occur in every province and territory, with BC and Quebec having the greatest number. The territories, Newfoundland and Labrador, and Saskatchewan are also relatively rich in endemic flora. Key areas for endemic vascular plants in Canada include the Athabasca Sand Dunes, coasts of the Gulf of St. Lawrence and St. Lawrence River freshwater estuary, islands of Canada's West Coast, mountainous regions in Yukon and limestone plains on the island of Newfoundland.

Canada has 21 nationally endemic mammals. Three-quarters of these are subspecies and varieties. Over two-thirds of Canada's endemic mammals are of global conservation concern, including Eastern Wolf (*Canis* sp. cf. *lycaon*), Peary Caribou (*Rangifer tarandus pearyi*) and Selkirk Least Chipmunk (*Neotamias minimus selkirki*). Nine species have been assessed as at risk by COSEWIC, including two species — Dawson Caribou (*Rangifer tarandus dawsoni*) and Vancouver Island Wolverine (*Gulo gulo vancouverensis*) — that are extinct or historical. Three species, including the Ungava Collared Lemming (*Dicrostonyx hudsonius*), occur in relatively intact landscapes and while restricted in range, are not at risk. Two species are now restricted to Canada because of their extirpation from the U.S. Wood Bison (*Bison bison athabascaae*) has recently been introduced to Alaska, but is considered to be a "nonessential experimental population" (Doney, Bath *et al.*, 2018). Eastern Wolf once ranged into the northeastern U.S. but is now restricted to a small and threatened population that centres on Algonquin Provincial Park in Ontario.

Eight of Canada's 11 endemic birds are subspecies and varieties. All of are of global conservation concern based on NatureServe ranks, with the exception of Harris's Sparrow (*Zonotrichia querula*). However, this Arctic breeder has been experiencing population declines and has been assessed as Special Concern by COSEWIC. Three other species have been assessed as at risk by COSEWIC (Whooping Crane [*Grus americana*], Red Crossbill *percna* subspecies [*Loxia curvirostra percna*], Northern Saw-Whet Owl *brooksi* subspecies [*Aegolius acadicus brooksi*]), and one species (Labrador Duck [*Camptorhynchus labradorius*]) is extinct. Most of these birds are resident. Harris's Sparrow, Whooping Crane and (formerly) Labrador Duck only breed in Canada, but migrate to the U.S. in the winter. Six of the ten species are restricted to BC's West Coast, particularly Vancouver Island and Haida Gwaii.

Canada has 14 species of mosses, liverworts, lichens and fungi that are nationally endemic. Only one of these is a subspecies. All are of global conservation concern or are Unranked. These species occur across the country, including a beard lichen (*Usnea fibrillosa*) endemic to Nova Scotia, Slender Notchwort (*Crossocalyx tenuis*) endemic to Ontario and Carlott's Wijkia Moss (*Wijkia carlottae*) endemic to Haida Gwaii.

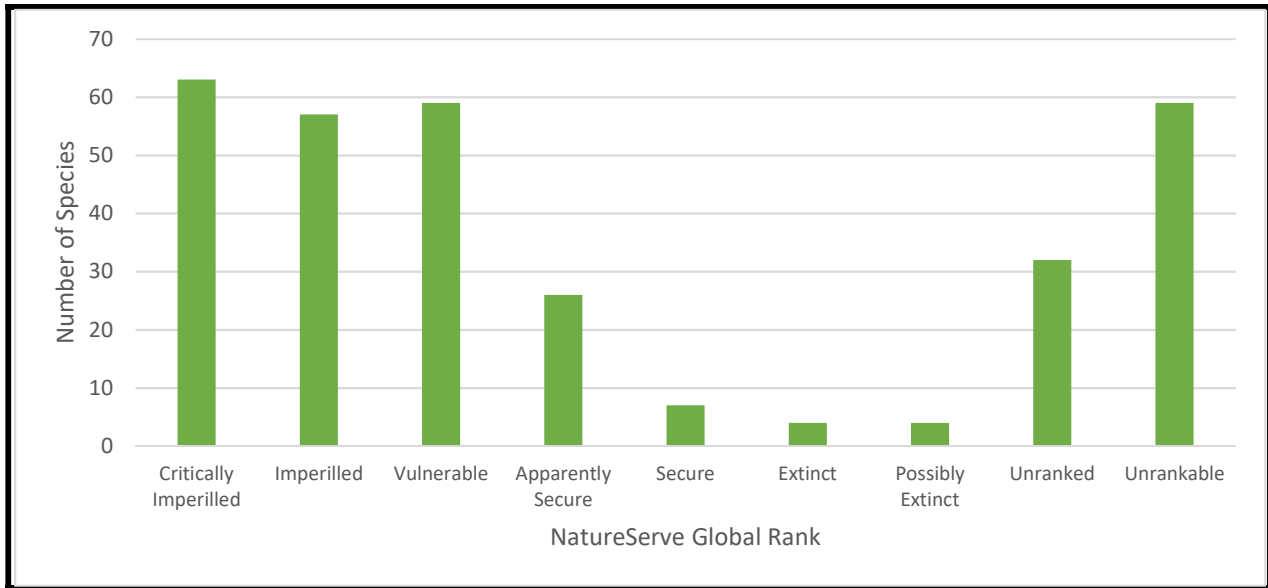
As discussed in the methods, there are populations and designatable units of fishes identified by COSEWIC that are restricted to Canada, but these are undergoing taxonomic review. As a result, only four endemic fishes are included in this study. Three species, Atlantic Whitefish (*Coregonus huntsmani*), Vancouver Lamprey (*Entosphenus macrostomus*) and Copper Redhorse (*Moxostoma hubbsi*), have been assessed as at risk nationally and are on the IUCN Red List of Threatened Species. The Banff Longnose Dace (*Rhinichthys cataractae smithi*) became extinct in the 1980s (Renaud & McAllister, 1988). There are several lake pairs of fishes, including sticklebacks, whitefish and lake smelt, that are also restricted to Canada and could be included as endemic species in future iterations of this project. For example, BC has several species pairs of stickleback (Gasterosteidae) that have evolved to occupy different niches (Wood, 2003), although one species pair in Hadley Lake may now be extinct (Taylor & Piercey, 2018).

Conservation Status

Most of Canada's nationally endemic species are of conservation concern. Almost 40% have been ranked as Critically Imperilled (G1) or Imperilled (G2) by NatureServe (Figure 1). This status reflects their limited global range and relatively small population. Eight species are now confirmed to be extinct or have not been documented for decades. Only about one in ten of Canada's nationally endemic species are ranked by NatureServe as globally Secure or Apparently Secure. These are generally widespread northern species, such as Allen's Buttercup (*Ranunculus allenii*). There is currently not enough information to rank almost one-third of Canadian endemics.

Less than 20% of Canada's endemic species have been assessed by the Committee on the Status of Endangered Wildlife in Canada. Another 28 species have been identified as candidates for future assessments.

Figure 1: Global Ranks of Nationally Endemic Species



Based on NatureServe rounded Global Ranks.

Potential endemic species

During the expert review, an additional 167 species that have only been recorded in Canada were identified as potential endemics. These do not include potential endemic fishes, such as species pairs that are undergoing taxonomic revision by COSEWIC. Over 90% of these potential nationally endemic species are arthropods (Appendix C).

Potential endemics are generally species that have been under-surveyed, or only described relatively recently, that often occur near the border with the U.S. For example, Ontario Calligrapha (*Calligrapha amator*), a type of beetle, has only been documented from Ontario and Quebec, but probably exists in the U.S., or should be synonymized with U.S. species names.

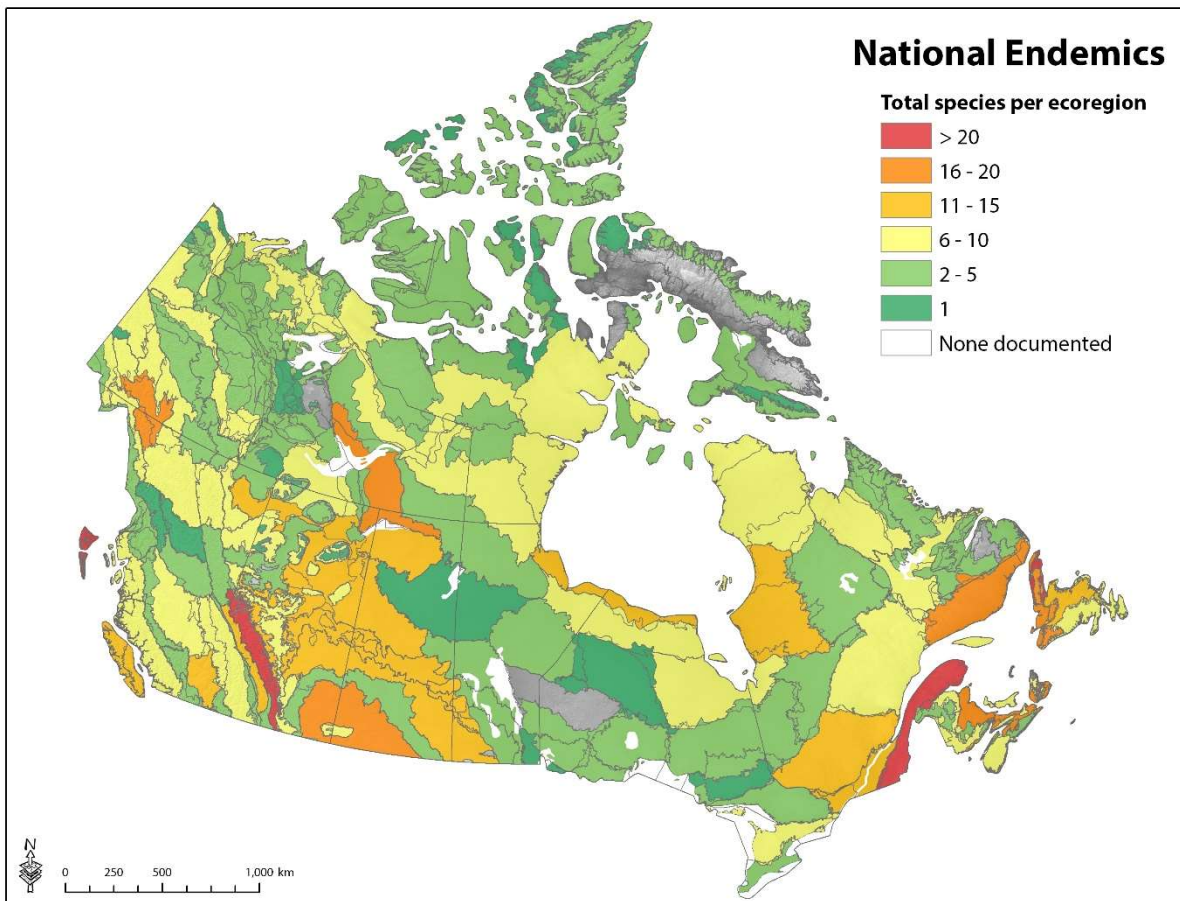
A few of the potential endemics have uncertain taxonomy. Round-leaved Spear Moss (*Calliargon orbicularicordatum*) only occurs in Nunavut and the Northwest Territories, but the validity of the species is currently under question. Boreal Cuckoo Sweat Bee (*Sphecodes borealis*) is known only from type locality in Saskatchewan but is possibly not a valid species (C. Sheffield, pers. comm., 2018)

Continued investigation of these species is needed to determine their taxonomy, range, status and Canada's conservation responsibility. Some of these species are probably restricted to Canada and, once confirmed, will be added to the national list of endemic species.

Distribution

Canada's endemic species are not evenly distributed across the country. Ecoregions with the most nationally endemic species include the Queen Charlotte Lowland, Appalachians and Northern Peninsula (Figure 2). This patchy distribution of endemism occurs in the U.S. (Jenkins, Van Houtan *et al.*, 2015) and throughout the world (Fa & Funk, 2007).

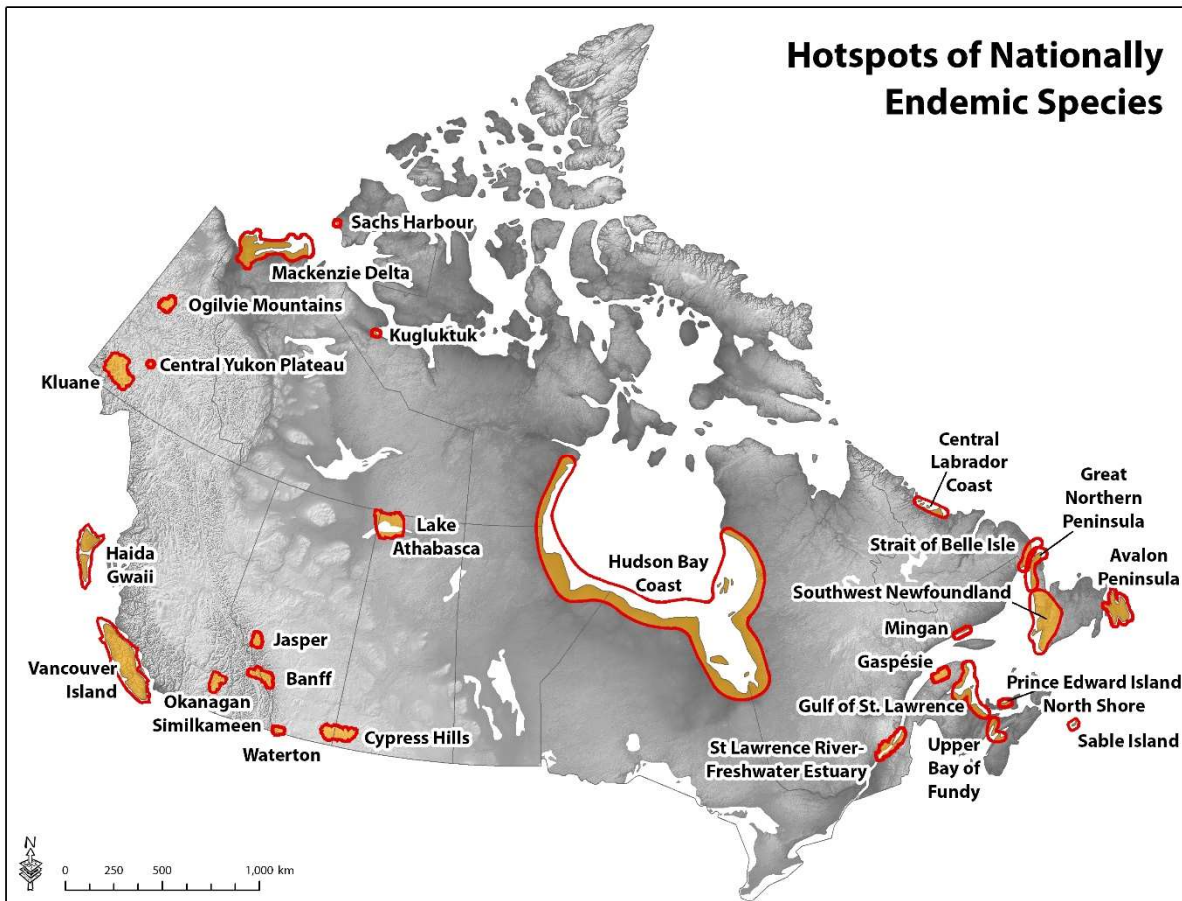
Figure 2: Number of Endemics Species by Ecoregion



This study identified 27 hotspots of nationally endemic species (Figure 3). These concentrations occur across the country and can be found in every province and territory. They are often associated with islands and coastal areas. Inland sites are a combination of areas with unique habitat conditions (e.g. Lake Athabasca) and regions that may have served as glacial refugia (e.g. sites in Yukon).

About half of these hotspots are located in the settled part of Canada where ecosystems are dominated by human land uses (Sanderson, Jaiteh *et al.*, 2002). Many of the northern sites are located in regions that are being impacted by climate change including rising temperatures (Porter, Schoenemann *et al.*, 2019) and increased rates of coastal erosion (Lantuit & Pollard, 2008).

Figure 3: Hotspots of Nationally Endemic Species



From a provincial/ territorial perspective, BC, Quebec, Alberta and Yukon have the greatest number of nationally endemic species (Figure 4). Approximately 60% of Canada’s endemic species are restricted to a single province or territory. These subnational endemics can be found in all regions except for Prince Edward Island (Figure 5). BC and Yukon have the highest numbers of subnational endemics (known only from a single province or territory).

