*Template for the Preparation of COSEWIC Status Reports*

(2021)

***NOTE TO USERS: text that is not highlighted is standard content to be retained as written; text highlighted in yellow represents specific items to be replaced with species-specific content; text highlighted in green represents guidance on content to be provided to report writers.***

***This annotated template is meant to be used in conjunction with detailed Instructions to Writers in Appendix F1 of the COSEWIC O & P manual and available online at the COSEWIC website:*** <https://cosewic.ca/index.php/en/reports/preparing-status-reports/formatting-template.html>.

**COSEWIC Status Report**

**on**

**Species English Name**

***Scientific name***

Photo or illustration of species

Image credit: Author (month/year, general locality)

**Draft/Provisional/Post-provisional[[1]](#footnote-1) Status Report, Date**

**Send comments to Assigned co-chair,**

**Co-chair, X Specialist Subcommittee**

**Email: co-chair email**

**Due date for comments: (leave blank – COSEWIC to insert)**

**Anticipated Assessment Date: (leave blank – COSEWIC to insert)**

**Funding provided by (leave blank – COSEWIC to insert)**

(Section Break)

Production note:

To be added by COSEWIC Secretariat to the final report

COSEWIC would like to acknowledge XXXX [and YYYY] for writing the status report on species A (*scientific name*) in Canada, prepared under contract with Environment Canada and Climate Change. This report was overseen by XXXX, Co-chair of the COSEWIC XXXX Specialist Subcommittee.

Cover photo: Species A from (locality, date or year); photo by photographer/illustrator.

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EXECUTIVE SUMMARY

This section must not exceed 2 pages (appr. 800 words max; exceptions can be made for reports addressing multiple Wildlife Species, i.e., Designatable Units) and should focus on aspects relevant to assessment. All information appearing in the Executive Summary must also appear in the narrative of the main body of the report. Keep sentences simple and language non-technical.

**Wildlife Species Description and Significance**

Short paragraph (1-2 sentences) providing high-level overview of description (much less detail than in the main text).

Short paragraph (1 sentence) highlighting significance, e.g., taxonomic uniqueness, indicator species, important interactions with other species, public interest.

**Aboriginal (Indigenous) Knowledge**

All species are significant and are interconnected and interrelated. And either: Aboriginal Traditional Knowledge (ATK) has been included under relevant headings of the report. Or: There is no species-specific ATK in the report.

**Distribution**

Short paragraph providing high-level overview of global/North American and Canadian distribution. Note seasonal differences, if applicable. Leave provincial/territorial details to the main text.

**Habitat**

Short paragraph identifying typical habitat features. If appropriate, highlight seasonal differences, requirements that may vary by behaviour or life history stage, and trends in habitat quality.

**Biology**

Short paragraph providing high-level overview of key aspects of biology, with an emphasis on relevant demographic parameters (e.g., reproductive potential, age-of-first breeding, longevity, generation time), and any key behavioural, physiological, or dietary characteristics relevant to assessment. Note key intrinsic limiting factors (e.g., slow reproductive rate, dependence on other species).

**Population Sizes and Trends**

Paragraph summarizing current Canadian population size estimate (numbers of mature individuals) and identifying key sources of this information (as applicable).

Paragraph identifying key trends used in assessment with emphasis on rate of change over 10 years or three generations, whichever is longer; where available briefly including longer-term context. If extreme fluctuations or severe fragmentation apply, describe them briefly.

**Threats**

Briefly identify the main threats to the population and habitats (consistent with threat calculator results) that are relevant to the species, and indicate the overall threat impact for the species.

**Protection, Status, and Recovery Activities**

Identify legal protection (federal and provincial acts) and status (SARA and COSEWIC if different; provincial/territorial listing) in Canada. Summarize relevant NatureServe rankings (global/national/provincial, and US) - a comprehensive list is usually not required. Briefly summarize any other types of status, if deemed significant, and recovery activities. Note whether any substantial part of the species’ range is within national parks or other protected areas. (Note: this section should be considerably shorter than the corresponding section in the main text).

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TECHNICAL SUMMARY

**Instructions (to be deleted after completion):** Complete the Technical Summary after you have finished writing the narrative of the report. Provide one Technical Summary for each proposed designatable unit (DU; refer to [Guidelines for Recognizing Designatable Units](http://cosewic.ca/index.php/en-ca/reports/preparing-status-reports/guidelines-recognizing-designatable-units)) as well as for the species in its entirety within Canada if the DU structure has not been formally approved by COSEWIC. For the meanings of terms in this Technical Summary, refer to [Definitions and Abbreviations](http://cosewic.ca/index.php/en-ca/about-us/definitions-abbreviations) accompanying the Information for Preparing Status Reports on the COSEWIC/COSEPAC website (http://cosewic.ca).

Provide requested data in the third column, and brief supporting explanations in the fourth (final) column. When using a percentage clearly indicate whether the percentage refers to an increase or a reduction by using a plus or minus sign.

**Template instructions (to be deleted from final version):**

Yellow highlighting indicates text to be replaced as appropriate.

Green highlighting provides guidance for responses, and is to be removed prior to submission.

Text without highlighting is to be retained without modification.

