COSEWIC
Status Appraisal Summary

on the

Bert's Predaceous Diving Beetle
Sanfilippodytes bertae

in Canada

ENDANGERED
2022

COSEWIC
Committee on the Status
of Endangered Wildlife
in Canada

COSEPAC
Comité sur la situation
des espèces en péril
au Canada

COSEWIC status appraisal summaries are working documents used in assigning the status of wildlife species suspected of being at risk in Canada. This document may be cited as follows:

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COSEWIC
Assessment Summary

Assessment Summary – December 2022

Common name
Bert's Predaceous Diving Beetle

Scientific name
Sanfilippodytes bertae

Status
Endangered

Reason for designation
This small aquatic beetle is endemic to Canada. It has been found at four springs and seepages along steep cliff edges or river bends in southern Alberta. Recent surveys found that aquatic habitat has been lost at two sites. Water withdrawal and trampling by livestock are continuing threats.

Occurrence
Alberta

Status history
Designated Endangered in November 2009. Status re-examined and confirmed in December 2022.

COSEWIC
Status Appraisal Summary

Bert's Predaceous Diving Beetle

Hydropore de Bertha

Sanfilippodytes bertae

Range of occurrence in Canada (province/territory/ocean): Alberta

SAS 6
Wildlife species:

Change in eligibility, taxonomy or designatable units:	yes ☐ no ☒
Explanation: No additional data since last assessment.	

Range:

SAS 7	Change in Extent of Occurrence (EOO):	yes ☐ no ☒ unk ☐
SAS 8	Change in Index of Area of Occupancy (IAO):	yes ☐ no ☒ unk ☐
SAS 9	Change in number of known or inferred current locations[1]:	yes ☐ no ☒ unk ☐
SAS 10	Significant new survey information	yes ☐ no ☒

Explanation:

The Bert's Predaceous Diving Beetle is known from two historical sites and one extant site (COSEWIC 2009). The occurrences of the Bert's Predaceous Diving Beetle were clarified in the recovery strategy (Environment and Climate Change Canada 2017). Four sites were recognized, including one that was not included in the original status report (Environment and Climate Change Canada 2017; Figure 1, Table 1). Sites 1 and 2 are in a floodplain and are historical; the habitat at site 1 was destroyed by road development and site 2 could not be relocated (COSEWIC 2009; Environment and Climate Change Canada 2017). Site 3 was not included in the 2009 status report but is supported by museum specimens collected in a floodplain during the 2007 surveys and deposited in the Wallis-Roughley Museum of Entomology (Environment and Climate Change Canada 2017). Site 4 is near Head-Smashed-In Buffalo Jump (COSEWIC 2009; Environment and Climate Change Canada 2017).

The sites for the Bert's Predaceous Diving Beetle that were included in the 2009 status report were surveyed in 2015, but no beetles were observed (Environment and Climate Change Canada 2017). Sites 2 and 3 were either dry, could not be relocated, had been destroyed at the time of the surveys, or had been inaccurately recorded in past reports (Environment and Climate Change Canada 2017). The coordinates used to determine the location of site 4 did not match the photos of the area, which contained prominent geographic features that should have made the site possible to identify (Environment and Climate Change Canada 2017). The location was eventually found using the descriptions in the status report and was determined to be closer to Head-Smashed-In Buffalo Jump. The spring at the site was active, but the Bert's Predaceous Diving Beetle was not found (Environment and Climate Change Canada 2017). The photos of site 4 showed a higher water level in 2007, suggesting that the seasonal timing of surveys could influence the detection of the Bert's Predaceous Diving Beetle (COSEWIC 2009; Environment and Climate Change Canada 2017).

[1] Use the IUCN definition of "location"

The Bert's Predaceous Diving Beetle appears to be geographically restricted, so increases in EOO or IAO are not expected (COSEWIC 2009). On the basis of two sites, about 18 km apart, the EOO is 18 km^2 (distance between two sites by 1 km). Spring and seepage habitat in Alberta was surveyed in 2009–2011 as part of the Alberta Springs Project (Environment and Climate Change Canada 2017; Stevens, pers. comm. 2021). Other species of predaceous diving beetles were detected at two sites on private land with intensive cattle grazing (Stevens pers. comm. 2021). The most widespread surveys of aquatic habitat in Alberta have focused on habitats that are unlikely to be suitable overall for the Bert's Predaceous Diving Beetle (Buck pers. comm. 2021; Hinchliffe pers. comm. 2021). More work is needed to improve the understanding of Bert's Predaceous Diving Beetle habitat (Environment and Climate Change Canada 2017).

