

On Guard for Them:



Species of Global Conservation Concern in Canada —Summary Report

April 2017

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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.



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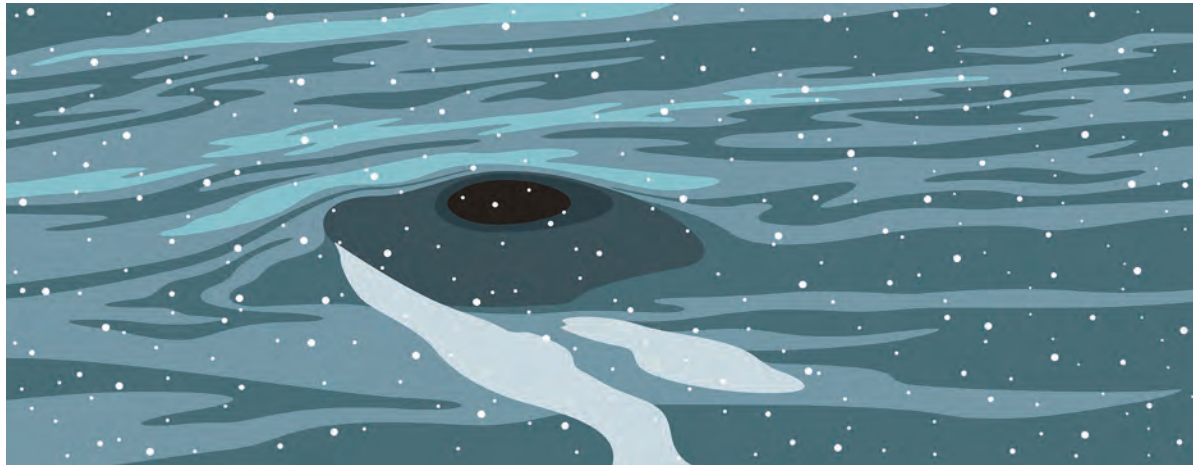


All human societies depend in countless ways upon life-supporting gifts from the diversity of life. Yet many of us are unaware of this simple fact. Biodiversity is like the magic carpet ride of life that we don't even know we are on. That carpet we ride is a beautifully intricate pattern, with each species contributing its colorful, interwoven fiber to the strength of the magic.

The interaction species have with one another creates beautiful patterns, patterns that we see in our everyday existence and that are part of our natural heritage, but of which we are not fully aware. Our magic carpet of life is the foundation of food production, medicines, nutrient cycling, water and air purification, pollination, soil creation, biotechnology, cultural survival, and spiritual renewal. All these are gifts from the diversity of life, derived from the pattern of species interacting with each other and the Earth.

With little awareness, we have been pulling individual fibers out of that magic carpet. As it unravels, the patterns weaken, diminish, and eventually disintegrate before our eyes, no longer able to offer their life-sustaining gifts. Humanity needs our magic carpet to keep flying. It is our responsibility, and essential to our journey, to keep it intact, intricate, colorful, and vibrant.

Healy Hamilton, Chief Scientist, NatureServe



Orca Rising, Roy Henry Vickers¹

¹ Roy Henry Vickers is a renowned First Nations artist from British Columbia: www.royhenryvickers.com/.





Atlantic Whitefish (*Coregonus huntsmani*)—
Critically Imperilled (G1)



Cliff Paintbrush (*Castilleja rupicola*)—
Vulnerable to Apparently Secure (G3G4)

Preface

This document is the summary of NatureServe Canada’s 2017 report *On Guard for Them: Species of Global Conservation Concern in Canada*. The full report, including references and the list of species and infraspecies (subspecies and varieties) of global conservation concern, is available from NatureServe Canada’s website (www.natureserve.ca).

On Guard for Them identifies species and infraspecies native to Canada that are currently assessed by the NatureServe Network to be Possibly Extinct, Critically Imperilled, Imperilled, or Vulnerable within their global range. As we did in our 2005 report *Our Home and Native Land: Canadian Species of Global Conservation Concern* (the first overview of the status of Canadian wild species in a global context), we focus on species in 13 taxonomic groups that are comparatively well known to science.² Unlike in 2005, we also identify infraspecies from among the 13 groups that are of global conservation concern and other species and infraspecies that are endemic to Canada and globally at risk but which do not belong to these groups. *On Guard for Them* thus reflects expanding biodiversity knowledge within the NatureServe Network—a process that is updated as data about animals, plants, lichens, fungi, and ecosystems continues to be gathered.