*Scientific name*

English name

French name

Indigenous names

Range of occurrence in Canada: list applicable provinces west to east, then territories west to east, then oceans west to east

**Demographic Information:**

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | Generation time (usually average age of parents in the population) | Approximately XX years | Based on IUCN method/other (explain, if not IUCN) |
| 2 | Is there an [observed, estimated, inferred, or projected] continuing decline in number of mature individuals? | Yes / no / unknown | Observed / estimated / inferred / projected based on key data source |
| 3 | [Observed, estimated, or projected] percent of continuing decline in total number of mature individuals within 3 years [or 1 generation; whichever is longer up to a maximum of 100 years] | XX% over 1 generation or 3 years (XXXX-20XX)or “n/a” if box 2 is “no” or “unknown” if box 2 is “unknown”  | Observed / estimated / projected / based on key data source or “No evidence of continuing decline” or “unknown” |
| 4 | Observed, estimated, or projected] 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] | XX% over 2 generations or 5 years (XXXX-20XX)or “n/a” if box 2 is “no” or “unknown””  | Observed / estimated / projected / based on key data source or “No evidence of continuing decline” or “unknown” |
| 5 | [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] | XX% reduction / increase over 3 generations or 10 years (XXXX-20XX) or “unknown” | Observed / estimated / inferred / projected / suspected based on key data source or briefly explain why estimate is unknown |
| 6 | [Projected, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over the next [10 years, or 3 generations, up to a maximum of 100 years] | XX% reduction / increase over 3 generations or 10 years (XXXX-20XX) or “unknown” | Projected / inferred / suspected based on threats assessment/ population modelling/ other source, or unknown. Briefly explain other source |
| 7 | [Observed, estimated, inferred, projected, or suspected] percent [reduction or increase] in total number of mature individuals over any period of 10 years [or 3 generations; whichever is longer, up to a maximum of 100 years], including both the past and future (up to a maximum of 100 years in future) | XX% reduction / increase over 3 generations or 10 years (XXXX-20XX) or “unknown” | Observed / estimated / inferred / projected / suspected based on key data source , or unknown. Briefly explain other source |
| 8a | Are the causes of the decline clearly reversible? | Yes / no / unknown | Brief explanation |
| 8b | Are the causes of the decline clearly understood? | Yes / no / unknown | Brief explanation |
| 8c | Are the causes of the decline clearly ceased? | Yes / no / unknown | Brief explanation |
| 9 | Are there extreme fluctuations in number of mature individuals | Yes / no / unknown | Brief explanation |

**Extent and Occupancy Information:**

|  |  |  |  |
| --- | --- | --- | --- |
| 10 | Estimated extent of occurrence (EOO)  | estimate km2  | Calculated based on minimum convex polygon around known occurrences (or alternate method); specify range of years included. |
| 11 | Index of area of occupancy (IAO), reported as 2x2 km grid value  | estimate km2  | Supporting notes/assumptions if required, including range of years included |
| 12 | Is the population “severely fragmented”, i.e., is >50% of individuals or >50% of the total area “occupied” (as a proxy for number of individuals) in habitat patches that are both (a) smaller than required to support a viable subpopulation, and (b) separated from other habitat patches by a distance larger than the species can be expected to disperse? | 1. Yes / no / unknown
2. Yes / no / unknown
 | Brief explanation (supporting notes as required to explain applicability of a) and b) |
| 13 | Number of “locations” (use plausible range to reflect uncertainty if appropriate) | Number (or range of possible values) | Brief explanation (make explicit reference to main threat(s) underpinning location definition) |
| 14 | Is there an [observed, inferred, or projected] continuing decline in extent of occurrence? | Yes / no / unknown | Observed / inferred / projected based on explanation |
| 15 | Is there an [observed, inferred, or projected] continuing decline in area of occupancy? | Yes / no / unknown | Observed / inferred / projected based on explanation |
| 16 | Is there an [observed, inferred, or projected] continuing decline in number of subpopulations? | Yes / no / unknown | Observed / inferred / projected based on explanation |
| 17 | Is there an [observed, inferred, or projected] continuing decline in number of “locations”? | Yes / no / unknown | Observed / inferred / projected based on explanation |
| 18 | Is there an [observed, inferred, or projected] continuing decline in [area, extent and/or quality] of habitat? | Yes / no / unknown | Observed / inferred / projected decline in area/extent/quality of habitat based on explanation |
| 19 | Are there extreme fluctuations in number of subpopulations? | Yes / no / unknown | Brief explanation, only if required |
| 20 | Are there extreme fluctuations in number of “locations”? | Yes / no / unknown | Brief explanation, only if required |
| 21 | Are there extreme fluctuations in extent of occurrence? | Yes / no / unknown | Brief explanation, only if required |
| 22 | Are there extreme fluctuations in index of area of occupancy? | Yes / no / unknown | Brief explanation, only if required |

**Number of Mature Individuals (by subpopulation):**

|  |  |  |  |
| --- | --- | --- | --- |
| 23 | Subpopulation 1Subpopulation 2Subpopulation X | Number rangeNumber rangeNumber range | Notes on individual estimates / sources (if applicable) |
| Total | Number range | Based on data source (year of estimate) |

**Quantitative Analysis:**

|  |  |  |  |
| --- | --- | --- | --- |
| 24 | Is the probability of extinction in the wild at least 20% within 20 years [or 5 generations], or 10% within 100 years] | Yes / no / unknown | Explanation (most often “analysis not conducted”) |

**Threats:**

|  |  |  |  |
| --- | --- | --- | --- |
| 25a | Was a threats calculator completed for this species? | Yes / no (see Appendix X) | Overall assigned threat impact: assigned threat impact (year) |
| 25b | Key threats were identified as: 1. Name of highest impact threat (IUCN number) – low/medium/high impact
2. Name of second highest impact threat (IUCN number) – low/medium/high impact

etc. [only list threats with an impact of low or higher] |
| 25c | What limiting factors are relevant?* Item 1
* Item 2 (etc)
 |