Figure 4: Total Number of Endemic Species by Province and Territory

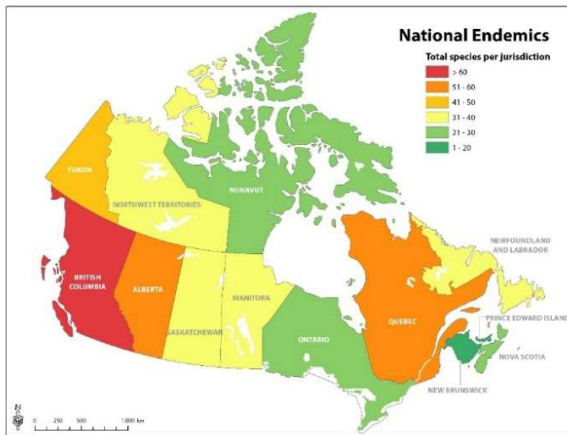
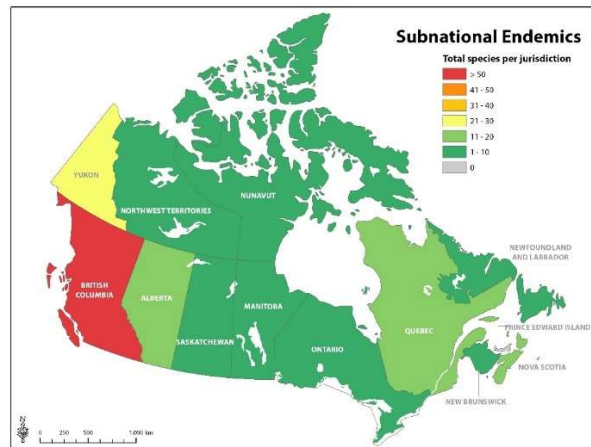


Figure 5: Total Number of Endemic Species Restricted to a Single Province and Territory (Subnational Endemics)



Alberta

Alberta has 54 nationally endemic species — the third highest in Canada (behind British Columbia and Quebec). Fifteen of these are subspecies or varieties, and four species have unresolved taxonomic questions. Alberta's nationally endemic species include 16 vascular plants and two species of tiger beetles. Alberta also includes a portion of the breeding habitat for Whooping Crane (*Grus americana*) in Wood Buffalo National Park.

Eighteen of this province's endemic species are entirely restricted to the province (Table 5). Several species that are restricted to Alberta are associated with hot springs and have very small ranges. These include Banff Springs Snail (*Physella johnsoni*) and Cordilleran Stygobromid (*Stygobromus secundus*).

Most Canadian endemic species occurring in Alberta are associated with the Rocky Mountains, Lake Athabasca and Cypress Hills. Many of the Rocky Mountain endemics can be found in Banff, Jasper and Waterton Lakes national parks and surrounding areas. Lake Louise Arnica (*Arnica louiseana*) is a colourful wildflower that can be found on exposed alpine slopes and calcareous rock slides at high elevations. There are also a few nationally endemic species that occur in the prairie region of the province. This includes Margaret's Diving Beetle (*Agabus margaretae*), a predaceous beetle that only lives in vernal ponds in the northern prairies of Alberta and Saskatchewan.

Only seven of the endemic species that occur in this province are ranked by NatureServe as globally Secure or Apparently Secure, and almost one-third are currently Unrankable. Eight species have been assessed as at risk by COSEWIC, and two plants from the Athabasca Sand Dunes have been assessed as Not at Risk.

Five hotspots for nationally endemic species have been identified from Alberta: Banff, Jasper, Waterton, Cypress Hills and the western edge of Lake Athabasca (Figure 3).

Table 5: Canadian Endemic Species Restricted to Alberta

Common Name	Scientific Name	Global Rank	COSEWIC Status
Nicholl's Bog Fritillary a weevil	<i>Boloria eunomia nichollae</i> <i>Ceutorhynchus carteri</i>	T3 GNR	<i>not assessed</i> <i>not assessed</i>
Alberta Fossaria	<i>Galba alberta</i>	GU	<i>not assessed</i>
Athabasca Thin Ant	<i>Leptothorax athabasca</i>	G4	<i>not assessed</i>
Pocahontas's Thin Ant a leaf beetle	<i>Leptothorax pocahontas</i> <i>Ophraella nuda</i>	G3 G1	<i>not assessed</i> <i>not assessed</i>
Alberta Needlefly	<i>Paraleuctra alta</i>	GU	<i>not assessed</i>
White Northern Caddisfly	<i>Philocasca alba</i>	GU	<i>not assessed</i>
Thor's Northern Caddisfly	<i>Philocasca thor</i>	GU	<i>not assessed</i>
Blunt Albino Physa	<i>Physa gyrina athearni</i>	T2	Candidate
Banff Springs Snail a tortricid moth	<i>Physella johnsoni</i> <i>Platphalonia dangi</i>	G1 GNR	Endangered <i>not assessed</i>
Alberta Trumpet-net Caddisfly	<i>Plectrocnemia jenula</i>	GU	<i>not assessed</i>
Banff Longnose Dace	<i>Rhinichthys cataractae smithi</i>	TX	Extinct
Bert's Predaceous Diving Beetle	<i>Sanfilippodytes bertae</i>	G1	Endangered
Castleguard Cave Stygobromid	<i>Stygobromus canadensis</i>	G1	<i>not assessed</i>
Cordilleran Stygobromid	<i>Stygobromus secundus</i>	G1	<i>not assessed</i>
Ragged Divided Ant	<i>Temnothorax fragosus</i>	G4	<i>not assessed</i>

Global Rank: GX (Presumed Extinct), GH (Possibly Extinct), G1 (Critically Imperilled), G2 (Imperilled), G3 (Vulnerable), G4 (Apparently Secure), G5 (Secure); Rounded Global Rank provided in table

Other Ranks and Qualifiers: T (Intraspecific Taxon), U (Unrankable), NR (Not Ranked)



Lake Louise Arnica (Photo by je9h/iNaturalist)

British Columbia

British Columbia has 105 nationally endemic species. This is the highest in all of Canada and represents over one-third of Canada's nationally endemic species. This includes 36 subspecies or varieties, and five species with questionable taxonomy. Over 70% of the nationally endemic species from BC are vascular plants and invertebrates. The province holds the vast majority of Canada's endemic mammals and birds.

There are 76 nationally endemic species found only in BC, by far the highest number in Canada (Table 6). Many of these occur on Vancouver Island, Haida Gwaii and other islands that probably acted as refugia during the last period of glaciation. Vancouver Island and Haida Gwaii both have several endemic mammals and birds including Vancouver Island Marmot (*Marmota vancouverensis*), Vancouver Island Water Shrew, (*Sorex navigator brooksi*) Queen Charlotte Hairy Woodpecker (*Dryobates villosus picoideus*), Queen Charlotte Pine Grosbeak (*Pinicola enucleator carlottae*), and several subspecies of the Townsend's Vole (*Microtus townsendii*) (Cornely & Verts, 1988).

There are several nationally endemic species in BC that are shared with Alberta and Yukon. Endemic species in the Rocky Mountains include Lake Louise Arnica (*Arnica louiseana*) and Rocky Mountain Woodland Spider (*Cybaeus sinuosus*). Scotter's Draba (*Draba scotteri*) and Western Meadow Fritillary (*Boloria epithore sigridae*) are northern species also found in Yukon.

Only about 10% of the endemic species that occur in BC are ranked by NatureServe as globally Secure or Apparently Secure. Twenty-three species, primarily arthropods, are currently Unrankable or Unranked. Thirteen nationally endemic species that occur in the province have been assessed by COSEWIC. Dawson Caribou (*Rangifer tarandus dawsoni*) was once restricted to Graham Island on Haida Gwaii. It is now extinct, although genetic analysis indicates it may not have been a separate caribou subspecies (Byun, Koop *et al.*, 2002).

Several other endemic species from BC have not been documented for many decades and may be extinct or extirpated. These include Vancouver Island Blue (*Plebejus saepiolus insulanus*), a butterfly last seen in 1979 near Victoria (COSEWIC, 2012) and a liverwort (*Cephaloziella brinkmanii*) last seen in 1912 in Yoho National Park (Hong, 1986).

British Columbia has three hotspots for national endemic species: Vancouver Island, Haida Gwaii and Okanagan-Similkameen (Figure 3).

Table 6: Canadian Endemic Species Restricted to British Columbia

Common Name	Scientific Name	Global Rank	COSEWIC
Dwarf Coastal Maidenhair Fern	<i>Adiantum aleuticum</i> var. <i>subpumilum</i>	T2	not assessed
Northern Saw-whet Owl brooksi subspecies	<i>Aegolius acadicus brooksi</i>	T2	Threatened
a centipede	<i>Arctogeophilus insularis</i>	G1	not assessed
Galling Small Minnow Mayfly	<i>Baetis persecutor</i>	GU	not assessed
Alpine Snowfly	<i>Bolshecapnia gregsoni</i>	GNR	not assessed
Moosehorn Snowfly	<i>Bolshecapnia rogozera</i>	GU	not assessed
Island Snow Scorpionfly	<i>Boreus insulanus</i>	G1	not assessed
Clubmoss Mountain-heather	<i>Cassiope lycopodioides</i> ssp. <i>crispilosa</i>	T3	not assessed
Small Woodnymph, phocus subspecies	<i>Cercyonis oetus phocus</i>	TNR	not assessed
Small Wood-nymph, undescribed species	<i>Cercyonis oetus</i> ssp. 1	TNR	not assessed
a weevil	<i>Ceutorhynchus opertus</i>	GU	not assessed
a weevil	<i>Ceutorhynchus squamosulus</i>	GU	not assessed
Crumpled Tarpaper Lichen	<i>Collema coniophilum</i>	G1	Threatened
Dark Green Hawthorn	<i>Crataegus atrovirens</i>	G2	not assessed
Vernon Hawthorn	<i>Crataegus chrysocarpa</i> var. <i>vernonensis</i>	T2	not assessed
Enderby Hawthorn	<i>Crataegus enderbyensis</i>	G2	not assessed
Oval Hawthorn	<i>Crataegus orbicularis</i>	G2	not assessed
Sheila Phipps' Hawthorn	<i>Crataegus sheila-hippsiae</i> var. <i>sheila-hippsiae</i>	T2	not assessed
Shuswap Hawthorn	<i>Crataegus shuswapensis</i>	G2	not assessed
Pacific Steller's Jay	<i>Cyanocitta stelleri carlottae</i>	T3	not assessed
Frankton's Draba	<i>Draba franktonii</i>	G2	not assessed
Queen Charlotte Hairy Woodpecker	<i>Dryobates villosus picoideus</i>	T3	not assessed
Queen Charlotte Islands False Rue-anemone	<i>Enemion savilei</i>	G4	not assessed
Vancouver Lamprey	<i>Lampetra macrostoma</i>	G1	Threatened
Vancouver Island Fleabane	<i>Erigeron philadelphicus</i> var. <i>glaber</i>	T1	not assessed
a noctuid moth	<i>Euchalcia borealis</i>	G3	not assessed
a dart moth	<i>Euxoa apopsis</i>	G3	not assessed
Queen Charlotte Islands Fescue	<i>Festuca pseudovivipara</i>	G2	not assessed
Roberts' Fescue	<i>Festuca saximontana</i> var. <i>robertsiana</i>	TU	not assessed
a liverwort	<i>Frullania hattoriana</i>	G3	not assessed
Queen Charlotte Avens	<i>Geum schofieldii</i>	G3	not assessed
Northern Pygmy-Owl swarthi subspecies	<i>Glaucidium gnoma swarthi</i>	T3	not assessed
Scudder's Rock Crawler	<i>Grylloblatta scudderi</i>	GU	not assessed
Vancouver Island Wolverine	<i>Gulo gulo vancouverensis</i>	TH	not assessed
Vancouver Island Blue	<i>Plebejus saepiolus insulanus</i>	TH	Endangered
Vancouver Island White-tailed Ptarmigan	<i>Lagopus leucura saxatilis</i>	T3	not assessed
a noctuid moth	<i>Lasionycta gelida</i>	G3	not assessed
a noctuid moth	<i>Lasionycta haida</i>	G1	not assessed
Macoun's Meadowfoam	<i>Limnanthes macounii</i>	G2	Threatened
Vancouver Island Marmot	<i>Marmota vancouverensis</i>	G1	Endangered
Triangle Island Vole	<i>Microtus townsendii cowani</i>	T1	not assessed
a vole	<i>Microtus townsendii laingi</i>	TNR	not assessed

Common Name	Scientific Name	Global Rank	COSEWIC
A vole	<i>Microtus townsendii tetramerus</i>	TNR	not assessed
a momphid moth	<i>Mompha nancyae</i>	GU	not assessed
Vancouver Island Ermine	<i>Mustela erminea anguinae</i>	T3	not assessed
Queen Charlotte Islands Ermine	<i>Mustela erminea haidarum</i>	T2	Threatened
a millipede	<i>Nearctodesmus insularis</i>	G1	not assessed
a ground beetle	<i>Nebria charlottae</i>	G2	not assessed
a ground beetle	<i>Nebria haida</i>	GU	not assessed
a ground beetle	<i>Nebria louiseae</i>	G2	not assessed
a cuckoo bee	<i>Neopasites aff. fulviventris</i>	GNR	not assessed
Selkirk Least Chipmunk	<i>Neotamias minimus selkirki</i>	T1	not assessed
Hotwater Physa	<i>Physella wright</i>	G1	Endangered
Queen Charlotte Pine Grosbeak	<i>Pinicola enucleator carlottae</i>	T3	not assessed
Okanagan Robber Fly	<i>Efferia okanagana</i>	G1	Endangered
Constricted Black Fly	<i>Prosimulium constrictistylum</i>	G2	not assessed
a leafhopper	<i>Psammotettix diadematus</i>	GNR	not assessed
an amphipod	<i>Ramellogammarus vancouverensis</i>	G1	not assessed
Dawson Caribou	<i>Rangifer tarandus dawsoni</i>	TX	Extinct
Queen Charlotte Island Buttercup	<i>Ranunculus occidentalis</i> var. <i>hexasepalus</i>	G3	not assessed
Taylor's Saxifrage	<i>Saxifraga taylorii</i>	G3	not assessed
Carey Small Limestone Moss	<i>Seligeria careyana</i>	G2	Endangered
Newcombe's Butterweed	<i>Sinosenecio newcombei</i>	G3	not assessed
Vancouver Island Water Shrew	<i>Sorex navigator brooksi</i>	T2	not assessed
Chilcotin Fritillary	<i>Speyeria callippe chilcotinensis</i>	T4	not assessed
Haida Gwaii Slug	<i>Staala gwaii</i>	G2	Special Concern
Boreal Northern Bog Lemming	<i>Synaptomys borealis borealis</i>	T4	not assessed
Creston Northern Pocket Gopher	<i>Thomomys talpoides segregatus</i>	T2	not assessed
a crambid snout moth	<i>Udea derasa</i>	GNR	not assessed
a crambid snout moth	<i>Udea saxifragae</i>	GNR	not assessed
a leafhopper	<i>Unoka dramatica</i>	GNR	not assessed
Kermode Bear	<i>Ursus americanus kermodei</i>	T4	not assessed
Queen Charlotte Islands Violet	<i>Viola biflora</i> var. <i>carlottae</i>	T3	not assessed
Carlott's Wijkia Moss	<i>Wijkia carlottae</i>	G3	not assessed
a geometrid moth	<i>Xanthorhoe clarkeata</i>	G2	not assessed
a liverwort	<i>Cephaloziella brinkmanii</i>	GH	not assessed

Global Rank: GX (Presumed Extinct), GH (Possibly Extinct), G1 (Critically Imperilled), G2 (Imperilled), G3 (Vulnerable), G4 (Apparently Secure), G5 (Secure); Rounded Global Rank provided in table

Other Ranks and Qualifiers: T (Intraspecific Taxon), U (Unrankable), NR (Not Ranked)



Vancouver Island Marmot (Photo by bradenjudson/iNaturalist)

Manitoba

There are 31 nationally endemic species that have been documented from Manitoba. Eight are subspecies or varieties, and none have questionable taxonomy. Over two-thirds of nationally endemic species found in Manitoba are invertebrates. A significant portion of breeding habitat for Harris's Sparrow (*Zonotrichia querula*) occurs in northern Manitoba.

Seven nationally endemic species only occur in Manitoba (Table 7). Most of these are weevils and other insects that have only been found in Manitoba prairies.

Many of the Canadian endemic species that occur in this province are associated with the coast of Hudson Bay, or also found in the territories or prairie and boreal ecoregions shared with Saskatchewan. Lori's Water-lily (*Nymphaea loriana*) was first described in 2008 (Borsch, Wiersema *et al.*, 2014). This plant appears to be restricted to just a few populations in Saskatchewan and Manitoba.



Harris's Sparrow (Photo by Paula Savage/iNaturalist)

Only seven of the endemic species that occur in Manitoba are ranked by NatureServe as globally Secure or Apparently Secure, and almost half are currently Unrankable or Unranked. Many of these are arthropods that have only recently been described. None of the nationally endemic species restricted to Manitoba have been assessed by COSEWIC. Whooping Crane (*Grus americana*) once nested in Manitoba, but now only occurs as a migrant.

The Hudson Bay Coast hotspot of Canadian endemic species occurs in northern Manitoba (Figure 3).

Table 7: Canadian Endemic Species Restricted to Manitoba

Common Name	Scientific Name	Global Rank	COSEWIC Status
a weevil	<i>Apinocis subaequalis</i>	GU	not assessed
a weevil	<i>Ceutorhynchus convexipennis</i>	GU	not assessed
a weevil	<i>Ceutorhynchus hearnei</i>	GU	not assessed
a weevil	<i>Ceutorhynchus munki</i>	GU	not assessed
a rove beetle	<i>Lypoglossa manitobae</i>	G2	not assessed
Passive Small Minnow Mayfly	<i>Procloeon in anum</i>	GU	not assessed
a noctuid moth	<i>Schinia sexata</i>	GU	not assessed

Global Rank: GX (Presumed Extinct), GH (Possibly Extinct), G1 (Critically Imperilled), G2 (Imperilled), G3 (Vulnerable), G4 (Apparently Secure), G5 (Secure); Rounded Global Rank provided in table

Other Ranks and Qualifiers: T (Intraspecific Taxon), U (Unrankable), NR (Not Ranked)

New Brunswick

New Brunswick has 17 nationally endemic species. This includes five subspecies or varieties, and two of the species have questionable taxonomy. Over half of the nationally endemic species from New Brunswick are vascular plants and butterflies (Table 8).