Many species and infraspecies are at risk of extirpation at national or provincial/territorial levels but yet remain common or otherwise are not threatened elsewhere in the world (i.e., they are not of global conservation concern). As did the 2005 report, *On Guard for Them* does not identify the status of native flora and fauna at these national or subnational levels. Rather, the spotlight is on the native animals, plants, and lichens closer than any others to being lost to extinction—including those found only within Canada, and those shared between Canada and other nations (notably, the United States).



² Mammals, birds, reptiles, amphibians, freshwater fishes, freshwater mussels, crayfishes, butterflies and skippers, tiger beetles, dragonflies and damselflies, ferns and relatives, conifers, and flowering plants



Introduction

At the time of Canada's Confederation in 1867, most of the 3.5 million people populating the new nation likely had limited scientific understanding of the animals and plants in their midst, other than species used for food or within commerce. The primary exceptions were First Nations, Métis, and Inuit whose deep knowledge about native species—their habitats, life histories, and interconnectedness, and how species could be used for food, medicine, and more—had been shaped by observing and working with nature over many generations.

Today, all Canadians have access to greatly expanded knowledge about the lands, waters, and biodiversity of Canada. We have made progress in cataloguing this natural heritage, including understanding it in the contexts of North America and the world, and in identifying and establishing the means by which biodiversity and ecosystem services can be maintained—for nature's sake and for our own.

NatureServe Canada's report *On Guard for Them: Species of Global Conservation Concern in Canada* identifies species and infraspecies that occur in Canada and that are at risk of being lost forever to extinction—including animals, plants, and lichens that occur only in Canada. In 2017, 150 years after Confederation and with an ever-growing body of scientific knowledge for protecting and conserving these species, will Canadians draw on the spirit of our national anthem to proclaim: We stand *On Guard for Them*?

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With 25% of Earth's wetlands, nine percent of Earth's forests and some of the world's largest populations of large mammals such as Caribou (*Rangifer tarandus*), wolves, and bears—including two-thirds of the global Polar Bear (*Ursus maritimus*) population—Canada is recognized for its rich biodiversity.

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Caribou (*Rangifer tarandus*)—emblematic of Canada’s world-renowned wilderness and wildlife

Canada’s Biodiversity

Canada is the world’s second largest country by area, covering seven percent of the Earth’s surface. Despite this geographic extent, Canada hosts less than two percent of Earth’s 8.7 million (± 1.3 million) species. Nonetheless, with 25% of Earth’s wetlands, nine percent of Earth’s forests, and some of the world’s largest populations of large mammals such as Caribou (*Rangifer tarandus*), wolves, and bears—including two-thirds of the global Polar Bear (*Ursus maritimus*) population—Canada is recognized for its rich biodiversity.

Roughly 70,000 native species occurring in Canada have been scientifically described. This number is believed to account for about half the total number of the native species of Canada. The ones that remain to be catalogued are principally those that belong to diverse groups of small organisms, or otherwise are difficult to detect and document. Information on many of these species is highly fragmentary or nonexistent. Nonetheless, scientists and citizen scientists³ are expanding knowledge about Canada’s species and the ecosystems to which they belong. *On Guard for Them* is a synthesis of this growing body of knowledge.

Gone Forever: Species In Canada That Have Gone Extinct Since 1844

Life on Earth began some 3.8 to 4.1 billion years ago. However, of all the species that have ever existed, more than 99% are extinct. They disappeared at a natural background rate of one to five species per year. Extinction, therefore, is a natural phenomenon.

However, we now live in what is being called “the sixth extinction.” This is the latest period of mass extinction within the past 440 million years—and the first almost entirely due to human activity. Today, worldwide, species are being lost at 1000 to 10,000 times the natural background rate.

There are regions of Canada where large numbers of species and infraspecies have disappeared but continue to exist elsewhere within the country. For Canada as a whole, at least 109 species and infraspecies have vanished but continue to exist in the United States and/or elsewhere. In terms of outright extinction, when all species and infraspecies in Canada that are included thus far in NatureServe’s databases are considered, 10 species (three of which were endemic to Canada) and six subspecies (three of which were endemic to Canada) have been lost since 1844 and are Presumed Extinct.



A specimen of the Passenger Pigeon (*Ectopistes migratorius*): The Passenger Pigeon once numbered in the billions and possibly represented up to 40% of all birds in North America. An individual named Martha, which died in captivity at the Cincinnati Zoo on September 1st, 1914, was the last known Passenger Pigeon.

³ Citizen scientists are people who may not have formal scientific credentials but who engage in scientific study and documentation, including monitoring the location and condition of species and their ecosystems.