**Rescue Effect (from outside Canada):**

|  |  |  |  |
| --- | --- | --- | --- |
| 26 | Status of outside population(s) most likely to provide immigrants to Canada. | Increasing / stable / declining / unknown  | Explanation (possible source regions and corresponding trends and/or S-ranks) |
| 27 | Is immigration known or possible? | Yes / no / unknown | Brief explanation |
| 28 | Would immigrants be adapted to survive in Canada?  | Yes / no / unknown | Brief explanation |
| 29 | Is there sufficient habitat for immigrants in Canada?  | Yes / no / unknown | Brief explanation |
| 30 | Are conditions deteriorating in Canada? | Yes / no / unknown | Brief explanation |
| 31 | Are conditions for the source (i.e., outside) population deteriorating? | Yes / no / unknown | Brief explanation |
| 32 | Is the Canadian population considered to be a sink? | Yes / no / unknown | Brief explanation |
| 33 | Is rescue from outside Canada likely, such that it could lead to a change in status?  | Yes / no / unknown | Brief explanation to be filled in by the relevant SSC / Co-chair; see flowchart in Figure 1 in O&P Appendix E3) |

**Wildlife Species with Sensitive Occurrence Data (general caution for consideration):**

|  |  |  |  |
| --- | --- | --- | --- |
| 34 | Could release of certain occurrence data result in increased harm to the Wildlife Species or its habitat? | Yes / No | If yes, indicate the category of harm I-V I. Capture/harvest of individualsII. Disturbance by observationIII. Intentional killing of individualsIV. Intentional destruction or damage of habitatV. Introduction of diseasesIf yes, indicate type of sensitive occurrence data (e.g., nesting sites, hibernacula, lek sites, breeding ponds, observation data)If there are local-level concerns, these could be communicated here. |

**Current Status:**

Refer to the Species at Risk Public Registry and copy/paste information, for Box 35-39, if the Wildlife species was previously assessed by COSEWIC. Current Status and Recommended Status will be updated when the assessment has been finalized.

|  |  |  |
| --- | --- | --- |
| 35 | COSEWIC status | Status (or “Not applicable” if not previously assessed) |
| 36 | Year of previous assessment | XXXX (or “Not previously assessed”) |
| 37 | COSEWIC Status History | Exact copy of text from previous status report, or “Not applicable” if not previously assessed |
| 38 | Criteria | Exact copy of alpha-numeric codes from previous status report, or “Not applicable” if not previously assessed |
| 39 | Reasons for designation | Exact copy from previous status report, in quotation marks, or “Not applicable” if not previously assessed |

**Recommended Status and Reasons for Designation:***(leave blank; The following sections are to be completed by the relevant SSC / Co-chair at the 2-month version with reference to the guidelines on alpha-numeric codes, reasons for designation, applicability of criteria, and codified reasons for a change in status)*

|  |  |  |
| --- | --- | --- |
| 40 | Recommended status |  |
| 41 | Alpha-numeric codes |  |
| 42 | Reason for change in status |  |
| 43 | Reasons for designation |  |

**Applicability of Criteria:**

|  |
| --- |
| **A: Decline in Total number of Mature Individuals**:  |
| 44 | Applicability Statement | Rationale Statement |
| **B: Small Range and Decline or Fluctuation** |
| 45 | Applicability Statement | Rationale Statement |
| **C: Small and Declining Number of Mature Individuals** |
| 46 | Applicability Statement | Rationale Statement |
| **D: Very Small or Restricted Population** |
| 47 | Applicability Statement | Rationale Statement |
| **E: Quantitative Analysis** |
| 48 | Applicability Statement | Rationale Statement |
| 49. | If a species is proposed as Special Concern, Data Deficient, Extirpated or Extinct, list the applicable guidelines, examples, or other considerations from O&P Appendix E3. |

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PREFACE

For reassessments only: In 1 to 2 paragraphs, provide a high-level overview of new data and analyses since the previous COSEWIC report for the species with a focus on information related to status assessment. Note any changes in status elsewhere in the range of the species. Also note any changes in protection including new protected areas, and production or amendment of recovery documents.

(section break)

# WILDLIFE SPECIES DESCRIPTION AND SIGNIFICANCE

## Name and Classification

*Current classification*:

Class:

Order:

Family:

Genus:

Species:

*Subspecies in Canada (if applicable)*:

*Taxonomic changes since previous report (for reassessments)*:

*Common names*: Provide source

 English:

 French:

 Indigenous (specify language):

*Synonyms and notes*:

Brief paragraph providing context for the species within its genus or family, explaining any taxonomic issues with this species, e.g., synonyms or uncertainties.

## Description of Wildlife Species

Use very short descriptions and simple vocabulary that will be understood by non-biologists. Avoid complex technical details. The objective is not to replace readily available field/identification guides (refer to them for details and illustrations). For poorly known species, the descriptions may be more comprehensive but should not be excessively detailed or technical. Subheadings may be used as required for particular species and can incorporate different life stages or similar/confusing species, if relevant.

## Designatable Units

For species considered to have one DU, briefly justify the approach based on lack of distinctiveness. For species with multiple DUs, provide information that can be matched to the Guidelines for Recognizing Designatable Units on COSEWIC website. Clearly identify the criteria used for supporting Discreteness and Evolutionary Significance among all putative DUs considered in the report. The criteria should be referenced and italicized. If it appears that the designatable unit structure is other than that specified in the contract, discuss the situation with the SSC Co-chairs early in the process. If the report deals with only one or a subset of DUs for a species, the existence of additional DUs should be mentioned here. If a separate, approved DU report exists, this report can be referred to or briefly summarized rather than repeating detailed evidence for discreteness and significance.

