Environment Canada Environnement Canada

Consultation on Amending the List of Species under the *Species at Risk Act*

Terrestrial Species

January 2015

Canada

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January 2015

Please submit your comments by

April 15, 2015, for terrestrial species undergoing **normal** consultations

and by

October 15, 2015, for terrestrial species undergoing **extended** consultations.

For a description of the consultation paths these species will undergo, please see:
www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=F4D833A7-1

Please email your comments to the Species at Risk Public Registry at:
sararegistry@ec.gc.ca

Comments may also be mailed to:
Director General
Canadian Wildlife Service
Environment Canada
Ottawa ON K1A 0H3

For more information on the *Species at Risk Act*, please visit the Species at Risk Public Registry at:
www.registrelep-sararegistry.gc.ca

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ADDITION OF SPECIES TO THE *SPECIES AT RISK ACT*

The *Species at Risk Act* and the List of Wildlife Species at Risk

The Government of Canada is committed to preventing the disappearance of wildlife species at risk from our lands. As part of its strategy for realizing that commitment, on June 5, 2003, the Government of Canada proclaimed the *Species at Risk Act* (SARA). Attached to the Act is Schedule 1, the list of the species provided for under SARA, also called the List of Wildlife Species at Risk. Extirpated, Endangered and Threatened species on Schedule 1 benefit from the protection of prohibitions and recovery planning requirements under SARA. Special Concern species benefit from its management planning requirements. Schedule 1 has grown from the original 233 to 521 wildlife species at risk.

The complete list of species currently on Schedule 1 can be viewed at: **www.registrelep-sararegistry.gc.ca/species/schedules_e.cfm?id=1**

Species become eligible for addition to Schedule 1 once they have been assessed as being at risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The decision to add a species to Schedule 1 is made by the Governor in Council following a recommendation from the Minister of the Environment. The Governor in Council is the formal executive body that gives legal effect to decisions that are to have the force of law.

COSEWIC and the assessment process for identifying species at risk

COSEWIC is recognized under SARA as the authority for assessing the status of wildlife species at risk. COSEWIC comprises experts on wildlife species at risk. Its members have backgrounds in the fields of biology, ecology, genetics, Aboriginal traditional knowledge and other relevant fields. They come from various communities, including academia, Aboriginal organizations, government and non-governmental organizations.

COSEWIC gives priority to those species more likely to become extinct, and then commissions a status report for the evaluation of the species' status. To be accepted, status reports must be peer-reviewed and approved by a subcommittee of species specialists. In special circumstances, assessments can be done on an emergency basis. When the status report is complete, COSEWIC meets to examine it and discuss the species. COSEWIC then determines whether the species is at risk, and if so, then assesses the level of risk and assigns a conservation status.

Terms used to define the degree of risk to a species

The conservation status defines the degree of risk to a species. The terms used under SARA are Extirpated, Endangered, Threatened and Special Concern. Extirpated species are wildlife species that no longer occur in the wild in Canada but still exist elsewhere. Endangered species are wildlife species that are likely to soon become extirpated or extinct. Threatened species are likely to become endangered if nothing is done to reverse the factors leading to their extirpation or extinction. The term Special Concern is used for wildlife species that may become threatened or endangered due to a combination of biological characteristics and threats. Once COSEWIC has assessed a species as Extirpated, Endangered, Threatened or Special Concern, it is eligible for inclusion on Schedule 1.

For more information on COSEWIC, visit: **www.cosewic.gc.ca**

On **October 15, 2014**, COSEWIC sent to the Minister of the Environment its newest assessments of species at risk. Environment Canada is now consulting on changes to Schedule 1 to reflect these new designations for these terrestrial species. To see the list of the terrestrial species and their status, please refer to tables 1 to 3.

Terrestrial and aquatic species eligible for Schedule 1 amendments

The Minister of Fisheries and Oceans conducts separate consultations for the aquatic species. For more information on the consultations for aquatic species, visit the Fisheries and Oceans Canada website at **www.dfo-mpo.gc.ca**.

The Minister of the Environment is conducting the consultations for all other species at risk.

Approximately 66% of the recently assessed terrestrial species at risk also occur in national parks or other lands administered by Parks Canada; Parks Canada shares responsibility for these species with Environment Canada.

Comments solicited on the proposed amendment of Schedule 1

The conservation of wildlife is a joint legal responsibility: one that is shared among the governments of Canada. But biodiversity will not be conserved by governments that act alone. The best way to secure the survival of species at risk and their habitats is through the active participation of all those concerned. SARA recognizes this, and that all Aboriginal peoples and Canadians have a role to play in preventing the disappearance of wildlife species from our lands. The Government of Canada is inviting and encouraging you to become involved. One way that you can do so is by sharing your comments concerning the addition or reclassification of these terrestrial species.

Your comments are considered in relation to the potential consequences of whether or not a species is included on Schedule 1, and they are then used to draft the Minister's proposed listing recommendations for each of these species.

Questions to guide your comments

The following questions are intended to assist you in providing comments on the proposed amendments to the List of Wildlife Species at Risk (see Table 1 for the list of species under consultation). They are not limiting, and any other comments you may have are welcome. We also encourage you to share descriptions and estimates of costs or benefits to you or your organization where possible, as well as to propose voluntary stewardship actions that could be taken for the conservation of these species.

Respondent information

Are you responding as an individual or representing a community, business or organization (please specify)?

Species benefit to people or the ecosystem

Do any or all of the species provide benefits to you or Canada's ecosystems? If yes, explain how. What is the estimated value of these benefits? Values do not need to be monetary.

For example:

- Do any or all of the species provide benefits by supporting your livelihood, for example, through harvesting, subsistence or medicine?
- Do any or all of the species provide cultural or spiritual benefits, for example, recreation, sense of place or tradition? If yes, how?
- Do any or all of the species provide environmental benefits, for example, pollination, pest control or flood control? If yes, how?

Impact of your activities and mitigation

- Based on the maps provided in this document, do any of your current or planned activities overlap with any or all of the species ranges or occurrences?
- Do any of your current or planned activities have the potential to kill, harm or harass any or all of the species, or damage or destroy their residence(s)? If yes, what are these activities, and how are they affecting the concerned species?
- What are you doing or what could you do to avoid killing, harming or harassing the species, or damaging or destroying their residence(s)?

Impacts of amending the List of Wildlife Species at Risk

Based on what you know about the *Species at Risk Act* and the information presented in this document, do you think amending the List of Wildlife Species at Risk with the proposed listing (Table 1) would have no impact, a positive impact or a negative impact on your activities or the species? Please provide as much detail as possible.

For example:

- If any of your activities impact a species or its residence, would you have to avoid or adjust these activities to mitigate their impact? What are the implications of such avoidance or mitigation?

- Do you think that listing the species would have cultural or social cost or benefits to you, your community or your organization?
- Do you think that listing the species would have economic costs or benefits to you, your community or your organization?
- Do you think that listing the species would have costs or benefits to the environment or Canada's ecosystems?

Additional information for small businesses

If you are responding for a **small business**, please provide the following details to help Environment Canada gather information to contribute to the required Small Business Lens analysis that forms part of the Regulatory Impact Analysis Statement that will accompany any future listing recommendation.

1) Are you an enterprise that operates in Canada?
2) Do you engage in commercial activities related to the supply of services or property (which includes goods)?
3) Are you an organization that engages in activities for a public purpose (i.e., social welfare or civic improvement), such as a provincial or municipal government, school, college/university, hospital or charity?
4) Is your enterprise owned by a First Nations community?
5) How many employees do you have?
   - 0–99
   - 100 or more
6) What was your annual gross revenue in the last year?
   - Less than $30,000
   - Between $30,000 and $5 million
   - More than $5 million

To ensure that your comments are considered in time, they should be submitted before the following deadlines.

For terrestrial species undergoing normal consultations, comments should be submitted by **April 15, 2015**.

For terrestrial species undergoing extended consultations, comments should be submitted by **October 15, 2015**.

To find out which consultation paths these species will undergo (extended or normal), please see: **www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=F4D833A7-1**

Comments received by these deadlines will be considered in the development of the listing proposal.

Please email your comments to the Species at Risk Public Registry at: **sararegistry@ec.gc.ca**

By regular mail, please address your comments to:

Director General
Canadian Wildlife Service
Environment Canada
Ottawa ON K1A 0H3

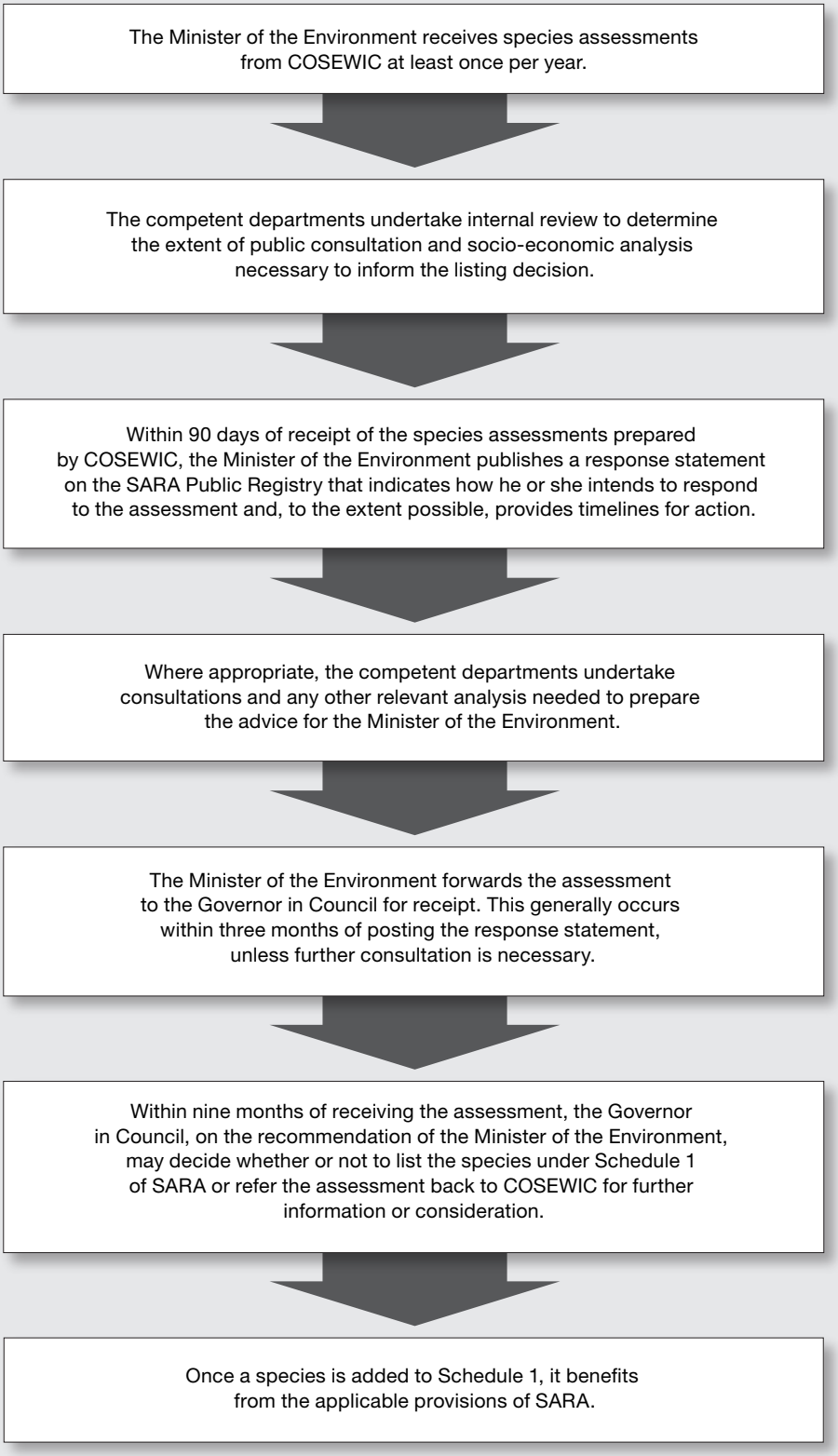
The *Species at Risk Act* Listing Process and Consultation

The addition of a wildlife species at risk to Schedule 1 of SARA strengthens and enhances the federal government's capacity to provide for its protection and conservation. To be effective, the listing process must be transparent and open. The species listing process under SARA is summarized in Figure 1.

The purpose of consultations on amendments to the List

When COSEWIC assesses a wildlife species, it does so solely on the basis of the best available information relevant to the biological status of the species. COSEWIC then submits the assessment to the Minister of the Environment, who considers it when making the listing recommendation to the Governor in Council. These consultations are to provide the Minister with a better understanding of the potential social and economic impacts of the proposed change to the List of Wildlife Species at Risk, and of the potential consequences of not adding a species to the List.

Figure 1: The species listing process under SARA



Legislative context of the consultations: the Minister's recommendation to the Governor in Council

The comments collected during the consultations inform the Governor in Council's consideration of the Minister's recommendations for listing species at risk. The Minister must recommend one of three courses of action. These are for the Governor in Council to accept the species assessment and modify Schedule 1 accordingly, not to add the species to Schedule 1, or to refer the species assessment back to COSEWIC for its further consideration (Figure 1).

The Minister of the Environment's response to the COSEWIC assessment: the response statement

After COSEWIC has completed its assessment of a species, it provides it to the Minister of the Environment. The Minister of the Environment then has 90 days to post a response on the Species at Risk Public Registry, providing information on the scope of any consultations and the timelines for action, to the extent possible. This is known as the response statement. It identifies how long the consultations will be (whether they are "normal" or "extended") by stating when the Minister will forward the assessment to the Governor in Council. Consultations for a group of species are launched with the posting of their response statements.

Normal and extended consultation periods

Normal consultations meet the consultation needs for the listing of most species at risk. They usually take two to three months to complete, while extended consultations may take one year or more.

The extent of consultations needs to be proportional to the expected impact of a listing decision and the time that may be required to consult appropriately. Under some circumstances, whether or not a species will be included on Schedule 1 could have significant and widespread impacts on the activities of some groups of people. It is essential that such stakeholders be informed of the pending decision and, to the extent possible, its potential consequences. They also need to have the opportunity to provide information on the potential consequences of the decision and to share ideas on how best to approach threats to the species. A longer period may also be required to consult appropriately with some groups. For example, consultations can take longer for groups that meet infrequently but that must be engaged on several occasions. For such reasons, extended consultations may be undertaken.

For both normal and extended consultations, once they are complete, the Minister of the Environment forwards the species assessments to the Governor in Council for the government's formal receipt of the assessment. The Governor in Council then has nine months to come to a listing decision. Thus, listing decisions for species in normal consultations are usually made about one year after the publication of their response statements. Listing decisions for species in extended consultations are usually made about two years after the response statements are published.