Staff from the British Columbia Conservation Data Centre undertaking fieldwork at the Nature Conservancy of Canada's Sparrow Grasslands Conservation Area

NatureServe Canada and Canada's Conservation Data Centres

Protecting and responsibly using land, water, and natural resources requires the best available knowledge to support decision-making—including knowledge about biodiversity. To help meet this need, in 1988 The Nature Conservancy, in partnership with the Nature Conservancy of Canada, began creating a network of Canadian Conservation Data Centres (CDCs). The first CDC was established in Québec that year. With the founding of the Nunavut CDC in late 2015, there are now 10 centres.⁴ Each CDC serves as a source for reliable and current scientific information about species and ecosystems.

The international NatureServe Network is made up of the Canadian CDCs and over 70 other similar organizations throughout the United States, Mexico, and much of the Caribbean, Central America, and South America. This network is centrally supported by NatureServe, a U.S.-based non-government organization headquartered in Arlington, Virginia.

The NatureServe Canada Network currently maintains information on over 38,000 species and 2200 ecosystems. The Network steadily adds new knowledge about biodiversity—including about species newly documented for Canada or species or infraspecies newly described to science, and where they are found and their conservation status. The Network also helps document the most important places for biodiversity in Canada, to aid in management decisions concerning them.

⁴ NatureServe Canada member CDCs represent British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland and Labrador, Yukon, Northwest Territories, and Nunavut. The CDC representing Québec is a member of NatureServe.

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 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.

Combining global, national, and subnational conservation status ranks provides perspective and scale for placing risk levels in geographic context and for setting conservation priorities. These assessments are continually reviewed, refined, and updated to reflect advances in knowledge. 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.

Table 1: NatureServe global conservation status ranks

Rank	Conservation Status
GX	Presumed Extinct
GH	Possibly Extinct
G1	Critically Imperilled
G2	Imperilled
G3	Vulnerable
G4	Apparently Secure
G5	Secure
GU	Unrankable
GNR	Unranked
GNA	Not Applicable



Zoologist John Klymko of the Atlantic Canada Conservation Data Centre, searching in coastal New Brunswick for *Ceropales bipunctata*, a poorly understood spider wasp which appears to have declined significantly throughout its range in Canada and the United States

Species of Global Conservation Concern In Canada

On Guard for Them presents findings regarding the global conservation status of 5457 species and 1751 infraspecies native to Canada, within the same 13 scientifically better-known species groups that were the focus of NatureServe Canada's 2005 report *Our Home and Native Land: Canadian Species of Global Conservation Concern*. To enlarge the picture of species and infraspecies of global conservation concern, other invertebrates, mosses, and lichens that are not among the 13 groups but that are endemic to Canada and at risk of extinction are also identified.

Of the animals and plants assessed for *On Guard for Them*, from the 13 species groups, sufficient data and information exist for 97% of the species and 92% of the infraspecies to have assigned them global conservation status ranks, ranging from Presumed Extinct to Secure. The remaining species and infraspecies do not yet have global ranks assigned due to insufficient information and/or a lack of confidence in their national and subnational ranks. Throughout the report these latter species and infraspecies are excluded from calculations of percentages of global conservation concern.

Of the animals and plants from the 13 groups, 333 species (6.3%) and 184 infraspecies (11.5%) are of global conservation concern: their ranks range from Possibly Extinct to Vulnerable (Table 2). In addition, 48 species and four infraspecies that are not among the 13 groups and that are endemic to Canada are also of global concern.⁵ *On Guard for Them* thus identifies 381 species and 188 infraspecies that occur in Canada as being globally at risk.



Sei Whale (*Balaenoptera borealis*)—Vulnerable (G3)

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***On Guard for Them* identifies
381 species and 188 infraspecies that occur
in Canada as being globally at risk.**

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⁵ Many species and infraspecies endemic to Canada (invertebrates, notably) remain to be fully documented and their status assessed.

Table 2: Global conservation status of native animals and plants in Canada, from 13 species groups