Due to its shared ecoregions with Quebec and Nova Scotia, there is only one endemic species restricted to New Brunswick. This rove beetle (*Mitosynum vockerothi*) has been collected from only three sites in New Brunswick, including where it was originally discovered along the edge of a sphagnum bog in Kouchibouguac National Park (Campbell, 1982).



Maritime Ringlet (Photo by kmelville/iNaturalist)

Many of the nationally endemic species that occur in New Brunswick are associated with coastal marshes along the Gulf of St. Lawrence. These include three species of butterflies: Maritime Ringlet (*Coenonympha nipisiquit*), Salt Marsh Copper (*Lycaena dospassosi*) and Short-tailed Swallowtail (*Papilio brevicauda bretonensis*). New Brunswick also includes a significant portion of the range for Maritime Shrew (*Sorex maritimensis*). The population of this species may be declining due to changes in its habitat (Reid, 2016). Maritime Shrew only occurs in New Brunswick and Nova Scotia. Labrador Duck (*Camptorhynchus labradorius*) probably bred along the Gulf of St. Lawrence and coastal Labrador, wintering from Nova Scotia south to Florida (BirdLife International, 2016). The last confirmed specimen was collected off Long Island, New York, in 1875 (Chilton, 1997).

Three of the endemic species that occur in this province are ranked by NatureServe as globally Secure or Apparently Secure, and four have been assessed by COSEWIC. Two species are currently Unrankable or Unranked.

Two hotspots for nationally endemic species have been identified from New Brunswick: Upper Bay of Fundy and Gulf of St. Lawrence (Figure 3).

Table 8: Canadian Endemic Species Restricted to New Brunswick

Common Name	Scientific Name	Global Rank	COSEWIC Status
a rove beetle	<i>Mitosynum vockerothi</i>	G1	not assessed

Global Rank: GX (Presumed Extinct), GH (Possibly Extinct), G1 (Critically Imperilled), G2 (Imperilled), G3 (Vulnerable), G4 (Apparently Secure), G5 (Secure); Rounded Global Rank provided in table

Other Ranks and Qualifiers: T (Intraspecific Taxon), U (Unrankable), NR (Not Ranked)

Newfoundland and Labrador

Newfoundland and Labrador has a very high richness of nationally endemic species, almost all of which occur on the island of Newfoundland. Forty species have been documented, a richness that exceeds many larger provinces and territories. These include 14 subspecies or varieties. Two species, Newfoundland Floater (*Pyganodon fragilis*) and Red Crossbill (*Loxia curvirostra percna*), have questionable taxonomy. Nineteen of the nationally endemic species from Newfoundland and Labrador are vascular plants and 16 are invertebrates.

Over one-quarter of the nationally endemic species found in Newfoundland and Labrador do not occur in other jurisdictions (Table 9). Fernald's Braya (*Braya fernaldii*), Long's Braya (*Braya longii*) and Barrens Willow (*Salix jejuna*) are restricted to the unique limestone barrens of the Great Northern Peninsula, along the Strait of Belle Isle. The Newfoundland Vallonia Snail (*Vallonia terraenovae*) is also restricted to the west coast of the island.

Newfoundland and Labrador's most well-known endemic species may be the Newfoundland subspecies of American Marten (*Martes americana atrata*). Its range is restricted to the island of Newfoundland and represents a genetically and geographically distinct population of the more widely distributed American Marten found across the boreal region of North America (Kyle & Strobeck, 2003). A new species of endemic fungus, Gros Morne Cortinarius (*Cortinarius grosmorneënsis*), was recently described from Gros Morne National Park in Newfoundland (Niskanen, Liimatainen *et al.*, 2012).

Several Canadian endemic species occur in Newfoundland and Labrador that are more widely distributed. Ungava Collared Lemming (*Dicrostonyx hudsonius*) only occurs in the tundra of northern Labrador and Quebec. Labrador Snowfly (*Utacapnia labradora*) also ranges from Labrador into northern Quebec. Several Gulf of St. Lawrence endemics also occur here, including Gulf of St. Lawrence Dandelion (*Taraxacum laurentianum*) and Griscom's Arnica (*Arnica griscomii* ssp. *griscomii*). The *percna* subspecies of the Red Crossbill was thought to be restricted as breeding species to Newfoundland, but breeding was recently documented from Anticosti Island in Quebec.

Twelve of the nationally endemic species that occur in Newfoundland and Labrador are ranked by NatureServe as globally Secure or Apparently Secure. Many of these are widespread northern species, such as Allen's Buttercup (*Ranunculus allenii*). Others, such as Limestone Scurvygrass (*Cochlearia tridactylites*), are secure only because of the large populations in Newfoundland and Labrador. Ten species, primarily arthropods, are currently Unrankable or Unranked. Eight nationally endemic species that occur in Newfoundland and Labrador have been assessed by COSEWIC, including three endemic plants restricted to limestone barrens. Labrador Duck (*Camptorhynchus labradorius*) once likely bred in Labrador but is now extinct.

Five hotspots for nationally endemic species have been identified from Newfoundland and Labrador: Avalon Peninsula, Southwest Newfoundland, Northern Peninsula, Strait of Belle Isle and Central Labrador Coast (Figure 3).

Table 9: Canadian Endemic Species Restricted to Newfoundland and Labrador

Common Name	Scientific Name	Global Rank	COSEWIC Status
Nebraska Fritillary	<i>Boloria selene terraenovae</i>	T4	<i>not assessed</i>
a bumble bee	<i>Bombus vagans bolsteri</i>	TNR	<i>not assessed</i>
Fernald's Braya	<i>Braya fernaldii</i>	G1	Endangered
Long's Braya	<i>Braya longii</i>	G1	Endangered
Newfoundland Chickweed	<i>Cerastium terrae-novae</i>	G1	<i>not assessed</i>
Gros Morne Cortinarius	<i>Cortinarius grosmorneënsis</i>	GU	<i>not assessed</i>
a glass miner moth	<i>Elachista beorella</i>	GNR	<i>not assessed</i>
a carpet moth	<i>Hydrelia terraenovae</i>	GU	<i>not assessed</i>
Barrens Willow	<i>Salix jejuna</i>	G1	Endangered
Newfoundland Vallonia Snail	<i>Vallonia terraenovae</i>	G2	<i>not assessed</i>
American Marten Newfoundland subspecies	<i>Martes americana atrata</i>	T1	Threatened

Global Rank: GX (Presumed Extinct), GH (Possibly Extinct), G1 (Critically Imperilled), G2 (Imperilled), G3 (Vulnerable), G4 (Apparently Secure), G5 (Secure); Rounded Global Rank provided in table

Other Ranks and Qualifiers: T (Intraspecific Taxon), U (Unrankable), NR (Not Ranked)



Newfoundland Pine Marten (Photo by Bailey Parsons)

Northwest Territories

The Northwest Territories has 32 nationally endemic species. This includes 12 subspecies or varieties, and none of the species have questionable taxonomy. Almost one-half of the nationally endemic species from the Northwest Territories are vascular plants.

Five Canadian endemic species are entirely restricted to the Northwest Territories (Table 10). While the Nahanni Arctic (*Oeneis uhleri nahanni*) has a wider distribution, the Nahanni Aster (*Symphyotrichum nahanniense*) is restricted to Nahanni National Park Reserve. The entire global distribution of the Mackenzie River Yellowcress (*Rorippa crystallina*) is only known from a small area near Great Slave Lake and Sand Bluegrass (*Poa ammophila*) is restricted to the Mackenzie River Delta region. Hairy Braya (*Braya pilosa*) which was first collected during the Franklin expedition in 1826, is restricted to the Cape Bathurst Peninsula and Baillie Islands. Despite its remote location, this species is highly threatened by climate change and rising sea levels.

Many of the nationally endemic species that occur in the Northwest Territories also occur in other northern regions of Canada. These include Mount Sheldon Ragwort (*Senecio sheldonensis*) and Raup's Willow (*Salix raupii*), which range from the northern Rockies into the Mackenzie Mountains, and the Arctic False Wallflower (*Parrya arctica*), a colourful wildflower found across the Arctic. A substantial portion of the breeding range of Harris's Sparrow (*Zonotrichia querula*) occurs in the Northwest Territories.

Twelve of the nationally endemic species that occur in this territory are ranked by NatureServe as globally Secure or Apparently Secure. Six species, primarily arthropods, are currently Unrankable or Unranked. Only seven of the nationally endemic species that occur here have been assessed by COSEWIC. This includes Whooping Crane (*Grus americana*) and Wood Bison (*Bison bison athabasca*), which are both found in Wood Buffalo National Park. There are eight species of global conservation concern that have not been assessed by COSEWIC. This include Arctic Orangebrush Lichen (*Seiophora aurantiaca*) (G1), which is restricted to a small area on Banks Island (Brodo, Sharnoff *et al.*, 2001).

Mackenzie Delta and Sachs Harbour are hotspots for nationally endemic species in the Northwest Territories (Figure 3).

Table 10: Canadian Endemic Species Restricted to Northwest Territories

Common Name	Scientific Name	Global Rank	COSEWIC Status
Hairy Braya	<i>Braya pilosa</i>	G2	Endangered
Nahanni Arctic	<i>Oeneis uhleri nahanni</i>	TNR	<i>not assessed</i>
Sand Bluegrass	<i>Poa ammophila</i>	G3	<i>not assessed</i>
Mackenzie River Yellowcress	<i>Rorippa crystallina</i>	G2	<i>not assessed</i>
Nahanni Aster	<i>Symphyotrichum nahanniense</i>	G3	Special Concern

Global Rank: GX (Presumed Extinct), GH (Possibly Extinct), G1 (Critically Imperilled), G2 (Imperilled), G3 (Vulnerable), G4 (Apparently Secure), G5 (Secure); Rounded Global Rank provided in table

Other Ranks and Qualifiers: T (Intraspecific Taxon), U (Unrankable), NR (Not Ranked)



Hairy Braya (Photo by springlake1/iNaturalist)

Nova Scotia

For its size, Nova Scotia has an extraordinary richness of nationally endemic species. Twenty-eight species have been documented, a richness similar to larger regions, including Ontario, Manitoba and Nunavut. These include 10 subspecies or varieties. One species, Maritime Needlefly (*Leuctra baddecka*), has questionable taxonomy. Eight of the nationally endemic species from Nova Scotia are vascular plants and 15 are invertebrates.

Over 40 percent of the national endemic species found in Nova Scotia do not occur in other jurisdictions (Table 11). This percentage of subnational endemics is only greater in British Columbia and Yukon. Six of these are insects that occur on Sable Island, such as Sable Island Sweat Bee (*Lasioglossum sablense*). During the last period of glaciation, sea levels were 120 metres lower, and Sable Island was part of a large refugia that occurred along the Continental Shelf (Wright, 1989). Species like the Sable Island Sweat Bee were unable to reach the mainland as sea levels rose and they became isolated on the island.

Atlantic Whitefish (*Coregonus huntsmani*) occurs in southwestern Nova Scotia. It once lived in the sea and spawned in freshwater lakes, but it is now landlocked to the Petite Rivière watershed and could go extinct without captive rearing and translocations. Nova Scotia Ladies'-tresses (*Spiranthes casei* var. *novaescotiae*) is a smaller version of the more widespread Case's Ladies'-tresses. It grows in open sand barrens and occasionally roadsides in southwestern Nova Scotia (Catling, 1981).

Several Canadian endemic species that occur in Nova Scotia have larger ranges. Many of these occur in coastal habitats, including Nova Scotia Shore Tiger Beetle (*Cicindela repanda novascotiae*) and Rocky Shore Sedge (*Carex viridula* var. *saxilittoralis*).

Only two of the nationally endemic species that occur in this province are ranked by NatureServe as globally Secure or Apparently Secure. Labrador Duck (*Camptorhynchus labradorius*) once wintered (and possibly bred) in waters off Nova Scotia but is now extinct. The Sable Island Leaf Beetle (*Tricholochmaea sablensis*) once occurred in a freshwater pond on Sable Island, but, despite searches, has not been recorded in over 50 years and may be extinct. Seven species, all arthropods, are currently Unrankable or Unranked. Only three of the nationally endemic species that occur in Nova Scotia have been assessed by COSEWIC, including Labrador Duck. Atlantic Whitefish is assessed as Endangered in Canada by COSEWIC and Critically Endangered on the IUCN Red List of Threatened Species and may be on the brink of extinction.

Nova Scotia has two hotspots for national endemic species: Sable Island and the Upper Bay of Fundy (Figure 3).

Table 11: Canadian Endemic Species Restricted to Nova Scotia

Common Name	Scientific Name	Global Rank	COSEWIC Status
Sable Island Cutworm Moth	<i>Agrotis arenarius</i> *	G1	Candidate
Bordered Apamea Moth	<i>Apamea sordens sableana</i> *	TU	<i>not assessed</i>
Atlantic Whitefish	<i>Coregonus huntsmani</i>	G1	Endangered
Sable Island Eucosma	<i>Eucosma sableana</i> *	G1	Candidate
a bark beetle	<i>Ips borealis thomasi</i>	TNR	<i>not assessed</i>
Sable Island Sweat Bee	<i>Lasioglossum sablense</i> *	G1	Threatened
Maritime Needlefly	<i>Leuctra baddecka</i>	GU	<i>not assessed</i>
White-marked Tussock Moth (Sable Island spp.)	<i>Orgyia leucostigma sablensis</i>	TU	<i>not assessed</i>
Sable Island Borer	<i>Papaipema</i> sp. 6*	G1	<i>not assessed</i>
Nova Scotia Ladies'-tresses	<i>Spiranthes casei</i> var. <i>novaescotiae</i>	T2	Candidate
Sable Island Leaf Beetle	<i>Tricholochmaea sablensis</i> *	GH	Candidate
a beard lichen	<i>Usnea fibrillosa</i>	G1	<i>not assessed</i>

***restricted to Sable Island**

Global Rank: GX (Presumed Extinct), GH (Possibly Extinct), G1 (Critically Imperilled), G2 (Imperilled), G3 (Vulnerable), G4 (Apparently Secure), G5 (Secure); Rounded Global Rank provided in table

Other Ranks and Qualifiers: T (Intraspecific Taxon), U (Unrankable), NR (Not Ranked)



Rocky Shore Sedge (Photo by agbelliveau/iNaturalist)

Nunavut

Canada's largest territory has 29 nationally endemic species. This includes 13 subspecies or varieties. None of the species have questionable taxonomy, although some have only been recently described. Prostrate Braya (*Braya glabella* ssp. *prostrata*) has been described based on a single site, and the plant was not in flower or fruit (Al-Shehbaz & Mulligan, 2014). Over one-half of the nationally endemic species from Nunavut are vascular plants.

Five Canadian endemic species are found only in Nunavut (Table 12), including two butterflies. Johansen's Sulphur (*Colias johanseni*) is only found on the dry tundra at Bernard Harbour in Nunavut. Rankin Inlet Sulphur (also known as the Kivalliq Sulphur) (*Colias rankinensis*) is more widespread and has been recorded in several locations across mainland Nunavut (Schmidt, 2018).

Many of the nationally endemic species found in Nunavut occur in the Northwest Territories and northern sections of adjacent provinces. Limestone Willow (*Salix calcicola* var. *calcicola*) is a widespread national endemic found along coastal areas, sand dunes and sandy or silty deposits along streams in eastern Canada's Arctic (Aiken, Dallwitz *et al.*, 2007). Cayouette's Draba (*Draba cayouettei*), previously only known from Quebec, was recently identified from Nunavut in 2014 (Al-Shehbaz & Mulligan, 2014). Peary Caribou (*Rangifer tarandus pearyi*) is endemic to the Canadian Arctic archipelago. Occasionally, individuals or small herds wander into Greenland, but the calving grounds are in Canada. A substantial portion of the breeding range of Harris's Sparrow (*Zonotrichia querula*) also occurs in Nunavut.

Nine of the nationally endemic species that occur in Nunavut are ranked by NatureServe as globally Secure or Apparently Secure. Six species are currently Unrankable or Unranked, including two Braya subspecies endemic to Ellesmere Island: Ellesmere Island Braya (*Braya humilis* ssp. *ellesmerensis*) and Prostrate Braya (*Braya glabella* ssp. *prostrata*). Only five of the nationally endemic species that occur in Nunavut have been assessed by COSEWIC, including Harris's Sparrow. There are eight globally imperilled species that have not been assessed by COSEWIC, including Kivalliq Sulphur and Natazhati Fritillary (*Boloria natazhati bankslandia*). None of the nationally endemic species restricted to Nunavut have been assessed by COSEWIC.

Two hotspots for nationally endemic species have been identified from Nunavut: Kugluktuk on the northern coast of the mainland and the Hudson Bay Coast (Figure 3).

Table 12: Canadian Endemic Species Restricted to Nunavut

Common Name	Scientific Name	Global Rank	COSEWIC Status
Prostrate Braya	<i>Braya glabella ssp. prostrata</i>	TU	not assessed
Ellesmere Island Braya	<i>Braya humilis ssp. ellesmerensis</i>	TU	not assessed
Johansen's Sulphur	<i>Colias johanseni</i>	G2	not assessed
Rankin Inlet Sulphur	<i>Colias rankinensis</i>	G2	not assessed
a screw moss	<i>Tortula cuneifolia var. blissii</i>	TU	not assessed

Global Rank: GX (Presumed Extinct), GH (Possibly Extinct), G1 (Critically Imperilled), G2 (Imperilled), G3 (Vulnerable), G4 (Apparently Secure), G5 (Secure); Rounded Global Rank provided in table

Other Ranks and Qualifiers: T (Intraspecific Taxon), U (Unrankable), NR (Not Ranked)



Peary Caribou (Photo by Émilie Desjardins/iNaturalist)

Ontario

Ontario has a total of 28 endemic species. One-third are subspecies or varieties, and three species have questionable taxonomy. Most nationally endemic species found in Ontario are vascular plants and invertebrates.

