COSEWIC
Status Appraisal Summary

on the

Magnum Mantleslug
Magnipelta mycophaga

in Canada

SPECIAL CONCERN
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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Production note:
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COSEWIC
Assessment Summary

Assessment Summary – December 2022

Common name
Magnum Mantleslug

Scientific name
Magnipelta mycophaga

Status
Special Concern

Reason for designation
The large slug species, up to 80 mm in length, is endemic to the northern Columbia Basin in western North America. Half of the global range is in southeastern British Columbia. The species occurs in patchy habitat and is confined to moist, cool microsites within coniferous forests at mid-to high elevations. Despite extensive searches, there are only 22 subpopulations recorded within its Canadian range. Fragmentation of its habitat continues to be a threat, as are logging and habitat shifts, droughts, storms, and flooding. It may become Threatened if threats are neither reversed nor managed with demonstrable effectiveness and is currently close to meeting Threatened criteria.

Occurrence
British Columbia

Status history
Designated Special Concern in May 2012. Status re-examined and confirmed in December 2022.

COSEWIC
Status Appraisal Summary

Magnum Mantleslug

Limace à grand manteau

Magnipelta mycophaga

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

SAS 6
Wildlife species:

Change in eligibility, taxonomy or designatable units:	yes ☐ no ☒
Explanation: No changes since the previous 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:
Distribution records for the species exist from 22 occurrences, representing 16 subpopulations (i.e., those >1 km apart or 3 km apart in continuous habitat) at scattered localities across the species' Canadian range (BCECCS 2018; Figure 1). Since the previous COSEWIC (2012) status report, which included records from 1992 to 2010, the species has been detected on 9 occasions; the last record is from 2015 (see Table 1 in BCECCS 2018 for a list of localities). In addition, a specimen collected in 1936 on Mount Revelstoke (a previously known locality) has come to light. An online search of the iNaturalist (2020) database resulted in no new records.

Survey efforts since the COSEWIC (2012) report include the following: Ovaska *et al*. (2020) reported on surveys for terrestrial gastropods in the Kootenay region from 2007 to 2015, focusing on species at risk. In September 2013, 2014, and 2015, they spent a total of 140 person-hours intensively searching for gastropods at 144 sites and detected Magnum Mantleslug (7 individuals) at 6 sites, all previously undocumented. Copley and co-workers conducted surveys for arthropods at 70 sites in 2011 (July to September), 2012 (August), 2013 (June to August), 2015 (July), and 2017 (July); all gastropods encountered were collected (C. Copley pers. comm. 2020). They detected the species (3 individuals) at 3 sites in 2011: Mount Revelstoke and 2 previously undocumented sites. Durand and Mackenzie (2017) reported on surveys by EcoLogic (2017) in the Slocan Watershed, which focused on species at risk, including gastropods; Magnum Mantleslug was not found.

Since the previous assessment, the known EOO has increased marginally (by 15.3%) with new records to the southeast near the international border and to the north, north of Revelstoke (Figure 2). The known IAO has increased by 40 km^2 (10 grid cells; 83.3%; Figure 2). The changes in EOO and IAO reflect increased survey efforts rather than range expansion.

[1] Use the IUCN definition of "location."

The number of known subpopulations has increased from 9 to 16. Threat-based locations, corresponding to subpopulations, have also increased accordingly, from 9 to 16, assuming that each subpopulation is subjected to separate threatening events from wildfires, or recreational developments. If droughts associated with climate change are considered the most serious plausible threat, then the number of locations might be 11, combining those occurrences on the same mountains, ridges, or watercourses. Although droughts may affect large areas simultaneously, forest type, aspect, and other factors contributing to habitat heterogeneity are likely to influence their impacts on the slugs, resulting in uncertainty in the number of locations.

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 ☒
Explanation: Survey efforts have focused on obtaining information on distribution. There is no information on population abundance or trends. Habitat quality is projected to deteriorate due to numerous threats. Logging, in particular, continues to fragment and alter habitats across the species' Canadian range. Severe fragmentation was previously considered "possible" but is more accurately assessed as "unknown." It is impossible to assess the viability of subpopulations based on available data. None of the surveys to date have attempted to estimate abundance and minimum viable population size for the species is unknown.		