The consultation paths (normal or extended) for the terrestrial species listed in Table 1 will be announced when the Minister publishes the response statements. These will be posted by **January 13, 2015**, on the Species at Risk Public Registry at: **www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=F4D833A7-1**

No consultations will be undertaken for those species already on Schedule 1 and for which no change in status is being proposed (Table 3).

Who is consulted and how

It is most important to consult with those who would be most affected by the proposed changes. There is protection that is immediately in place when a species that is Extirpated, Endangered or Threatened is added to Schedule 1. It prohibits killing or harming the species or destroying a residence. For terrestrial species, this applies to migratory birds protected by the *Migratory Birds Convention Act, 1994* (which already provides similar protection for the migratory birds and their nests). The immediate protection also applies to other terrestrial species where they are on federal land (for more details, see below, "Protection for listed Extirpated, Endangered and Threatened species"). This immediate protection does not apply to species of Special Concern. Therefore, Environment Canada considers the type of species, its conservation status, and where the species is found. Those who may be affected by the impacts

of the automatic protections are contacted directly; others are encouraged to contribute through a variety of approaches.

Aboriginal peoples known to have species at risk on their lands, for which changes to Schedule 1 are being considered, will be contacted. Their engagement is of particular significance, acknowledging their role in the management of the extensive traditional territories and the reserve and settlement lands.

A Wildlife Management Board is a group that has been established under a land claims agreement and is authorized by the agreement to perform functions in respect of wildlife species. Some eligible species at risk are found on lands where existing land claims agreements apply that give specific authority to a Wildlife Management Board. In such cases, the Minister of the Environment will consult with the relevant board.

To encourage others to contribute and make the necessary information readily available, this document is distributed to known stakeholders and posted on the Species at Risk Public Registry. More extensive consultations may also be done through regional or community meetings or through a more targeted approach.

Environment Canada also sends notice of this consultation to identified concerned groups and individuals who have made their interests known. These include, but are not limited to, industries, resource users, landowners and environmental non-governmental organizations.

In most cases, it is difficult for Environment Canada to fully examine the potential impacts of recovery actions when species are being considered for listing. Recovery actions for terrestrial species usually have not yet been comprehensively defined at the time of listing, so their impact cannot be fully understood. Once they are defined, efforts are made to minimize adverse social and economic impacts of listing and to maximize the benefits. SARA requires that recovery measures be prepared in consultation with those considered to be directly affected by them.

In addition to the public, Environment Canada consults on listing with the governments of the provinces and territories responsible for the conservation and management of these wildlife species. Environment Canada also consults with other federal departments and agencies.

Role and impact of public consultations in the listing process

The results of the public consultations are of great significance to the process of listing species at risk. Environment Canada carefully reviews the comments it receives to gain a better understanding of the benefits and costs of changing the List.

The comments are then used to inform the Regulatory Impact Analysis Statement (RIAS). The RIAS is a report that summarizes the impact of a proposed regulatory change. It includes a description of the proposed change and an analysis of its expected impact, which incorporates the results from the public consultations. In developing the RIAS, the Government of Canada recognizes that Canada's natural heritage is an integral part of our national identity and history and that wildlife in all its forms has value in and of itself. The Government of Canada also recognizes that the absence of full scientific certainty is not a reason to postpone decisions to protect the environment.

A draft Order (see Glossary) is then prepared, providing notice that a decision is being taken by the Governor in Council. The draft Order proposing to list all or some of the species under consideration is then published, along with the RIAS, in the *Canada Gazette*, Part I, for a comment period of 30 days.

The Minister of the Environment will take into consideration comments and any additional information received following publication of the draft Order and the RIAS in the *Canada Gazette*, Part I. The Minister then makes a listing recommendation for each species to the Governor in Council. The Governor in Council next decides either to accept the species assessment and amend Schedule 1 accordingly; or not to add the species to Schedule 1; or to refer the species assessment back to COSEWIC for further information or consideration. The final decision is published in the *Canada Gazette*, Part II, and on the Species at Risk Public Registry. If the Governor in Council decides to list a species, it is at this point that it becomes legally included on Schedule 1.

Significance of the Addition of a Species to Schedule 1

The protection that comes into effect following the addition of a species to Schedule 1 depends upon a number of factors. These include the species' status under SARA, the type of species and where it occurs.

Protection for listed Extirpated, Endangered and Threatened species

Responsibility for the conservation of wildlife is shared among the governments of Canada. SARA establishes legal protection of individuals and their residences as soon as a species is listed as Threatened, Endangered or Extirpated, if they are considered federal species or if they are found on federal land.

Federal species include migratory birds, as defined by the *Migratory Birds Convention Act, 1994*, and aquatic species covered by the *Fisheries Act*. Federal land means land that belongs to the federal government, and the internal waters and territorial sea of Canada. It also means land set apart for the use and benefit of a band under the *Indian Act* (such as reserves). In the territories, the protection for species at risk on federal lands applies only where they are on lands under the authority of the Minister of the Environment or the Parks Canada Agency.

Migratory birds are protected by the *Migratory Birds Regulations*, under the *Migratory Birds Convention Act, 1994*, which strictly prohibits the harming of migratory birds and the disturbance or destruction of their nests and eggs.

Protection under SARA makes it an offence to kill, harm, harass, capture or take an individual of a species listed as Extirpated, Endangered or Threatened. It is also an offence to damage or destroy the residence of one or more individuals of an Endangered or Threatened species or an Extirpated species whose reintroduction has been recommended by a recovery strategy. The Act also makes it an offence to possess, collect, buy, sell or trade an individual of a species that is Extirpated, Endangered or Threatened.

Species at risk that are neither aquatic nor protected under the *Migratory Birds Convention Act, 1994,* nor on federal lands, do not receive immediate protection upon listing under SARA. Instead, in most cases, the protection of terrestrial species on non-federal lands is the responsibility of the provinces and territories where they are found. The application of protections under SARA to a species at risk on non-federal lands requires that the Governor in Council make an order defining those lands. This can only occur when the Minister is of the opinion that the laws of the province or territory do not effectively protect the species. To put such an order in place, the Minister would then need to recommend the order be made to the Governor in Council. If the Governor in Council agrees to make the order, the prohibitions of SARA would then apply to the provincial or territorial lands specified by the order. The federal government would consult before making such an order.

Permits and agreements

For terrestrial species listed on SARA Schedule 1 as Extirpated, Endangered or Threatened, the Minister of the Environment may authorize exceptions to the Act's prohibitions, when and where they apply. The Minister can enter into agreements or issue permits only for one of three reasons: for research, for conservation activities, or if the effects to the species are incidental to the activity. Research must relate to the conservation of a species and be conducted by qualified scientists. Conservation activities must benefit a listed species or be required to enhance its chances of survival. All activities, including those that incidentally affect a listed species, must also meet certain conditions. First, it must be established that all reasonable alternatives have been considered and the best solution has been adopted. It must also be established that all feasible measures will be taken to minimize the impact of the activity, and finally that the survival or recovery of the species will not be jeopardized. Having issued a permit or agreement, the Minister must then include an explanation on the Species at Risk Public Registry of why the permit or agreement was issued.

Recovery strategies and action plans for Extirpated, Endangered and Threatened species

Recovery planning results in the development of recovery strategies and action plans for Extirpated, Endangered or Threatened species. It involves the different levels of government responsible for the management of the species, depending on what type of species it is and where it occurs. These include federal, provincial and territorial governments as well as Wildlife Management Boards. Recovery strategies and action plans are also prepared in cooperation with directly affected Aboriginal organizations. Landowners and other stakeholders directly affected by the recovery strategy are consulted to the extent possible.

Recovery strategies must be prepared for all Extirpated, Endangered and Threatened species. They include measures to mitigate the known threats to the species and its habitat and set the population and distribution objectives. Other objectives can be included, such as stewardship (to establish protection for an existing population) or education (to increase public awareness). Recovery strategies must include a statement of the time frame for the development of one or more action plans. To the extent possible, recovery strategies must also identify the critical habitat of the species. If there is not enough information available to identify critical habitat, the recovery strategy includes a schedule of studies required for its identification. This schedule outlines what must be done to obtain the necessary information and by when it needs to be done. In such cases critical habitat can be identified in a subsequent action plan.

Proposed recovery strategies for newly listed species are posted on the Species at Risk Public Registry to provide for public review and comment. For Endangered species, proposed recovery strategies are posted within one year of their addition to Schedule 1, and for Threatened or Extirpated species within two years.

Action plans state the measures necessary to implement the recovery strategy. These include measures to address threats and achieve the population and distribution objectives. Action plans also complete the identification of the critical habitat where necessary, and to the extent possible state measures that are proposed to protect it.

Protection for listed species of Special Concern

While immediate protection under SARA for species listed as Extirpated, Endangered and Threatened do not apply to species listed as Special Concern, any existing protections and prohibitions, such as those provided by the *Migratory Birds Convention Act, 1994* or the *Canada National Parks Act*, continue to be in force.

Management plans for species of Special Concern

For species of Special Concern, management plans are to be prepared and made available on the Species at Risk Public Registry within three years of species' addition to Schedule 1, allowing for public review and comment. Management plans include appropriate conservation measures for the species and for its habitat. They are prepared in cooperation with the jurisdictions responsible for the management of the species, including directly affected Wildlife Management Boards and Aboriginal organizations. Landowners, lessees and others directly affected by a management plan will also be consulted to the extent possible.

THE LIST OF SPECIES ELIGIBLE FOR AN AMENDMENT TO SCHEDULE 1

Status of the recently assessed species and consultation paths

On **October 15, 2014**, COSEWIC submitted 27 assessments of species at risk to the Minister of the Environment for species that are eligible to be added to Schedule 1 of SARA. Nineteen of these are terrestrial species and 8 are aquatic species. COSEWIC also reviewed the classification of species already on Schedule 1, in some cases changing their status. Five terrestrial species are now being considered for down-listing on SARA (to a lower risk status) and 4 terrestrial species are now being considered for up-listing on SARA (to a higher risk status). In all, 25 terrestrial species that are eligible to be added to Schedule 1 or to have their current status on Schedule 1 changed are included in this consultation (Table 1).

The three other terrestrial species are bats for which COSEWIC submitted an emergency assessment in February 2012 and confirmed their status as Endangered in November 2013 (Table 2). Consultations for these bat species were conducted in July–August 2014 and all three species were added to Schedule 1 of SARA as announced on December 17, 2014. The three bat species are included in this document for your information but are not a part of the current consultation. Details on the SARA listing for the three bat species are available at **http://www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=073DC653-1**.

COSEWIC also submitted the reviews of species already on Schedule 1, confirming their classification. Thirteen of these reviews were for terrestrial species. These species are not included in the consultations because there is no regulatory change being proposed (Table 3).

For more information on the consultations for aquatic species, visit the Fisheries and Oceans Canada website at **www.dfo-mpo.gc.ca**.

Providing comments

The involvement of Canadians is integral to the process, as it is to the ultimate protection of Canadian wildlife. Your comments matter and are given serious consideration. Environment Canada reviews all comments it receives by the deadlines provided below.

Comments for terrestrial species undergoing normal consultations must be received by **April 15, 2015**.

Comments for terrestrial species undergoing extended consultations must be received by **October 15, 2015**.

Most species will be undergoing normal consultations. For the final consultation paths, please see **www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=F4D833A7-1** after **January 13, 2015**.

For more details on submitting comments, see page 5, “Comments solicited on the proposed amendment of Schedule 1.”

Table 1: Terrestrial species recently assessed by COSEWIC eligible for addition to Schedule 1 or reclassification

Taxon	Species	Scientific Name	Range
Species eligible for addition to Schedule 1 (16)			
Endangered (4)			
Vascular Plants	Tweedy's Lewisia	*Lewisiopsis tweedyi*	BC
Arthropods	Oregon Branded Skipper	*Hesperia colorado oregonia*	BC
Arthropods	Gypsy Cuckoo Bumble Bee	*Bombus bohemicus*	YT NT BC AB SK MB ON QC NB PE NS NL
Amphibians	Eastern Tiger Salamander (Prairie population)	*Ambystoma tigrinum*	MB
Threatened (5)			
Lichens	Eastern Waterfan	*Peltigera hydrothyria*	QC NB NS
Vascular Plants	Hare-footed Locoweed	*Oxytropis lagopus*	AB
Arthropods	Audouin's Night-stalking Tiger Beetle	*Omus audouini*	BC
Arthropods	Western Bumble Bee *occidentalis* subspecies	*Bombus occidentalis occidentalis*	BC AB SK
Mammals	Plains Bison	*Bison bison bison*	BC AB SK
Special Concern (7)			
Lichens	Western Waterfan	*Peltigera gowardii*	BC
Vascular Plants	Nahanni Aster	*Symphyotrichum nahanniense*	NT
Arthropods	Western Bumble Bee *mckayi* subspecies	*Bombus occidentalis mckayi*	YT NT BC
Amphibians	Wandering Salamander	*Aneides vagrans*	BC
Birds	Grasshopper Sparrow *pratensis* subspecies	*Ammodramus savannarum pratensis*	ON QC
Birds	Western Grebe	*Aechmophorus occidentalis*	BC AB SK MB
Mammals	Wolverine[1]	*Gulo gulo*	YT NT NU BC AB SK MB ON QC NL
Reclassifications: Up-list (4)			
From Threatened to Endangered (3)			
Arthropods	Dakota Skipper	*Hesperia dacotae*	SK MB
Mammals	Caribou (Central Mountain population)[2]	*Rangifer tarandus*	BC AB
Mammals	Caribou (Southern Mountain population)[2]	*Rangifer tarandus*	BC
From Special Concern to Threatened (1)			
Vascular Plants	Sweet Pepperbush	*Clethra alnifolia*	NS
Reclassifications: Down-list (5)			
From Endangered to Threatened (1)			
Amphibians	Rocky Mountain Tailed Frog	*Ascaphus montanus*	BC
From Threatened to Special Concern (4)			
Vascular Plants	Water Pennywort	*Hydrocotyle umbellata*	NS
Arthropods	Mormon Metalmark (Prairie population)	*Apodemia mormo*	SK
Mammals	Caribou (Northern Mountain population)[2]	*Rangifer tarandus*	YT NT BC
Mammals	Wood Bison	*Bison bison athabascae*	YT NT BC AB MB

1. The Western population is not listed under Schedule 1 of SARA. In May 2014, COSEWIC considered Western and Eastern populations as a single population and designated it as Special Concern. If Schedule 1 is amended to reflect this change, the former Eastern population would be down-listed from Endangered to Special Concern, and the Western population would be added to Schedule 1 as Special Concern.
2. The three Caribou populations included in the present consultation document (Northern Mountain, Central Mountain and Southern Mountain populations) were recently restructured by COSEWIC. In this restructuration, nine subpopulations formerly included in the Southern Mountain population, currently listed as Threatened, are now included in the Northern Mountain population, currently listed as Special Concern. Although COSEWIC's last assessment for the Northern Mountain population is also Special Concern, this reclassification would mean a down-listing of these nine subpopulations from Threatened to Special Concern. Please refer to the status history sections of the COSEWIC assessment summaries, reproduced in this document, for details on the restructuration of these three populations of Caribou (formerly called Woodland Caribou).