Nine of Ontario's endemic species are entirely restricted to the province (Table 13). These species include a small scavenger beetle (*Hydnobius autumnalis*) that is only known from eastern Ontario; Slender Notchwort (*Crossocalyx tenuis*), a liverwort that has only been found on the Bruce Peninsula and Eugenia Falls on the Niagara Escarpment; a lichen (*Myriolecis carlottiana*) that only occurs on the Bruce Peninsula and Manitoulin Island; and Cain's Screw Moss (*Syntrichia cainii*), that is restricted to alvars. The only other moss species restricted to Ontario is now believed to be extinct. Macoun's Shining Moss (*Neomacounia nitida*) was first found in 1864 in elm and cedar swamps near Belleville and has only ever been known from those original collections. The original site had been cleared by 1892, and this moss has never been found again despite searches in 1972 and 2001 (COSEWIC, 2002).

Most Canadian endemic species that occur in Ontario are found in northern areas and in adjacent provinces. The core population of Eastern Wolf (*Canis sp. cf. lycaon*) occurs in Ontario's Algonquin Provincial Park, with scattered records from eastern Quebec.

All but eight of the endemic species that occur here are of global conservation concern and six are currently Unrankable or Unranked. With the exception of Macoun's Shining Moss, none of the nationally endemic species restricted to Ontario has been assessed by COSEWIC. False Northwestern Moonwort (*Botrychium pseudopinnatum*), a small fern that occurs in sandy soils and has only been documented from six sites along northern Lake Superior and the Hudson Bay region, is currently on the candidate list.

The Hudson Bay Coast hotspot of Canadian endemic species occurs in northern Ontario (Figure 3).

Table 13: Canadian Endemic Species Restricted to Ontario

Common Name	Scientific Name	Global Rank	COSEWIC Status
False Northwestern Moonwort	<i>Botrychium pseudopinnatum</i>	G1	not assessed
Slender Notchwort	<i>Crossocalyx tenuis</i>	G1	not assessed
a small scavenger beetle	<i>Hydnobius autumnalis</i>	G1	not assessed
Guarded Guest Thin Ant	<i>Leptothorax paraxenus</i>	GU	not assessed
a rust fly	<i>Loxocera ojbwayensis</i>	GNR	not assessed
a lichen	<i>Myriolecis carlottiana</i>	G2	not assessed
Macoun's Shining Moss	<i>Neomacounia nitida</i>	GX	Extinct
Insignificant Small Minnow Mayfly	<i>Procloeon insignificans</i>	GU	not assessed
Cain's Screw Moss	<i>Syntrichia cainii</i>	G1	not assessed

Global Rank: GX (Presumed Extinct), GH (Possibly Extinct), G1 (Critically Imperilled), G2 (Imperilled), G3 (Vulnerable), G4 (Apparently Secure), G5 (Secure); Rounded Global Rank provided in table

Other Ranks and Qualifiers: T (Intraspecific Taxon), U (Unrankable), NR (Not Ranked)



Cain's Screw Moss (Photo by Jennifer Doubt, Canadian Museum of Nature)

Prince Edward Island

The smallest of Canada's territories and provinces, Prince Edward Island (PEI) has seven nationally endemic species. This includes two subspecies or varieties, and none of the species have questionable taxonomy. Five of the nationally endemic species from PEI are vascular plants.

All of the nationally endemic species recorded from PEI occur in other Maritime provinces. Several of these are associated with the Gulf of St. Lawrence, including Gulf of St. Lawrence Aster (*Symphotrichum laurentianum*) and Salt Marsh Copper (*Lycaena dospassosi*). The global range of Gulf of St. Lawrence Beach Pinweed (*Lechea maritima* var. *subcylindrica*) is restricted to the sand dunes of New Brunswick and the northern coast of PEI (Environment Canada, 2013). The nationally endemic shrub, Fernald's Serviceberry (*Amelanchier fernaldii*), also occurs in the province but is very rare.

Five of the nationally endemic species that occur here are ranked by NatureServe as globally Imperilled. Two species are currently Unrankable or Unranked. Gulf of St. Lawrence Aster and Gulf of St. Lawrence Beach Pinweed have been assessed by COSEWIC in risk categories.

One hotspot for nationally endemic species has been identified from the northern coast of Prince Edward Island (Figure 3).

Quebec

Quebec has 57 nationally endemic species, the second highest number in Canada. This includes 17 subspecies or varieties, and six species have questionable taxonomy. Over 40% of the nationally endemic species from Quebec are vascular plants and seven are butterflies or moths.

Sixteen nationally endemic species can only be found in Quebec (Table 14). These occur in several key places in the province. The Gaspé Peninsula provides habitat for Quebec Rockcress (*Boechera quebecensis*), Gaspé Saxifrage (*Micranthes gaspensis*) and Gaspésie Grasshopper (*Melanoplus gaspesiensi*). Quebec also has a high number of endemic species that are associated with the Gulf of St. Lawrence such as Gulf of St. Lawrence Aster (*Symphotrichum laurentianum*) and Maritime Ringlet (*Coenonympha nipisiquit*). Copper Redhorse (*Moxostoma hubbsi*) and Ungava Seal (*Phoca vitulina mellonae*) also only occur in Quebec. Copper Redhorse is restricted to a small area of the St. Lawrence River and the des Prairies and Richelieu rivers. Ungava Seal is the only seal that lives in Canada that is restricted to fresh water. It inhabits a small series of lakes in northern Quebec and may number fewer than 100 individuals.

Some nationally endemic species in Quebec are northern species that are shared with other provinces and territories. This includes the Nearctic Mason Bee (*Osmia nearctica*), Subarctic Dock (*Rumex subarcticus*) and Limestone Willow (*Salix calcicola* var. *calcicola*). Many of Quebec's nationally endemic species also extend into the Maritime provinces, such as Short-tailed Swallowtail (*Papilio brevicauda bretonensis* and *P. b. brevicauda*), Gaspé Aster (*Symphotrichum novi-belgii* var. *crenifolium*) and Fernald's Serviceberry (*Amelanchier fernaldii*.) Dense Draba (*Draba pycnosperma* is now probably extirpated from Newfoundland and the world's largest population occurs in the Percé region of the Gaspé Peninsula.

Only eight of the endemic species that occur in the province are ranked by NatureServe as globally Secure or Apparently Secure. Nine species, primarily arthropods, are currently Unrankable or Unranked. Fifteen nationally endemic species that occur in Quebec have been assessed by COSEWIC. Many of these have been assessed as Endangered or Threatened, including Copper Redhorse, Quebec Rockcress, Ungava Seal and Maritime Ringlet. The Gatineau Tadpole Snail (*Physa gyrina latchfordi*), known only from a few lakes in Gatineau Park, is currently assessed as Data Deficient.

Three hotspots for nationally endemic species have been identified from Quebec: St. Lawrence River Freshwater Estuary, Mingan and Gaspésie (Figure 3).

Table 14: Canadian Endemic Species Restricted to Quebec

Common Name	Scientific Name	Global Rank	COSEWIC Status
Quebec Rockcress	<i>Boechera québecensis</i>	G1	Endangered
Round-fruited Sedge	<i>Carex deweyana</i> var. <i>collectanea</i>	T1	<i>not assessed</i>
Victorin's Water-hemlock	<i>Cicuta maculata</i> var. <i>victorinii</i>	T3	Special Concern
Puvirnitug Mountain Draba	<i>Draba puvirnitugii</i>	G1	Special Concern
Boreal Three-way Sedge	<i>Dulichium arundinaceum</i> var. <i>boreale</i>	TNR	<i>not assessed</i>
Ojibway Waterwort	<i>Elatine ojibwayensis</i>	G1	<i>not assessed</i>
Victorin's Fringed Gentian	<i>Gentianopsis virgata</i> ssp. <i>victorinii</i>	G2	Threatened
Gaspésie Grasshopper	<i>Melanoplus gaspensis</i>	G2	<i>not assessed</i>
Magdalen Island Grasshopper	<i>Melanoplus madeleineae</i>	G2	Special Concern
Sugluk Snowfly	<i>Mesocapnia sugluka</i>	GNR	<i>not assessed</i>
Gaspé Saxifrage	<i>Micranthes gaspensis</i>	G2	<i>not assessed</i>
Copper Redhorse	<i>Moxostoma hubbsi</i>	G1	Endangered
Ungava Seal	<i>Phoca vitulina mellonae</i>	T1	Endangered
Mount Lyall Flat-headed Mayfly	<i>Rhithrogena gaspeensis</i>	GNR	<i>not assessed</i>
Green-scaled Willow	<i>Salix chlorolepis</i>	G1	Threatened
Mt. Albert Goldenrod	<i>Solidago chlorolepis</i>	T2	<i>not assessed</i>

Global Rank: GX (Presumed Extinct), GH (Possibly Extinct), G1 (Critically Imperilled), G2 (Imperilled), G3 (Vulnerable), G4 (Apparently Secure), G5 (Secure); Rounded Global Rank provided in table

Other Ranks and Qualifiers: T (Intraspecific Taxon), U (Unrankable), NR (Not Ranked)

Saskatchewan

Saskatchewan has 36 nationally endemic species. This includes 13 subspecies or varieties, and none of the species has questionable taxonomy. Over half of the nationally endemic species from Saskatchewan are vascular plants. These are primarily willows (*Salix* sp.) associated with northern sand dunes, and hawthorns (*Crataegus* sp.) found in and around the Cypress Hills.

Ten of Canada's endemic species are only found in Saskatchewan (Table 15). These are primarily vascular plants that are restricted to the Saskatchewan portion of the Athabasca Sand Dunes and Cypress Hills. In addition, the global range of the endemic geometrid moth (*Animomyia hardwicki*) is restricted to the Great Sand Hills.

There are several nationally endemic species that are more widespread in the prairie and boreal ecozones. Margaret's Diving Beetle (*Agabus margaretae*) is known only from the shortgrass prairies and aspen parklands of Alberta and Saskatchewan, where it occurs in vernal, grassland ponds (Larson, Alarie *et al.*, 2000). Several endemic weevils are also known from the prairie ecozone in Saskatchewan. Nationally endemic species in Saskatchewan's boreal ecozones include Woodland Tiger Moth (*Dodia tarandus*) and Lori's Water-lily (*Nymphaea loriana*).

Only five of the endemic species that occur in this province are ranked by NatureServe as globally Secure or Apparently Secure. Eight species, primarily arthropods, are currently Unrankable or Unranked. All nationally endemic vascular plants restricted to Saskatchewan's Athabasca region have been assessed by COSEWIC. These have all been assessed as Special Concern or Not at Risk because they have a limited geographic range, but few threats.

Two hotspots for nationally endemic species have been identified from Saskatchewan: Cypress Hills and Lake Athabasca (Figure 3).

Table 15: Canadian Endemic Species Restricted to Saskatchewan

Common Name	Scientific Name	Global Rank	COSEWIC Status
Large-headed Woolly Yarrow	<i>Achillea millefolium</i> var. <i>megacephala</i>	T1	Special Concern
a geometrid moth	<i>Animomyia hardwicki</i>	G2	<i>not assessed</i>
Athabasca Thrift	<i>Armeria maritima</i> ssp. <i>interior</i>	T1	Special Concern
a weevil	<i>Ceutorhynchus dubitans</i>	GU	<i>not assessed</i>
Loch Lomond Hawthorn	<i>Crataegus purpurella</i>	GNR	<i>not assessed</i>
Saskatchewan Hawthorn	<i>Crataegus sheila-hippsiae</i> var. <i>saskatchewanensis</i>	TNR	<i>not assessed</i>
Sand-dune Short-capsuled Willow	<i>Salix brachycarpa</i> var. <i>psammophila</i>	T3	Special Concern
Turnor's Willow	<i>Salix turnorii</i>	G2	Special Concern
Subarctic Lake Stagnicola	<i>Stagnicola catascopium preblei</i>	TU	<i>not assessed</i>
Floccose Tansy	<i>Tanacetum huronense</i> var. <i>floccosum</i>	T3	Special Concern

Global Rank: GX (Presumed Extinct), GH (Possibly Extinct), G1 (Critically Imperilled), G2 (Imperilled), G3 (Vulnerable), G4 (Apparently Secure), G5 (Secure); Rounded Global Rank provided in table

Other Ranks and Qualifiers: T (Intraspecific Taxon), U (Unrankable), NR (Not Ranked)

Yukon

Yukon has 43 nationally endemic species. This includes 12 subspecies or varieties, and none of the species have questionable taxonomy. Fifteen of the nationally endemic species from Yukon are vascular plants and 18 are butterflies or moths.

Almost half of the species are entirely endemic to Yukon (Table 16). This richness of subnational endemics is second only to British Columbia. These are primarily vascular plants and insects that are often restricted to small regions and specialized habitats, including the Ogilvie Mountains and Kluane National Park. These include Glass Miner Moth (*Elachista cicadella*), Ogilvie Mountains Spring Beauty (*Claytonia ogilviensis*) and Kluane Draba (*Draba kluanei*). The Ogilvie Mountains Collared Lemming (*Dicrostonyx nunatakensis*) is found only in a restricted area of the Ogilvie Mountains in north-central Yukon. The endemic Klaza Draba (*Draba brucebennettii*) was only discovered in 2012 from the Langham and Tritop mountains in the Dawson Range (Al-Shehbaz, 2016). Other nationally endemic species that only occur in Yukon include Yukon Grasshopper (*Bruneria yukonensis*), found in the grasslands of southwestern and central Yukon. Yukon Goldenweed (*Nestotus macleanii*) is restricted to grasslands in south-central Yukon. The species is known from 49 sites, all of which have been mapped by Yukon Conservation Data Centre. Although much more abundant than originally thought and assessed as Not at Risk by COSEWIC, Yukon Goldenweed is still vulnerable to the effects of habitat shift through climate change and development, as none of the sites are protected.

Several Canadian endemic species that occur in Yukon have large ranges that extend into the Northwest Territories and British Columbia. Elko Paintbrush (*Castilleja miniata* var. *fulva*) extends south of Yukon border into much of the Peace River Valley. Western Arctic Pondsail (*Stagnicola kennicotti*) also occurs in the Northwest Territories and Nunavut. There are a high number of ecoregional endemic species in Yukon associated with the Beringia region that also occur in adjacent Alaska. This unglaciated region served as both a land bridge for migrations between North America and Asia and as an important glacial refugia for many species of insects and plants during the last Ice Age.

Only nine of the nationally endemic species that occur in Yukon are ranked by NatureServe as globally Secure or Apparently Secure. Thirteen species, primarily arthropods, are currently Unrankable or Unranked. Only four of the nationally endemic species that occur in Yukon have been assessed by COSEWIC. Yukon Draba (*Draba yukonensis*) is assessed as Special Concern, and Yukon Goldenweed and Yukon Wormwood (*Artemisia woodii*) are assessed as Not at Risk.

Three hotspots for nationally endemic species have been identified from Yukon: Ogilvie Mountains, Kluane and Central Yukon Plateau (Figure 3).