SAS 16
Threats:

Change in nature and/or severity of threats:	yes ☐ no ☒ unk ☐
Explanation: Magnum Mantleslug continues to face a multitude of threats, as identified previously (COSEWIC 2012). Threat calculator results presented in COSEWIC (2012) were re-evaluated as part of the preparation of the provincial management plan for Kootenay slugs (see Table 6 in BCECCS 2018). This evaluation resulted in some changes to the scores based on updated information on the distribution and threats. The changes are due to more realistic scoring as the process has evolved rather than a change in the actual threats. Logging (Biological Resource Use; Threat 5.3) and habitat shifts, droughts, and storms and flooding (Climate Change & Severe Weather; Threats 11.1, 11.2, 11.4) remained the greatest threats to the species, but the threat impact of both categories was reduced from Medium and Medium-Low, respectively, to Low. Other threats, also scored as Low impact, accrued from the development of ski hills and recreational areas (Residential & Commercial Developments; Threats 1.1, 1.3); introduction and spread of invasive gastropods, earthworms, and other invertebrates (Invasive & Other Problematic Species; Threat 8.1); wildfires (Natural System Modifications; Threat 7.1); quarrying (Energy Production & Mining; Threat 3.2); and road building (Transportation & Service Corridors; Threat 4.1). Forestry effluents and air pollution (Pollution; Threats 9.3, 9.5) were flagged as threats of unknown impact. Based on the cumulative impacts of all threats, the overall threat impact was calculated as Medium, as opposed to High in the previous threat calculator assessment.	

SAS 17
Protection:

Change in effective protection:	yes ☐ no ☒ unk ☐

Explanation: In total, 31.8% of known occurrences are in protected areas (Mount Revelstoke National Park, Wells Gray and Stagleap provincial parks, and Darkwoods Conservation Area by Nature Conservancy Canada). The species' presence in these areas was previously documented (COSEWIC 2012). Most occurrences are on BC Crown forestry lands (45.5%), followed by recreational (18.2%) and private forestry (4.5%) lands. The objectives of the provincial management plan (BCECCS 2018) include securement of habitat for extant subpopulations, mitigating threats, and restoring habitat connectivity. These objectives have yet to be achieved, and it is unknown whether any of the recommended actions have been initiated (by November 2020).

SAS 18
Rescue Effect:

Change in evidence of rescue effect:	yes ☐ no ☒
Explanation: Several records exist from the vicinity of the international border, including two recent records from the Purcell Mountains just north of the border abutting Kootenai National Forest in the United States. However, as stated in COSEWIC (2012), while rescue from the United States is possible, it is unlikely over the short term given the poor dispersal ability and patchy distribution of the slugs in the landscape.	

SAS 19
Quantitative Analysis:

Change in estimated probability of extirpation:	yes ☐ no ☒ unk ☐
Details: Insufficient data for analysis	

Summary and Additional Considerations [e.g., recovery efforts; summarize exactly what has changed since the previous assessment]:

Since the previous COSEWIC assessment (COSEWIC 2012), the species has been listed as Special Concern in Schedule 1 of the *Species at Risk Act* in 2017. Survey efforts have increased the known occurrences (i.e., sites) from 13 to 22, and the number of subpopulations from 9 to 16. The EOO has increased only marginally (15.3%), whereas the IAO has increased by 83.3%. Undocumented occurrences probably exist, but it is likely that the distribution will remain very patchy. A multi-species provincial management plan for Kootenay slugs, including Magnum Mantleslug, has been prepared (BCECCS 2018). The plan describes several actions for protecting habitats and reducing threats at known sites and for filling in knowledge gaps on the distribution and habitat requirements of the species. These actions have yet to be implemented.

ACKNOWLEDGEMENTS

Claudia Copley and Robert Forsyth generously shared their respective data on distribution records and search efforts in the Kootenay region. Heidi Gartner provided records of the species in the Royal British Columbia Museum's collection. Lea Gelling and Katrina Stipec provided records from the BC Conservation Data Centre database. Sydney Allen (COSEWIC Secretariat) prepared the distribution maps and EOO and IAO calculations for this report. Dwayne Lepitzki, Co-chair of the COSEWIC Mollusc Species Specialist Subcommittee, and anonymous reviewers provided helpful comments on an earlier draft.