Table 2: Terrestrial species recently added to Schedule 1 (no consultations)

Taxon	Species	Scientific Name	Range
Endangered (3)			
Mammals	Little Brown Myotis	*Myotis lucifugus*	YT NT BC AB SK MB ON QC NB PE NS NL
Mammals	Northern Myotis	*Myotis septentrionalis*	YT NT BC AB SK MB ON QC NB PE NS NL
Mammals	Tri-colored Bat	*Perimyotis subflavus*	ON QC NB NS

Table 3: Terrestrial species recently reassessed by COSEWIC (no consultations – species status confirmation)

Taxon	Species	Scientific Name	Range
Status Confirmations (13)			
Extirpated (1)			
Amphibians	Eastern Tiger Salamander (Carolinian population)	*Ambystoma tigrinum*	ON
Endangered (6)			
Arthropods	Mormon Metalmark (Southern Mountain population)	*Apodemia mormo*	BC
Arthropods	Sand-verbena Moth	*Copablepharon fuscum*	BC
Amphibians	Small-mouthed Salamander	*Ambystoma texanum*	ON
Birds	Loggerhead Shrike Eastern subspecies	*Lanius ludovicianus ssp.*	ON QC
Birds	Piping Plover *circumcinctus* subspecies	*Charadrius melodus circumcinctus*	AB SK MB ON
Birds	Piping Plover *melodus* subspecies	*Charadrius melodus melodus*	QC NB PE NS NL
Threatened (4)			
Mollusks	Dromedary Jumping-slug	*Hemphillia dromedarius*	BC
Amphibians	Coastal Giant Salamander	*Dicamptodon tenebrosus*	BC
Birds	Loggerhead Shrike Prairie subspecies	*Lanius ludovicianus excubitorides*	AB SK MB
Birds	Short-tailed Albatross	*Phoebastria albatrus*	BC Pacific Ocean
Special Concern (2)			
Reptiles	Eastern Milksnake	*Lampropeltis triangulum*	ON QC
Birds	Harlequin Duck (Eastern population)	*Histrionicus histrionicus*	NU QC NB NS NL

THE COSEWIC SUMMARIES OF TERRESTRIAL SPECIES RECENTLY ADDED OR ELIGIBLE FOR AN ADDITION OR RECLASSIFICATION ON SCHEDULE 1

The following section presents a brief summary of the reasons for the COSEWIC status designation of individual species, and their biology, threats, distribution and other information. For a more comprehensive explanation of the conservation status of an individual species, please refer to the COSEWIC status report for that species, also available on the Species at Risk Public Registry at: **www.sararegistry.gc.ca**

or contact:
COSEWIC Secretariat
c/o Canadian Wildlife Service
Environment Canada
Ottawa ON K1A 0H3

Audouin's Night-stalking Tiger Beetle

Photo: © Andy Teucher

Scientific name
Omus audouini

Taxon
Arthropods

COSEWIC Status
Threatened

Canadian range
British Columbia

Reason for designation

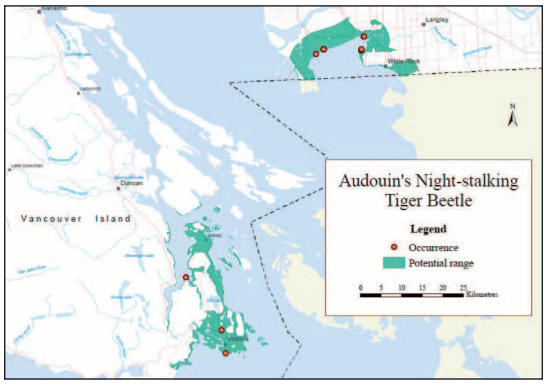
This beetle is restricted to a small area in the Georgia Basin of southwestern British Columbia, within a narrow strip of coastal lowland around Boundary Bay and Greater Victoria. Major threats include habitat loss through agricultural and urban development, vegetation succession in open habitats, disturbance from recreational activities, and, in the longer term, sea level rise. There are fewer than ten known sites, and the discovery of more populations is unlikely. The species is flightless and thus dispersal is limited.

Wildlife Species Description and Significance

The Audouin's Night-stalking Tiger Beetle is a medium sized (14–18 mm), dull black, flightless beetle. A closely related species, the Greater Night-stalking Tiger Beetle, occurs in similar habitats, but the adults of both species are easily distinguished.

Distribution

The global range of the Audouin's Night-stalking Tiger Beetle is in western North America from the southwestern corner of B.C. south through western Washington and Oregon to northwestern California. Approximately 10% of the global range is in Canada. Within Canada, the species is restricted to a small area of the Georgia Basin, with sites recorded from a thin strip of coastal lowland habitat in the Boundary Bay area (mainland) and the greater Victoria area (Vancouver Island). Overall, there are eleven recorded sites within Canada (extant and extirpated). Nine of these sites are considered extant: seven in the Lower Mainland and two in greater Victoria. Three of the nine sites are unconfirmed but potential habitat is still present within the general collection areas and these are considered extant. The two sites considered extirpated are both in the greater Victoria area and in regions with extensive (1960s to present) urban development. The Canadian range extent is estimated at 1600 km^2 and all but one site is within 1 km of the marine shoreline (that site is within 3 km).



Occurrences and potential range of the Audouin's Night-stalking Tiger Beetle within the known range of the species in B.C. Map completed by Byron Woods (B.C. Ministry of Environment, June 2013).

Source: COSEWIC. 2013. COSEWIC assessment and status report on the Audouin's Night-stalking Tiger Beetle in Canada

Habitat

The Audouin's Night-stalking Tiger Beetle is recorded from two ecosystem types in B.C.: 1) sparsely vegetated sand ecosystems (six of the nine extant sites) and 2) Garry Oak and associated ecosystems (three extant sites and two extirpated sites, although extirpated site collection information is vague and habitat is inferred). Overall habitat description includes open grassy areas, sparsely vegetated habitats, coastal bluffs, meadows, open forests, older agricultural fields (no crops present for a number of years), and similar habitats.

Larvae dwell in underground burrows, typically located within clay banks with up to 50% slope, and usually above the ocean high-tide line. Burrows are frequently adjacent to hiking trails and within road cuts, stream banks and other similar habitats.

The Audouin's Night-stalking Tiger Beetle appears to be tolerant of some forms of habitat disturbance, although it does not appear to depend on dynamic environmental factors such as fire or flooding. All known sites are from areas potentially flooded by seawater or periodic freshwater floods due to rain runoff. Six sites are within high recreation habitats and all have both non-native (alien) and native (natural succession) invasive species.

Biology

The Audouin's Night-stalking Tiger Beetle has four main life stages: egg, larva (three larval instars), pupa and adult. Only adult beetles have been observed in B.C. They mate sometime in the early spring, and females lay 10–20 eggs per day within suitable substrate for larval burrow construction, and egg-laying continues throughout early spring. Depending on the species and local temperature conditions, tiger beetle eggs hatch 9 to 38 days later.

Tiger beetles spend from 1 to 3 years in the larval stage, during which time they excavate long, deep and narrow cylindrical tunnels (20–35 cm) and develop through three instars. Larvae close their tunnels during winter months. Pupation takes place after the third larval instar within a chamber at the bottom of the larval burrow. Adults and larvae are voracious opportunistic predators and feed on a variety of small arthropods, including ants and centipedes. Adults are mobile, crawling around at moderate speeds and moving like a spider. Larvae are sit-and-wait predators, being predominantly confined to their burrow.

Photo: © Andrew E. McKorney

Population Sizes and Trends

The Audouin's Night-stalking Tiger Beetle has not been studied at a population level. Surveys have been by pitfall trapping and hand searching, methods that do not give population estimates. There are insufficient data to provide an accurate estimate of abundance across the species' Canadian range. Most specimen and sight record data are of single individuals. The species is flightless, and although it is considered to have moderate running ability, it is unlikely that it could significantly disperse through terrestrial habitats.

Threats and Limiting Factors

Primary threats include habitat loss through agricultural and urban development, ongoing pesticide use in some areas, vegetation succession in sparsely-vegetated habitats, disturbance from recreational activities, storm surges and, in the longer term, sea level rise.

Photo: © Andrew E. McKorney

Male Audouin's Night-stalking Tiger Beetle. Andrew E. McKorney collection specimen

Protection, Status, and Ranks

The Audouin's Night-stalking Tiger Beetle is not currently protected by provincial or federal laws. The species is Red-listed (critically imperiled) by the British Columbia Conservation Data Centre and ranked globally secure by NatureServe. ■

Caribou

Photo: © Mark Bradley

Male Caribou, Central Mountain population

Scientific name
Rangifer tarandus

Taxon
Mammals

COSEWIC Status
Northern Mountain population: Special Concern
Central Mountain population: Endangered
Southern Mountain population: Endangered

Canadian range
Northern Mountain population: Yukon, Northwest Territories, British Columbia
Central Mountain population: British Columbia, Alberta
Southern Mountain population: British Columbia

Reason for designation

Northern Mountain population:

This population occurs in 45 subpopulations ranging from west-central British Columbia to the Yukon and western Northwest Territories. The majority of its distribution is in Canada, where it numbers about 43,000–48,000 mature individuals. There is little long-term (three generations) trend information, and many current estimates are based on survey data more than 5 years old. Currently 2 subpopulations are thought to be increasing, 7 are stable and 9 are declining. The condition of the remaining 27 subpopulations is unknown. The two largest subpopulations comprise > 15,000 animals, or 26-29% of the estimated population, and are thought to be stable. About half of the 45 subpopulations each contain < 500 individuals. All stable or increasing subpopulations are located in the northern part of the range, whereas 9 in the southern part of the range have declined by 26% since the last assessment. The status of northern subpopulations may be compromised in the future because of increasing threats, particularly land use change with industrial development causing shifts in predator-prey dynamics.

Central Mountain population

This population is endemic to Canada and occurs in 10-11 extant subpopulations in east-central British Columbia and west-central Alberta in and around the Rocky Mountains. The current estimate for the population is 515 mature individuals and it has declined by at least 62% over the past 3 generations. One subpopulation in central British Columbia may be extirpated, and an additional one in Banff was confirmed extirpated in 2010. All extant subpopulations are estimated to contain fewer than 250 mature individuals, with 7 of these having fewer than 50. Two recognized subpopulations in 2002 have since split due to lack of dispersal within former ranges. All subpopulations have experienced declines of about 60% since the last assessment in 2002, and declines continue for all but one subpopulation. Surveys have shown consistently high adult mortality and low calf recruitment, accelerating decline rates. Threats are continuing and escalating.

Southern Mountain population:

This population is largely restricted to Canada, except for < 40 animals in Idaho and Washington. It occurs in 15 extant subpopulations in southeastern British Columbia, most of which have no movement between them. Two subpopulations have been extirpated since 2002. The current estimate for the population is 1,294 mature individuals, which has declined by at least 46% in the past three generations, and 30% since the last assessment in 2002. All but two extant subpopulations are estimated to contain fewer than 250 mature individuals, with 9 of these having fewer than 50, and 6 with fewer than 15 mature individuals. Dispersal within the ranges of 11 subpopulations is severely limited. Surveys have shown consistently high adult mortality and low calf recruitment, accelerating decline rates. Threats are continuing and escalating.

Status history

The Northern Mountain population was designated Not at Risk in May 2000. This population was formerly designated as part of the "Western population"(now de-activated). Status re-examined and designated Special Concern in May 2002. Following the Designatable Unit report on caribou (COSEWIC 2011), a new population structure was proposed and accepted by COSEWIC. This new Northern Mountain population is composed of all 36 subpopulations in the previous Northern Mountain population of Caribou in addition to 9 subpopulations from the previous (2002) Southern Mountain population. The Northern Mountain population was designated Special Concern in May 2014.

Following the Designatable Unit report on caribou (COSEWIC 2011), a new population structure was proposed and accepted by COSEWIC. This resulted in the new Central Mountain population, composed of 12 subpopulations from the previous Southern Mountain population of Caribou (COSEWIC 2002). The Central Mountain population was designated Endangered in May 2014.

Photo: © Mark Bradley

Caribou mother and calf, Central Mountain population

The Southern Mountain population was designated Threatened in May 2000. This population was formerly designated as part of the "Western population" (now de-activated). Status re-examined and confirmed in May 2002. Following the Designatable Unit report on caribou (COSEWIC 2011), a new population structure was proposed and accepted by COSEWIC. This resulted in the new Southern Mountain population, composed of 17 subpopulations from the former Southern Mountain population of Caribou (COSEWIC 2002). The remaining subpopulations were assigned to the new Central and Northern Mountain populations. The Southern Mountain population was designated Endangered in May 2014.

Photo: © Jukka Jatunen

Caribou, Northern Mountain population

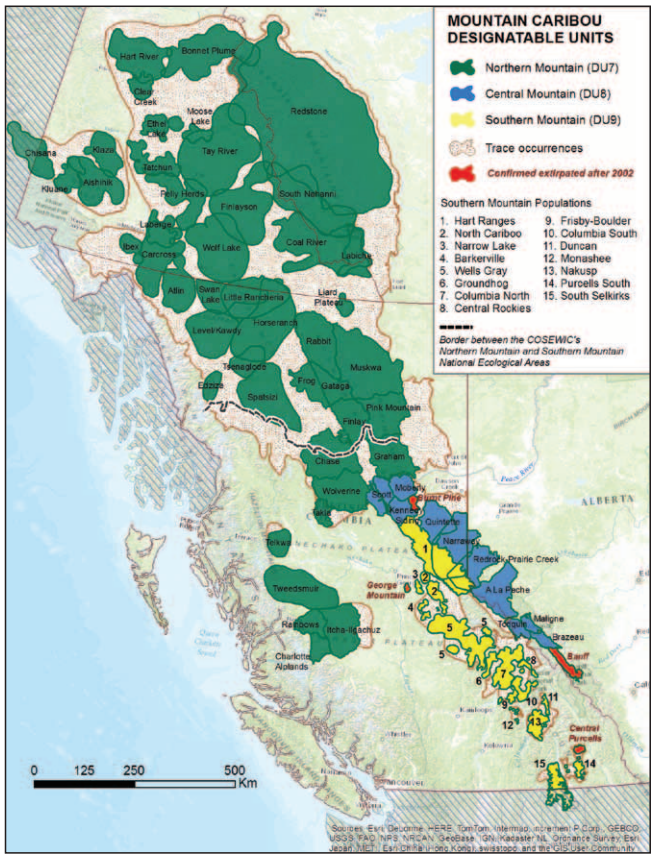
Wildlife Species Description and Significance

All the world's caribou and reindeer belong to a single species, *Rangifer tarandus*, and are found in arctic and subarctic regions as well as in northern forests. Caribou that occur in the western mountainous region of Canada are largely brown in colour with a white mane. Mature females and males usually weigh 110-150 kg and 160-210 kg, respectively. Both males and females grow antlers, although some females may lack these. A distinctive characteristic is large, rounded hooves that reduce sinking in snow and wetlands and act as shovels when digging for food under snow.