Table 16: Canadian Endemic Species Restricted to Yukon

Common Name	Scientific Name	Global Rank	COSEWIC Status
Yukon Wormwood	<i>Artemisia woodii</i>	G2	Not at Risk
Yukon Grasshopper	<i>Bruneria yukonensis</i>	G3	<i>not assessed</i>
a twirler moth	<i>Chionodes mikkolai</i>	GNR	<i>not assessed</i>
Ogilvie Mountains Spring Beauty	<i>Claytonia ogilviensis</i>	G3	Candidate
Ogilvie Mountains Collared Lemming	<i>Dicrostonyx nunatakensis</i>	G2	<i>not assessed</i>
Straight-lined Dodia	<i>Dodia verticalis</i>	G3	<i>not assessed</i>
Klaza Draba	<i>Draba bruce-bennettii</i>	G1	Candidate
Caswell's Draba	<i>Draba caswellii</i>	G1	<i>not assessed</i>
Kluane Draba	<i>Draba kluanei</i>	G1	Candidate
Yukon Draba	<i>Draba yukonensis</i>	G2	Special Concern
a glass miner moth	<i>Elachista cicadella</i>	GNR	<i>not assessed</i>
a noctuid moth	<i>Feltia troubridgei</i>	GU	<i>not assessed</i>
Yukon Potworm	<i>Henlea yukonensis</i>	GU	<i>not assessed</i>
a noctuid moth	<i>Lasionycta carolynae</i>	GU	<i>not assessed</i>
a fly	<i>Neossos tombstonensis</i>	GU	<i>not assessed</i>
Yukon Goldenweed	<i>Nestotus macleanii</i>	G3	Not at Risk
Murray's Locoweed	<i>Oxytropis arctica</i> var. <i>murrayi</i>	T2	<i>not assessed</i>
Ogilvie Range Locoweed	<i>Oxytropis nigrescens</i> var. <i>lonchopoda</i>	T4	<i>not assessed</i>
Labrador Lousewort	<i>Pedicularis labradorica</i> var. <i>sulphurea</i>	TU	<i>not assessed</i>
a noctuid moth	<i>Resapamea mammothus</i>	GU	<i>not assessed</i>

Global Rank: GX (Presumed Extinct), GH (Possibly Extinct), G1 (Critically Imperilled), G2 (Imperilled), G3 (Vulnerable), G4 (Apparently Secure), G5 (Secure); Rounded Global Rank provided in table

Other Ranks and Qualifiers: T (Intraspecific Taxon), U (Unrankable), NR (Not Ranked)



Yukon Draba (Photo by Syd Cannings/
iNaturalist)

Areas of ecoregional high endemism shared with the United States

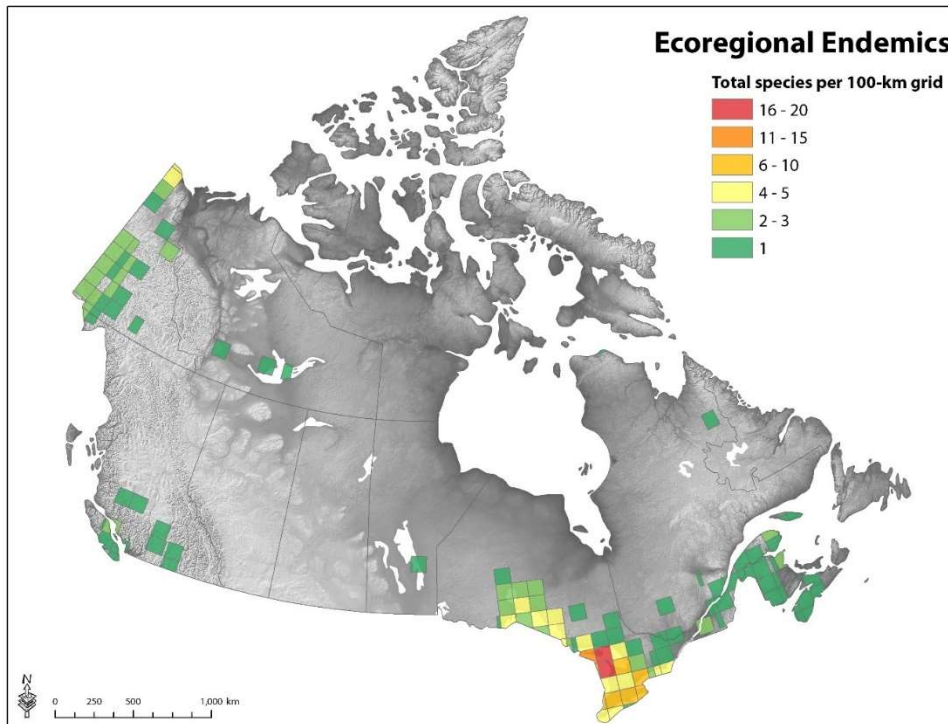
This study examined nationally endemic species that are restricted in occurrence to the political boundaries of Canada. In addition to nationally endemic species, Canada also has sites with ecoregional endemism that are shared with the U.S.

Examples of these species include:

- Arctic Brotula (*Bythites fuscus*): A fish that is restricted to eastern Arctic waters of Canada and immediately adjacent Greenland waters (Coad & Reist, 2018).
- Lakeside Daisy (*Tetraneuris herbacea*): A Great Lakes coastal species with most of its global range in Ontario.
- Pink Dandelion (*Taraxacum carneocoloratum*): An alpine species that may be associated with unglaciated areas of Alaska and Yukon.

Ecoregional endemic species that also occur in the U.S. are not included in this analysis. Most of these species occur within a restricted geographical range and have a high fidelity to specific habitat parameters, and as a result are also globally rare (Rainer, Bennett *et al.*, 2017). Ecoregions with high numbers of these species include the Great Lakes and northern Yukon (Figure 6). Ecoregional endemic species are also important for conservation and have been included in several conservation plans (e.g. Henson, Riley *et al.*, 2005). A preliminary list of these ecoregional endemics was assembled for this project (Appendix D), but this is an area for future study and refinement.

Figure 6: Number of Ecoregional Endemic Species. These species often have small ranges or narrow habitat requirements, but also occur in the United States.



Discussion

This study has generated Canada's most comprehensive and current list of nationally endemic species and builds on past efforts to identify this important group of Canadian species (Canadian Endangered Species Conservation Council [CESCC], 2016; Kershaw & Morton, 1976; Rainer, Bennett *et al.*, 2017). The results will be used to support species assessments, encourage research on species that are data deficient, and support conservation efforts including the identification of Key Biodiversity Areas.

Supporting future species assessments

We hope that this list of Canadian endemic species will encourage investments in both species assessments and further study of species that lack sufficient information to assign conservation ranks. Of the 183 species included on the list and ranked by NatureServe as globally Critically Imperilled, Imperilled, Vulnerable or Possibly Extinct, less than one-third have been assessed by COSEWIC. Jurisdictional responsibility is a key factor in prioritizing species for national assessment, and our list can be used by COSEWIC and provincial/territorial species-at-risk assessment authorities to prioritize candidate species. In addition to national species assessments, many of Canada's endemic species could also be priorities for global assessment for the IUCN Red List of Threatened Species (Red List). Currently only ten of Canada's endemic species are on the Red List (IUCN, 2019b).

Potential high priority candidates for COSEWIC and IUCN Red List assessments are summarized in Table 17. These 56 species have been ranked as globally Critically Imperilled or Imperilled (G1 or G2) by NatureServe but have not been assessed by COSEWIC or the IUCN Red List. In addition to national and global species assessments, many of the species we have identified would also be candidates for Alliance for Zero Extinction (AZE) sites. Currently only two Canadian endemic species, Vancouver Island Marmot and Whooping Crane, are included as AZE sites. Atlantic Whitefish has been recently nominated (J. Noseworthy, pers. comm., September 30, 2019)

Table 17: Potential Priority Endemic Species for National and Global Species Assessments

Common Name	Scientific Name
Sable Island Cutworm Moth	<i>Agrotis arenarius</i>
a geometrid moth	<i>Animomyia hardwicki</i>
a centipede	<i>Arctogeophilus insularis</i>
Lake Louise Arnica	<i>Arnica louiseana</i>
Island Snow Scorpionfly	<i>Boreus insulanus</i>
False Northwestern Moonwort	<i>Botrychium pseudopinnatum</i>
Newfoundland Chickweed	<i>Cerastium terrae-novae</i>
Johansen's Sulphur	<i>Colias johanseni</i>
Rankin Inlet Sulphur	<i>Colias rankinensis</i>
Elkwater Hawthorn	<i>Crataegus aquacervensis</i>
Dark Green Hawthorn	<i>Crataegus atrovirens</i>
Enderby Hawthorn	<i>Crataegus enderbyensis</i>
Oval Hawthorn	<i>Crataegus orbicularis</i>
Adams Creek Hawthorn	<i>Crataegus rivuloadamensis</i>
Battle Creek Hawthorn	<i>Crataegus rivulopugnensis</i>
Red Bracteole Hawthorn	<i>Crataegus rubribracteolata</i>
Shuswap Hawthorn	<i>Crataegus shuswapensis</i>
Slender Notchwort	<i>Crossocalyx tenuis</i>
Klaza Draba	<i>Draba bruce-bennettii</i>
Caswell's Draba	<i>Draba caswellii</i>
Cayouette's Draba	<i>Draba cayouettei</i>
Frankton's Draba	<i>Draba franktonii</i>
Kluane Draba	<i>Draba kluanei</i>
Dense Draba	<i>Draba pycnosperma</i>
Ojibway Waterwort	<i>Elatine ojibwayensis</i>
Sable Island Eucosma	<i>Eucosma sableana</i>
Queen Charlotte Islands Fescue	<i>Festuca pseudovivipara</i>
a small scavenger beetle	<i>Hydnobius autumnalis</i>
Yukon Sweat Bee	<i>Lasioglossum yukonae</i>
a noctuid moth	<i>Lasionycta haida</i>
a rove beetle	<i>Lypoglossa manitobae</i>
Gaspésie Grasshopper	<i>Melanoplus gaspesiensis</i>
Gaspé Saxifrage	<i>Micranthes gaspensis</i>
Seashore Stitchwort	<i>Sabulina litorea</i>
a rove beetle	<i>Mitosynum vockerothi</i>
a lichen	<i>Myriolecis carlottiana</i>
a millipede	<i>Nearctodesmus insularis</i>
a ground beetle	<i>Nebria charlottae</i>
a ground beetle	<i>Nebria louiseae</i>
Lafontaine's Tiger Moth	<i>Chelis lafontainei</i>
Lori's Water-lily	<i>Nymphaea loriana</i>
a leaf beetle	<i>Ophraella nuda</i>
Cypress Hills Mountainsnail	<i>Oreohelix stantoni</i>
Sable Island Borer	<i>Papaipema sp. 6</i>
Constricted Black Fly	<i>Prosimulium constrictistylum</i>
an amphipod	<i>Ramellogammarus vancouverensis</i>
Mackenzie River Yellowcress	<i>Rorippa crystallina</i>
Arctic Orangebush Lichen	<i>Seiophora aurantiaca</i>
Castleguard Cave Stygobromid	<i>Stygobromus canadensis</i>
Cordilleran Stygobromid	<i>Stygobromus secundus</i>
Cain's Screw Moss	<i>Syntrichia cainii</i>
Gulf of St. Lawrence Dandelion	<i>Taraxacum laurentianum</i>
a moss	<i>Trematodon montanus</i>
a beard lichen	<i>Usnea fibrillosa</i>
Newfoundland Vallonia Snail	<i>Vallonia terraenovae</i>
a geometrid moth	<i>Xanthorhoe clarkeata</i>

Endemic species research

Almost one-third of Canadian endemic species do not have sufficient information to assign national ranks or have continued taxonomic uncertainty. Further study on the ecology, distribution, population dynamics and genetics of these species is a high priority to develop conservation status ranks and facilitate future national and global assessments. NatureServe Canada along with the Canadian network of Conservation Data Centres and academic institutions are well positioned to fill this key information gap in the next few years.

In addition to further study on Canada's endemic species, areas with high concentrations of endemic species could also be the focus of additional biological inventories, particularly for more cryptic taxa. These concentrations are the result of glacial refugia or physical and ecological conditions that have resulted in more rapid speciation. Targeted inventories in Canada's endemic species hotspots would collect additional information on known endemics and potentially discover new species. Funding and support for baseline biological surveys is needed throughout Canada. Several of the hotspots identified in this report have not been thoroughly surveyed, particularly with DNA barcoding (deWaard, Ratnasingham *et al.*, 2019) and may be high priority for continued surveys.

The designation of distinct ecotypes, including designatable units, as nationally endemic species also needs further research. Currently there are many fishes that are likely endemic, but their taxonomy requires further clarification. For example, the Lake Whitefish pairs in Opeongo Lake in Algonquin Park are currently classified as populations by COSEWIC, while the Enos Lake Stickleback pair in B.C. are not. There are many populations that have been assessed by COSEWIC but their distinctiveness and occurrence outside of Canada have not been determined. Distinct populations and ecotypes will continue to be discovered and defined as our understanding of population genetic for all species expands (e.g. Hendricks, Schweizer *et al.*, 2019).

Evolutionary distinctiveness is also an important measure to prioritize species for conservation (Isaac, Turvey *et al.*, 2007; Redding, Hartmann *et al.*, 2008; Redding, Mazel *et al.*, 2014; Redding & Mooers, 2006). In the U.S. monotypic genera are used to prioritize species for listing under the Endangered Species Act (USFWS, 2016). A preliminary assessment has identified five Canadian endemic species that represent monotypic genera: Labrador Duck (*Camptorhynchus labradorius*), a rove beetle (*Mitosynum vockerothi*), Macoun's Shining Moss (*Neomacounia nitida*), Verna's Flower Moth (*Schinia verna*) and Haida Gwaii Slug (*Staala gwaii*). This does not include subspecies or varieties of monotypic genera, such as *Rangifer*. Categorizing Canadian endemic species on evolutionary distinctiveness based on monotypic genera or other measures of evolutionary distinctiveness or phylogenetic fields (Villalobos, Rangel *et al.*, 2013) would make an important contribution to prioritizing species for conservation.

Priority areas for conservation

Endemic species are important for the identification of Key Biodiversity Areas (KBAs). KBAs are nationally or globally important areas for species, ecosystems and biological processes identified through standard global criteria (IUCN, 2016). Endemic species can be triggers for KBA criteria on threatened species, geographically restricted species and assemblages, and irreplaceability. This project will help support the ongoing efforts of the Canadian KBA Coalition and regional initiatives to identify important sites for biodiversity conservation.

Many of Canada's nationally endemic species assemblages occur in unique and restricted vegetation communities. These include alvars and other rocky barrens, sand dunes, coastlines, hot springs and alpine meadows. More detailed mapping of these (and all vegetation communities) along with completing the Canadian National Vegetation Classification system would support the identification and conservation of these rare and important habitat types, and their species of conservation concern through ecosystem-based conservation initiatives.

Eight of Canada's endemic plants and animals are now extinct or based on historical records. These represent 2.5% of all the species documented in this study. Half of these losses have been from islands. Globally, endemic species restricted to islands represent more than 60% of known terrestrial extinctions in the last 500 years (Matthews, Leidinger *et al.*, 2020) and Canada's island endemics be particularly vulnerable. Two of the extinctions were the result of over-harvest and the remainder resulted from habitat loss or modifications for species that occurred in small ranges. The small range and specific habitat requirements of endemic species increases their vulnerability to extinction, particularly when their distribution occurs in landscapes dominated by human activities. Focusing conservation efforts in the endemic species hotspots identified in this study may be necessary to prevent future extinctions.

Data limitations

The list of Canada's endemic species will continue to change with new species discoveries and population and taxonomic updates, particularly for invertebrates. There are an estimated 27,000–42,600 additional species expected to be eventually discovered in Canada (Langor, 2019), in particular insects (Hebert, Ratnasingham *et al.*, 2016).

As this project was being completed, there have been several new discoveries of endemic species. A new endemic species of *Isoetes* was discovered in the freshwater estuary of the St. Lawrence River (Brunton, Sokoloff *et al.*, 2019), a cave-dwelling dipluran was described from Vancouver Island (Sendra & Wagnell, 2019) and a new endemic beetle (*Flaviellus kluanensis*) was described from Yukon (Smith & Skelley, 2020). These recent discoveries and descriptions are all within the hotspots identified in this study.

There will also be changes in our knowledge on the range of endemic species. For example, Rankin Island Sulphur (*Colias rankinensis*) was recently confirmed in

Yukon and Northwest Territories (it was previously only known from Nunavut). There are several species of invertebrates that are probably nationally endemic, but more information is needed on their Canadian and global range (Bennett, pers. comm., October 24, 2018). Some Canadian endemic species may be more widespread. Puvirnituk Mountain Draba (*Draba puvirnitukii*) (discovered in 2011) is only known from two hills near the Deception River in Nunavik (northern Quebec) that are covered with a bright orange gravel. It may also exist where similar geological conditions are found, such as in Nunavut or northern Newfoundland, but field research in Canada's north is costly and difficult.

There are significant sampling biases in the data that are reflected in the counts of endemic species by jurisdiction and in the identification and mapping of hotspots. Marine species within the Biotics database were included in the analysis; however, there are many marine species, particularly invertebrates, that do not have comprehensive surveys and are under-represented in the database.

Gaps in our knowledge of endemic species are the most significant in the north and for invertebrates. In addition to more comprehensive biological surveys of Canada, some of these biases could be reduced through habitat suitability modelling and including endemic species in the current Ecosystem Based Automated Range (EBAR) mapping initiative being led by NatureServe Canada. Developing models that account for the current spatial sampling biases (Stolar & Nielsen, 2015) would also refine the boundaries of the hotspots.

Our study only included species that are currently restricted to Canada in their total range, or during the breeding season. In addition to nationally endemic species there are many species that Canada has very high jurisdictional responsibility. For example, most of the world's population of Ross's Goose breeds in the Canada's Arctic, with only a few breeding occurrences from Alaska. Species that primarily live or breed in Canada have been only partially documented (CESCC, 2016). These species also warrant further documentation and need to be the focus of Canada's conservation efforts.

Next steps

This study has developed the first comprehensive list of Canadian endemic species. The results have been incorporated into NatureServe's Biotics database and are available via data requests and through NatureServe Explorer and will be shared with partners. There are many gaps in our knowledge of these species, and further research on endemic and potential endemic species is a priority. The results of this analysis can be used to prioritize conservation actions and to inspire public support for species and habitat protection in Canada. Endemic species are of interest to the public (Meuser, Harshaw *et al.*, 2009) and can be used to highlight conservation opportunities and responsibilities of key areas in Canada.

Species, sub-species and varieties are just one component of the Canada's endemic biodiversity. Canada has distinct evolutionary units of some species that are important for conserving genetic diversity. These units, such as the disjunct

population of Blanding's Turtle (*Emydoidea blandingii*) in Nova Scotia (Mockford, McEachern *et al.*, 2005) and distinct populations of fishes could be included in future iterations. Canada also has ecosystems and vegetation communities, such as some alvar types (Reschke, Reid *et al.*, 1999), that are endemic. In many cases, these ecosystems and communities are of global conservation concern and support endemic and threatened species. Identifying, mapping and conserving these assemblages is also needed to conserve globally significant biodiversity that is unique to Canada.

Protecting Canadian endemic species is Canada's responsibility and our first stop against global biodiversity loss. The consequence of our failure to conserve these species is their extinction.