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Writer of Status Appraisal Summary:

- Kristiina Ovaska

TECHNICAL SUMMARY

Magnipelta mycophaga

Magnum Mantleslug

Limace à grand manteau

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

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 yr
Is there an [observed, inferred, or projected] continuing decline in number of mature individuals?	Inferred and projected decline most likely based on threats
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
Are the causes of the decline a. clearly reversible and b. understood and c. ceased?	a. partially (habitat alteration by logging) b. partially c. no
Are there extreme fluctuations in number of mature individuals?	Unknown

Extent and Occupancy Information

Estimated extent of occurrence (EOO)	47,040 km² Minimum convex polygon method
Index of area of occupancy (IAO) (Always report 2x2 grid value).	88 km² 22 2x2 km grid cells (includes all records)

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. Yes Subpopulation sizes and their viability are unknown: 16 isolated subpopulations (22 sites), most of which are known from one record only, representing 1–4 individuals.
Number of “locations”∗ (use plausible range to reflect uncertainty if appropriate)	11 to 16; minimum based on climate change (droughts) as the most plausible serious threat and groupings of sites on same mountains, ridges, or watercourses together; maximum based on the number of subpopulations (i.e., sites >1 km apart in fragmented habitat or >3 km apart in continuous habitat), assuming that each is subjected to separate threatening events from logging, wildfires, and recreational developments.
Is there an [observed, inferred, or projected] decline in extent of occurrence?	No observed decline (known EOO has increased due to search effort). Decline could be projected due to threats.
Is there an [observed, inferred, or projected] decline in index of area of occupancy?	No observed decline (known IAO has increased due to search effort). Decline could be projected due to threats.
Is there an [observed, inferred, or projected] decline in number of subpopulations?	Yes, projected decline most likely based on threats.
Is there an [observed, inferred, or projected] decline in number of “locations”*?	Yes, projected decline most likely based on threats.
Is there an [observed, inferred, or projected] decline in [area, extent and/or quality] of habitat?	Yes, inferred and projected decline in habitat quality based on threats.
Are there extreme fluctuations in number of subpopulations?	No
Are there extreme fluctuations in number of “locations”*?	No
Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

Number of Mature Individuals (in each subpopulation)

Subpopulations (give plausible ranges)	**N Mature Individuals**
Sixteen known subpopulations; an increased from nine in previous status report, reflecting increased search effort	
Total	Insufficient data to determine.

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

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]?	Not done due to lack of data

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

Was a threats calculator completed for this species?
Yes, in November 2017 as part of the preparation of the provincial management plan (BCECCS 2018). Calculated impact for all threat categories was Low, cumulatively resulting in a Medium overall threat impact.

i. Biological Resource Use (Logging & wood harvesting; Threat 5.3)
ii. Climate Change & Severe Weather (Habitat shifting & alteration, Droughts, Storms & flooding; Threats 11.1, 11.2, 11.4)
iii. Residential & Commercial Development (Tourism & recreational areas; Threats 1.1, 1.3)
iv. Energy Production & Mining (Mining & quarrying; Threat 3.2)
v. Transportation & Service Corridors (Roads; Threat 4.1)
vi. Natural System Modifications (Fires & fire suppression; Threat 7.1)
vii. Invasive & Other Problematic Species (Invasive/non-native alien species; Threat 8.1)

What additional limiting factors are relevant?
Naturally patchy habitats; poor dispersal ability

Rescue Effect (immigration from outside Canada)

Status of outside population(s) most likely to provide immigrants to Canada.	Idaho: S2 – imperilled; Montana: S2S3 – critically imperilled to vulnerable; Washington: S2 – imperilled (NatureServe 2021)
Is immigration known or possible?	Possible but limited by poor dispersal ability of slugs and their patchy distribution
Would immigrants be adapted to survive in Canada?	Yes
Is there sufficient habitat for immigrants in Canada?	Probably
Are conditions deteriorating in Canada?+	Yes
Are conditions for the source (i.e., outside) population deteriorating?+	Unknown
Is the Canadian population considered to be a sink?+	No
Is rescue from outside populations likely?	No

Data Sensitive Species

Is this a data sensitive species?	No

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

Status History

COSEWIC Status History: Designated Special Concern in May 2012. Status re-examined and confirmed in December 2022.