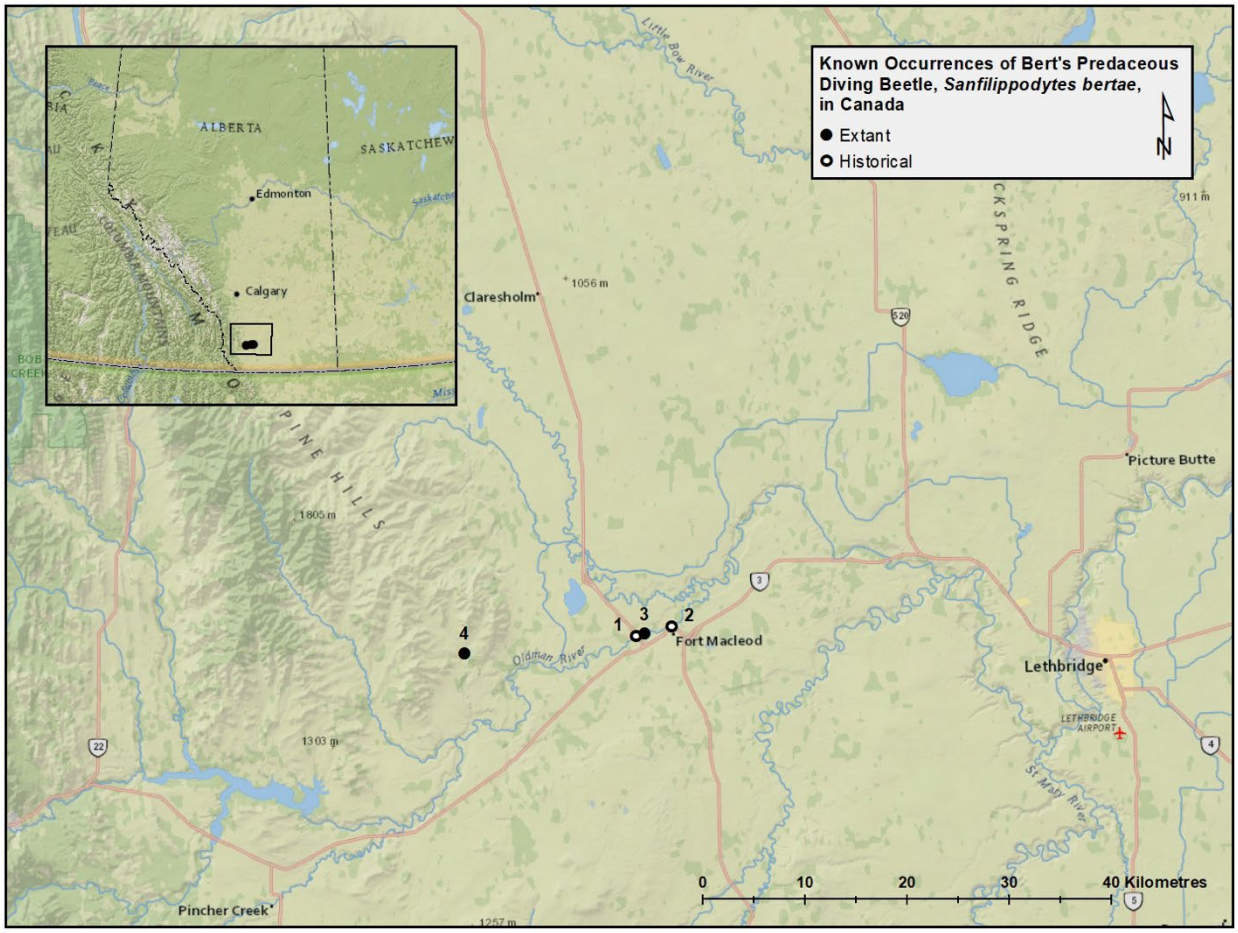

Figure 1. Occurrences of the Bert's Predaceous Diving Beetle in Canada numbered chronologically: oldest = 1. Also see Table 1. (Map prepared by Alain Filion, COSEWIC Secretariat).