Western mountain caribou have played an important role for Aboriginal peoples as well as for early fur traders and settlers. A majority of the current range is in Canada in the Northern Mountain, Central Mountain and Southern Mountain populations. Northern and Central Mountain Caribou both inhabit shallow snow areas in winter where they forage primarily for terrestrial lichens, but differ in their genetic makeup and evolutionary origin. Southern Mountain Caribou are distinct from other mountain caribou in that they have adapted to living in a deep snow environment where they forage primarily for arboreal lichens in winter.

Distribution

Northern Mountain Caribou are currently distributed across 45 subpopulations ranging from west-central British Columbia north to Yukon and Northwest Territories. The Central Mountain population includes 10 extant subpopulations in east-central BC and west-central Alberta in and around the Rocky Mountains. Southern Mountain Caribou are distributed across 15 extant subpopulations in the deep snow-belt region of southeastern BC, and northern Idaho and Washington in the United States. There has been an overall range loss in western mountain caribou of about 30% since the early 1900s, with the major change in distribution occurring in the central and southern portion of BC and Alberta.



Distribution of the Caribou subpopulations in the Northern Mountain (DU 7), Central Mountain (DU 8) and Southern Mountain (DU 9).

Source: COSEWIC. 2014. COSEWIC assessment and status report on the Caribou Northern Mountain population, Central Mountain population and Southern Mountain population in Canada.

Habitat

In general, caribou require large tracts of range where they can separate themselves (horizontally and altitudinally) from other prey and predators, and shift their range use in response to various natural processes (e.g. fire, forest insects, weather/snow conditions) and human activities (e.g. disturbance from forest harvesting, mining, oil and gas, and recreation). Access to high-quality undisturbed calving areas in high-elevation alpine, subalpine parkland, subalpine forests, and/or islands in lakes is also essential to mountain caribou survival. While some subpopulations or portions of subpopulations migrate long distances between winter and summer ranges, others do not.

In winter months, both Northern and Central Mountain Caribou forage primarily on terrestrial lichens either in older coniferous forests at low elevations or on windswept alpine slopes, and summer at high elevations in mountains. They also may forage on arboreal lichens in older low-elevation and subalpine forests. Southern Mountain Caribou spend the winter at higher elevations in older subalpine forests where they are able to walk on a hardened snowpack and eat arboreal lichens. Caribou habitat has declined in quality and extent on many ranges due to impacts from industrial activities, particularly in Alberta and British Columbia.

Biology

Mountain caribou breed in late September and October. Mountain caribou have only one calf per year and females do not generally breed until they are at least 2 years old. Although pregnancy rates are generally high (over 90%), calf survival during the first few months is often 50% or less. Pregnant females travel to isolated, relatively predator-free areas in the mountains to calve in mid-late May or early June. Calf survival is higher for females that calve at high elevations in mountainous terrain or on islands in lakes, compared to females that calve below treeline where they are closer to other ungulates and predators. Caribou are usually one of several prey species in multiple predator-prey systems. Wolves and bears are the main predators of caribou; however, cougars, wolverine, golden eagles, and other predators may also kill adults and/or calves in some areas or during some seasons. Although they have diverse diets, western mountain caribou are adapted

Photo: © Mark Bradley

Caribou and habitat, Central Mountain population

to feed on lichens, with specialized microbes in their stomachs that digest and extract nutrients from lichens efficiently. They can withstand severe cold because their thick winter coat contains insulating semi-hollow hair.

Population Sizes and Trends

The current Northern Mountain Caribou population estimate is about 45 000 mature individuals; however, estimates for only 16 of 45 (36%) of the subpopulations are based on surveys conducted within the last 5 years. Twenty-six subpopulations consist of > 500 caribou and 13 are < 250. Current trends are known for 18 subpopulations: 9 decreasing, 7 stable, and 2 increasing; all 5 subpopulations in west-central BC are declining. Late winter calf recruitment was < 15% for 6 of 10 subpopulations with sufficient data. An overall trend for caribou in the Northern Mountain DU is not possible to determine because survey data and/or data on vital rates for most subpopulations are lacking. The 9 subpopulations in the southern part of the range have declined by 27% since the last COSEWIC assessment in 2002.

The current Central Mountain DU caribou population is estimated at 469 mature individuals. The population has declined by at least 64% over the last 27 years (3 generations) and 62% over the last 18 years (2 generations). All 10 currently recognized extant subpopulations consist of < 250 mature individuals; 4 of these are < 50. All but one are in continued decline; the status of one is unknown. Two additional subpopulations have been confirmed extirpated since the last status report in 2002 and two recognized subpopulations in 2002 have since split into several due to lack of dispersal within some part of the ranges.

The current estimate for the Southern Mountain DU caribou population is 1,356 mature individuals. The population has declined by at least 45% over the last 27 years (3 generations), 40% over the last 18 years (2 generations), and 27% since the last assessment in 2002. All 15 extant subpopulations consist of < 500 mature individuals, 13 of which are < 250, and 9 < 50; some former subpopulations

have split into several due to lack of dispersal within ranges. Fourteen of 15 subpopulations have declined since the last status report in 2002. At present, 11 subpopulations are still declining, 3 are stable and 1 is increasing. Most subpopulations have been subjected to intensive management measures, including translocations, wolf sterilization programs, and moose reduction through liberalized hunting. Two additional subpopulations have been extirpated since 2002. A recent population viability analysis predicted that 13 of 15 subpopulations would be lost within 50 years.

Threats and Limiting Factors

In the Northern Mountain DU, major threats include altered predator-prey dynamics due to habitat change. Human disturbance and habitat loss (including functional habitat loss due to avoidance) have resulted from the cumulative effects of forest harvesting, mineral exploration and development and associated access, motorized and non-motorized recreational activities, changes in forest structure due to Mountain Pine Beetle infestations and/or associated salvage logging, and impacts from climate change.

The primary threats to caribou in the Central Mountain DU include altered predator-prey dynamics due to both direct and functional habitat loss and disturbance resulting from multiple industrial activities including forest harvesting, coal exploration and development, and oil and gas exploration and development. Additional factors include vehicle collisions, motorized recreation (all terrain vehicle, snowmobiling), facilitated access to caribou winter range for predators resulting from increased linear corridors and packed trails or ploughed roads in winter, impacts from climate change, and stochastic environmental events associated with small population sizes.

The primary threats to caribou in the Southern Mountain DU include altered predator/prey dynamics due to habitat change resulting from forest harvesting in adjacent low-elevation valley bottoms, snowmobiling, heli-skiing, impacts from climate change, and the severe limitation of small populations that will have a high likelihood of becoming extirpated due to random environmental and demographic events.

Photo: © Lee Harding

Caribou at Selkirk Mountains BC, Southern Mountain population

Protection, Status, and Ranks

Caribou in the former COSEWIC Southern Mountain population are currently listed as Threatened under the federal *Species at Risk Act*. This includes all caribou in the current Southern Mountain and Central Mountain DUs and 9 subpopulations in west-central and north-central BC in the Northern Mountain DU. Caribou in the former Northern Mountain population are listed as Special Concern under the federal *Species at Risk Act*. The majority of western mountain caribou habitat is on public land. Protected areas cover 22%, 41%, and 32% of the Northern Mountain, Central Mountain and Southern Mountain DU caribou ranges respectively, although most of the protected portion of the Central Mountain DU range covers high-elevation summer habitat. In addition to protected areas, in BC, Ungulate Winter Ranges and Wildlife Habitat Areas were established in 2009 to protect areas from forest harvesting or to guide forest harvesting activities. ■

Dakota Skipper

Photo: © Christa Rigney

Scientific name
Hesperia dacotae

Taxon
Arthropods

COSEWIC Status
Endangered

Canadian range
Saskatchewan, Manitoba

Reason for designation

This butterfly is dependent on tall-grass and mixed-grass prairie habitats, which have suffered > 99% historical losses since the 1850s. The species occurs within fragmented patches of habitat in three population centres in Canada. It has a small home range and is associated with specific prairie plants, making it sensitive to conversion of prairie remnants to cropland, spring and summer haying, overgrazing, controlled burns, drainage of natural sites, and natural disturbances such as floods. The long-term persistence of this butterfly is dependent on appropriate management of its habitat, most of which consists of small fragments.

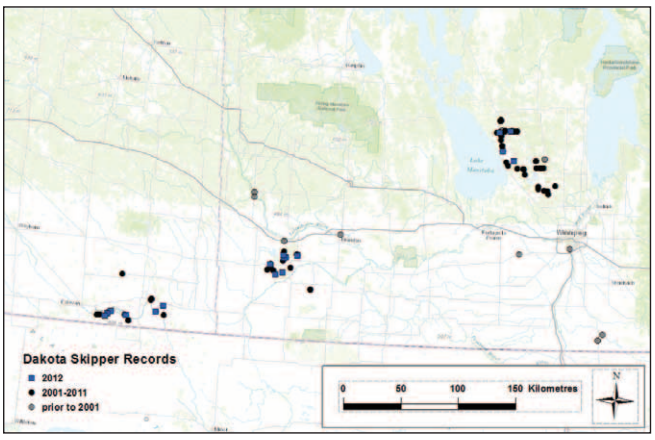
Wildlife Species Description and Significance

Dakota Skipper (*Hesperia dacotae*) is a small (21-33 mm) butterfly. The dorsal wing surfaces of females vary in colour from grayish-beige to brown, suffused with differing amounts of orange and paler translucent spots on the forewing. Wing undersides are greyish-brown with obscure pale spots on the hindwing, and are considered diagnostic for the species. Male dorsal wing surfaces are tawny orange with narrow, diffuse brownish borders and a distinct dark marking on the forewing. The underside of males is often a dull yellowish-orange with poorly developed pale spots.

Dakota Skipper is one of a small group of habitat specialist butterflies that ranges in native tall-grass and mixed-grass prairie habitats that remain in small isolated pockets in Canada. The loss of this skipper from Canada would represent the loss of a significant species of this endangered prairie ecosystem.

Distribution

Dakota Skipper is closely associated with native tall-grass and upland dry mixed-prairie ecosystems, and historically ranged throughout central North America from southern Illinois, Iowa, North and South Dakotas and western Minnesota into southern Canada within Manitoba and extreme Saskatchewan. As of 2012, there are three extant and five extirpated population centres in Canada. The three extant population centres are: 1) Interlake Region surrounding Lundar, Manitoba; 2) Oak Lake Region near Griswold, southwestern Manitoba; and 3) Souris River Region, from Bienfait to Glen Ewen in southeastern Saskatchewan.



Canadian distribution of the Dakota Skipper.

Source: COSEWIC. 2014. COSEWIC assessment and status report on the Dakota Skipper in Canada.

Habitat

Dakota Skipper is an obligate native tall-grass and upland dry mixed-prairie specialist. This species' habitat is categorized into one of two habitat types. In Manitoba the species inhabits wet-mesic tall grass prairie distinguished by topographically low relief (< 1 m), more sandy gravel-free soils, and high water tables prone to intermittent flooding. This habitat type is associated with bluestem grasses and four predominant flowers, almost always present and in bloom during Dakota Skipper flight season: Black-eyed Susan, Common Harebell, Mountain Death Camas, and Wood Lily.

In Saskatchewan Dakota Skipper inhabits upland dry mixed prairie habitat associated with glacial landscapes characterized by rolling terrain with relatively higher relief. Within this habitat, Bluestem and Needle Grasses are dominant. Wood Lily and Common Harebell are present; however, Common Gaillardia and especially Narrow-leaved Prairie Coneflower are important nectar sources.

Biology

Dakota Skipper has one generation per year. Individual adults live up to three weeks, but populations are active for a three- to five-week period during late June to mid-July. Adult females mate within one or two days following emergence and immediately begin laying eggs. Eggs are typically laid individually on the undersides of leaves of the larval host plants.

Population Sizes and Trends

There has been substantial search effort for Dakota Skipper in Canada. As of 2012, the species occurs within three population centres: two in Manitoba and one in Saskatchewan. In 2012, Dakota Skipper population size in Canada is estimated to be 14,000 individuals: Oak Lake, southwest Manitoba 7,670 adults; Interlake Manitoba 5,450 adults; and Saskatchewan 890 adults. In 2002, Dakota Skipper population size was estimated between 28,500–40,500 individuals in only three or four populations.

Numerous sites in Manitoba have been affected by flooding or grazing regimes inappropriate for Dakota Skipper, which has contributed to the population decline over the past 10 years. It appears that much of the suitable habitat in Saskatchewan remains intact. Estimates of available habitat per site are uncertain as these sites are not nearly as clearly defined as in Manitoba.

Threats and Limiting Factors

The predominant threat to Dakota Skipper is increased frequency and severity of flooding that partially affects parts of this low-relief habitat at all three population centres. Historically, prairie ecosystems experienced periodic natural flooding; however, the present-day remaining habitat patches are no longer interconnected, preventing recolonization between these periodically flooded sites. This factor, combined with the cumulative threats that include conversion of habitat to non-grassland farming (e.g., agricultural intensification), overgrazing, haying, mining operations, native and non-native vegetative succession, wildfires and fire suppression and pest control, is causing further declines.

Protection, Status, and Ranks

In Canada Dakota Skipper was assessed as Threatened in 2003 by COSEWIC and listed under the *Species at Risk Act* (SARA) in 2005. Provincially, the species is listed as threatened in Manitoba under the Manitoba *Endangered Species Act.* ■

Eastern Tiger Salamander (Prairie population)

Photo: © Scott Gillingwater

Scientific name
Ambystoma tigrinum

Taxon
Amphibians

COSEWIC Status
Endangered

Canadian range
Manitoba

Reason for designation

This salamander is known from only six sites in Canada within a landscape modified by livestock production, pastures, and forage crops, and intersected by roads. There are recent records from only one of these sites, and the species may be extirpated from one site. The persistence of populations is precarious because of the salamander's small Canadian range, isolation of populations, and the tendency of salamander numbers to fluctuate widely among years, exacerbated by increasing frequency of droughts and other severe weather events.