*Recognized subspecies or varieties in Canada*:

*Designatable Units (DUs)*: List them

 \

*Evidence for discreteness (if applicable)*:

Reference the criteria (D1 and D2) for discreteness as per Guidelines for Recognizing Designatable Units on COSEWIC website and summarized in detailed instructions to report writers.

*Evidence for evolutionary significance (only if discreteness applies)*:

Reference the criteria (S1 and S2) for significance as per Guidelines for Recognizing Designatable Units on COSEWIC website and summarized in detailed instructions to report writers.

## Special Significance

Short section describing broader significance of the species. Consider and include, if relevant, the following types of information: endemic to Canada or relic species, taxonomic uniqueness, Canadian responsibility, key ecological role, interactions with other species, value as indicator species, economic significance, cultural significance (other than to Indigenous peoples), and public interest.

# ABORIGINAL (INDIGENOUS) KNOWLEDGE

The following paragraph is included in all COSEWIC status reports and requires no additional input from the status report writer:

Aboriginal Traditional Knowledge (ATK) is relationship-based. It involves information on ecological relationships between humans and their environment, including characteristics of species, habitats, and locations. Laws and protocols for human relationships with the environment are passed on through teachings and stories, and Indigenous languages, and can be based on long-term observations. Place names provide information about harvesting areas, ecological processes, spiritual significance or the products of harvest. ATK can identify life history characteristics of a species or distinct differences between similar species.

## Cultural Significance to Indigenous Peoples

The COSEWIC Secretariat will provide you with existing Aboriginal Traditional Knowledge Subcommittee (ATK SC) Source and/or Assessment reports and an ATK Integration Manual, if available.

Include the following sentence under this heading if ATK from an ATK SC Source Report, Assessment Report, or from another source was available:

This species is culturally significant to Indigenous Peoples who hold detailed knowledge on the evolving, dynamic nature of the species. ATK has been included under relevant headings of the report; sources of information are indicated.

Briefly describe cultural significance under this heading.

or

Where ATK, from Source and/or Assessment reports, or from other ATK sources, was NOT provided during preparation of the status report, include the following paragraph:

There is no species-specific ATK in the report. However, Name Species is important to Indigenous Peoples who recognize the interrelationships of all species within the ecosystem.

# DISTRIBUTION

## Global Range

Provide a very concise (1-3 sentences) overview of the global distribution of the species, noting seasonal differences for migratory species as appropriate. For species with a wide global distribution, describe distributional limits; a complete list of jurisdictions is not needed. Emphasize where the core range of the global population occurs, especially for widespread species that may have uneven distribution/density. Provide an up-to-date map of the current global range. When available, include a description or a map of the historical range of the species and identify recently extirpated occurrences at a broad scale.

## Canadian Range

Begin by identifying what proportion of the species’ global range is in Canada (by area and/or population). Provide a very brief general overview of the distribution of the species (west to east, north to south), referencing a distribution map that must include boundaries around DUs (if there is more than one DU). Provide an overview-level description of any temporal changes in distribution pattern, e.g., changes from historical distribution, if known.

Follow up, if applicable, with an additional paragraph that identifies particular areas of importance (e.g., high abundance) in broad terms or key aspects of distribution in relation to particular ecoregions or areas. Do not give exact geographic locations, if the information might be data sensitive and increases the vulnerability of the species. If detailed data are required for COSEWIC assessment, flag them so that they may be removed when the report is finalized and posted for public distribution.

Include a brief paragraph on the adequacy of search effort to document the species’ distribution and whether significant data gaps exist in survey coverage. If additional information is deemed relevant to assessment, as with poorly known cryptic species, use Appendix A for details of survey effort, including robustness of the methods and proportion of suitable habitat not surveyed adequately.

## Population Structure

Briefly report on whether there are any spatial discontinuities or genetic structure within DUs, and the extent to which research or spatial analyses have been conducted. Explain how subpopulations, element occurrences, sites and other spatial terms are used in this report. For DUs with distinct subpopulation structure, indicate how subpopulations are defined and spatially distributed, including a statement on separation distances. If genetic information within DUs is available but not previously discussed (e.g., in the DU section), include it here; otherwise, a reference to the relevant section is sufficient.

## Extent of Occurrence and Area of Occupancy

Include calculation method, range of years, and whether all records or only those for a certain life history function (e.g., breeding, hibernation) are used. For comparisons between periods, recalculate previously given values using the most up-to-date dataset to ensure consistency. Account for differences, emphasizing whether they reflect true changes in status or changes in methods. Describe how extant, historical, and extirpated sites are defined and used here (e.g., according to NatureServe terminology). In cases where search effort is not deemed adequate, historical sites should be included in the current EOO and IAO calculations. State clearly which data are included in the calculations and why.

### Current EOO:

Extent of occurrence (EOO) within Canada is [estimated area calculated by COSEWIC Secretariat] km2, calculated using a minimum convex polygon that encompasses known records from 2000-2019 (Figure X – map showing EOO). See detailed instructions for approach to time-lines to be used.

### Current IAO:

Index of area of occupancy (IAO) within Canada is [estimated area calculated by COSEWIC Secretariat] km2, calculated using a 2 x 2 km grid drawn over known records from 2000-2019 (Figure X – map showing IAOs, if applicable).