Population Information:

SAS 11	Change in number of mature individuals:	yes ☐ no ☒ unk ☐
SAS 12	Change in population trend:	yes ☐ no ☒ unk ☐
SAS 13	Change in severity of population fragmentation:	yes ☐ no ☒ unk ☐
SAS 14	Change in trend in area and/or quality of habitat:	yes ☐ no ☒ unk ☐
SAS 15	Significant new survey information	yes ☐ no ☒ unk ☐

Explanation:

The Bert's Predaceous Diving Beetle has been found at four sites, two historical and two presumed extant (COSEWIC 2009; Environment and Climate Change Canada 2017). A broad survey of the biota at springs in Alberta, conducted around the time of the original assessment, did not record this beetle but provided useful information about threats to, and the conservation of, springs (Springer *et al*. 2015). The field crew surveyed 20 springs within 100 km, with Danny Shpeley, Strickland Museum, University of Alberta, responsible for beetle identification (Springer *et al*. 2015). No targeted surveys have been conducted since the recovery strategy. The consultation of the authorities contacted and major data/specimen repositories such as the Alberta Conservation Information Management System (ACIMS); Canadian National Collection of Insects, Arachnids, and Nematodes (CNC); Ottawa Research and Development Centre (Ottawa RDC); Alberta Biodiversity Monitoring Institute (ABMI); Royal Alberta Museum; and E.H. Strickland Entomological Museum did not result in any observations.

It appears as if declines in the Bert's Predaceous Diving Beetle population are historical (Table 1).

Table 1. Summary of Bert's Predaceous Diving Beetle occurrence records in Canada (data and notes taken verbatim from Environment and Climate Change Canada 2017).

Map Label	Site[a]	Date	# Specimens[b]	Status[c]
1	Northwest bank of the Oldman River upstream of the Hwy. 2 crossing west of Fort MacLeod, Alberta	March 1980 and May 1984	30	Historical
2	South bank of the Oldman River, 3 km downstream of the Hwy. 2 crossing west of Fort McLeod, Alberta	May 1984	12	Historical
3[d]	South bank of the Oldman River, 0.7 km downstream of the Hwy. 2 crossing west of Fort McLeod, Alberta	April 2007	2	Extant
4[e]	Small creek south of Head-Smashed-In Buffalo Jump, Alberta, 20 km west of Fort McLeod, Alberta	April 2007	2	Extant

[a]The site information reported is the best information available to Environment and Climate Change Canada at the time the recovery strategy was written. Sources are Larson *et al*. (2000), COSEWIC (2009), Alberta Conservation Information Management System, and the Wallis-Roughley Museum of Entomology at the University of Manitoba.

[b]All specimens collected were adults.

[c]Extant means the occurrence is recent and habitat still exists at the time of writing the recovery strategy.

[d]This site was not mentioned in the text of the COSEWIC (2009) status report. The Wallis-Roughley Museum of Entomology at the University of Manitoba has confirmed that these specimens were collected on 28 April 2007 by R. E. Roughley and J. A. Knopp. Surveys in 2015 failed to find this site. The precision of the coordinates is uncertain as the habitat described was not found.

[e]The coordinates provided for this site by the Wallis-Roughley Museum of Entomology at the University of Manitoba were investigated in August 2015 but did not match the descriptions in the COSEWIC status report. The actual site was closer to Head-Smashed-In Buffalo Jump.

SAS 16
Threats:

Change in nature and/or severity of threats:	yes ☐ no ☒ unk ☐

Explanation:

The threats described in the status report for the Bert's Predaceous Diving Beetle were organized to fit the current COSEWIC threats framework (see Salafsky et al. 2008; Master et al. 2012) in the recovery strategy and are listed below (see Environment and Climate Change Canada 2017).