Status and Reasons for Designation:

Status:	**Alpha-numeric codes:**
Special Concern	Not applicable.
Reasons for designation: The large slug species, up to 80 mm in length, is endemic to the northern Columbia Basin in western North America. Half of the global range is in southeastern British Columbia. The species occurs in patchy habitat and is confined to moist, cool microsites within coniferous forests at mid-to high elevations. Despite extensive searches, there are only 22 subpopulations recorded within its Canadian range. Fragmentation of its habitat continues to be a threat, as are logging and habitat shifts, droughts, storms, and flooding. It may become Threatened if threats are neither reversed nor managed with demonstrable effectiveness and is currently close to meeting Threatened criteria.	

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Not applicable. Insufficient data to calculate inferred population decline.
Criterion B (Small Distribution Range and Decline or Fluctuation): Not applicable. Nearly meets the thresholds for Threatened, B2. While the EOO of 47,040 km^2 is above the threshold for Threatened, the IAO (88 km^2) is well below the threshold for Endangered. The species probably does not undergo extreme fluctuations and is not severely fragmented, although subpopulations are isolated. It occurs at slightly more than 10 locations; the number of mature individuals, IAO; the number of subpopulations and locations are projected to continue to decline and there is an implied and projected continuing decline in area, extent, and quality of habitat.
Criterion C (Small and Declining Number of Mature Individuals): Not applicable. Insufficient data to determine number of mature individuals.
Criterion D (Very Small or Restricted Population): Not applicable. Number of mature individuals is unknown and typical thresholds for D2, Threatened are exceeded (>5 locations and IAO >20 km^2).
Criterion E (Quantitative Analysis): Not applicable. Analysis not conducted.