Appendix A: Assessing Conservation Status: NatureServe's Methodology

Information about species and ecosystem conservation status is crucial for setting priorities for biodiversity conservation. Over the past 40+ years, the NatureServe Network (with origins dating to the founding of the first CDCs in South Carolina and Mississippi, in 1974), has developed standardized methods and tools for assessing such status at global, national, and subnational scales. NatureServe collects and evaluates data for species and ecosystems using these methods and tools to ensure that assigned status ranks are accurate and consistent, based on current field and remote sensing information.

NatureServe has developed a rank calculator to increase the repeatability and transparency of its ranking process. The calculator computes a numeric score, based on weightings assigned to each factor and some conditional rules, and that is translated to a calculated status rank. This calculated rank is reviewed and adjusted (if deemed appropriate) before it is recorded as the final assigned conservation status rank.

NatureServe uses 10 status factors to assess the conservation status of species or ecosystems (Table A1). Based on these factors, conservation status is assigned on a scale from 1 (Critically Imperilled) through 5 (Secure). These ranks may be derived at global, national, or subnational levels. Range-ranks may also be produced to transparently reveal the degree of uncertainty in a status when the available information does not permit a single status rank (e.g., G1G3 = globally Critically Imperilled to Vulnerable).³

Table A1: Summary of NatureServe conservation status factors

Factor Category	Factor
Rarity	Range Extent
	Area of Occupancy
	Population
	Number of Occurrences
	Number of Occurrences or Percent Area with Good Viability/Ecological Integrity
	Environmental Specificity
Trends	Long-Term Trend
	Short-Term Trend
Threats	Threats
	Intrinsic Vulnerability

Species or ecosystems that no longer exist or are believed to no longer exist are classified as Presumed Extinct (X). Species or ecosystems that are Possibly Extinct (H) are of highest conservation concern, followed by species which are Critically Imperilled (1), Imperilled (2), or Vulnerable (3) (Table A2).

Table A2: NatureServe global conservation status ranks

Rank	Conservation Status	Definition
GX	Presumed Extinct (Species)	Not located despite intensive searches and virtually no likelihood of rediscovery
	Presumed Eliminated (Ecosystems)	Eliminated throughout its range, due to loss of key dominant and characteristic taxa and/or elimination of the sites and ecological processes on which the type depends
GH	Possibly Extinct (Species)	Known from only historical occurrences but still some hope of rediscovery: examples of evidence include (1) that a species has not been documented in approximately 20–40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species or ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume that it is extinct or eliminated throughout its range
	Possibly Eliminated (Ecosystems)	
G1	Critically Imperilled	At very high risk of extinction or elimination due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors
G2	Imperilled	At high risk of extinction or elimination due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors
G3	Vulnerable	At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors
G4	Apparently Secure	At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors
G5	Secure	At very low risk of extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats
GU	Unrankable	Currently Unrankable due to lack of information or due to substantially conflicting information about status or trends
GNR	Unranked	Global conservation status not yet assessed
GNA	Not Applicable	A conservation status rank is not applicable because the species is not a suitable target for conservation activities

Range-ranks may also be reported as rounded ranks. For example, a species with a range-rank of G2G3 has a rounded rank of G2, as does a species with a range-rank of G1-G3.

The methodology:

- Considers all of the status factor data collectively in assigning a status
- Explicitly considers threats in the assessment
- Assesses conservation status for both species and ecosystems
- Is sufficiently complete for many North American species such that global, national, and subnational ranks are routinely linked to facilitate conservation priority setting
- Intraspecies are also given an equivalent “T” ranking. For example, the conservation status ranking for a globally Secure plant species would be G5; an Imperilled subspecies of the same plant would be ranked G5T2.
- There are three qualifiers that may be appended to conservation status ranks to provide additional information:
 - Q = questionable taxonomy
 - ? = imprecision: The addition of a “?” qualifier to a 1–5 conservation status rank denotes that the assigned rank is imprecise.
 - C = occurrence presently limited to captive or cultivated individuals (for species only)

Combining global, national, and subnational conservation status ranks also provides perspective and scale for placing risk levels in a geographic context and for setting conservation priorities. These assessments are continually reviewed, refined, and updated to reflect advances in knowledge. NatureServe Network specialists rely on the best available information from natural history museum collections, scientific literature, research projects, and knowledgeable observers, including those involved in citizen science, to determine conservation status. This information is augmented by field inventories targeting species of conservation concern and those for which little information exists or are only known historically. Many shifts in conservation status ranks reflect improved scientific understanding of the condition of species, rather than changes in the actual status of species in the wild.

Appendix B: Nationally Endemic Species

Taxonomic Group	Common Name	Scientific Name
Amphipods	an amphipod	<i>Ramellogammarus vancouverensis</i>
Amphipods	Castleguard Cave Stygobromid	<i>Stygobromus canadensis</i>
Amphipods	Cordilleran Stygobromid	<i>Stygobromus secundus</i>
Ants, Wasps, and Sawflies	Athabasca Thin Ant	<i>Leptothorax athabasca</i>
Ants, Wasps, and Sawflies	Guarded Guest Thin Ant	<i>Leptothorax paraxenus</i>
Ants, Wasps, and Sawflies	Pocahontas's Thin Ant	<i>Leptothorax pocahontas</i>
Ants, Wasps, and Sawflies	Peat Moss Thin Ant	<i>Leptothorax sphagnicola</i>
Ants, Wasps, and Sawflies	Quebec Ant	<i>Myrmica quebecensis</i>
Ants, Wasps, and Sawflies	Ragged Divided Ant	<i>Temnothorax fragosus</i>
Birds	Northern Saw-whet Owl brooksi subspecies	<i>Aegolius acadicus brooksi</i>
Birds	Labrador Duck	<i>Camptorhynchus labradorius</i>
Birds	Pacific Steller's Jay	<i>Cyanocitta stelleri carlottae</i>
Birds	Queen Charlotte Hairy Woodpecker	<i>Dryobates villosus picoideus</i>
Birds	Northern Pygmy-Owl swarthi subspecies	<i>Glaucidium gnoma swarthi</i>
Birds	Whooping Crane	<i>Grus americana</i>
Birds	Vancouver Island White-tailed Ptarmigan	<i>Lagopus leucura saxatilis</i>
Birds	Red Crossbill percna subspecies	<i>Loxia curvirostra percna</i>
Birds	Savannah Sparrow princeps subspecies	<i>Passerculus sandwichensis princeps</i>
Birds	Queen Charlotte Pine Grosbeak	<i>Pinicola enucleator carlottae</i>
Birds	Harris's Sparrow	<i>Zonotrichia querula</i>
Black Flies	Constricted Black Fly	<i>Prosimulium constrictistylum</i>
Bumble Bees	a bumble bee	<i>Bombus vagans bolsteri</i>
Butterflies and Skippers	Western Meadow Fritillary	<i>Boloria epithore sigridae</i>
Butterflies and Skippers	Nicholl's Bog Fritillary	<i>Boloria eunomia nichollae</i>
Butterflies and Skippers	Natazhati Fritillary	<i>Boloria natazhati bankslandia</i>
Butterflies and Skippers	Natazhati Fritillary	<i>Boloria natazhati nabokovi</i>
Butterflies and Skippers	Nebraska Fritillary	<i>Boloria selene terraenovae</i>
Butterflies and Skippers	Small Woodnymph, phocus subspecies	<i>Cercyonis oetus phocus</i>
Butterflies and Skippers	Small Wood-nymph, undescribed species	<i>Cercyonis oetus</i> ssp. 1
Butterflies and Skippers	Maritime Ringlet	<i>Coenonympha nipisiquit</i>
Butterflies and Skippers	Johansen's Sulphur	<i>Colias johanseni</i>
Butterflies and Skippers	Rankin Inlet Sulphur	<i>Colias rankinensis</i>
Butterflies and Skippers	Booth's Sulphur	<i>Colias tyche boothii</i>
Butterflies and Skippers	Salt Marsh Copper	<i>Lycaena dospassosi</i>
Butterflies and Skippers	Newfoundland Arctic	<i>Oeneis jutta terraenovae</i>
Butterflies and Skippers	Melissa Arctic	<i>Oeneis melissa atlinensis</i>
Butterflies and Skippers	Nahanni Arctic	<i>Oeneis uhleri nahanni</i>
Butterflies and Skippers	Short-tailed Swallowtail	<i>Papilio brevicauda bretonensis</i>
Butterflies and Skippers	Short-tailed Swallowtail	<i>Papilio brevicauda brevicauda</i>
Butterflies and Skippers	Yukon Parnassian	<i>Parnassius smintheus yukonensis</i>
Butterflies and Skippers	Vancouver Island Blue	<i>Plebejus saepiolus insulanus</i>

Taxonomic Group	Common Name	Scientific Name
Butterflies and Skippers	California White	<i>Pontia sisymbrii beringiensis</i>
Butterflies and Skippers	Chilcotin Fritillary	<i>Speyeria callippe chilcotinensis</i>
Caddisflies	Alberta Mountain Caddisfly	<i>Apatania alberta</i>
Caddisflies	Spiny Saddle-case Caddisfly	<i>Glossosoma spinatum</i>
Caddisflies	White Northern Caddisfly	<i>Philocasca alba</i>
Caddisflies	Thor's Northern Caddisfly	<i>Philocasca thor</i>
Caddisflies	Alberta Trumpet-net Caddisfly	<i>Plectrocnemia jenula</i>
Caddisflies	Milne's Free-living Caddisfly	<i>Rhyacophila milnei</i>
Conifers and relatives	Magdalen Islands Juniper	<i>Juniperus communis</i> var. <i>megistocarpa</i>
Dragonflies and Damselflies	Muskeg Emerald	<i>Somatochlora septentrionalis</i>
Ferns and relatives	Dwarf Coastal Maidenhair Fern	<i>Adiantum aleuticum</i> var. <i>subpumilum</i>
Ferns and relatives	False Northwestern Moonwort	<i>Botrychium pseudopinnatum</i>
Flowering Plants	Large-headed Woolly Yarrow	<i>Achillea millefolium</i> var. <i>megacephala</i>
Flowering Plants	Fernald's Serviceberry	<i>Amelanchier fernaldii</i>
Flowering Plants	Newfoundland Pussytoes	<i>Antennaria pulcherrima</i> ssp. <i>eucosma</i>
Flowering Plants	Athabasca Thrift	<i>Armeria maritima</i> ssp. <i>interior</i>
Flowering Plants	Griscom's Arnica	<i>Arnica griscomii</i> ssp. <i>griscomii</i>
Flowering Plants	Lake Louise Arnica	<i>Arnica louiseana</i>
Flowering Plants	Yukon Wormwood	<i>Artemisia woodii</i>
Flowering Plants	Fernald's Milkvetch	<i>Astragalus robbinsii</i> var. <i>fernaldii</i>
Flowering Plants	Frankton's Saltbush	<i>Atriplex glabriuscula</i> var. <i>franktonii</i>
Flowering Plants	Quebec Rockcress	<i>Boechera quebecensis</i>
Flowering Plants	Fernald's Braya	<i>Braya fernaldii</i>
Flowering Plants	Prostrate Braya	<i>Braya glabella</i> ssp. <i>prostrata</i>
Flowering Plants	Ellesmere Island Braya	<i>Braya humilis</i> ssp. <i>ellesmerensis</i>
Flowering Plants	McCalla's Braya	<i>Braya humilis</i> ssp. <i>maccallae</i>
Flowering Plants	Porsild's Braya	<i>Braya humilis</i> ssp. <i>porsildii</i>
Flowering Plants	Long's Braya	<i>Braya longyi</i>
Flowering Plants	Hairy Braya	<i>Braya pilosa</i>
Flowering Plants	Round-fruited Sedge	<i>Carex deweyana</i> var. <i>collectanea</i>
Flowering Plants	Rocky Shore Sedge	<i>Carex viridula</i> var. <i>saxilittoralis</i>
Flowering Plants	Clubmoss Mountain-heather	<i>Cassiope lycopodioides</i> ssp. <i>cristapilosa</i>
Flowering Plants	Elko Paintbrush	<i>Castilleja miniata</i> var. <i>fulva</i>
Flowering Plants	Purple Paintbrush	<i>Castilleja purpurascens</i>
Flowering Plants	Newfoundland Chickweed	<i>Cerastium terrae-novae</i>
Flowering Plants	Victorin's Water-hemlock	<i>Cicuta maculata</i> var. <i>victorinii</i>
Flowering Plants	Ogilvie Mountains Spring Beauty	<i>Claytonia ogilviensis</i>
Flowering Plants	Limestone Scurvygrass	<i>Cochlearia tridactylites</i>
Flowering Plants	Hooker's Bugseed	<i>Corispermum hookeri</i> var. <i>hookeri</i>
Flowering Plants	Elkwater Hawthorn	<i>Crataegus aquacervensis</i>
Flowering Plants	Dark Green Hawthorn	<i>Crataegus atrovirens</i>
Flowering Plants	Vernon Hawthorn	<i>Crataegus chrysocarpa</i> var. <i>vernonensis</i>
Flowering Plants	Enderby Hawthorn	<i>Crataegus enderbyensis</i>
Flowering Plants	Oval Hawthorn	<i>Crataegus orbicularis</i>
Flowering Plants	Loch Lomond Hawthorn	<i>Crataegus purpurella</i>
Flowering Plants	Adams Creek Hawthorn	<i>Crataegus rivuloadamensis</i>
Flowering Plants	Battle Creek Hawthorn	<i>Crataegus rivulopugnensis</i>

Taxonomic Group	Common Name	Scientific Name
Flowering Plants	Red Bracteole Hawthorn	<i>Crataegus rubibracteolata</i>
Flowering Plants	Saskatchewan Hawthorn	<i>Crataegus sheila-hippsiae</i> var. <i>saskatchewanensis</i>
Flowering Plants	Sheila Phipps' Hawthorn	<i>Crataegus sheila-hippsiae</i> var. <i>sheila-hippsiae</i>
Flowering Plants	Shuswap Hawthorn	<i>Crataegus shuswapensis</i>
Flowering Plants	Mackenzie Hairgrass	<i>Deschampsia mackenzieana</i>
Flowering Plants	Klaza Draba	<i>Draba bruce-bennettii</i>
Flowering Plants	Caswell's Draba	<i>Draba caswellii</i>
Flowering Plants	Cayouette's Draba	<i>Draba cayouettei</i>
Flowering Plants	Frankton's Draba	<i>Draba franktonii</i>
Flowering Plants	Kluane Draba	<i>Draba kluanei</i>
Flowering Plants	Puvirnituk Mountain Draba	<i>Draba puvirnitukii</i>
Flowering Plants	Dense Draba	<i>Draba pycnosperma</i>
Flowering Plants	Scotter's Draba	<i>Draba scotteri</i>
Flowering Plants	Simmons' Draba	<i>Draba simmonsii</i>
Flowering Plants	Yukon Draba	<i>Draba yukonensis</i>
Flowering Plants	Boreal Three-way Sedge	<i>Dulichium arundinaceum</i> var. <i>boreale</i>
Flowering Plants	Ojibway Waterwort	<i>Elatine ojibwayensis</i>
Flowering Plants	Queen Charlotte Islands False Rue-anemone	<i>Enemion savilei</i>
Flowering Plants	Estuarine Willowherb	<i>Epilobium ciliatum</i> var. <i>ecomosum</i>
Flowering Plants	Vancouver Island Fleabane	<i>Erigeron philadelphicus</i> var. <i>glaber</i>
Flowering Plants	Three-lobed Fleabane	<i>Erigeron trifidus</i>
Flowering Plants	Burgundy Eyebright	<i>Euphrasia vinacea</i>
Flowering Plants	Pubescent Proliferous Fescue	<i>Festuca prolifera</i> var. <i>lasiolepis</i>
Flowering Plants	Queen Charlotte Islands Fescue	<i>Festuca pseudovivipara</i>
Flowering Plants	Roberts' Fescue	<i>Festuca saximontana</i> var. <i>robertsiana</i>
Flowering Plants	Island Fringed Gentian	<i>Gentianopsis detonsa</i> ssp. <i>nesophila</i>
Flowering Plants	Raup's Fringed Gentian	<i>Gentianopsis detonsa</i> ssp. <i>raupii</i>
Flowering Plants	Victorin's Fringed Gentian	<i>Gentianopsis virgata</i> ssp. <i>victorinii</i>
Flowering Plants	Queen Charlotte Avens	<i>Geum schofieldii</i>
Flowering Plants	Impoverished Pinweed	<i>Lechea intermedia</i> var. <i>depauperata</i>
Flowering Plants	Beach Pinweed	<i>Lechea maritima</i> var. <i>subcylindrica</i>
Flowering Plants	Macoun's Meadowfoam	<i>Limnanthes macounii</i>
Flowering Plants	Lepage's Flax	<i>Linum lewisii</i> var. <i>lepagei</i>
Flowering Plants	Gaspé Saxifrage	<i>Micranthes gaspensis</i>
Flowering Plants	Yukon Goldenweed	<i>Nestotus macleanii</i>
Flowering Plants	Lori's Water-lily	<i>Nymphaea loriana</i>
Flowering Plants	Murray's Locoweed	<i>Oxytropis arctica</i> var. <i>murrayi</i>
Flowering Plants	Bell's Locoweed	<i>Oxytropis bellii</i>
Flowering Plants	Hudson Bay Locoweed	<i>Oxytropis borealis</i> var. <i>hudsonica</i>
Flowering Plants	Davis' Locoweed	<i>Oxytropis campestris</i> var. <i>davisii</i>
Flowering Plants	Small Northern Yellow Locoweed	<i>Oxytropis campestris</i> var. <i>minor</i>
Flowering Plants	Ogilvie Range Locoweed	<i>Oxytropis nigrescens</i> var. <i>lonchopoda</i>
Flowering Plants	Arctic False Wallflower	<i>Parrya arctica</i>
Flowering Plants	Labrador Lousewort	<i>Pedicularis labradorica</i> var. <i>sulphurea</i>
Flowering Plants	Sand Bluegrass	<i>Poa ammophila</i>