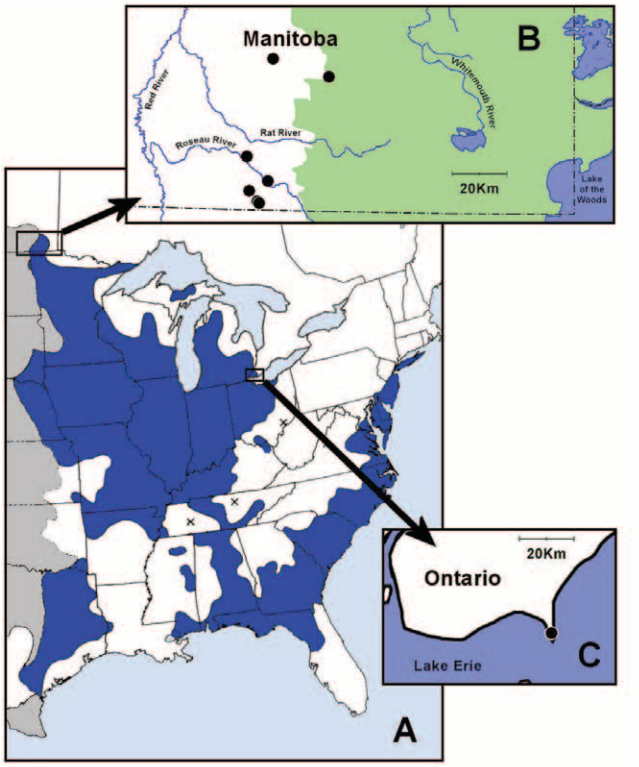
Wildlife Species Description and Significance

Eastern Tiger Salamanders are robust mole salamanders and among the largest terrestrial salamanders in North America. Adults are primarily dark olive to grey or brown with lighter olive to yellow spots on the back and sides. The head is round when viewed from above, the eyes are relatively small, and the underside is dark with yellow blotches. The Eastern Tiger Salamander was recently recognized to be a separate species from other tiger salamanders based on genetic and morphological evidence. Thus much of the scientific literature on tiger salamanders does not distinguish the Eastern Tiger Salamander from what is now known as the Western (= Barred) Tiger Salamander, including its northern prairie subspecies, the Gray Tiger Salamander.

Photo: © Doug Collicutt

Distribution

In North America, Eastern Tiger Salamanders occur throughout most of the eastern United States. In Canada, Eastern Tiger Salamanders are known only from scattered locales in southeast Manitoba and from a historical (1915) record in extreme southern Ontario where the salamanders inhabit the Prairie and Carolinian Ecozones, respectively. These two populations represent separate postglacial range expansions into Canada and are considered separate designatable units in this report.



Distribution of the Eastern Tiger Salamander in North America (Map A). Map B shows confirmed localities (dots) of the Prairie population in extreme southeastern Manitoba. Map C shows the approximate location of the only known Canadian locality for the now Extirpated Carolinian population, at Point Pelee, Ontario.

Source: COSEWIC. 2013. COSEWIC assessment and status report on the Eastern Tiger Salamander in Canada.

Habitat

Eastern Tiger Salamanders inhabit areas where sandy or friable (crumbly) soils surround fishless, semi-permanent or permanent water bodies that they use as breeding sites. These aquatic breeding sites are generally soft-bottomed, may or may not have abundant emergent vegetation, and must hold water at least for the 3–7 months needed for development until metamorphosis. Aquatic, neotenic adults (i.e., animals that retain larval form after sexual maturity) require fishless permanent wetlands. Terrestrial adult Eastern Tiger Salamanders burrow into deep friable soils using their forelimbs and tend to be associated with grasslands, savannas, and woodland edges adjacent to breeding sites and less so with closed canopy forests.

Biology

Eastern Tiger Salamanders living in northern locales breed in wetlands following warm spring rains within a few weeks of ice-off. To reach these breeding sites, adults migrate from terrestrial overwintering sites. Females lay clusters of darkly pigmented eggs below the surface of the water. Males reach sexual maturity in 2 years and females in 3 to 5 years. The generation time is approximately 5 years. Eastern Tiger Salamanders are visually oriented “sit and wait” predators and feed on a wide variety of aquatic and terrestrial invertebrates, tadpoles, and other salamanders. In turn, they serve as prey for predators such as fishes and invertebrates, garter snakes, and crows.

Population Sizes and Trends

There are no recent records of the Eastern Tiger Salamander from Ontario. There are recent records of the species from only one site in Manitoba, where its population sizes and trends are unknown. Studies conducted elsewhere indicate that Eastern Tiger Salamander populations are subject to fluctuations in abundance and are in decline in the mid-western and southeastern United States.

Threats and Limiting Factors

Like most amphibians with separate habitat requirements for adults and larvae, Eastern Tiger Salamanders must contend with threats and limitations in both aquatic and terrestrial habitats in increasingly modified environments. When migrating to and from breeding ponds, tiger salamanders are susceptible to road mortality. Loss or degradation of both the terrestrial and aquatic habitats required by Eastern Tiger Salamanders, as well as migration routes between these habitats, have detrimental effects upon the long-term persistence of populations.

Introduced fishes present in Eastern Tiger Salamander breeding ponds will reduce or eliminate populations by preying on aquatic larvae. Increased incidences of drought have reduced populations in the southeast of their range in the US. Although adapted to life in semi-arid environments, tiger salamanders are vulnerable to prolonged, multi-year droughts that curtail breeding and can disrupt the structure of their populations within the landscape. Emerging infectious disease agents, such as ranaviruses and chytrid fungi, are potential threats.

Protection, Status, and Ranks

The Eastern Tiger Salamander, Carolinian population, in Ontario is listed under the *Species at Risk Act* (SARA) as Extirpated (it is listed as Tiger Salamander, *Ambystoma tigrinum,* Great Lakes population, as per the 2001 COSEWIC assessment). Eastern Tiger Salamanders in Manitoba are not listed under SARA. ■

Eastern Waterfan

Photo: © David Richardson

Scientific name
Peltigera hydrothyria

Taxon
Lichens

COSEWIC Status
Threatened

Canadian range
Quebec, New Brunswick, Nova Scotia

Reason for designation

This rare lichen is endemic to Eastern North America. In Canada, it is known only from New Brunswick, Nova Scotia and Quebec. It grows at or below water level in cool, clear, partially shaded streams. It is threatened in the short term by disturbance from activities which cause stream siltation, alteration of microclimate and declines in water quality. In the longer term, changes in weather patterns that alter water levels and flow in its preferred habitat are another threat.

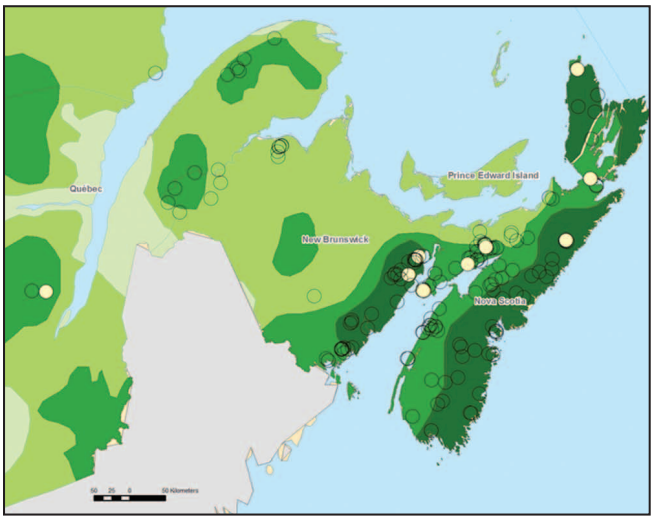
Wildlife Species Description and Significance

The Eastern Waterfan, *Peltigera hydrothyria,* is a leafy lichen having veins on the under surface that are distributed in a fan-shaped manner. The lichen is fixed to rocks by spongy tufts of fibres. The red-brown fruit bodies are borne on the margin of the lichen. The sacs within the fruit bodies shoot out elliptical spores. There are no specialized vegetative propagules. The photosynthetic partner in this lichen is a cyanobacterium. This species is one of only a few leafy lichens that can grow at and below water level.

Distribution

The Eastern Waterfan is endemic to eastern North America. In the USA, this lichen occurs at approximately 30 sites scattered throughout Connecticut, Georgia, Maine, Massachusetts, New Hampshire, North Carolina, Pennsylvania, Rhode Island, Tennessee, Vermont and Virginia.

In Canada, the Eastern Waterfan is currently known only from three provinces: Québec, New Brunswick and Nova Scotia. There are thirteen sites comprising ten occurrences and seven locations. A site is where the lichen is actually found, and sites less than 1 km apart comprise a single occurrence. A location is a geographically or ecologically distinct area in which a single threatening event can rapidly affect all the individuals present at an occurrence. There is one occurrence of the Eastern Waterfan in Québec, three in New Brunswick and six in Nova Scotia. The Canadian population of the Eastern Waterfan represents approximately one-quarter of the known world total. There are no historical occurrences from Ontario, Prince Edward Island or Newfoundland and Labrador.



Distribution on the Western Waterfan in Canada. The pale yellow circles mark the occurrences where the lichen has been found, and the open circles show where streams have been searched unsuccessfully.

Source: Modified from COSEWIC. 2013. COSEWIC assessment and status report on the Eastern Waterfan in Canada.

Habitat

In eastern North America, the Eastern Waterfan grows attached to rocks at or below water level in clear, cool, partially shaded streams. Small waterfalls, exposed boulders and sinuous stream configurations create quiet or protected backwaters where the lichen grows outside the main current. In summer, this lichen is often partially or completely exposed during low water flow periods. The elevation of streams in which the Eastern Waterfan is found varies from 10 m to 720 m a.s.l. Stream quality, including a suitable pH, water temperature, and absence of silt, appears to be very important. Partial shade may be needed to help keep humidity high and temperatures low during summer months. Stream water temperature appears to be very important. Studies on the related Western Waterfan show that if the temperature reaches 18°C, photosynthetic rates decline and thallus weight loss occurs after only 30 days. Nitrate levels at or above 5 mM lead to a similar decline.

Biology

The Eastern Waterfan produces no specialized vegetative propagules but it is likely that small pieces of lichen break off and become attached downstream to provide a means for dispersal. The only other way the lichen can reproduce is via the discharge of fungal spores from the apothecia but success depends upon the presence of a suitable cyanobacterium for resynthesis of the lichen. The fruit bodies of the lichen eject their spores into the air. Upon landing on a rock surface in or on the banks of a stream, these germinate and grow towards nearby cyanobacteria. If the latter are compatible, they become enveloped by the fungal strands and eventually grow into a visible lichen. The generation time for lichens varies from ten years in rapidly colonizing lichens to more than 17 years for old-growth forest species.

The Eastern Waterfan is a member of a group of lichens known as cyanolichens in which cyanobacteria provide carbohydrates through photosynthesis to the fungal partner as well as nitrogen since they are able to fix atmospheric nitrogen. The cyanobacterium in the Eastern Waterfan is reported to be *Capsosira lowei.*

Population Sizes and Trends

The abundance of the Eastern Waterfan at the ten occurrences varies greatly, from 12 to 484 mature individuals (colonies).The total enumerated population of the Eastern Waterfan is 1,282 mature individuals. In some streams, one or a small number of individuals (colonies) were found, while in other streams almost every rock in up to 5 m stretches were colonized. In such areas, 100 or more colonies occurred and were a problem to count accurately as it was difficult to determine where one individual ends and the next begins.

Further surveys may reveal a few more occurrences for this lichen, but it is likely that the total population of the Eastern Waterfan in Canada will not exceed 2,000 colonies, taking into account the many streams where this species was searched for but not found.

There are no historical records of the Eastern Waterfan in Maritime Canada before 1978. Those found since were only re-visited in 2011 so there is insufficient documented evidence to assess trends or fluctuations in the population.

Threats and Limiting Factors

Activities that alter the watercourses, water quality and protective vegetation surrounding habitats all have the potential to affect Eastern Waterfan locations. Cool water appears to be crucial to the Eastern Waterfan's ability to thrive. Removal of trees growing near stream banks exposes the Eastern Waterfan to increased sun, raised air temperatures, reduced humidity and increased erosion and runoff. Increased wind and light exposure in harvested areas can reduce water levels on and around rocks where the Eastern Waterfan occurs so that during months with low water levels, the lichen may be exposed and become dry beyond its tolerance limits. Forestry activities in Colchester County, Nova Scotia, may currently affect five of the seven locations of this lichen and over 30% of the total enumerated mature individuals in Canada. The need to supply 500,000 tons of wood annually for the new 60-megawatt biomass electricity co-generating station in Nova Scotia will mean greater forestry activity and habitat disturbance. Currently, forest harvesters in Nova Scotia are only required to leave a 20 m buffer on each side of streams; it is 30 m in New Brunswick.

The further expansion of wind farms in Nova Scotia, forestry activity, or mineral exploration also requires access roads through undisturbed woodlands. These may encroach on existing Eastern Waterfan habitats and be a source of siltation, which has the potential to affect several of the Eastern Waterfan sites. The extraction of natural gas through hydrofracturing is also known to alter groundwater patterns and water quality. Two areas in Nova Scotia where the Eastern Waterfan occurs are being considered for this activity. The Eastern Waterfan grows only in semi-shaded streams with little to no siltation. Repeated siltation events caused by runoff from roadbeds or motorized vehicle tracks can coat the lobe surfaces of the lichen, affect photosynthesis and cover potential sites for establishment on rock surfaces.

Air pollution can affect lichens. Acid rain, currently less serious in the Maritimes than in former decades, may eventually result in the buffering capacity of the watersheds or substrata being exceeded. This may lead to the water becoming more acidic and this could prevent cyanolichens like the Eastern Waterfan from thriving.

Climate change in the medium term is a serious threat to most of the Eastern Waterfan locations. Recent models suggest that the amount of summer precipitation in Nova Scotia is not expected to change much, but there will be more droughts due to increased evaporation as a result of higher summer temperatures. Droughts reduce water flow and stream depth, which can lead to desiccation and death of the Eastern Waterfan. In winter the climate models suggest there will be more precipitation of which a higher proportion will fall as rain. The increased water flow is likely to enhance scouring and remove the Eastern Waterfan from rocks on the margins and bottoms of streams.

Protection, Status, and Ranks

In Canada, the Eastern Waterfan is ranked by NatureServe as SNR (unranked at a national or subnational conservation level: status not yet assessed). The General Status of Species in Canada lists it as May Be at Risk in Québec and also for Nova Scotia, and as Undetermined for New Brunswick. NatureServe lists the Waterfan as N2 (imperiled) for Canada as of 09 Sept 2011.