Dams and water management/use (Natural System Modifications, Threat 7; 7.2) were considered a significant threat to the Bert's Predaceous Diving Beetle. Its habitat could be negatively impacted by fluctuating water levels in the Oldman River Basin due to withdrawals, diversions, or impoundments for use in irrigation and industry (COSEWIC 2009). Since 1991, the Oldman River Dam and Reservoir have been used for irrigation, community water supplies, and agriculture (such as livestock production). About 13,568,000 m^3 (11,000 acre-feet) of water is reserved for these activities (Oldman River Basin Water Allocation Order 2003). The Government of Alberta has proposed changes to the Water Allocation Order that could increase access by all industries to the water from the Oldman Reservoir (Oldman Watershed Council 2021). The proposal suggested that 20% of the 13,568,000 m^3 would be allocated to maintaining environmental flow, an amount that the Oldman Watershed Council argued may not be adequate to support ecosystem functions based on the current methodologies for estimating flow (Oldman Watershed Council 2021). However, the Allocation Order does not include groundwater, which is a small amount of water compared to the reservoir. It does apply to water upstream of the Oldman Reservoir, suggesting that impacts on groundwater around Fort MacLeod would be limited (Frank pers. comm. 2021). An increase in water use could lead to less recharge, although it is expected to be minimal and further research is required (Frank pers. comm. 2021).

Any alterations to the groundwater could significantly alter the stability of seeps and springs, but little information is available relating to the habitat where Bert's Predaceous Diving Beetle has been found. The Foothillls Sub-basins include a vast stretch of ungauged, unnamed sub-basin on which there is no water quality or streamflow information (Oldman Watershed Council 2010b). Two groundwater studies have been carried out in the area, one in the Willow Creek watershed and another focusing on nitrates near Fort MacLeod. Both of these reports did not specifically target the types of seep and spring habitat thought to be suitable for the Bert's Predaceous Diving Beetle (Frank pers. comm. 2021). More information is needed to determine how water management may impact ground and surface hydrology (Environment and Climate Change Canada 2017).

Another significant threat to the Bert's Predaceous Diving Beetle is livestock farming and ranching (Agriculture and Aquaculture, Threat 2; 2.3). Ranching vehicles and cattle grazing can cause significant damage to spring and seepage habitat through compaction, trampling, and muddying, and the soiling of the water from defecation (COSEWIC 2009). Individual springs and seeps can become heavily contaminated with fecal material if cattle are concentrated around these habitats (COSEWIC 2009). The Bert's Predaceous Diving Beetle likely requires undisturbed seepage and spring habitat with a specific structure—fine-grained substrates and mosses over fine particulate soil (COSEWIC 2009). The physical disturbance from ranching activities quickly disrupts these conditions and may also alter the flow of water into the springs (COSEWIC 2009).

Cattle grazing occurs where the Bert's Predaceous Diving Beetle has been found. While 46% of the Oldman River mainstem is grassland habitat, much of that area is not cultivated due to the continuous risk of flooding (Oldman Watershed Council 2010a). Current grazing intensity is likely similar to that found during the 2015 surveys for the recovery strategy (Frank pers. comm. 2021). At the time of those surveys, most sites were already lost due to drying or cattle grazing (Environment and Climate Change Canada 2017).

The impact of other threats on the Bert's Predaceous Diving Beetle remains low or is unknown (see Environment and Climate Change Canada 2017 for details). Human intrusion and disturbance (Threat 6), such as recreational activities (Threat 6.1) and work and other activities (Threat 6.3), are considered to have a low overall impact. Threats with unknown impacts include oil and gas drilling (Energy Production and Mining, Threat 3; 3.1), roads and railroads (Transportation and Service Corridors, Threat 4; 4.1), agricultural and forestry effluents (Pollution, Threat 9; 9.3), and droughts (Climate Change and Severe Weather, Threat 11; 11.2).

Springer *et al*. (2015) and Nielson *et al*. (2019), in broad surveys of springs, their biota, and threats, note that grazing, along with drinking water extraction, can threaten the integrity of the natural communities associated with springs. They recommend a better inventory of springs and their biotic communities, as well as ongoing protection from overgrazing. Their review of threats to spring ecosystems is consistent with the threats in the recovery strategy and original status report.