Taxonomic Group	Common Name	Scientific Name
Flowering Plants	Hudson Bay Knotweed	<i>Polygonum fowleri</i> ssp. <i>hudsonianum</i>
Flowering Plants	Allen's Buttercup	<i>Ranunculus allenii</i>
Flowering Plants	Queen Charlotte Island Buttercup	<i>Ranunculus occidentalis</i> var. <i>hexasepalus</i>
Flowering Plants	Mackenzie River Yellowcress	<i>Rorippa crystallina</i>
Flowering Plants	Subarctic Dock	<i>Rumex subarcticus</i>
Flowering Plants	Seashore Stitchwort	<i>Sabulina litorea</i>
Flowering Plants	Sand-dune Short-capsuled Willow	<i>Salix brachycarpa</i> var. <i>psammophila</i>
Flowering Plants	Limestone Willow	<i>Salix calcicola</i> var. <i>calcicola</i>
Flowering Plants	Green-scaled Willow	<i>Salix chlorolepis</i>
Flowering Plants	Barrens Willow	<i>Salix jejuna</i>
Flowering Plants	Raup's Willow	<i>Salix raupii</i>
Flowering Plants	Blanket-leaved Willow	<i>Salix silicicola</i>
Flowering Plants	Turnor's Willow	<i>Salix turnorii</i>
Flowering Plants	Tyrrell's Willow	<i>Salix tyrrellii</i>
Flowering Plants	Taylor's Saxifrage	<i>Saxifraga taylorii</i>
Flowering Plants	Mount Sheldon Ragwort	<i>Senecio sheldonensis</i>
Flowering Plants	Newcombe's Butterweed	<i>Sinosenecio newcombei</i>
Flowering Plants	Mt. Albert Goldenrod	<i>Solidago chlorolepis</i>
Flowering Plants	Nova Scotia Ladies'-tresses	<i>Spiranthes casei</i> var. <i>novaescotiae</i>
Flowering Plants	Lake Athabasca Starwort	<i>Stellaria longipes</i> ssp. <i>arenicola</i>
Flowering Plants	Gulf of St. Lawrence Aster	<i>Symphotrichum laurentianum</i>
Flowering Plants	Nahanni Aster	<i>Symphotrichum nahanniense</i>
Flowering Plants	Gaspé Aster	<i>Symphotrichum novi-belgii</i> var. <i>crenifolium</i>
Flowering Plants	Floccose Tansy	<i>Tanacetum huronense</i> var. <i>floccosum</i>
Flowering Plants	Gulf of St. Lawrence Dandelion	<i>Taraxacum laurentianum</i>
Flowering Plants	Queen Charlotte Islands Violet	<i>Viola biflora</i> var. <i>carlottae</i>
Freshwater and Anadromous Fishes	Atlantic Whitefish	<i>Coregonus huntsmani</i>
Freshwater and Anadromous Fishes	Vancouver Lamprey	<i>Entosphenus macrostomus</i>
Freshwater and Anadromous Fishes	Copper Redhorse	<i>Moxostoma hubbsi</i>
Freshwater and Anadromous Fishes	Banff Longnose Dace	<i>Rhinichthys cataractae smithi</i>
Freshwater Mussels	Newfoundland Floater	<i>Pyganodon fragilis</i>
Freshwater Snails	Alberta Fossaria	<i>Galba alberta</i>
Freshwater Snails	Blunt Albino Physa	<i>Physa gyrina athearni</i>
Freshwater Snails	Gatineau Tadpole Snail	<i>Physa gyrina latchfordi</i>
Freshwater Snails	Banff Springs Snail	<i>Physella johnsoni</i>
Freshwater Snails	Hotwater Physa	<i>Physella wrighti</i>
Freshwater Snails	Low-spired Rams-horn	<i>Planorbella campanulata collinsi</i>
Freshwater Snails	Whiteave's Capacious Rams-horn	<i>Planorbella corpulenta whiteavesi</i>
Freshwater Snails	Subarctic Lake Stagnicola	<i>Stagnicola catascopium preblei</i>
Freshwater Snails	Western Arctic Pondsnailed	<i>Stagnicola kennicotti</i>
Fungi (non-lichenized)	Gros Morne Cortinarius	<i>Cortinarius grosmorneënsis</i>
Grasshoppers	Yukon Grasshopper	<i>Bruneria yukonensis</i>
Grasshoppers	Gaspésie Grasshopper	<i>Melanoplus gaspesiensis</i>

Taxonomic Group	Common Name	Scientific Name
Grasshoppers	Magdalen Island Grasshopper	<i>Melanoplus madeleineae</i>
Ground Beetles	a ground beetle	<i>Nebria charlottae</i>
Ground Beetles	a ground beetle	<i>Nebria haida</i>
Ground Beetles	a ground beetle	<i>Nebria louiseae</i>
Katydids and Crickets	Bog Shield-backed Katydid	<i>Metrioptera sphagnum</i>
Lichens	Crumpled Tarpaper Lichen	<i>Collema coniophilum</i>
Lichens	a lichen	<i>Myriolecis carlottiana</i>
Lichens	Arctic Orangebush Lichen	<i>Seiropora aurantiaca</i>
Lichens	a beard lichen	<i>Usnea fibrillosa</i>
Liverworts	a liverwort	<i>Cephaloziella brinkmanii</i>
Liverworts	Slender Notchwort	<i>Crossocalyx tenuis</i>
Liverworts	a liverwort	<i>Frullania hattoriana</i>
Mammals	Wood Bison	<i>Bison bison athabascaae</i>
Mammals	Eastern Wolf	<i>Canis sp. cf. lycaon</i>
Mammals	Ungava Collared Lemming	<i>Dicrostonyx hudsonius</i>
Mammals	Ogilvie Mountains Collared Lemming	<i>Dicrostonyx nunatakensis</i>
Mammals	Vancouver Island Wolverine	<i>Gulo gulo vancouverensis</i>
Mammals	Vancouver Island Marmot	<i>Marmota vancouverensis</i>
Mammals	American Marten - Newfoundland Population	<i>Martes americana atrata</i>
Mammals	Triangle Island Vole	<i>Microtus townsendii cowani</i>
Mammals	a vole	<i>Microtus townsendii laingi</i>
Mammals	a vole	<i>Microtus townsendii tetramerus</i>
Mammals	Vancouver Island Ermine	<i>Mustela erminea anguinae</i>
Mammals	Queen Charlotte Islands Ermine	<i>Mustela erminea haidarum</i>
Mammals	Selkirk Least Chipmunk	<i>Neotamias minimus selkirki</i>
Mammals	Ungava Seal	<i>Phoca vitulina mellonae</i>
Mammals	Dawson Caribou	<i>Rangifer tarandus dawsoni</i>
Mammals	Peary Caribou	<i>Rangifer tarandus pearyi</i>
Mammals	Maritime Shrew	<i>Sorex maritimensis</i>
Mammals	Vancouver Island Water Shrew	<i>Sorex navigator brooksi</i>
Mammals	Boreal Northern Bog Lemming	<i>Synaptomys borealis borealis</i>
Mammals	Creston Northern Pocket Gopher	<i>Thomomys talpoides segregatus</i>
Mammals	Kermode Bear	<i>Ursus americanus kermodei</i>
Mason Bees	Nearctic Mason Bee	<i>Osmia nearctica</i>
Mayflies	Galling Small Minnow Mayfly	<i>Baetis persecutor</i>
Mayflies	White Small Square-gilled Mayfly	<i>Caenis candida</i>
Mayflies	Passive Small Minnow Mayfly	<i>Procloeon in anum</i>
Mayflies	Insignificant Small Minnow Mayfly	<i>Procloeon insignificans</i>
Mayflies	Mount Lyall Flat-headed Mayfly	<i>Rhithrogena gaspeensis</i>
Millipedes and Centipedes	a centipede	<i>Arctogeophilus insularis</i>
Millipedes and Centipedes	a millipede	<i>Nearctodesmus insularis</i>
Mosses	Macoun's Shining Moss	<i>Neomacounia nitida</i>
Mosses	Carey Small Limestone Moss	<i>Seligeria careyana</i>
Mosses	Cain's Screw Moss	<i>Syntrichia cainii</i>
Mosses	a screw moss	<i>Tortula cuneifolia var. blissii</i>

Taxonomic Group	Common Name	Scientific Name
Mosses	a moss	<i>Trematodon montanus</i>
Mosses	Carlott's Wijkia Moss	<i>Wijkia carlottae</i>
Other Bees	Sable Island Sweat Bee	<i>Lasioglossum sablense</i>
Other Bees	Yukon Sweat Bee	<i>Lasioglossum yukonae</i>
Other Bees	a cuckoo bee	<i>Neopasites aff. fulviventris</i>
Other Bees	Brittain's Cuckoo Nomad Bee	<i>Triepeolus brittaini</i>
Other Beetles	a weevil	<i>Apinocis subaequalis</i>
Other Beetles	a weevil	<i>Centrinogyna canadensis</i>
Other Beetles	a weevil	<i>Ceutorhynchus carteri</i>
Other Beetles	a weevil	<i>Ceutorhynchus convexipennis</i>
Other Beetles	a weevil	<i>Ceutorhynchus dubitans</i>
Other Beetles	a weevil	<i>Ceutorhynchus handfordi</i>
Other Beetles	a weevil	<i>Ceutorhynchus hearnei</i>
Other Beetles	a weevil	<i>Ceutorhynchus munki</i>
Other Beetles	a weevil	<i>Ceutorhynchus opertus</i>
Other Beetles	a weevil	<i>Ceutorhynchus squamosulus</i>
Other Beetles	a small scavenger beetle	<i>Hydnobius autumnalis</i>
Other Beetles	a bark beetle	<i>Ips borealis thomasi</i>
Other Beetles	a rove beetle	<i>Lypoglossa manitobae</i>
Other Beetles	a rove beetle	<i>Mitosynum vockerothi</i>
Other Beetles	a leaf beetle	<i>Ophraella nuda</i>
Other Beetles	Sable Island Leaf Beetle	<i>Tricholochmaea sablensis</i>
Other Flies and Keds	a rust fly	<i>Loxocera ojibwayensis</i>
Other Flies and Keds	a fly	<i>Neossos tombstonensis</i>
Other Insects	Beringian Grass Leafhopper	<i>Athysanella resusca</i>
Other Insects	a leafhopper	<i>Athysanella secunda</i>
Other Insects	Island Snow Scorpionfly	<i>Boreus insulanus</i>
Other Insects	Scudder's Rock Crawler	<i>Grylloblatta scudderi</i>
Other Insects	a leafhopper	<i>Psammotettix diadematus</i>
Other Insects	a leafhopper	<i>Unoka dramatica</i>
Other Moths	Sable Island Cutworm Moth	<i>Agrotis arenarius</i>
Other Moths	a geometrid moth	<i>Animomyia hardwicki</i>
Other Moths	Bordered Apamea Moth	<i>Apamea sordens sableana</i>
Other Moths	Saskatchewan Dune Scythrid	<i>Areniscythis sp. 1</i>
Other Moths	a leafroller moth	<i>Cenopsis daphnana</i>
Other Moths	a twirler moth	<i>Chionodes boreas</i>
Other Moths	a twirler moth	<i>Chionodes mikkolai</i>
Other Moths	a glass miner moth	<i>Elachista beorella</i>
Other Moths	a glass miner moth	<i>Elachista cicadella</i>
Other Moths	a glass miner moth	<i>Elachista serra</i>
Other Moths	a noctuid moth	<i>Euchalcia borealis</i>
Other Moths	Sable Island Eucosma	<i>Eucosma sableana</i>
Other Moths	a dart moth	<i>Euxoa apopsis</i>
Other Moths	a dart moth	<i>Euxoa chimoensis</i>
Other Moths	Mulder's Dart Moth	<i>Euxoa muldersi</i>
Other Moths	a noctuid moth	<i>Feltia troubridgei</i>
Other Moths	a carpet moth	<i>Hydrelia terraenovae</i>

Taxonomic Group	Common Name	Scientific Name
Other Moths	a noctuid moth	<i>Lasionycta carolynae</i>
Other Moths	Cold Lasionycta Moth	<i>Lasionycta frigida</i>
Other Moths	a noctuid moth	<i>Lasionycta gelida</i>
Other Moths	a noctuid moth	<i>Lasionycta haida</i>
Other Moths	a noctuid moth	<i>Lasionycta lagganata</i>
Other Moths	a momphid moth	<i>Mompha nancyae</i>
Other Moths	a noctuid moth	<i>Neoligia lillooet</i>
Other Moths	White-marked Tussock Moth (Sable Island spp.)	<i>Orgyia leucostigma sablensis</i>
Other Moths	a tortricid moth	<i>Pelochrista louisana</i>
Other Moths	a tortricid moth	<i>Platphalonia dangi</i>
Other Moths	a noctuid moth	<i>Resapamea mammothus</i>
Other Moths	a noctuid moth	<i>Schinia sexata</i>
Other Moths	Verna's Flower Moth	<i>Schinia verna</i>
Other Moths	a plume moth	<i>Stenoptilia grandipuncta</i>
Other Moths	a crambid snout moth	<i>Udea derasa</i>
Other Moths	a crambid snout moth	<i>Udea saxifragae</i>
Other Moths	a geometrid moth	<i>Xanthorhoe clarkeata</i>
Papaipema Moths	Sable Island Borer	<i>Papaipema</i> sp. 6
Predaceous Diving Beetles	Margaret's Diving Beetle	<i>Agabus margaretae</i>
Predaceous Diving Beetles	Bert's Predaceous Diving Beetle	<i>Sanfilippodytes bertae</i>
Robber Flies	Okanagan Robber Fly	<i>Efferia okanagana</i>
Spiders and other Chelicerates	Rocky Mountain Woodland Spider	<i>Cybaeus sinuosus</i>
Stoneflies	Alpine Snowfly	<i>Bolshecapnia gregsoni</i>
Stoneflies	Moosehorn Snowfly	<i>Bolshecapnia rogozera</i>
Stoneflies	Maritime Needlefly	<i>Leuctra baddecka</i>
Stoneflies	Sugluk Snowfly	<i>Mesocapnia sugluka</i>
Stoneflies	Alberta Needlefly	<i>Paraleuctra alta</i>
Stoneflies	Labrador Snowfly	<i>Utacapnia labradora</i>
Terrestrial Snails	Cypress Hills Mountainsnail	<i>Oreohelix stantoni</i>
Terrestrial Snails	Haida Gwaii Slug	<i>Staala gwaii</i>
Terrestrial Snails	Newfoundland Vallonia Snail	<i>Vallonia terraenovae</i>
Tiger Beetles	Athabasca Tiger Beetle	<i>Cicindela hirticollis athabascensis</i>
Tiger Beetles	Sandy Tiger Beetle	<i>Cicindela limbata hyperborea</i>
Tiger Beetles	Nova Scotia Shore Tiger Beetle	<i>Cicindela repanda novascotiae</i>
Tiger Moths	Yukon Tiger Moth	<i>Apantesis yukona</i>
Tiger Moths	Kluane Tiger Moth	<i>Arctia brachyptera</i>
Tiger Moths	Lafontaine's Tiger Moth	<i>Chelis lafontainei</i>
Tiger Moths	Woodland Tiger Moth	<i>Dodia tarandus</i>
Tiger Moths	Straight-lined Dodia	<i>Dodia verticalis</i>
Worms, Leeches, and other Annelids	Yukon Potworm	<i>Henlea yukonensis</i>

Appendix C: Potential endemic species that require further investigation

List does not include fishes that are under taxonomic review.