## Fluctuations and Trends in Distribution

Provide quantification of changes based on calculations of EOO and IAO and indicate whether changes reflect actual changes in distribution or increased knowledge. Avoid repetition with description under **Canadian Range**.

# Biology and Habitat Use

For all sections below, synthesize available information, focusing on Canadian studies where available; avoid excessive description and detail from individual studies. Focus on information that affects status assessment, such as aspects of the species’ biology or habitats that affect the resiliency or vulnerability of populations to perturbations.

## Life Cycle and Reproduction

Begin with a brief overview of age of sexual maturity, fecundity, and longevity. Describe typical timing of breeding, hibernation, and other key life history functions. Report on juvenile and adult survival rates or productivity estimates, including any regional differences. Provide an estimate of generation time, including how it was calculated. Where information is lacking, closely related species may be used as surrogates.

## Habitat Requirements

Outline the typical characteristics of seasonal habitats (e.g., breeding, migration, foraging, and over-wintering) and indicate whether habitats vary among different life history stages (e.g., larvae, juveniles, adults). Note any regional variation or plasticity (i.e., to establish the degree to which the species is a habitat specialist, or susceptible to habitat change). Where known, indicate whether particular habitats are optimal or marginal, and whether certain habitats are reproductive sinks (i.e., attract the species but usually produce no recruits). If appropriate, include a short description of habitats used outside of Canada (for migratory species), especially if these areas support the species during an important or limiting stage of the life cycle. Consider summarizing important habitat features in a table (*see suggested format and examples provided at end* for Table A). Keep the narrative short and concise avoid repeating details presented in the table.

## Movements, Migration, and Dispersal

Identify to what degree (if any) the species is migratory. For long-distance migratory species (e.g., birds, sea turtles, marine fish), dedicate a paragraph to what is known about the timing and rate of migration and key routes and stopover sites. Identify migration characteristics that may increase risk to the species (e.g. long trans-oceanic migration, reliance on key re-fueling sites). For short-distance migratory species (e.g., snakes, amphibians) indicate movement distances between seasonal habitats. For non-migratory species, provide information on seasonal home-range size and seasonal movement distances.

For all species, provide a paragraph summarizing what is known about dispersal, including timing and nature of site fidelity (juvenile and adult separately, if documented). If there is variability in extent of dispersal and migration (e.g., irruptions or nomadism), outline what is known about the range of behaviour and factors known to influence it.

## Interspecific Interactions

Lists for prey/predators/parasites should not be exhaustive, but sufficient to give the reader an understanding of the species’ requirements and ecological role.

### Diet:

### Predators and competitors:

### Host/parasite/disease interactions (include only where relevant to status assessment):

### Other interactions (omit if not applicable):

## Physiological, Behavioural, and Other Adaptations

Briefly describe adaptations that are potentially relevant to threats/status assessment, such as physiological characteristics, social behaviour, foraging behaviour, niche breadth, or evidence of tolerance (or lack thereof) to changing habitat or climate, human disturbance, or competition. Note any special physiological adaptations that allow the species to survive periods of adverse conditions, such as spore formation in plants, hibernation, aestivation or thermoregulation in terrestrial animals, and requirements for physical characteristics of water for aquatic organisms. Avoid repeating information presented in other sections (e.g., **Habitat Requirements**; refer to these sections as needed). Where deemed relevant to status assessment, include success of artificial propagation/captive-rearing and transplanting organisms into the wild.

## Limiting Factors

Include a brief list of life history, ecological, behavioural, or other biological factors that hinder or constrain the recovery of the species (e.g., late maturity, physiological limitations, dependence on a particular species or rare habitat). Limiting factors, by definition, may not cause a population decline, but limit the growth, resilience or recovery of the population. Threats (factors that reduce population size) are dealt with in another section. This section should be brief; cross-reference other sections of the report, as appropriate.

Limiting factors are generally not human-induced and include intrinsic characteristics that make the species less likely to respond to conservation efforts. Limiting factors may become threats if they result in population decline. The main limiting factors for species A are:

# POPULATION SIZES AND TRENDS

The sections below should provide rationale for the population information presented in the Technical Summary.

## Data Sources, Methodologies, and Uncertainties

Briefly describe data sources and methodology used for estimating abundance and trends. Include description and rationale for indices and population models used; avoid excessive detail, which can be included in an appendix, if needed. For each data source, highlight any strengths or weaknesses with respect to the species in question. For some groups (e.g., birds), the basic methods have been included in many previous status reports, and can be restated from recent examples with minimal adaptations.

## Abundance

Begin with an introductory paragraph that highlights the best overall estimate for Canada, or range of estimates, if they vary substantially based on data sources. If the available estimates report a total number of individuals or pairs, describe briefly the approach used to convert these counts to numbers of mature individuals. Be as quantitative as data allow; consider using inferences from densities and available habitat where direct population data are unavailable.

Additional paragraphs may be required to describe regional estimates (not relevant to all species) and/or to discuss differences among estimates and provide insight into which one is most likely to be reliable. Include estimates of the number of mature individuals for subpopulations, if known. A brief concluding statement or paragraph may be required to summarize conclusions on the most appropriate estimate.

## Fluctuations and Trends

This section is often critical to the assessment and requires careful attention to detail and strong referencing throughout. Where available, both short-term (10 years or 3 generations, whichever is longer, usually up to 100 years) and long-term trends should be presented. Show all sources of evidence from available indices and monitoring studies; case studies can be included and their wider applicability discussed. If there are hypotheses to explain documented trends (both nationally and regionally), these should be mentioned here, although detailed discussion of impacts can be reserved for the threats section. For future trends, threats calculator or population modelling results may be referred to.