In New Brunswick, two of the three occurrences for the Eastern Waterfan are currently protected by being in Fundy National Park. At the other occurrence, there is no protection as the streams flow through Crown and private land. Two of the six occurrences in Nova Scotia are protected: one is in Cape Chignecto Provincial Park and the second is on Crown land near the Pollett's Cove-Aspy Bay Wilderness Area. The Québec occurrence is now protected via a biodiversity conservation project called Réserve de biodiversité projetée de la Forêt-Montmorency.

In the USA, the Eastern Waterfan is ranked as S1 (critically endangered) in Virginia, and S3 (vulnerable) in North Carolina. It has not yet been ranked in Connecticut, Georgia, Maine, Massachusetts, New Hampshire, Pennsylvania, Rhode Island, Tennessee, or Vermont. ■

Grasshopper Sparrow *pratensis* subspecies

Photo: © Jacques Bouvier

Scientific name
Ammodramus savannarum pratensis

Taxon
Birds

COSEWIC Status
Special Concern

Canadian range
Ontario, Quebec

Reason for designation

In Canada, this grassland bird is restricted to southern Ontario and southwestern Quebec. This subspecies has experienced persistent, long-term declines. It faces several ongoing threats including habitat loss, as pastures and hayfields are converted to row crops, habitat fragmentation, which increases predation rates, and mowing activities that destroy nests.

Wildlife Species Description and Significance

The Grasshopper Sparrow *pratensis* subspecies (hereafter Eastern Grasshopper Sparrow) is a small dull-coloured song bird of grassland habitats. It has a short tail, flat head and conical beige bill. Adults of both sexes have similar plumage, i.e. a plain buff-coloured throat and breast, buff, unmarked or faintly marked flanks, whitish below and mottled with rust above. Its summer diet is largely composed of grasshoppers and so the Eastern Grasshopper Sparrow is considered beneficial for agriculture.

Distribution

In Canada, the breeding range of the Eastern Grasshopper Sparrow includes extreme southern Québec and southern Ontario, with the vast majority of birds occurring in Ontario. In the United States, it breeds in all states east of the Midwestern states to the East coast and south to Georgia and Texas. The Eastern Grasshopper Sparrow winters in the southeastern United States, but also in the Caribbean and Central America.

Canadian range of the Grasshopper Sparrow. The darkest area corresponds to the known breeding range of the Eastern Grasshopper Sparrow (*pratensis* subspecies), and the lighter area corresponds to the breeding range of the Western Grasshopper Sparrow.

Source: COSEWIC. 2013. COSEWIC assessment and status report on the Grasshopper Sparrow *pratensis* subspecies, in Canada.

Habitat

In Canada, the Eastern Grasshopper Sparrow typically breeds in large human-created grasslands (≥ 5 ha), such as pastures and hayfields, and natural prairies, such as alvars, characterized by well-drained, often poor soil dominated by relatively low, sparse perennial herbaceous vegetation. The habitat used by the Grasshopper Sparrow in its wintering range is generally similar to that used in the breeding range.

Biology

The Eastern Grasshopper Sparrow is monogamous and generally exhibits breeding site fidelity. Males arrive on the breeding grounds in early May, and pair formation occurs immediately after females arrive, which is shortly after the males. Clutch size ranges from 4 to 5 eggs. Two broods can be produced per year. Nestlings are reared and fed in the nest by both adults for approximately 8 to 9 days. Post-fledging care lasts between 4 and 19 days. Age at first breeding is estimated at 1 year.

Population Sizes and Trends

In Canada, the Eastern Grasshopper Sparrow population is estimated at roughly 25,000 breeding pairs, distributed primarily in the Lake Simcoe-Rideau region of Ontario.

Breeding Bird Survey (BBS) trend analyses from Ontario, where the species is detected on enough routes for analyses, show a significant long-term (1970-2011) decline of 1.5% (CI: -2.98, -0.058) per year and a non-significant short-term (2001–2011) decline of 1.39% (-3.87, 1.16) per year, which amounts to population losses of 46% over 41 years and 13% over 10 years, respectively. According to the Ontario Breeding Bird Atlas, the Eastern Grasshopper Sparrow showed a non-significant decline of 17% in the probability of detection over the 20 years between atlases. This amounts to a 9% decline over the last 10 years. In Québec, the SOS-POP database (*Suivi de l'occupation des stations de nidification des populations d'oiseaux en péril du Québec*) suggests a decline of 36% (14/39 of known sites) in the number of sites occupied by the subspecies between 1989–1998 and 1999-2008. In Québec, the average of the maximum number of individuals observed per site has also declined by over half between the periods 1989–1998 and 1999-2008.

Threats and Limiting Factors

The main causes of Eastern Grasshopper Sparrow declines are: 1) habitat loss caused by the conversion of forage crops and pastures to intensive crop production, 2) habitat fragmentation, which can result in high predation rates and 3) more frequent and earlier hay mowing activities during the breeding season causing nest failure.

Protection, Status and Ranks

In Canada, the Eastern Grasshopper Sparrow, its nest and its eggs are protected under the *Migratory Birds Convention Act, 1994.* In Québec, the Grasshopper Sparrow is protected under *Loi sur la conservation et la mise en valeur de la faune* (the *Act Respecting the Conservation and Development of Wildlife*) and the *Loi sur la qualité de l'environnement* (the *Act for the Quality of the Environment*) and it appears on the list of species likely to be designated threatened or vulnerable according to *the Québec Loi sur les espèces menacées ou vulnérables* (the *Act Respecting Vulnerable and Threatened Species*). NatureServe ranks the Eastern Grasshopper Sparrow as apparently secure (S4) in Ontario and imperiled (S2B) in Québec. ■

Gypsy Cuckoo Bumble Bee

Photo: © Rehanon Pampell

Scientific name
Bombus bohemicus

Taxon
Arthropods

COSEWIC Status
Endangered

Canadian range
Yukon, Northwest Territories, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador

Reason for designation

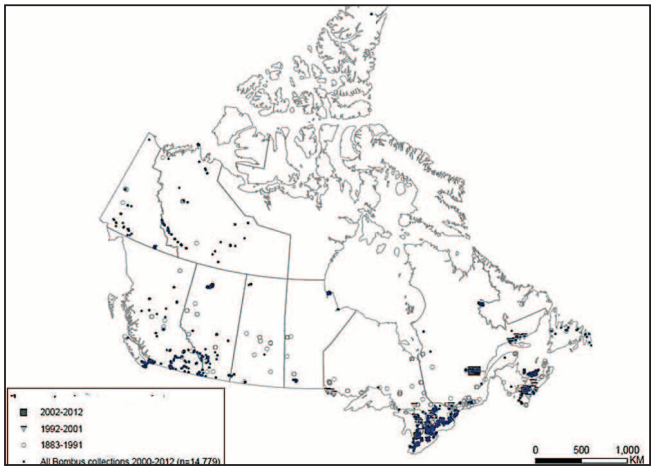
This large and distinctive bee is a nest parasite of other bumble bees. It had an extensive range in Canada and has been recorded from all provinces and territories except Nunavut. Although not known to be abundant, there has been a large observed decline in relative abundance in the past 20-30 years in areas of Canada where the species was once common, with the most recent records coming from Nova Scotia (2002), Ontario (2008) and Quebec (2008). Significant search effort throughout Canada in recent years has failed to detect this species, even where its hosts are still relatively abundant. Primary threats include decline of hosts (Rusty-patched Bumble Bee, Yellow-banded Bumble Bee, and Western Bumble Bee), pesticide use (particularly neonicotinoids), and the escape of non-native, pathogen-infected bumble bees from commercial greenhouses.

Wildlife Species Description and Significance

Gypsy Cuckoo Bumble Bee (*Bombus bohemicus*) is one of six cuckoo bumble bees (subgenus *Psithyrus*) occurring in North America. Both sexes are medium-sized (12–18 mm length), with a white-tipped abdomen and similar colour pattern. Gypsy Cuckoo Bumble Bee is an obligate social parasite of bumble bees of the subgenus *Bombus* in North America, including the Rusty-patched Bumble Bee (*B. affinis*) (assessed Endangered by COSEWIC), Yellow-banded Bumble Bee (*B. terricola*) and Western Bumble Bee (*B. occidentalis)* (both currently being assessed by COSEWIC). Cryptic Bumble Bee (*B. cryptarum*) may also serve as a host. Due to recent analysis of DNA barcode and morphological data, the formerly recognized species *Bombus ashtoni* was found to be conspecific with the widespread Old World species *Bombus bohemicus*.

Distribution

Gypsy Cuckoo Bumble Bee is a holarctic species, occurring throughout most of Europe (except Iceland) and extreme southwestern Europe and parts of north and central Asia. In Canada, Gypsy Cuckoo Bumble Bee has been recorded in every province and territory except Nunavut. Canadian records are from 1883 to 2008, the most recent records being from Pinery Provincial Park in Ontario (2008) and Parc national des Monts-Valin in Quebec (2008). Since 1991, the species has only been recorded from three provinces: Ontario (67 specimens), Quebec (39 specimens) and Nova Scotia (18 specimens). Despite high search effort in recent years (2001–2013), only 42 specimens of Gypsy Cuckoo Bumble Bee have been recorded. The species distribution is partially determined by the distribution and abundance of its host bumble bee species.



Gypsy Cuckoo Bumble Bee records in Canada and recent search effort (2000-2012) that shows collection records for all *Bombus* specimens.

Source: COSEWIC. 2014. COSEWIC assessment and status report on the Gypsy Cuckoo Bumble Bee in Canada.

Habitat

Gypsy Cuckoo Bumble Bee occurs in diverse habitats, including open meadows, mixed farmlands, urban areas, boreal forest and montane meadows. The species feeds on pollen and nectar from a variety of plant genera. Gypsy Cuckoo Bumble Bee emerges slightly later than host queens, and parasitizes host nests in the spring. Host nests occur in abandoned underground rodent burrows and rotten logs.

Biology

Gypsy Cuckoo Bumble Bee is a social parasite, and does not have the typical eusocial colony cycle of other bumble bees, and therefore does not produce workers. Mated females emerge in the spring and look for potential host nests. The female kills or subdues the host queen and lays eggs that the host colony workers tend. In the late summer and autumn, females and males emerge from the host nest and leave to mate with conspecifics. Mated females then select an overwintering site. Like other bumble bees, the males and the egg-laying female of that generation die at the onset of cold weather.

Population Sizes and Trends

Recent surveys at historically occupied sites have recorded no specimens. Historical abundance data on Gypsy Cuckoo Bumble Bee are available for only a fraction of the species Canadian range (mainly southern Ontario and Manitoba). The species has not been recorded at many sites surveyed within the last four decades, even where its hosts remain present.

Threats and Limiting Factors

The most likely threat to Gypsy Cuckoo Bumble Bee is the decline of two of the host species, especially Rusty-patched Bumble Bee in eastern Canada and Western Bumble Bee in western Canada. The third host, Yellow-banded Bumble Bee, is more widespread although may also be declining in parts of its range. At regional scales, pesticide use, pathogen spillover and habitat loss are probable threats.

Protection, Status, and Ranks

Gypsy Cuckoo Bumble Bee is not protected in Canada by any federal or provincial laws. The Canada General Status Rank is undetermined overall in Canada but ‘may be at risk’ in Ontario, Quebec, Nova Scotia, New Brunswick and Newfoundland. The global conservation status rank is possibly extinct (GH).

Given this expansive range of Gypsy Cuckoo Bumble Bee across Canada, many suitable areas of habitat are within protected areas. ■

Hare-footed Locoweed

Photo: © Cheryl Bradley

Scientific name
Oxytropis lagopus

Taxon
Vascular plants

COSEWIC status
Threatened

Canadian range
Alberta

Reason for designation

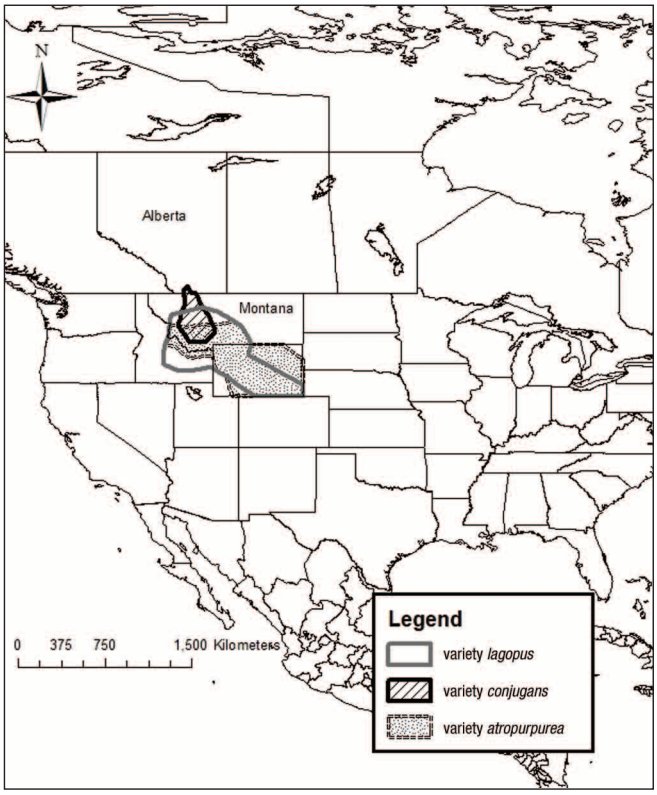
This member of the pea family occurs in highly restricted habitat within a small area of rough fescue prairie on gravelly soils in southern Alberta and western Montana. Alberta occurrences represent a large portion of the world population. The plants face numerous threats including competition with invasive alien plant species, mining and quarrying, cultivation, oil and gas drilling, road development, and intensive livestock grazing, all of which have not been mitigated and are contributing to continuing habitat loss and degradation.

Wildlife Species Description and Significance

Hare-footed Locoweed (*Oxytropis lagopus* var. *conjugans*) is a member of the Fabaceae (pea family). It is a perennial forb, having a stout taproot crowned by leaves and large, purple, attractive flowers. Despite its attractiveness it has little interest for the horticultural trade. Plants can be poisonous to livestock, especially horses. Parts of the plant have medicinal properties and they were used by First Nation peoples to treat several ailments.

Distribution

There are three varieties of *Oxytropis lagopus*: *atropurpurea, conjugans* and *lagopus*. Variety *conjugans* is restricted to the prairies in southern Alberta and western Montana. The other two varieties occur in Montana, Wyoming, and Idaho, USA. In Canada, Hare-footed Locoweed is known from 11 subpopulations in an area of approximately 229 km^2 on the uplands of the Milk River Ridge and Del Bonita Plateau in southern Alberta. The number of subpopulations in Montana is unknown. The nearest US subpopulation is approximately 48 km south of the Canadian-USA in Glacier County, Montana.