SAS 17
Protection:

Change in effective protection:	yes ☐ no ☒ unk ☐
Explanation: Federal protection: The Bert's Predaceous Diving Beetle is listed as Endangered under Schedule 1 of the federal *Species at Risk Act* (SARA). The federal recovery strategy for the Bert's Predaceous Diving Beetle contains several knowledge gaps (see Environment and Climate Change Canada 2017). Critical habitat was not identified in this recovery strategy because of insufficient information on the species' distribution and specific habitat requirements. Provincial (Alberta) protection: Bert's Predaceous Diving Beetle has a provincial rank of S1. Status information for invertebrates in Alberta can be found in the ACIMS.	

SAS 18
Rescue Effect:

Change in evidence of rescue effect:	yes ☐ no ☒
Explanation: This species has only been recorded at four spring and seep habitats in Alberta and appears to be endemic to Canada and Alberta.	

SAS 19
Quantitative Analysis:

Change in estimated probability of extirpation:	yes ☐ no ☒ unk ☐
Details: No quantitative data exists for the Bert's Predaceous Diving Beetle.	

Summary and Additional Considerations

An action plan with recovery information is scheduled to be completed by 2022 (Environment and Climate Change Canada 2017).

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Jennifer Heron, David McCorquodale (co-chairs of the Arthropods Specialist Subcommittee), Rosana Soares, and Joanna James (COSEWIC Secretariat) provided guidance and support during the writing of this summary. The Arthropods Specialist Subcommittee provided valuable comments and constructive criticism that improved this SAS (Robert Buchkowski, Sydney Cannings, Jeremy deWaard, Allan Harris, Colin Jones, John Klymko, Jayme Lewthwaite, Jessica Linton, Dawn Marks, Julia Mlynarek, Jeff Ogden, Leah Ramsay, John Richardson, Brian Starzomski, Myrle Ballard, Sue Chiblow, and Dan Benoit). Shannon Frank and Larry Stevens generously shared their expertise about Alberta springs.

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Writer of Status Appraisal Summary:

- Sarah Semmler

TECHNICAL SUMMARY

Bert's Predaceous Diving Beetle

Hydropore de Bertha

Sanfilippodytes bertae

Range of occurrence in Canada (province/territory/ocean): Alberta

Demographic Information

Generation time (usually average age of parents in the population; indicate if another method of estimating generation time indicated in the IUCN guidelines (2011) is being used)	1 year
Is there an [observed, inferred, or projected] continuing decline in number of mature individuals?	Unknown
Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations, whichever is longer up to a maximum of 100 years]	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over the last [10 years, or 3 generations, whichever is longer up to a maximum of 100 years].	Unknown
[Projected or suspected] percent [reduction or increase] in total number of mature individuals over the next [10 years, or 3 generations, whichever is longer up to a maximum of 100 years].	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over any period [10 years, or 3 generations, whichever is longer up to a maximum of 100 years], including both the past and the future.	Unknown. Majority of reduction appears to be historical.
Are the causes of the decline a. clearly reversible and b. understood, and c. ceased?	a. no b. partially c. no
Are there extreme fluctuations in number of mature individuals?	Unknown

Extent and Occupancy Information

Estimated extent of occurrence (EOO)	18 km² Distance between two sites by 1 km
Index of area of occupancy (IAO) (Always report 2x2 grid value).	8 km² 2 extant sites
Is the population "severely fragmented" i.e., is >50% of its total area of occupancy in habitat patches that are (a) smaller than would be required to support a viable population, and (b) separated from other habitat patches by a distance larger than the species can be expected to disperse?	a. unknown b. unknown. Dispersal described as "minimal"

Number of “locations”* (use plausible range to reflect uncertainty if appropriate)	1-2, water diversion and trampling by livestock
Is there an [observed, inferred, or projected] decline in extent of occurrence?	No
Is there an [observed, inferred, or projected] decline in index of area of occupancy?	No
Is there an [observed, inferred, or projected] decline in number of subpopulations?	No
Is there an [observed, inferred, or projected] decline in number of “locations”*?	No
Is there an [observed, inferred, or projected] decline in [area, extent and/or quality] of habitat?	Yes, inferred
Are there extreme fluctuations in number of subpopulations?	Unknown
Are there extreme fluctuations in number of “locations”*?	Unknown
Are there extreme fluctuations in extent of occurrence?	Unknown
Are there extreme fluctuations in index of area of occupancy?	Unknown

Number of Mature Individuals (in each subpopulation)

Subpopulations (give plausible ranges)	**N Mature Individuals**
Total	Unknown

Quantitative Analysis

Is the probability of extinction in the wild at least [20% within 20 years or 5 generations whichever is longer up to a maximum of 100 years, or 10% within 100 years]?	Data not available

Threats (direct, from highest impact to least, as per IUCN Threats Calculator)

Was a threats calculator completed for this species?