	Total Species Analyzed ^a	Total Infrasppecies Analyzed ^a	Species (G) and Infrasppecies (T) Ranked Possibly Extinct (GH/TH) to Secure (G5/T5)														Species of Global Concern (GH–G3) ^b	Infrasppecies of Global Concern (TH–T3) ^b
			GX	TX	GH	TH	G1	T1	G2	T2	G3	T3	G4	T4	G5	T5		
Vertebrates	951	170	7	5	2	1	24	7	5	10	45	22	126	35	743	73	76 (8.0)	40 (27.0)
Mammals	193	54	1	2	0	1	5	5	2	5	17	2	37	16	131	15	24 (12.5)	13 (29.5)
Birds	448	59	3	0	1	0	2	2	1	4	11	17	49	15	381	15	15 (3.4)	23 (43.4)
Reptiles and Turtles	45	32	0	0	0	0	0	0	1	1	3	1	5	1	36	29	4 (8.9)	2 (6.3)
Amphibians	47	10	0	0	0	0	0	0	1	0	0	0	9	0	37	10	1 (2.1)	0 (0.0)
Freshwater Fishes	218	15	3	3	1	0	17	0	0	0	14	2	26	3	158	4	32 (14.8)	2 (22.2)
Invertebrates	594	331	0	0	0	1	3	10	6	10	27	25	86	55	467	174	36 (6.1)	46 (16.7)
Freshwater Mussels	54	4	0	0	0	0	1	0	1	1	6	0	14	0	32	3	8 (14.8)	1 (25.0)
Crayfishes	9	4	0	0	0	0	0	0	0	0	0	0	0	0	9	4	0 (0.0)	0 (0.0)
Butterflies and Skippers	294	279	0	0	0	1	2	8	3	9	12	21	32	48	241	137	17 (5.9)	39 (17.4)
Tiger Beetles	31	37	0	0	0	0	0	2	1	0	4	4	4	7	21	24	5 (16.7)	6 (16.2)
Dragonflies and Damselflies	206	7	0	0	0	0	0	0	1	0	5	0	36	0	164	6	6 (2.9)	0 (0.0)
Vascular Plants	3912	1250	1	0	0	1	29	14	48	20	144	63	635	266	2876	818	221 (5.9)	98 (8.3)
Ferns and Relatives	171	43	0	0	0	0	2	1	1	0	20	4	33	11	115	21	23 (13.5)	5 (13.5)
Conifers	36	13	0	0	0	0	0	0	0	0	2	3	3	0	31	10	2 (5.6)	3 (23.1)
Flowering Plants	3705	1194	1	0	0	1	27	13	47	20	122	56	599	255	2730	787	196 (5.6)	90 (8.0)
Total (Percentage)	5457	1751	8 –	5 –	2 (0.0)	3 (0.2)	56 (1.1)	31 (1.9)	59 (1.1)	40 (2.5)	214 (4.1)	110 (6.9)	847 (16.1)	356 (22.2)	4086 (77.6)	1065 (66.4)	333 (6.3)	184 (11.5)

a) Of the species and infrasppecies analyzed for this report, some do not have global conservation status ranks assigned due to lack of information to inform ranks, or lack of confidence in assigning ranks. They have thus been excluded from calculations of percentages of species and infrasppecies of global conservation concern.

b) Percentage figures in this table (in brackets) have been calculated by dividing the applicable GH/TH to G3/T3 figures into the total applicable GH/TH to G5/T5 figures.

Species Endemic to Canada and of Global Conservation Concern

One hundred and twenty-eight species and 85 infraspecies of animals, plants, and lichens endemic to Canada and assessed for the *On Guard for Them* report are of global conservation concern. At the species level, 56 (44%) of the endemics of concern are flowering plants, 46 (36%) are invertebrates, and 16 (13%) are freshwater fishes. At the infraspecies level, 36 (42%) of the endemics of concern are flowering plants, 29 (34%) are invertebrates, and 10 (12%) are mammals (Table 3).

Table 3: Number of endemic animals and plants, from 13 species groups, plus endemic mosses, lichens, and other invertebrates that are of global conservation concern

	GH	TH	G1	T1	G2	T2	G3	T3	GH-G3	TH-T3
Vertebrates	0	1	16	5	1	5	2	6	19	17
Mammals	0	1	1	4	1	4	1	1	3	10
Birds	0	0	0	1	0	1	0	5	0	7
Reptiles and Turtles	0	0	0	0	0	0	0	0	0	0
Amphibians	0	0	0	0	0	0	0	0	0	0
Freshwater Fishes	0	0	15	0	0	0	1	0	16	0
Invertebrates	3	1	23	5	14	7	6	16	46	29
Freshwater Mussels	0	0	0	0	0	0	0	0	0	0
Crayfishes	0	0	0	0	0	0	0	0	0	0
Butterflies and Skippers	0	1	1	4	2	4	1	13	4	22
Tiger Beetles	0	0	0	1	0	0	0	2	0	3
Dragonflies and Damselflies	0	0	0	0	0	0	0	0	0	0
Other Invertebrates	3	0	22	0	12	3	5	1	42	4
Vascular Plants	0	0	21	12	21	8	15	19	57	39
Ferns and Relatives	0	0	1	1	0	0	0	0	1	1
Conifers	0	0	0	0	0	0	0	2	0	2
Flowering Plants	0	0	20	11	21	8	15	17	56	36
Mosses	0	0	1	0	2	0	0	0	3	0
Mosses	0	0	1	0	2	0	0	0	3	0
Lichens	0	0	2	0	1	0	0	0	3	0
Lichens	0	0	2	0	1	0	0	0	3	0
Total	3	2	63	22	39	20	23	41	128	85