*Continuing decline[[2]](#footnote-2) in number of mature individuals*: Provide a brief statement whether there is an observed, inferred, or projected continuing decline, referring to subsequent points on population trends as rationale, as required (Technical Summary box 2).

*Evidence for continuing decline (1 generations or 3 years, whichever is longer, usually up to 100 years)*: Provide quantitative information on the magnitude of the decline. Note that the decline must be observed, estimated, or projected, not inferred or suspected. For details of the information required, refer to Criteria C1 and Technical Summary box 3. *Omit if “unknown”.*

*Evidence for continuing decline (2 generations or 5 years, whichever is longer, usually up to 100 years)*: Provide quantitative information on the magnitude of the decline. Note that the decline must be observed, estimated, or projected, not inferred or suspected. For details of the information required, refer to Criteria C1 and Technical Summary box 4. *Omit if “unknown”.*

Evidence for past decline (3 generations or 10 years, whichever is longer) that has either ceased or is continuing (specify): For details of the information required, refer to Criteria A1 and A2 and Technical Summary boxes 5 and 8.

Evidence for projected or suspected future decline (next 3 generations or 10 years, whichever is longer, up to a maximum of 100 years): For details of the information required for ongoing and future declines, refer to criteria A3 and A4 and Technical Summary boxes 6 and 7).

*Extinction risk based on quantitative analysis*: Percent projected decline within 20 years or 5 generations, whichever is longer, up to 100 years, and/or within 100 years (Omit unless PVA or equivalent has been done – see O&P Appendix F12). *Omit if analyses were not done.*

*Long-term trends*: Refers to trends beyond 3 generations into the past or the future (e.g., based on harvest records, long-term survey programs or inferred from habitat trends)

*Population fluctuations, including extreme fluctuations*: Consider fluctuations in numbers of mature individuals and subpopulations; for fluctuations in distribution, refer to **Fluctuations and Trends in Distribution**.

## Severe Fragmentation

A taxon can be considered to be severely fragmented if most (>50%) individuals or most (>50%) of the total area occupied (as a proxy for number of individuals) is in habitat patches that are both (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. Include this section only for species with restricted distribution (i.e., EOO < 20,000 km2 or IAO < 2000 km2). Describe habitat fragments and their isolation based on movement capabilities of the organism in question, potentially with the aid of a map. Refer to section on Population Structure where subpopulations are identified, and make inferences of their long-term viability based on size of habitat fragments, threats, or other sources (detailed population modelling is usually not available, nor is it necessary). Avoid repeating information elsewhere in the report but briefly summarize relevant information (e.g., from **Movements, Migration, and Dispersal** section).

## Rescue Effect

Identify potential source(s) for natural immigration from outside Canada, and evidence for any known or suspected immigration. Note whether there is suitable habitat available for immigrants to Canada, and evaluate whether source populations are stable, increasing (potential for rescue) or declining (no potential for rescue). Ensure that text in this section provides sufficient detail to support all boxes on rescue effect in the technical summary.

# THREATS

## Historical, Long-term, and Continuing Habitat Trends

Based on existing sources, describe high-level changes to habitat quantity and quality over time (e.g., loss of wetlands, increasing urban development) that provide context for long-term declines. For species wintering or breeding outside Canada, address trends in that range too (and if applicable, key migratory stop-over sites). The trends should relate directly to the Canadian population’s range and be as quantitative as possible.

## Current and Projected Future Threats

This section addresses future predicted impacts following the IUCN-CMP unified threats classification system. If a threats calculator is yet to be conducted, the report writer is to provide information on each of the main threats to help in the assessment (see Appendix F3 in COSEWIC O&P manual). This section is expected to be revised and condensed after the threats calculator assessment is completed by a panel of experts.

The threats calculator spreadsheet included in the report as an appendix should provide a complete overview of the nature, scope, and severity of all current and future threats. The two paragraphs below should therefore provide a sufficient summary of threats in most cases. For species with multiple DUs, threats for each DU should be presented separately, but information common to all DUs should be combined or cross-referenced rather than repeated.

Species A is vulnerable to the cumulative effects of various threats, especially name key threats or life stages. The nature, scope, and severity of these threats has been described in Appendix B, following the IUCN-CMP (International Union for the Conservation of Nature – Conservation Measures Partnership) unified threats classification system (see Salafsky *et al*. 2008 for definitions and Master *et al*. 2012 for guidelines). The threat assessment process consists of assessing impacts for each of 11 main categories of threats and their subcategories, based on the scope (proportion of population exposed to the threat over the next 10-year period), severity (predicted population decline within the scope during the next 10 years or 3 generations, whichever is longer up to ~100 years), and timing of each threat. The overall threat impact is calculated by taking into account the separate impacts of all threat categories and can be adjusted by the species experts participating in the threats evaluation.

The overall threat impact for Species A is considered to be very high / high / moderate / low, corresponding to an anticipated further decline of between XX and XX% over the next ten years (or three generations, whichever is longer). These values are to be interpreted with caution, as they may be based on subjective information, such as expert opinion, although efforts have been made to corroborate the scores with available studies and quantitative data. For species with multiple DUs, repeat this paragraph for each subsequent one (omitting the caveat in the final sentence).

Provide a brief and concise summary of the main threats (i.e., those with overall threat other than “negligible”), based on the threats calculator results.