Threats Calculator for Recovery Strategy was used.

i 2 Agriculture and Aquaculture
ii 7 Natural System Modifications

What additional limiting factors are relevant?
Presumably type of spring

* See Definitions and Abbreviations on COSEWIC website for more information on this term.

Rescue Effect (immigration from outside Canada)

Status of outside population(s) most likely to provide immigrants to Canada.	Not applicable
Is immigration known or possible?	Not applicable
Would immigrants be adapted to survive in Canada?	Not applicable
Is there sufficient habitat for immigrants in Canada?	Not applicable
Are conditions deteriorating in Canada? [+]	Yes, inferred
Are conditions for the source (i.e., outside) population deteriorating?[+]	Not applicable
Is the Canadian population considered to be a sink?[+]	Not applicable
Is rescue from outside populations likely?	Not applicable

Data Sensitive Species

Is this a data sensitive species?	No

Current Status

COSEWIC Status History: Designated Endangered in November 2009. Status re-examined and confirmed in December 2022.

Status and Reasons for Designation:

Status: Endangered	**Alpha-numeric codes:** B1ab(iii)+2ab(iii)
Reasons for designation: This small aquatic beetle is endemic to Canada. It has been found at four springs and seepages along steep cliff edges or river bends in southern Alberta. Recent surveys found that aquatic habitat has been lost at two sites. Water withdrawal and trampling by livestock are continuing threats.	

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Not applicable. Insufficient data to reliably infer, project, or suspect population trends.
Criterion B (Small Distribution Range and Decline or Fluctuation): Meets Endangered B1ab(iii)+2ab(iii) with EO (18 km^2) and IAO (8 km^2) below thresholds, known from at most two locations, and inferred continuing decline in the quality of habitat.
Criterion C (Small and Declining Number of Mature Individuals): Not applicable. Reliable estimates of population size trends not available.
Criterion D (Very Small or Restricted Population): May meet Endangered D1, if population assumed to be <250 mature beetles, although reliable estimates of population size are not available. May meet Threatened D2, because is known from two locations with ongoing threats of water withdrawal and livestock trampling.
Criterion E (Quantitative Analysis): Not applicable. Analysis not conducted.

[+] See Table 3 (Guidelines for modifying status assessment based on rescue effect).

COSEWIC HISTORY

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list. On June 5, 2003, the *Species at Risk Act* (SARA) was proclaimed. SARA establishes COSEWIC as an advisory body ensuring that species will continue to be assessed under a rigorous and independent scientific process.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species, subspecies, varieties, or other designatable units that are considered to be at risk in Canada. Designations are made on native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fishes, arthropods, molluscs, vascular plants, mosses, and lichens.

COSEWIC MEMBERSHIP

COSEWIC comprises members from each provincial and territorial government wildlife agency, four federal entities (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biodiversity Information Partnership, chaired by the Canadian Museum of Nature), three non-government science members and the co-chairs of the species specialist subcommittees and the Aboriginal Traditional Knowledge subcommittee. The Committee meets to consider status reports on candidate species.

DEFINITIONS
(2022)

Wildlife Species	A species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.
Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)**	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)***	A category that applies when the available information is insufficient (a) to resolve a species' eligibility for assessment or (b) to permit an assessment of the species' risk of extinction.

* Formerly described as "Vulnerable" from 1990 to 1999, or "Rare" prior to 1990.

** Formerly described as "Not In Any Category", or "No Designation Required."

*** Formerly described as "Indeterminate" from 1994 to 1999 or "ISIBD" (insufficient scientific information on which to base a designation) prior to 1994. Definition of the (DD) category revised in 2006.

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The Canadian Wildlife Service, Environment and Climate Change Canada, provides full administrative and financial support to the COSEWIC Secretariat.