Global distribution of the three varieties of *Oxytropis lagopus*.

Source: COSEWIC. 2014. COSEWIC assessment and status report on the Hare-footed Locoweed in Canada.

Habitat

In Canada, Hare-footed Locoweed grows within the Foothills Fescue and Mixedgrass Subregions south of Lethbridge. Plants grow on thin gravelly soils in open grassland at elevations between 1,189 and 1,995 m (3,900 to 6,545 feet) in Alberta. Native rough fescue grassland communities, in which it occurs, are themselves becoming rarer and are considered a high priority for conservation efforts. A notable characteristic of the habitat descriptions is the almost continuous cover of microbiotic crust (primarily lichens) and Dense Spikemoss. There is also indication that a calcium carbonate (limestone) component to substrate materials may be important.

Biology

Hare-footed Locoweed blooms in late April to early June. The flowers are insect-pollinated. The plants take advantage of spring moisture and pods mature early in the year. Seed predation by insects may be heavy in some years and annual seed production is likely to fluctuate between years and localities. Seed is dispersed primarily by gravity. Wind and rodents may also contribute to seed dispersal. The longevity of the seed in the soil and the state of the seed bank is unknown.

Population Sizes and Trends

Hare-footed Locoweed occurrences are fragmented and sites that comprise one to several dozen plants may be separated by several kilometres. One subpopulation, south of Cardston has been extirpated within the last 40 years. Currently there are 11 subpopulations, of which one subpopulation needs to be confirmed to be extant.

Threats and Limiting Factors

Gravel extraction, energy (oil and gas) development, cultivation, off-road vehicles, road building and intensive livestock grazing have, and potentially may, contribute to habitat loss and modification. Recent observations have also concluded that the invasive species Crested Wheat Grass is adversely influencing the numbers of plants in at least five occurrences. These plants are likely direct competitors for nutrients, water and light and may contribute to habitat modification.

Protection, Status, and Ranks

Hare-footed Locoweed has no legal protection in Alberta or the USA. The taxon was last assessed by COSEWIC in April 1995 when it was designated a species of Special Concern, and it is currently on Schedule 3 under the *Species at Risk Act* (SARA). The NatureServe Conservation Rank in Canada is Critically Imperilled (N1) and in Alberta is also Critically Imperilled (S1).

In Alberta, three subpopulations are on private land (includes the extirpated site), four subpopulations are divided between private and public land, three are on Land Trust property, one is in a provincial protected area (Ross Grassland Natural Area North) and one is divided between the provincial protected area (Ross Grassland Natural Area), land trust properties and private land.

The variety *conjugans* is listed by NatureServe as Vulnerable (S3) in Montana, N3 in the USA, and G4G5T3 globally. The full species *Oxytropis lagopus* has not yet been assessed for the most current IUCN Red List. ■

Little Brown Myotis, Northern Myotis and Tri-colored Bat

Note that these three bat species were added to SARA Schedule 1, as announced on December 17, 2014. Details on the SARA listing for the three bat species are available at **http://www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=073DC653-1**.

Photo: © Merlin Tuttle, Bat Conservation International

Little Brown Myotis

Scientific name
Myotis lucifugus (Little Brown Myotis)
Myotis septentrionalis (Northern Myotis)
Perimyotis subflavus (Tri-colored Bat)

Taxon
Mammals

COSEWIC Status
Endangered

Canadian ranges
Little Brown Myotis and *Northern Myotis*: Yukon, Northwest Territories, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador
Tri-colored Bat: Ontario, Quebec, New Brunswick, Nova Scotia

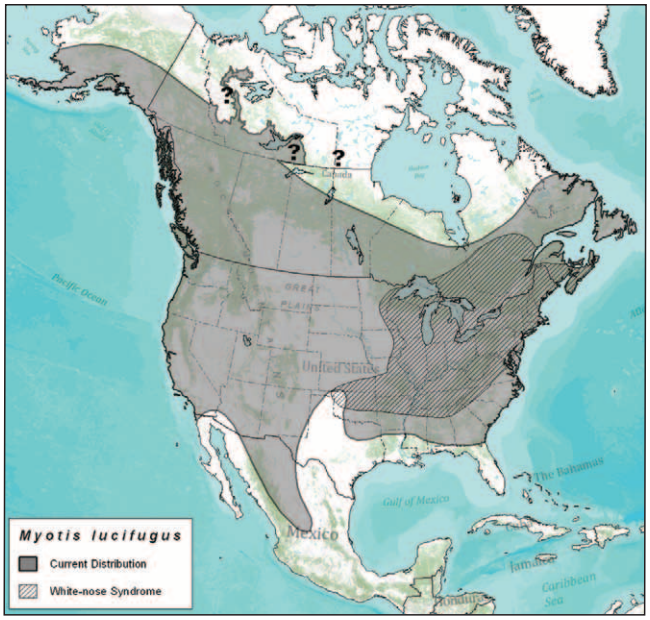
Reason for designation:

Little Brown Myotis:

Approximately 50% of the global range of this small bat is found in Canada. Subpopulations in the eastern part of the range have been devastated by White-nose Syndrome, a fungal disease caused by an introduced pathogen. This disease was first detected in Canada in 2010, and to date has caused a 94% overall decline in known numbers of hibernating Myotis bats in Nova Scotia, New Brunswick, Ontario, and Quebec. The current range of White-nose Syndrome has been expanding at an average rate of 200-250 kilometres per year. At that rate, the entire

Photo: © Brock Fenton

Little Brown Myotis in flight



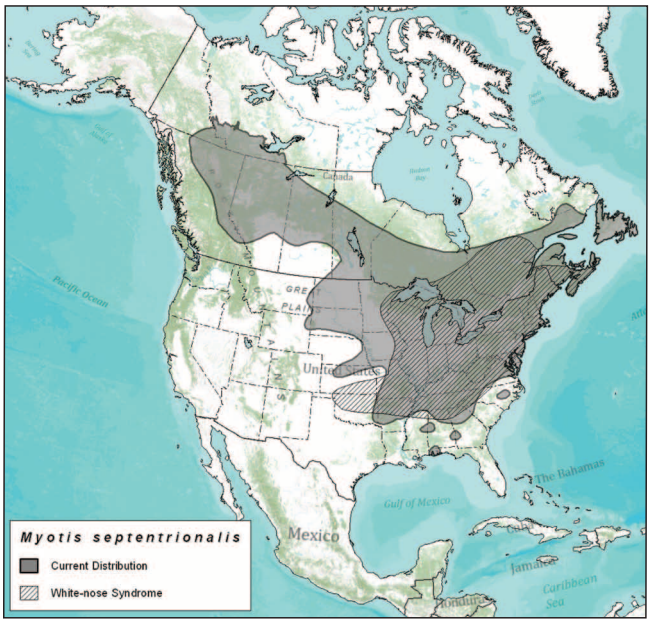
Approximate distribution of the Little Brown Myotis (*Myotis lucifugus*) and White-nose Syndrome, as of August 2013. Some records in NT and Nunavut (indicated with '?') are probable but unconfirmed, or may be extralimital.

Source: COSEWIC. 2013. COSEWIC assessment and status report on the Little Brown Myotis, Northern Myotis and Tri-colored Bat in Canada.

Canadian population is likely to be affected within 12 to 18 years. There is no apparent containment of the northward or westward spread of the pathogen, and proper growing conditions for it exist throughout the remaining range.

Northern Myotis:

Approximately 40% of the global range of this northern bat is in Canada. Subpopulations in the eastern part of the range have been devastated by White-nose Syndrome, a fungal disease caused by an introduced pathogen. This disease was first detected in Canada in 2010 and to date has caused a 94% overall decline in numbers of known hibernating Myotis bats in Nova Scotia, New Brunswick, Ontario, and Quebec hibernacula compared with earlier counts before the disease struck. Models in the northeastern United States for Little Brown Myotis predict a 99% probability of functional extirpation by 2026. Given similar life history characteristics, these results are likely applicable to this species. In addition to its tendency to occur in relatively low abundance levels in hibernacula, there is some indication this species is experiencing greater declines than other species since the onset of White-nose Syndrome. The current range of White-nose Syndrome overlaps with approximately one third of this species' range and is expanding at an average rate of 200 to 250 kilometres per year. At that rate, the entire Canadian population will likely be affected within 12 to18 years. There is no apparent containment of the northward or westward spread of the pathogen, and proper growing conditions for it exist throughout the remaining range.



Approximate distribution of the Northern Myotis (*Myotis septentrionalis*) and White-nose Syndrome, as of August 2013

Source: COSEWIC. 2013. COSEWIC assessment and status report on the Little Brown Myotis, Northern Myotis and Tri-colored Bat in Canada.

Photo: © Merlin Tuttle, Bat Conservation International

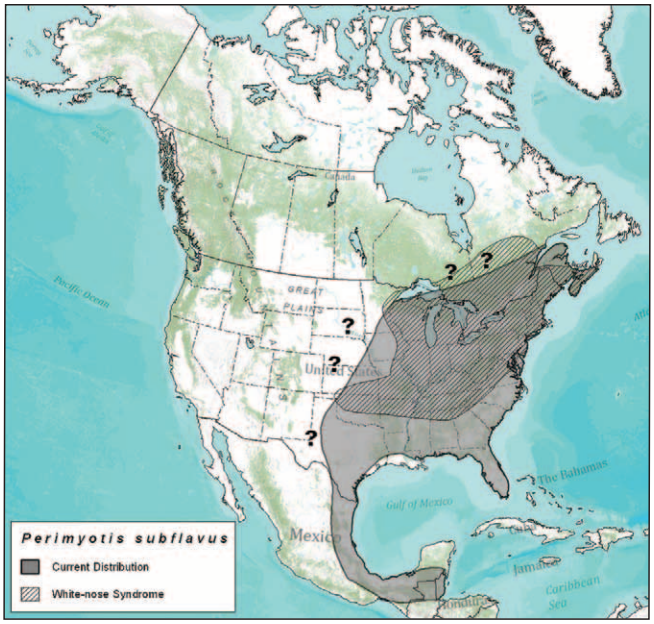
Northern Myotis

Tri-colored Bat:

This bat is one of the smallest bats in eastern North America. Approximately 10% of its global range is in Canada, and it is considered rare in much of its Canadian range. Declines of more than 75% have occurred in the known hibernating populations in Quebec and New Brunswick due to White-nose Syndrome. This fungal disease, caused by an invasive pathogen, was first detected in Canada in 2010, and has caused similar declines in Little Brown Myotis and Northern Myotis in eastern Canada and the northeastern United States. Most of the Canadian range of the species overlaps with the current White-nose Syndrome range, and further declines are expected as more hibernacula continue to become infected.

Photo: © Brock Fenton

Tri-colored Bat



Approximate distribution of the Tri-colored Bat (*Perimyotis subflavus*) and White-nose Syndrome, as of August 2013. Question marks indicate areas where status of the species is uncertain.

Source: COSEWIC. 2013. COSEWIC assessment and status report on the Little Brown Myotis, Northern Myotis and Tri-colored Bat in Canada.

Status history (All three species)

Designated Endangered in an emergency assessment on February 3, 2012. Status re-examined and confirmed in November 2013.

Wildlife Species Description and Significance

All three bat species are small (average 7.4 g), brown-pelaged, insectivorous species of the Family Vespertilionidae. Little Brown Myotis (*Myotis lucifugus*) likely is the most common bat species in Canada and the most familiar of the three species to the public because they often use buildings as day-roosts and forage in areas where they are visible (e.g., over lakes, aound streetlights, etc.). Northern Myotis (*M. septentrionalis*) are common in forests and Tri-colored Bat (*Perimyotis subflavus*) is found in variety of habitats, but is rarer than the other two. Public concern over zoonotic diseases (i.e., rabies, histoplasmosis), noise, and hygiene has resulted in periodic extermination of maternity colonies and/or elimination of their roosts. Bats are predators of insects, some of which are considered pests in the agriculture and forestry sectors, and provide an important ecological service in this regard.

Distribution

In Canada, *Myotis lucifugus* and *M. septentrionalis* occur from Newfoundland to British Columbia, and northward to near the treeline in Labrador, Northwest Territories (NT) and the Yukon. *Perimyotis subflavus* occurs in Nova Scotia (NS), New Brunswick (NB), Quebec, and Ontario. All three species occur in much of the eastern half of the United States (US), and *M. lucifugus* extends to the US west coast, including Alaska.

Habitat

All three species overwinter in cold and humid hibernacula (caves/mines). Their specific physiological requirements limit the number of suitable sites for overwintering. In the east, large numbers (i.e., > 3000 bats) of several species typically overwinter in relatively few hibernacula. In the west, there are fewer known hibernacula, and numbers appear lower per site. Females establish summer maternity colonies, often in buildings (mainly *Myotis lucifugus*), or large-diameter trees. Foraging occurs over water (mainly *M. lucifugus, P. subflavus*), along waterways, forest edges, and in gaps in the forest (mainly *M. septentrionalis*). Large open fields or clearcuts generally are avoided. In autumn, bats return to hibernacula, which may be hundreds of kilometres from their summering areas, swarm near the entrance, mate, and then enter that hibernaculum, or travel to different hibernacula to overwinter.

Biology

Breeding is promiscuous. Females produce one pup (potentially two in *Perimyotis subflavus*) after one year of age. Maximum recorded longevity is 15 years (*P. subflavus*) to > 30 years (*Myotis lucifugus*). Survivorship is low in year one, then highly variable (e.g., 0.6-0.9) afterwards. Generation time is estimated as 5-10 years for *M. lucifugus* and *M. septentrionalis*, and 5-7 years for *P. subflavus*. Finite population growth rate is slow, with a range of 0.98-1.2.

Population Sizes and Trends

Population sizes are unknown but were likely over a million for each of the *Myotis* species prior to the 2010 arrival in Canada of White-nose Syndrome (WNS), a disease caused by a cold-loving fungus *Pseudogymnoascus destructans* (*Pd*), likely originating in Europe. *M. lucifugus* and *M. septentrionalis* were considered to be common in much of their range in eastern Canada and northeastern US, and are still common in Canada outside the range of WNS. *Perimyotis subflavus* was considered rare to uncommon in parts of Canada. Approximately 95% of the hibernating *Myotis* bats that have been counted occur in the range from Nova Scotia to Manitoba, with relatively few bats having been recorded west of Manitoba. However, the number in the north and west is considered an underestimate and the proportion of the populations of the two *Myotis* that has been affected by WNS since its arrival in Canada is unknown. During 2006-2012, an estimated 5.7–6.7 million bats in eastern North America died due to WNS. *M. lucifugus* is predicted to be functionally extirpated (i.e., < 1% of former population) by 2026 in northeastern US. The same prediction likely applies to *M. septentrionalis* because of similar life history traits. *P. subflavus* populations have declined in the US by approximately 75%.