Name of Threat 1 (IUCN #; overall threat impact Low, Medium, High, Very High, Unknown – include impact only after threats calculator assessment). Repeat for each Level 1 threat category, presented in the perceived order of importance.

## Number of Threat Locations

Present a brief statement identifying the likely number of threat-based locations, based on the COSEWIC definition (i.e., geographically or ecologically distinct areas in which a single threatening event can rapidly, e.g., within a single generation or three years, whichever is longer, affect all individuals present, resulting in population decline), and identifying the key threats used to deduce the number of locations. For most widespread species, the number is often much greater than 10, and it is sufficient to state this without much further detail. If known, include whether there are trends or fluctuations in numbers of locations. This section is usually best completed after the threats calculator conference call.

# PROTECTION, STATUS, AND RECOVERY ACTIVITIES

## Legal Protection and Status

Briefly summarize current designations and applicable legislations; an assessment of the effectiveness of legislative protection is not needed. Note whether the species is already listed under the *Species at Risk Act (2002)*, and if so, at what status, under which schedule. Report any official provincial or territorial at risk status (west to east). Finish by noting any global legal designations, such as complementary agreements or legislation that may support conservation of the species in Canada or legally protect the species in other countries).

## Non-Legal Status and Ranks

Report on global (G), national (N), and provincial/territorial (S) conservation ranks, including both codes and their verbal definitions (NatureServe Explorer: http://www.natureserve.org/explorer/). Briefly summarize S ranks in the US with focus on states bordering Canada (i.e., those with greatest potential to serve as a source for rescue). Provide the most current Canadian and provincial/territorial General Status ranks (http://www.wildspecies.ca/), if they differ from NatureServe ranks. A table with a list is usually not needed as the most current designations are readily available online, such as from NatureServe website (include year of assessment).

If there are other non-legal rankings (e.g., Partners in Flight, IUCN), briefly describe these and their interpretation in a separate paragraph.

## Land Tenure and Ownership

Indicate how much habitat is protected and how much is likely to be secure in the future (e.g., through agreements with landowners, tenure by government or private conservation agencies). Include the approximate proportion of range or occurrences on private lands and in protected areas. The threats section may be cross-referenced for threats still facing the species in protected areas.

## Recovery Activities

For reassessments only. Briefly summarize recovery activities undertaken since the previous COSEWIC status report, based on information provided by recovery teams. Focus on those activities that may influence status assessment. Point form is preferred.

# INFORMATION SOURCES

## References Cited

Alphabetically list all sources cited in the report, including personal communications and unpublished data, carefully following the format prescribed for COSEWIC reports (see O&P Appendix F1); the most common types are highlighted below. Include sources for ATK. Do not cite the ATK SC Source and Assessment reports; rather, cite the original ATK references provided in ATK SC reports.

Journal manuscript:

Author, A.B., and C.D. Co-author. Year. Manuscript title. Journal Title volume:page-page.

Book:

Author, A.B. Year. Book Title. Publisher, City, Province/State (not abbreviated). X pp.

Book chapter:

Author, A.B, and C.D. Coauthor. Year. Title. Pp. xx-xx, *in* A.B. Editor (ed.). Title. Publisher, City, Province/State (not abbreviated).

Personal communication:

Person, A. pers. comm. Year. *Email or telephone correspondence to writer initial and last name.* Month year. Person Title. Employer/affiliation, City, Province/State (not abbreviated).

Thesis:

Author, Q.R. Year. Title. Thesis type, University, City, Province/State (not abbreviated). X pp.

Website:

Organization or author. Year. Title. Website: <http://www.address.ca> [accessed Month Year].

Master, L.L., D. Faber-Langendoen, R. Bittman, G.A. Hammerson, B. Heidel, L. Ramsay, K. Snow, A. Teucher, and A. Tomaino. 2012. NatureServe conservation status assessments: factors for evaluating species and ecosystems risk. NatureServe, Arlington, Virginia.

Salafsky, N., D. Salzer, A.J. Stattersfield, C. Hilton-Taylor, R. Neugarten, S.H.M. Butchart, B. Collen, N. Cox, L.L. Master, S. O’Connor, and D. Wilkie. 2008. A standard lexicon for biodiversity conservation: unified classifications of threats and actions. Conservation Biology 22:897-911.

# COLLECTIONS EXAMINED

No collections were examined for the preparation of this report or list collections, as applicable. Collections queried may also be included here and indicated as such.

# AUTHORITIES CONTACTED

Use the Contact Tracking Sheet as a source for authorities contacted.

Last name, Initials. Title. Employer/affiliation. City, Province (not abbreviated), Country (if other than Canada).

# ACKNOWLEDGEMENTS

Funding for the preparation of this report was provided by (insert source, usually Environment and Climate Change Canada). The authorities listed below provided valuable data and/or advice. Acknowledgments should include providers of key data sources (including citizen science participation), any particularly informative authorities contacted and report reviewers, and any others who merit special recognition for the species in question. For update reports, the previous report(s) and writer(s) should be acknowledged.

# BIOGRAPHICAL SUMMARY OF REPORT WRITER(S)

Provide one paragraph for each writer, identifying name, general expertise (e.g., species at risk biologist), and education overview, emphasizing anything that relates particularly to the species being assessed. Briefly discuss any other ways in which the writer demonstrates expertise, including research on this or related species, and previous COSEWIC status report writing experience. Conclude with a short overview of the writer’s current position(s) and research interests. Keep it to less than half a page.