Taxonomic Group	Common Name	Scientific Name
Black Flies	Rothfel's Black Fly	<i>Simulium rothfelsi</i>
Butterflies and Skippers	Four-dotted Alpine, herscheli subspecies	<i>Erebia youngi herscheli</i>
Butterflies and Skippers	Gaspé Arctic	<i>Oeneis bore gaspeensis</i>
Caddisflies	Thomas's Mountain Caddisfly	<i>Allomyia thomasi</i>
Caddisflies	Schmid's Long-horned Caddisfly	<i>Triaenodes schmidi</i>
Flower Flies or Hoverflies	a flower fly	<i>Platycheirus hispidipes</i>
Flowering Plants	Golden Alpine Lily	<i>Lloydia serotina</i> var. <i>flava</i>
Freshwater and Anadromous Fishes	Mountain Sculpin	<i>Cottus bairdii punctulatus</i>
Lichens	Half Moon Lichen	<i>Dendroscosticta oroborealis</i>
Liverworts	a liverwort	<i>Apopellia alpicola</i>
Liverworts	a liverwort	<i>Bazzania tricrenata</i> var. <i>fulfordiae</i>
Liverworts	a liverwort	<i>Scapania diplophyloides</i>
Liverworts	a liverwort	<i>Scapania pseudocalcicola</i>
Liverworts	a liverwort	<i>Scapania scandica</i> var. <i>dimorpha</i>
Mammals	Victoria Collared Lemming	<i>Dicrostonyx groenlandicus kilangmiutak</i>
Mayflies	Out-of-reach Small Minnow Mayfly	<i>Acerpenna akataleptos</i>
Mayflies	Hudsonia Small Minnow Mayfly	<i>Baetis hudsonicus</i>
Mayflies	Zaranko's Small Minnow Mayfly	<i>Kirmaushenkreena zarankoe</i>
Mayflies	Dark-winged Primitive Minnow Mayfly	<i>Parameletus croesus</i>
Mosses	Round-leaved Spear Moss	<i>Calliergon orbicularicordatum</i>
Mosses	a moss	<i>Sphagnum venustum</i>
Other Bees	an andrenid bee	<i>Andrena fulvicrista</i>
Other Bees	an andrenid bee	<i>Andrena lillooetensis</i>
Other Bees	an andrenid bee	<i>Andrena revelstokensis</i>
Other Bees	an andrenid bee	<i>Andrena singularis</i>
Other Bees	Boreal Cuckoo Sweat Bee	<i>Sphecodes borealis</i>
Other Bees	a sweat bee	<i>Sphecodes hudsoni</i>
Other Beetles	a leaf beetle	<i>Altica ribis</i>
Other Beetles	a rove beetle	<i>Apimela canadensis</i>
Other Beetles	a rove beetle	<i>Atheta borealis</i>
Other Beetles	a rove beetle	<i>Atheta savardae</i>
Other Beetles	Ontario Calligrapha	<i>Calligrapha amator</i>
Other Beetles	a leaf beetle	<i>Calligrapha knabi</i>
Other Beetles	a leaf beetle	<i>Calligrapha tiliae</i>
Other Beetles	a leaf beetle	<i>Calligrapha virginea</i>
Other Beetles	a leaf beetle	<i>Chaetocnema borealis</i>
Other Beetles	a leaf beetle	<i>Chrysomela walshi</i>
Other Beetles	a click beetle	<i>Ctenicera tristis</i>
Other Beetles	a click beetle	<i>Dalopius agnellus</i>
Other Beetles	a click beetle	<i>Dalopius brevicornis</i>
Other Beetles	a click beetle	<i>Dalopius corvinus</i>
Other Beetles	a click beetle	<i>Dalopius insolitus</i>

Taxonomic Group	Common Name	Scientific Name
Other Beetles	a click beetle	<i>Dalopius insulanus</i>
Other Beetles	a click beetle	<i>Dalopius maritimus</i>
Other Beetles	a click beetle	<i>Dalopius parvulus</i>
Other Beetles	a click beetle	<i>Dalopius vernus</i>
Other Beetles	a rove beetle	<i>Dinaraea curtipenis</i>
Other Beetles	a rove beetle	<i>Dinaraea piceana</i>
Other Beetles	a leaf beetle	<i>Graphops viridis</i>
Other Beetles	a rove beetle	<i>Gyronycha pseudoobscura</i>
Other Beetles	a rove beetle	<i>Gyrophaena meduxnekeagensis</i>
Other Beetles	a leaf beetle	<i>Longitarsus pallescens</i>
Other Beetles	a small scavenger beetle	<i>Macrohydriobius tibioalcaris</i>
Other Beetles	a click beetle	<i>Negastrius atrosus</i>
Other Beetles	a rove beetle	<i>Philonthus turbo</i>
Other Beetles	a leaf beetle	<i>Phyllotreta alberta</i>
Other Beetles	a leaf beetle	<i>Phyllotreta brevipennis</i>
Other Beetles	a click beetle	<i>Pseudanostirus laricis</i>
Other Beetles	a click beetle	<i>Selatosomus funereus</i>
Other Beetles	a rove beetle	<i>Subhaida monticola</i>
Other Beetles	a leaf beetle	<i>Systema carri</i>
Other Insects	a leafhopper	<i>Ceratagallia okanagana</i>
Other Insects	a leafhopper	<i>Chlorita nearctica</i>
Other Insects	a mealybug	<i>Chorizococcus altoarcticus</i>
Other Insects	a leafhopper	<i>Elymana pacifica</i>
Other Insects	a leafhopper	<i>Empoasca caesarsi</i>
Other Insects	a leafhopper	<i>Empoasca dissimularis</i>
Other Insects	a leafhopper	<i>Empoasca rossi</i>
Other Insects	a leafhopper	<i>Empoasca tigris</i>
Other Insects	a leafhopper	<i>Flexamia</i> sp. 1
Other Insects	a leafhopper	<i>Hebecephalus planaria</i>
Other Insects	a leafhopper	<i>Hecalus finnamorei</i>
Other Insects	a leafhopper	<i>Idiocerus canae</i>
Other Insects	a leafhopper	<i>Idiocerus vanduzeei</i>
Other Insects	a leafhopper	<i>Laevicephalus saskatchewanensis</i>
Other Insects	a leafhopper	<i>Laevicephalus</i> sp. 1
Other Insects	a leafhopper	<i>Limotettix brooksi</i>
Other Insects	a leafhopper	<i>Macrostes flavalis</i>
Other Insects	a leafhopper	<i>Macrostes</i> sp. 1
Other Insects	a leafhopper	<i>Memnonia maia</i>
Other Insects	a leafhopper	<i>Orocastus</i> sp. 1
Other Insects	a leafhopper	<i>Psammotettix nesiotus</i>
Other Insects	a leafhopper	<i>Rosenus decurvatus</i>
Other Insects	a leafhopper	<i>Telusius</i> sp. 1
Other Moths	a tortricid moth	<i>Acleris okanagana</i>
Other Moths	a twirler moth	<i>Agonochoetia shawinigan</i>
Other Moths	a noctuid moth	<i>Agrotis kingi</i>
Other Moths	a pterophorid moth	<i>Amblyptilia bowmani</i>
Other Moths	a shiny head-standing moth	<i>Argyresthia columbia</i>

Taxonomic Group	Common Name	Scientific Name
Other Moths	a shiny head-standing moth	<i>Argyresthia nymphocoma</i>
Other Moths	a shiny head-standing moth	<i>Argyresthia tsuga</i>
Other Moths	a noctuid moth	<i>Capis archaia</i>
Other Moths	a twirler moth	<i>Chionodes acerella</i>
Other Moths	a twirler moth	<i>Chionodes boreas</i>
Other Moths	a twirler moth	<i>Chionodes histon</i>
Other Moths	a moth	<i>Coelopoeta maiadella</i>
Other Moths	a twirler moth	<i>Coleotechnites biopes</i>
Other Moths	a grass-veneer moth	<i>Crambus cockleellus</i>
Other Moths	a tortricid moth	<i>Cydia costastrigulana</i>
Other Moths	a pyralid moth	<i>Dioryctria okanaganella</i>
Other Moths	a pyralid moth	<i>Dioryctria vancouverella</i>
Other Moths	a glass miner moth	<i>Elachista amideta</i>
Other Moths	a glass miner moth	<i>Elachista aranella</i>
Other Moths	a glass miner moth	<i>Elachista curufinella</i>
Other Moths	a glass miner moth	<i>Elachista gorlimella</i>
Other Moths	a glass miner moth	<i>Elachista huron</i>
Other Moths	a glass miner moth	<i>Elachista neithanella</i>
Other Moths	an epermeniid moth	<i>Epermenia canadensis</i>
Other Moths	an epermeniid moth	<i>Epermenia infracta</i>
Other Moths	a tortricid moth	<i>Epinotia tsugana</i>
Other Moths	a tortricid moth	<i>Eucosma albertana</i>
Other Moths	a tortricid moth	<i>Eucosma complicana</i>
Other Moths	a tortricid moth	<i>Eucosma fasciculatana</i>
Other Moths	a dart moth	<i>Euxoa macrodentata</i>
Other Moths	a dart moth	<i>Euxoa unica</i>
Other Moths	a crambid snout moth	<i>Frechinia criddlealis</i>
Other Moths	a twirler moth	<i>Gelechia griseaella</i>
Other Moths	a plume moth	<i>Gillmeria albertae</i>
Other Moths	a twirler moth	<i>Gnorimoschema clavatum</i>
Other Moths	a twirler moth	<i>Gnorimoschema lobatum</i>
Other Moths	a twirler moth	<i>Gnorimoschema petiolatum</i>
Other Moths	a twirler moth	<i>Gnorimoschema segregatum</i>
Other Moths	a twirler moth	<i>Gnorimoschema spinosum</i>
Other Moths	a twirler moth	<i>Gnorimoschema tunicatum</i>
Other Moths	a noctuid moth	<i>Hyppa potamus</i>
Other Moths	a noctuid moth	<i>Lasionycta macleani</i>
Other Moths	a noctuid moth	<i>Lasionycta pulverea</i>
Other Moths	a geometrid moth	<i>Meris suffusaria</i>
Other Moths	a plume moth	<i>Oidaematophorus downesi</i>
Other Moths	a leafroller moth	<i>Olethreutes brevirostratum</i>
Other Moths	a crambid snout moth	<i>Oreana pallidivittalis</i>
Other Moths	a noctuid moth	<i>Parabarrovia ogilviensis</i>
Other Moths	a pterophorid moth	<i>Paraplatyptilia nana</i>
Other Moths	a tortricid moth	<i>Pelochrista jejunana</i>
Other Moths	a tortricid moth	<i>Phalonidia ontariana</i>
Other Moths	a tortricid moth	<i>Platphalonia albertae</i>

Taxonomic Group	Common Name	Scientific Name
Other Moths	a noctuid moth	<i>Protogygia alberta</i>
Other Moths	a plume moth	<i>Stenoptilia columbia</i>
Other Moths	a noctuid moth	<i>Sympistis mackiei</i>
Other Moths	a leafminer	<i>Tinagma brunneofasciatum</i>
Other Moths	Lax Dart Moth	<i>Xestia laxa</i>
Spiders and other Chelicerates	Eagle Short-legged Sheetweaver	<i>Agyneta aquila</i>
Spiders and other Chelicerates	Shefford Short-legged Sheetweaver	<i>Agyneta sheffordiana</i>
Spiders and other Chelicerates	Waterton's Short-legged Sheetweaver	<i>Agyneta watertoni</i>
Spiders and other Chelicerates	Yukon Short-legged Sheetweaver	<i>Agyneta yukona</i>
Spiders and other Chelicerates	a wolf spider	<i>Alopecosa koponeni</i>
Spiders and other Chelicerates	Labrador Arboreal Money Spider	<i>Ceratinopsis labradorensis</i>
Spiders and other Chelicerates	Angulated Sac Spider	<i>Clubiona angulata</i>
Spiders and other Chelicerates	Glassy Double-coiled Money Spider	<i>Disembolus hyalinus</i>
Spiders and other Chelicerates	Buckle's Running Crab Spider	<i>Ebo bucklei</i>
Spiders and other Chelicerates	Marshy Harvester Money Spider	<i>Mermessus paludosus</i>
Spiders and other Chelicerates	Banff Money Spider	<i>Oreoneta banffkluane</i>
Spiders and other Chelicerates	Arviat Money Spider	<i>Oreoneta eskimopoint</i>
Spiders and other Chelicerates	Colorado Money Spider	<i>Oreoneta garrina</i>
Spiders and other Chelicerates	Herschel Money Spider	<i>Oreoneta herschel</i>
Spiders and other Chelicerates	Yukon Money Spider	<i>Oreoneta repeater</i>
Spiders and other Chelicerates	Koponen's Money Spider	<i>Oreoneta sepe</i>
Spiders and other Chelicerates	British Columbia Money Spider	<i>Scotinotylus columbia</i>
Spiders and other Chelicerates	Ant-loving Money Spider	<i>Scotinotylus exsectoides</i>
Spiders and other Chelicerates	Sintaluta Money Spider	<i>Scotinotylus sintalutus</i>
Spiders and other Chelicerates	Leech's Antmimic Jumping Spider	<i>Synageles leechi</i>
Spiders and other Chelicerates	Cameron's Humble Money Spider	<i>Tapinocyba cameroni</i>
Spiders and other Chelicerates	Black-headed Erudite Money Spider	<i>Walckenaeria fusciceps</i>
Spiders and other Chelicerates	Alberta Ground Crab Spider	<i>Xysticus albertensis</i>
Stoneflies	Brunswick Sallfly	<i>Alloperla acadiana</i>
True Bugs	a leafhopper	<i>Gastrodes walleyi</i>
True Bugs	a scale insect	<i>Pulvinaria ellesmerensis</i>

Appendix D: A Preliminary List of Ecoregional Endemics

Taxonomic Group	Common Name	Scientific Name
Bumble Bees	a bumble bee	<i>Bombus kluanensis</i>
Flowering Plants	Nova Scotia False Foxglove	<i>Agalinis neoscotica</i>
Flowering Plants	American Alyssum	<i>Alyssum obovatum</i>
Flowering Plants	Clustered Wormwood	<i>Artemisia glomerata</i>
Flowering Plants	Kenai Birch	<i>Betula kenaica</i>
Flowering Plants	Great Lakes Sea Rocket	<i>Cakile edentula</i> var. <i>lacustris</i>
Flowering Plants	Lake Huron Single-spike Sedge	<i>Carex scirpoidea</i> ssp. <i>convoluta</i>
Flowering Plants	Pitcher's Thistle	<i>Cirsium pitcheri</i>
Flowering Plants	Hill's Thistle	<i>Cirsium pumilum</i> var. <i>hillii</i>
Flowering Plants	Dunbar's Hawthorn	<i>Crataegus beata</i>
Flowering Plants	Beautiful Hawthorn	<i>Crataegus formosa</i>
Flowering Plants	Middlesex Frosted Hawthorn	<i>Crataegus perjucunda</i>
Flowering Plants	Mulligan's Draba	<i>Draba mulliganii</i>
Flowering Plants	Taylor's Draba	<i>Draba taylori</i>
Flowering Plants	Muir's Fleabane	<i>Erigeron muirii</i>
Flowering Plants	Yukon Wild Buckwheat	<i>Eriogonum flavum</i> var. <i>aquilinum</i>
Flowering Plants	Olympic Mountain Aster	<i>Eucephalus paucicapitatus</i>
Flowering Plants	Kalm's St. John's-wort	<i>Hypericum kalmianum</i>
Flowering Plants	Dwarf Lake Iris	<i>Iris lacustris</i>
Flowering Plants	Stiff Yellow Flax	<i>Linum medium</i> var. <i>medium</i>
Flowering Plants	Spiked Saxifrage	<i>Micranthes spicata</i>
Flowering Plants	Olympic Saxifrage	<i>Micranthes tischii</i>
Flowering Plants	Arctic Pennycress	<i>Noccaea arctica</i>
Flowering Plants	Fameflower	<i>Phemeranthus sediformis</i>
Flowering Plants	Yukon Podistera	<i>Podistera yukonensis</i>
Flowering Plants	Honey-flowered Solomon's Seal	<i>Polygonatum biflorum</i> var. <i>melleum</i>
Flowering Plants	Congested Cinquefoil	<i>Potentilla crebridens</i>
Flowering Plants	Beringian Cinquefoil	<i>Potentilla crebridens</i> ssp. <i>hemicyphila</i>
Flowering Plants	Gillman's Goldenrod	<i>Solidago gillmanii</i>
Flowering Plants	Houghton's Goldenrod	<i>Solidago houghtonii</i>
Flowering Plants	Ontario Goldenrod	<i>Solidago ontarioensis</i>
Flowering Plants	Great Lakes Sandreed	<i>Sporobolus rigidus</i> var. <i>magnus</i>
Flowering Plants	Anticosti Aster	<i>Symphotrichum anticostense</i>
Flowering Plants	Pink Dandelion	<i>Taraxacum carneocoloratum</i>
Flowering Plants	Lakeside Daisy	<i>Tetraneris herbacea</i>
Flowering Plants	Estuarine Wildrice	<i>Zizania aquatica</i> var. <i>brevis</i>
Freshwater and Anadromous Fishes	Redside Dace	<i>Clinostomus elongatus</i>
Freshwater and Anadromous Fishes	Bloater	<i>Coregonus hoyi</i>
Freshwater and Anadromous Fishes	Deepwater Cisco	<i>Coregonus johanna</i>
Freshwater and Anadromous Fishes	Kiyi	<i>Coregonus kiyi</i>
Freshwater and Anadromous Fishes	Blackfin Cisco	<i>Coregonus nigripinnis</i>
Freshwater and Anadromous Fishes	Shortnose Cisco	<i>Coregonus reighardi</i>

Taxonomic Group	Common Name	Scientific Name
Freshwater and Anadromous Fishes	Blue Walleye	<i>Sander vitreus glaucus</i>
Freshwater Snails	Coldwater Pondsnaail	<i>Stagnicola woodruffi</i>
Freshwater Snails	Purplecap Valvata	<i>Valvata perdepressa</i>
Giant Silkworm and Royal Moths	Bogbean Buckmoth	<i>Hemileuca</i> sp. 1
Grasshoppers	Lake Huron Grasshopper	<i>Trimerotropis huroniana</i>
Marine Fishes	Arctic Brotula	<i>Bythites fuscus</i>
Marine Fishes	Mcallister's Eelpout	<i>Lycodes mcallisteri</i>
Other Beetles	Hungerford's Crawling Water Beetle	<i>Brychius hungerfordi</i>
Other Beetles	Artemisia Broad-nosed Weevil	<i>Connatichela artemisiae</i>
Reptiles	Lake Erie Watersnake	<i>Nerodia sipedon insularum</i>
Reptiles	Eastern Foxsnake	<i>Pantherophis gloydi</i>

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