Polar Bear (*Ursus maritimus*)—Vulnerable (G3)



Gibson's Big Sand Tiger Beetle (*Cicindela formosa gibsoni*)—Critically Imperilled (G5T1)

Species of Global Conservation Concern: Comparing 2016 to 2005

NatureServe Canada's 2005 report *Our Home and Native Land: Canadian Species of Global Conservation Concern* listed 354 species (from 13 species groups) that were globally at risk, ranging from Possibly Extinct to Vulnerable. This amounted to 6.4% of the 5520 species identified in 2005 as having a global status rank ranging from Possibly Extinct to Secure. In 2016, NatureServe Canada found 333 species to be globally at risk, from those same 13 groups. Against 5266 species identified as having reliable global status ranks, this results in a small decrease in the percentage of globally at risk species, from 6.4% to 6.3% (Table 4).

While there has been little overall change since 2005 in the percentage of species of global conservation concern, for specific groups (e.g., mammals, freshwater mussels, butterflies and skippers, conifers), several changes stand out. Changes in the status of a species may be related to improvements in knowledge of the distribution and abundance of that species, and/or in the nature of the threats to the species, rather than a change in the actual status of the species in the wild. Conversely, a change in status may reflect actual change in a species' distribution and/or abundance, and/or in the nature of the threats to it.

Table 4: Species of global conservation concern, from 13 species groups, 2005 and 2016

	2005						2016					
	GH	G1	G2	G3	Total GH-G3	% GH-G3	GH	G1	G2	G3	Total GH-G3	% GH-G3
Vertebrates	2	20	4	36	62	6.4%	2	24	5	45	76	8.0%
Mammals	0	3	1	13	17	8.7%	0	5	2	17	24	12.5%
Birds	1	4	1	8	14	3.0%	1	2	1	11	15	3.4%
Reptiles and Turtles	0	0	1	3	4	9.1%	0	0	1	3	4	8.9%
Amphibians	0	0	1	0	1	2.2%	0	0	1	0	1	2.1%
Freshwater Fishes	1	13	0	12	26	12.3%	1	17	0	14	32	14.8%
Invertebrates	0	4	8	35	47	8.3%	0	3	6	27	36	6.1%
Freshwater Mussels	0	2	1	7	10	18.5%	0	1	1	6	8	14.8%
Crayfishes	0	0	0	0	0	0.0%	0	0	0	0	0	0.0%
Butterflies and Skippers	0	2	5	16	23	8.5%	0	2	3	12	17	5.9%
Tiger Beetles	0	0	1	2	3	8.6%	0	0	1	4	5	16.7%
Dragonflies and Damselflies	0	0	1	10	11	5.6%	0	0	1	5	6	2.9%
Vascular Plants	1	24	57	163	245	6.1%	0	29	48	144	221	5.9%
Ferns and Relatives	0	4	6	13	23	13.5%	0	2	1	20	23	13.5%
Conifers	0	0	0	0	0	0.0%	0	0	0	2	2	5.6%
Flowering Plants	1	20	51	150	222	5.8%	0	27	47	122	196	5.6%
Total	3	48	69	234	354	6.4%	2	56	59	216	333	6.3%

Note: In order to compare more exactly with figures in this table for 2016, some percentage calculations for 2005 differ slightly from those reported in the 2005 report. Excluded from the adjusted 2005 calculations are species identified in 2005 as Presumed Extinct and species to which a rank was not assigned.

Species of Global Conservation Concern: By Province and Territory

By a wide margin, British Columbia has more species (151) and infraspecies (80) that are globally at risk than any other province or territory (Table 5). As well, by a large margin British Columbia has more Canadian endemic species (46) and infraspecies (35) that are globally at risk than any other province or territory. (Of British Columbia's endemics at risk, 64 are known only from the province and, of those, at least 41 occur only along the west coast.) That British Columbia should "lead" so overwhelmingly in numbers of species and infraspecies that are globally at risk is due in large measure to the province being the most biologically diverse jurisdiction in Canada, which is in turn due to British Columbia's wide topographic and climatic variability.

Ontario (94), Québec (83), and Alberta (60) are the jurisdictions with the next highest numbers of species that are globally at risk. Québec (35), Ontario (29), and Newfoundland and Labrador (26) are the jurisdictions with the next highest numbers of infraspecies that are globally at risk.