(page break)

**TABLES**

Include all requested tables. For any additional tables, carefully consider whether they contribute to the status assessment.

Table A. Summary of essential functions, habitat, and detail of habitat for [Species Name] in Canada by life stage.

| **Life stagea** | **Habitat functionb** | **Habitatc**  | **Detail of habitatd** |
| --- | --- | --- | --- |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

a Life Stage: stage of the life cycle of the species (e.g., seed; egg, seedling, juvenile, larva, pupa, adult).

b Habitat Function: How a habitat supports a life-cycle process of the species (e.g., habitat that supports spawning, breeding, denning, nursery, rearing, feeding/foraging, migration, flowering, fruiting, seed dispersing, germinating, seedling development).

c Habitat: The structural or biological features of the area or type of site needed for a species to carry out its life processes.

 d Detail of habitat: detailed information such as measureable properties or characteristics of the habitat habitat.

**Example 1. Completed Habitat Summary Table for Mexican Mosquito-fern\***

Table A. Summary of essential functions, habitat, and detail of habitat of Mexican Mosquito-fern habitat in Canada by life stage.

| **Life stage(s) a** | **Habitat Function b** | **Habitat c** | **Detail of habitat** d  |
| --- | --- | --- | --- |
| All life history stages | Growing, reproduction, dispersal | Aquatic habitat Slow-moving, partially shaded, sheltered, shallow waters (ponds, ditches, oxbow lakes, lakeshores) | Depth: typically, but not exclusively, 50 cm or less; where the roots can touch the substrate in summer drawdown Movement: sheltered, slow-moving to still Chemistry: above pH 3.5, below pH 10 (optimal at pH 6.5 to 8.1); low salinity (≤1.3% salt); iron and phosphorous-rich, but otherwise nutrient-poor Temperature: optimal at 18 to 28°C (cold tolerance dependent on pH) |
| All life history stages | Growing, reproduction, dispersal | Shoreline habitat Drawdown zone, band of vegetation associated with shoreline (within 30 m of highest waterline) | Coverage: semi-shaded (typically, but not exclusively, with intermediate canopy coverage); optimally around 50% |

a Life Stage: stage of the life cycle of the species (e.g., seed; egg, seedling, juvenile, larva, pupa, adult)

b Habitat Function: How a habitat supports a life-cycle process of the species (e.g., habitat that supports spawning, breeding, denning, nursery, rearing, feeding/foraging, migration, flowering, fruiting, seed dispersing, germinating, seedling development).

c Habitat: The structural or biological features of the area or type of site needed for a species to carry out its life processes.

 d Detail of habitat: detailed information such as measurable properties or characteristics of the habitat.

\*Adapted from original: <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/recovery-strategies/mexican-mosquito-fern-2017.html>

**Example 2. Completed Habitat Summary Table for Great Basin Spadefoot**\*

Table A. Summary of essential functions, habitat, and detail of habitat of Great Basin Spadefoot habitat in Canada by life stage.

| **Life Stagea** | **Habitat Functionb** | **Habitatc** | **Detail of Habitatd** |
| --- | --- | --- | --- |
| Adults; juveniles; eggs; tadpoles | Courtship, mating, egg-laying; foraging and development | Vernal Ponds (seasonal and temporary wetlands) | wet areas at any time having these features: shallow areas of less than 1 m depth, required for development of eggs and tadpolesemergent vegetation (e.g., grasses, sedges, rushes), sticks, rocks, or other debris, required to provide egg attachment surfacesalgae, aquatic vegetation, and other organic matter, required as food for tadpolesdry areas that become wet areas under the right conditions, identified at any time by: depressions with bare mud, sedges, rushes, or other hydrophilic plants |
| Adults; juveniles; eggs; tadpoles | Courtship, mating, egg-laying; foraging and development | Lakes, ponds, marshes, springs, sluggish streams, and seasonally wetted margins around permanent waterbodies | shallow areas less than 1 m depth, required for development of eggs and tadpolesemergent vegetation (e.g., grasses, sedges, rushes), sticks, rocks, or other debris, required to provide egg attachment surfacesalgae, aquatic vegetation, and other organic matter, required as food for tadpolesoptimally, an absence of predatory fish (sport fish, Goldfish (*Carassius auratus*), and fish used for mosquito control or other purposes) |
| Adults; juveniles (metamorphosed) | Foraging, refuge, overwintering, seasonal migrations | Grassland, shrub-steppe, open forest | friable (easily crumbled) soils that permit burrowing (e.g., clay loam, fine gravel, clay, sandy soils), existing burrows (may include firmer soils), or naturally occurring holes or crevicessmall vertebrate and invertebrate prey (e.g., earthworms, ants, beetles, flies, grasshoppers, etc.)active-season refuges: self-made burrows, rodent burrows (ground squirrel, pocket gopher), surface cover objects such as flat rocks and coarse woody debrisoverwintering refuges: self-made burrows, rodent burrows, crevices, or soil mounds that are sufficiently deep to permit access to frost-free areas (40–145 cm) |

Footnotes a-d as in Example 1.

\*Adapted from original: <https://sararegistry.gc.ca/default.asp?lang=En&n=F2F16DFD-1&offset=2&toc=show#_p1_01_1>

1. To be changed to draft, 6-month, or 2-month by COSEWIC Secretariat [↑](#footnote-ref-1)
2. A recent, current, or projected future decline (which may be smooth, irregular or sporadic), which is liable to continue unless remedial measures are taken. Fluctuations will not normally count as continuing declines. [↑](#footnote-ref-2)