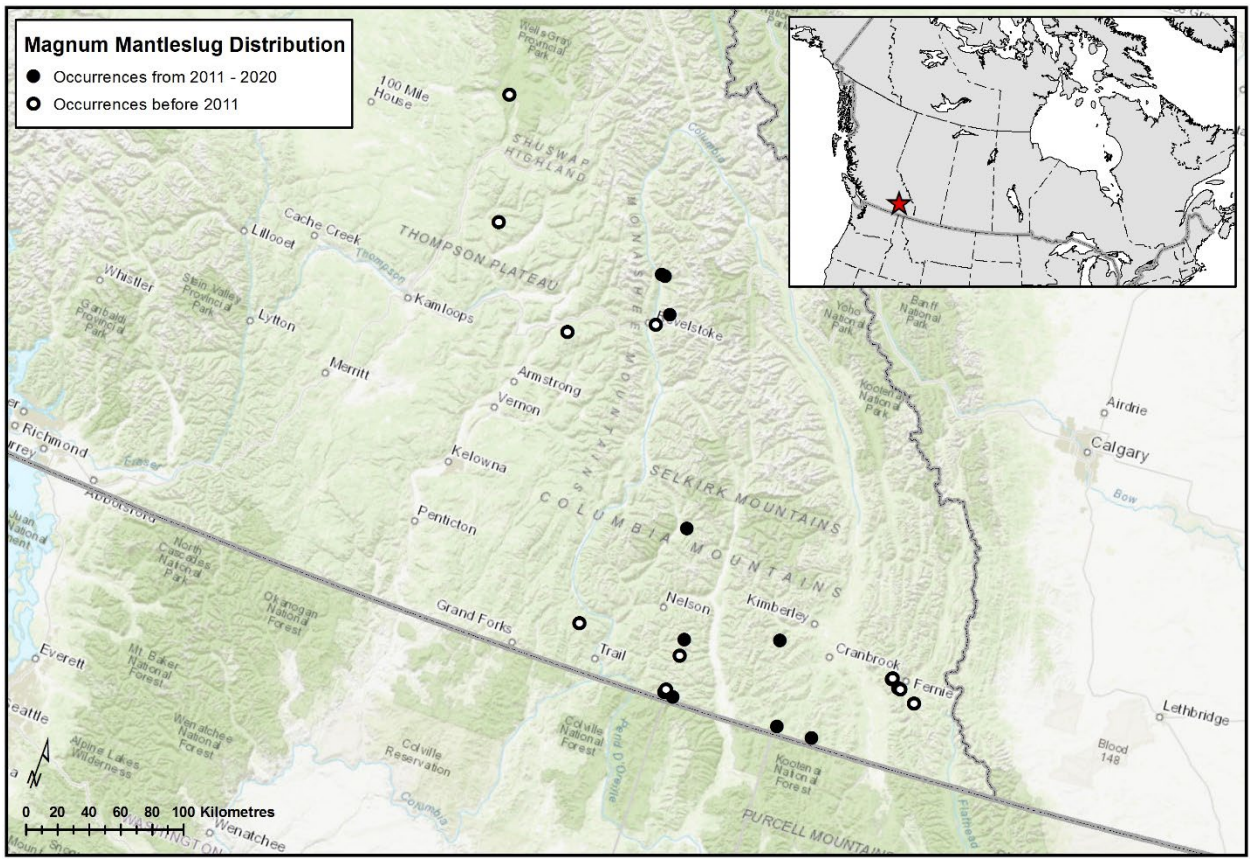

Figure 1. Distribution of Magnum Mantleslug (*Magnipelta mycophaga*) in Canada, showing localities known at the time of the previous COSEWIC (2012) status report and new localities documented since then. Lack of recent records from large areas of the distribution reflects paucity of search effort. Map prepared by Sydney Allen (COSEWIC Secretariat).

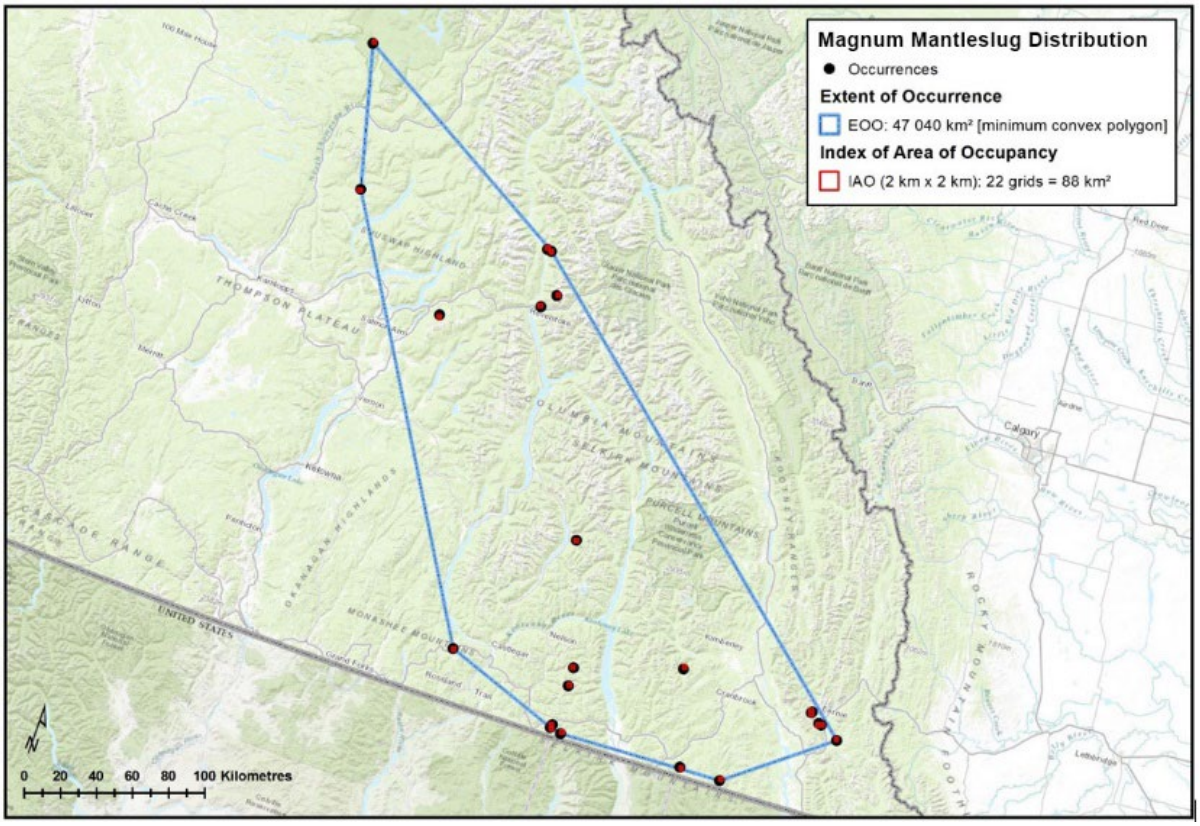

Figure 2. Extent of Occurrence (EOO) and Area of Occupancy (IAO) for Magnum Mantleslug (*Magnipelta mycophaga*) in Canada, based on all records, as compiled in 2020. Map prepared by Sydney Allen (COSEWIC Secretariat).

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.

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