Table 5: Species and infraspecies of global conservation concern, from 13 species groups, plus endemic mosses, lichens, and other invertebrates of global conservation concern, by province and territory

Province/Territory	GH	TH	G1	T1	G2	T2	G3	T3	Total GH–G3	Total TH–T3
Alberta	1	0	10	5	3	3	46	15	60	23
British Columbia	0	2	31	8	25	20	95	50	151	80
Manitoba	0	0	5	1	3	5	29	7	37	13
New Brunswick	1	0	8	2	5	3	38	15	52	20
Newfoundland and Labrador	1	0	10	7	2	2	22	17	35	26
Northwest Territories	1	0	3	3	7	3	29	8	40	14
Nova Scotia	2	0	9	2	6	2	27	11	44	15
Nunavut	1	0	2	1	7	2	13	6	23	9
Ontario	4	1	11	1	13	8	66	19	94	29
Prince Edward Island	1	0	3	0	2	3	8	5	14	8
Québec	1	0	14	4	12	3	56	28	83	35
Saskatchewan	1	0	5	5	8	5	28	11	42	21
Yukon Territory	0	0	4	1	9	8	43	11	56	20



Ram's-head Lady's-slipper
(*Cypripedium arietinum*)—Vulnerable (G3)

Species of Global Conservation Concern: Responsibility to Protect

Canada has sole responsibility for protecting and conserving the 128 species and 85 infraspecies that are endemic to Canada and identified in *On Guard for Them* as globally at risk (Table 6). For 226 species and 92 infraspecies which span across Canada and the United States, protection and conservation is a shared responsibility. (About 85 of these animals and plants have their range primarily within the United States.)

The Critically Imperilled (G5T1) Peary Caribou (*Rangifer tarandus pearyi*), in Northwest Territories and Nunavut and also reported from Greenland, requires bilateral conservation cooperation between Canada and Denmark. The remaining 27 species and 10 infraspecies that are globally at risk span three or more nations and thus require multilateral cooperation for conservation success.

Table 6: Conservation responsibility for species and infraspecies of global conservation concern (GH/TH–G3/T3) occurring in Canada

	Canada Endemic Species	Canada Endemic Infraspecies	Canada & U.S. Species	Canada & U.S. Infraspecies	Multilateral Species	Multilateral Infraspecies
Vertebrates	19	17	34	17	23	6
Mammals	3	10	7	2	14	1 ^a
Birds	0	7	7	11	8	5
Reptiles and Turtles	0	0	3	2	1	0
Amphibians	0	0	1	0	0	0
Freshwater Fishes	16	0	16	2	0	0
Invertebrates	46	29	32	20	0	1
Freshwater Mussels	0	0	8	1	0	0
Crayfishes	0	0	0	0	0	0
Butterflies and Skippers	4	22	13	16	0	1
Tiger Beetles	0	3	5	3	0	0
Dragonflies and Damselflies	0	0	6	0	0	0
Other Invertebrates	42	4	0	0	0	0
Vascular Plants	57	39	160	55	4	4
Ferns and Relatives	1	1	22	4	0	0
Conifers	0	2	2	1	0	0
Flowering Plants	56	36	136	50	4	4
Mosses	3	0	0	0	0	0
Mosses	3	0	n/a	n/a	n/a	n/a
Lichens	3	0	0	0	0	0
Lichens	3	0	n/a	n/a	n/a	n/a
Total	128	85	226	92	27	11

a) Includes Peary Caribou (*Rangifer tarandus pearyi*), shared by Canada and Denmark



The Eastern Musk Turtle (*Sternotherus odoratus*) is globally Secure (G5). However, typical of the multiple threats that wild species often face, this turtle is impacted by loss of shoreline habitat, by being accidentally hooked by fishermen, and by being struck by boats. Compounding the threats, the species is slow to sexually mature, has a low reproductive rate, and a small clutch size.

Threats to Canada's Biodiversity

At Confederation in 1867, wild species in Canada were generally not at risk of extinction because threats to them, from within or outside of Canada, were generally neither plentiful nor severe. Over the past 150 years, however, Canada's human population has increased more than 10-fold, reaching 36.4 million by latter 2016. In medium- and high-growth scenarios, it is projected to reach 52.3-63.0 million by 2060.

Along with population increase, land and natural resources use as well as consumption patterns are intensifying. In consequence, on a per capita basis Canada has an ecological footprint larger than most nations. As well, declining ecological health has been documented for each of Canada's 25 terrestrial, freshwater, and marine ecozones. And, at least 381 native animal, plant, and lichen species, and a further 188 native animal and plant infraspecies, are at risk of extinction (as documented in the *On Guard for Them* report).

Wild species face numerous threats.⁶ By themselves, individual threats can render a species extinct, extirpated, or endangered. More commonly, though, a combination of two or more threats is behind species loss or decline.

Elimination, degradation, or fragmentation of habitat is often the principal cause of species loss or decline. Of the many other threats to wild species, climate change is especially notable. In response to it, many species are rapidly shifting their ranges such as documented in Canada for some mammal, bird, butterfly, and plant species. Range expansions or shifts, however, cannot guarantee that certain species will thrive. Indeed, current and projected rates of climate change—unprecedented within the last 65 million years—are such that some species will not adapt quickly enough to accommodate the new conditions.

Melting permafrost caused this “thaw slump” near Fort McPherson, NT in 2015, and will eventually cause the small lake to collapse and the lake's aquatic life to disappear.



⁶ The NatureServe Network has adopted a classification system that identifies 40 threat types within 11 threat categories.

Key Findings

- 1** Ten species (three of which were endemic to Canada) and six subspecies (three endemic to Canada) have vanished from Canada since 1844 and are Presumed Extinct.
- 2** Of all animals and plants from 13 species groups that have reliable global status ranks, 333 species (6.3%) and 184 infraspecies (11.5%) in Canada are of global conservation concern. Another 48 invertebrate, moss, and lichen species endemic to Canada, and another four invertebrate infraspecies endemic to Canada, are also globally at risk. Thus, this report identifies 381 species and 188 infraspecies in Canada—including 128 species and 85 infraspecies that are endemic to Canada—that are globally at risk.
- 3** At the species level, in terms of percentage of animals or plants of global conservation concern, tiger beetles are most at risk (16.7%), followed by freshwater mussels (14.8%), freshwater fishes (14.8%), ferns and relatives (13.5%), and mammals (12.5%). At the infraspecies level, birds are most at risk (43.4%), followed by mammals (29.5%), freshwater mussels (25%), conifers (23.1%), and freshwater fishes (22.2%).
- 4** The overall percentage of species of global conservation concern in Canada was stable between 2005 (6.4%) and 2016 (6.3%). However, change was significant for tiger beetles (8.6% to 16.7%), mammals (8.7% to 12.5%), freshwater fishes (12.3% to 14.8%), conifers (0.0% to 5.6%), butterflies and skippers (8.5% to 5.9%), and dragonflies and damselflies (5.6% to 2.9%).
- 5** Sixty-six species endemic to Canada from among the 13 species groups reported on in 2005 were globally at risk in 2005. In 2016, 77 of them were.
- 6** British Columbia has more species (151) and infraspecies (80) of global conservation concern than any other province or territory, followed by Ontario (94 and 29), Québec (83 and 35), Alberta (60 and 23), and Yukon (56 and 20). More than any other province or territory, British Columbia also has more species (46) and infraspecies (35) of global conservation concern that are endemic to Canada, followed by Québec (21 and 16), Alberta (16 and 13), and Newfoundland and Labrador (10 and 17).
- 7** Canada has sole responsibility for protecting and conserving 128 species and 85 infraspecies that are endemic to Canada and that are of global conservation concern.
- 8** Canada and the United States have a shared responsibility for protecting and conserving 226 species and 92 infraspecies that occur in both nations. About 85 of these species and infraspecies are found largely within the U.S.
- 9** Twenty-seven of the globally at risk species and 10 infraspecies span three or more nations and thus require multilateral cooperation for conservation success. In addition, the Critically Imperilled (G5T1) Peary Caribou (*Rangifer tarandus pearyi*), in Northwest Territories and Nunavut and reported from Greenland, requires bilateral conservation cooperation between Canada and Denmark.



Elusive Clubtail (*Stylurus notatus*)—
Vulnerable (G3)

Recommendations

Based upon the Key Findings of the *On Guard for Them* report and in the spirit of advancing biodiversity science in Canada, NatureServe Canada recommends that Canadians work together to achieve the following:

- 1** Celebrate Canada's biodiversity (terrestrial, freshwater, and marine species and ecosystems), with special emphasis on those species that are endemic to Canada
- 2** Develop a comprehensive and accurate list of Canada's native and naturalized wild species
- 3** Improve knowledge of the taxonomy, distribution, and status of Canada's biodiversity, notably for lesser-known rare and/or threatened species (e.g., lichens, invertebrates from understudied groups, plants of northern Canada)
- 4** Expand biodiversity knowledge through data mining and the digital capture of data currently held in non-electronic format
- 5** Support targeted, expert-driven field surveys that deploy advanced and innovative methods and sampling strategies, including those designed for detecting elusive and/or rare species⁷
- 6** Support effective and engaging citizen-science projects and tools that yield species and ecosystem data that is of value to decision-makers
- 7** Improve provincial, territorial, and federal knowledge regarding the status, trends, and threats to Canada's biodiversity, so that this information can be better interpreted and integrated across all jurisdictional levels and ecological scales
- 8** Complete the Canadian National Vegetation Classification so that provincial, territorial, and state governments can work together across boundaries to identify terrestrial and aquatic ecosystems and the critical habitat these ecosystems provide for rare and threatened species
- 9** Improve access to biodiversity data, through online distribution tools and by promoting data sharing that is in line with Open Data principles, to ensure that conservation decision-making in Canada is based on the best available biodiversity information
- 10** Use species and ecosystems distribution information to identify priority areas for biodiversity conservation, including public and private protected areas



Klaza Draba (*Draba bruce-bennettii*) is Critically Imperilled (G1). Klaza Draba was discovered in 2012 by Bruce Bennett, Coordinator of the Yukon Conservation Data Centre and present Chair of the Board of NatureServe Canada. The species' scientific name was subsequently named after Mr. Bennett. A species endemic to Canada, Klaza Draba is known only from high elevations on Langham and Tritop mountains of the Dawson Range in Yukon.

⁷ Most species in Canada and the majority of the Canadian landscape have not been surveyed by biologists and ecologists. Increasing the number and geographic coverage of field surveys often results in determining that a rare species is more common than was previously believed, thereby allowing scarce resources to be redirected to other species of conservation concern.

Conclusion

Were the recommendations listed above to be fulfilled, Canadians would significantly enhance their base of knowledge from which intelligent decisions may be made regarding protection and utilization of land, water, ecosystems, and species—Canada's natural capital.

There is reason to be optimistic. First, the identity of Canadians, generally, has long been tied to the wild species that share our land and water. Second, half of Canadian adults have chosen to live where we do in part to be close to nature, and 70% of us spend time outdoors to experience nature further, and are aware of examples of how nature supports us. Third, 13% of us volunteer in nature conservation and, for those who do not volunteer, the principal reasons have to do with a lack of time or not being aware of an opportunity to contribute.

To Canadians in 2017, then, as for the Canadians of 1867, nature matters—though in a fundamentally different way. For whereas at Confederation nature may have been seen as something to be exploited or extracted for profit, or removed as an impediment to settlement, today our relationship with nature is arguably deeper and more strongly woven with our identity—indeed with what it means to be Canadian. These ties are symbolized by a maple leaf on our national flag, by the Common Loon (*Gavia immer*) on our dollar, and by countless other means of expression or commemoration.

As long as that identity endures, we can be confident that Canadians will indeed be *On Guard for Them*—the wild species of Canada that bless our land with beauty and wonder, and that support our health and wealth.



Spotted Owl (*Strix occidentalis*)—
Vulnerable to Apparently Secure (G3G4)



Pair of Loons, Roy Henry Vickers⁸

⁸ Roy Henry Vickers is a renowned First Nations artist from British Columbia: www.royhenryvickers.com/.

In Gratitude to Our Members and Partners

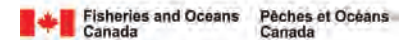
NatureServe Canada is deeply grateful for the monetary and in-kind contributions of our members and partners—thank you!

Alberta Conservation Information
Management System

Atlantic Canada Conservation Data Centre
British Columbia Conservation Data Centre
Environment and Climate Change Canada –
Canadian Wildlife Service

Fisheries and Oceans Canada
Manitoba Conservation Data Centre
Nature Conservancy of Canada
NatureServe
Northwest Territories Conservation Data Centre
Nunavut Conservation Data Centre

Ontario Natural Heritage Information Centre
Parks Canada Agency
Saskatchewan Conservation Data Centre
Western Canada SFI Implementation
Committee
Yukon Conservation Data Centre



An Invitation to Contribute to Biodiversity Science

To invest in biodiversity science is to invest in knowledge about nature, upon which depends the health of the environment, the economy, and our society. The need for biodiversity science continues to grow but government funding is limited. Financial support from foundations, corporations, other non-government organizations, and individuals complements that of government—and helps meet the need for the best available knowledge in support of conservation decision-making.

NatureServe Canada is a registered Canadian charity (#862330529RR0001). We welcome financial gifts in support of our business—biodiversity science. As well, Associate membership in NatureServe Canada is available to organizations that support our mission, that manage data of conservation value, and/or that are active in promoting science-based conservation action nationally or subnationally.

To learn more, to donate in support of our work, or to inquire about Associate membership, please contact us:



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