WNS has been recorded in Ontario, Quebec, NB, NS, and Prince Edward Island (PEI). Most population trend data are derived from counts in some of the few, known hibernacula. Data on *Myotis lucifugus* and *M. septentrionalis* often are combined but percent change is assumed to be equal between species. Declines recorded at hibernacula having pre- and post-WNS data have been catastrophic: 93% (Ontario); 99% (NB), 93% (NS) for *Myotis* combined, and 98% for *M. lucifugus* and 99.8% for *M. septentrionalis* in Quebec. The total decline in *Myotis* bats known to be present in NS, NB, Ontario, and Quebec hibernacula from the time of WNS arrival to most recent data for the same sites is 94% (86,952 to 5,225). Relatively few *Perimyotis subflavus* occur in Canada and it is difficult to determine trends; declines of 94% and 75% were recorded in caves in Quebec and NB, respectively. Trend data on bats in summer are limited but are similar to winter data, suggesting winter hibernacula data likely are an accurate reflection of declines in the population. Extent of occurrence has not declined, and may not in the future if very low numbers persist across the species' ranges. Major population declines have not been reported outside WNS range.

WNS was first recorded in Canada in spring 2010, and has spread in all directions from the epicentre in northern New York at a rate of 200-250 km/yr. There is uncertainty about the rate of spread to the western range of the two *Myotis* species. The amount of east-west bat movements, and the wintering ecology and hibernacula conditions that may affect the ecology of the disease in western and northern Canada, are largely unknown. However, predictions that WNS will spread throughout the range of both species rest upon: 1) no evidence of containment to date; 2) evidence that abiotic conditions in western hibernacula are conducive to *Pd* growth; and 3) evidence that hibernacula with lower bat densities are still susceptible to WNS. Model predictions and present rate of spread suggest that WNS will reach the western edge of *M. lucifugus* range in 12-18 yrs, and western edge of *M. septentrionalis* in 12-15 yrs, or within three generations, which is 15-30 yrs. There are also concerns WNS may move more quickly to western Canada if transmitted via human clothing from infected caves. The Canadian range of *P. subflavus* already is contained within WNS range.

Rescue effect is not likely because mortality is high in adjacent areas of the US and any future immigrants likely will be vulnerable to *Pd*. A few sites near the epicentre have possibly stabilized at approximately 1,000 bats for several years (albeit following > 90% decline), but it is unknown if these numbers indicate survival, or movement between hibernacula. There is the hope that some individuals have genetically based resistance to WNS and they will survive and reproduce resistant offspring. However, the slow population growth rate of all three species means populations would take many generations to recover.

Threats and Limiting Factors

Other threats besides WNS include colony eradication, chemical contamination, change in forest structure, and wind turbines. Although cases of colony eradication have been documented (mainly chemical or physical destruction of maternity colonies of *Myotis lucifugus* in buildings), the overall number of colonies exterminated, or impacts on the larger-scale population is unknown. The extent of disturbance by people on hibernating bats and the impacts of chemical contamination on bats, or insecticide on prey availability, are unknown. To date, the impact of wind turbines is highly variable among sites, but generally they have been less of a mortality factor on the three species than on other bat species that conduct long-distance migration. There is potential concern for *M. lucifugus* in some regions of Canada where higher mortality has been recorded.

Protection, Status, and Ranks

Regulations protecting bats vary across their range; removal of maternity colonies is permitted but some hibernacula are closed to the public. Ontario listed *M. lucifugus* and *M. septentrionalis* as Endangered, due to WNS, in autumn 2012. Both NB and NS listed all three species as Endangered in summer 2013.

NatureServe ranks for *Perimyotis subflavus* are Global; G3 (vulnerable), National; N2N3, and S1 (critically imperilled) to S3 at the sub-national level. *Myotis lucifugus* (G3; N3) and *M. septentrionalis* (G1G3; N2N3) are ranked sub-nationally as apparently secure-secure (S4-S5) over much of their range, although jurisdictions within the area affected by WNS changed status to vulnerable or endangered in the last year, or are conducting a review because of WNS. ■

Mormon Metalmark (Prairie population)

Photo: © Shelley Pruss

Scientific name
Apodemia mormo

Taxon
Arthropods

COSEWIC status
Special Concern (Prairie population)

Canadian range
Saskatchewan (Prairie population)

Reason for designation

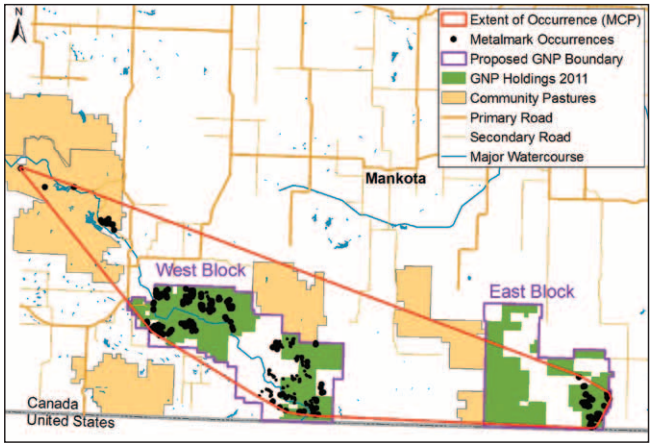
This butterfly occurs in the remote badlands and grassland habitats of Grasslands National Park and adjacent community pastures. Because of extensive surveys in the last decade, the known population of this butterfly is now large enough that it no longer meets the criteria for Threatened. There are few direct threats to the butterfly, although the slow spread of non-native plants that may compete with host plants and overgrazing in areas outside of the park are of concern and may impact habitat quality.

Wildlife Species Description and Significance

Mormon Metalmark, *Apodemia mormo* (Family Riodinidae) is a small butterfly (wingspan 25 to 32 mm) that is dorsally dark brown and ventrally grey, with white spots and black marks on the wings. The central forewings are orange on both dorsal and ventral surfaces. The larvae are up to 25 mm long, dark purple with yellow spots, and clumps of black bristles.

Distribution

The Canadian range is represented by two disjunct populations. The Southern Mountain Population is restricted to south-central British Columbia (BC) and the Prairie Population restricted to southwestern Saskatchewan (SK) (Prairie Population). In BC, the butterfly occurs in the Similkameen Valley from the international border to Olalla and west to Keremeos. It is also known from one extant site in the south Okanagan Valley near Osoyoos and historically as far north as Okanagan Falls. Within this range it occupies an area of less than 50 ha in small, scattered sites at low elevation (450-680 m above sea level). In SK, Mormon Metalmark is found in the East and West Blocks of Grasslands National Park, and a few adjacent private properties and community pastures.



Distribution of the Mormon Metalmark, Prairie population, in Canada.

Source: COSEWIC. 2014. COSEWIC assessment and status report on the Mormon Metalmark in Canada.

Habitat

Mormon Metalmarks are associated with open, arid habitats that support the larval host plants, buckwheats. The Southern Mountain Population is primarily found on eroding sandy-gravelly and rocky slopes with Snow Buckwheat. These include natural hillsides and human-modified habitats such as roads and transmission rights-of-way, railway embankments, and gravel pits. The Prairie Population is typically associated with Few-flowered Buckwheat and Rubber Rabbitbrush, the larval host plant and main adult nectaring source respectively. They can be found on eroding, clay slopes in the prairie badlands, as well as more level terrain.

Photo: © Shelley Pruss

Mormon Metalmark caterpillar

Biology

In Canada, Mormon Metalmarks have one generation per year. Eggs or early instar larvae overwinter in the soil or at the base of their larval host plants. The species has five larval instars and pupates for several weeks in July, within debris near the base of host plants. The adult flight period is from late July until late September with a peak in mid- to late August. Individual adults live about 10 days and primarily nectar on Stinking Rabbitbrush and the larval host plant. The maximum dispersal in the Southern Mountain Population is estimated as 4 km but for most individuals is probably less (< 100 m).

Population Sizes and Trends

Population sizes and trends are poorly known for both the Southern Mountain and Prairie populations. Survey effort in both DUs in the last decade has resulted in new sites. Sites resurveyed show abundance varies yearly. The population size of the Southern Mountain DU is estimated to be at least 2000 individuals in 2006 compared to less than 100 in 2002. At least one historic site has been lost in the Okanagan Valley and yet one additional site (Spotted Lake) was added. The Prairie Population is currently small (estimated 1800–3500 at seven sites, but there are many more sites) but larger than the 1000 individuals estimated in 2002. This can be inferred from the additional 126 sites recorded since 2002, bringing the total to 132 known occupied sites. Habitat mapping in SK grouped known sites into 111 habitat polygons using a 222 m radius around the outermost occurrence within a grouping.

Threats and Limiting Factors

The primary threat to the Southern Mountain Population is habitat degradation and loss, which has resulted in the loss of at least one site within the past decade. Right-of-way maintenance disrupts roadside sites in the Similkameen Valley, and gravel extraction could affect the largest known site in Keremeos. Conversely, minor disturbance may benefit host plants by maintaining the early successional habitat required for these plants.

Most Prairie Population sites are protected within Grasslands National Park and have no primary threats. However, the divestment of federal community pastures to the province of SK may result in the sale of these lands to private individuals or private business consortiums. Non-native weeds can be significant competitors of host plants at some sites, potentially reducing larval food supply.

The distribution of the larval host plants limits the areas of potential habitat for Mormon Metalmark in both the Southern Mountain and Prairie DUs, but both buckwheat species occur in many areas where the butterfly is currently absent. Both Canadian populations are at the northern limits of the species' range so microclimate and related site variables (e.g., slope, aspect) may be limiting factors.

Protection, Status, and Ranks

Under the federal *Species at Risk Act* the Southern Mountain Population is listed as Endangered and the Prairie Population as Threatened. The subnational conservation status rank in both BC and SK is critically imperilled (S2); and the global conservation status rank is secure (S5). The species is ranked as At Risk (1) by the General Status program, both in Canada and in BC, and as Sensitive (3) in SK. None of the Southern Mountain Population sites are within protected areas. Approximately 92% of Prairie Population sites are within Grasslands National Park and federal community pastures. Divesture of community pastures by Agriculture Canada to the province of SK will proceed in the next few years, which will potentially affect Mormon Metalmark populations if there is a change in land use practices. ■

Nahanni Aster

Photo: © Allan Harris

Scientific name
Symphyotrichum nahanniense

Taxon
Vascular plants

COSEWIC Status
Special Concern

Canadian range
Northwest Territories

Reason for designation

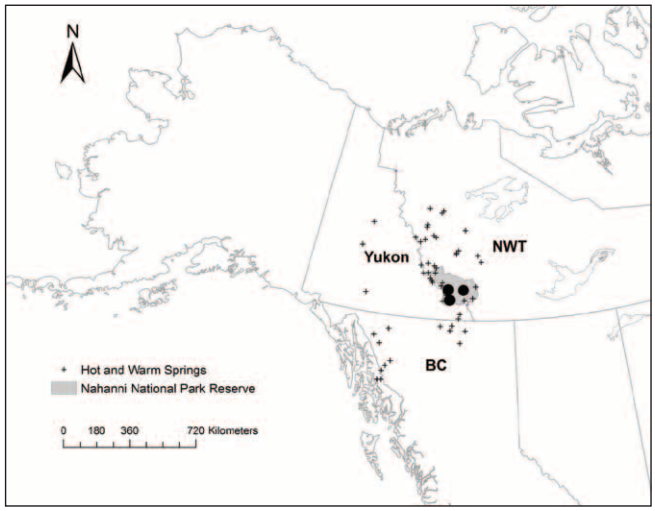
The global population of this species is restricted to hot springs in Nahanni National Park Reserve. A very small range and population size make this endemic species susceptible to losses through natural alterations due to geothermal processes or to landslide events that may become more frequent as climate warms and permafrost melts.

Wildlife Species Description and Significance

Nahanni Aster is a perennial wildflower up to 35 cm tall with white to pale pink flower heads. It typically grows in clumps of about two to ten stems from short, woody rhizomes (horizontal underground stems). The stems are branched to form an open panicle typically with one to three flower heads, but some plants have 15 or more. The number of flower heads appears to vary between sites and may be determined by growing conditions. The stems are green to reddish, often with fine woolly hairs, especially towards the base. Each flower head consists of a yellow disc, surrounded by 15 to 41 white to pale pink rays. Nahanni Aster is endemic to Canada and found only in Nahanni National Park Reserve. It may have evolved here when this part of the Mackenzie Mountains remained unglaciated while the surrounding region was still covered by ice until about 11,000 years ago.

Distribution

Nahanni Aster is confined to six known sites in the southern Mackenzie Mountains of the Northwest Territories, within about 110 km of each other. The hot springs are mostly arranged along two major faults. The southeast – northwest trending Broken Skull Fault follows the valley of the South Nahanni River and lies beneath the Rabbitkettle Hotsprings. Another fault extends down the valley of the Flat River.



Global range of Nahanni Aster. Dots represent the approximate sites of Nahanni Aster populations.

Source: COSEWIC. 2014. COSEWIC assessment and status report on the Nahanni Aster in Canada.

Habitat

Nahanni Aster is found at hot and warm spring habitats with tufa (calcium carbonate deposits). Nahanni Aster grows around the edge of the springs and along the streams and seepage discharging from the spring. It is rooted in moss, but also occurs in broken old tufa and dense turf with various rushes and sedges and is typically unshaded by trees or shrubs.

Biology

Very little is known of the biology of Nahanni Aster. It is a perennial species forming clumps of flowering stems with multiple shoots. It reproduces both by seed and asexually using short rhizomes. Flowering occurs in August to September. Nahanni Aster occurs exclusively at a limited number of springs in a small geographic area, suggesting that it tolerates a narrow range of habitat conditions. Dispersal presumably occurs by wind-borne seeds, as is the case with other aster species. Dispersal between springs is probably limited by the scarcity of suitable habitat.

Population Sizes and Trends

Nahanni Aster population fluctuations and trends are unknown due to the lack of consistent and comprehensive surveys. Comparison of the 2012 data with a 2003 survey shows no apparent change in the distribution of plants or area occupied. Two additional sites have been discovered since 2003. A minimum of over 5600 flowering stems (mature individuals) was counted in 2012. Given the scarcity of springs with tufa, the species is highly unlikely to be much more widespread or abundant than currently known.

Threats and Limiting Factors

Nahanni Aster habitat is protected from industrial development and roads by its isolated habitat and protected status in the Nahanni National Park Reserve. Climate change is the most likely threat to Nahanni Aster habitat. The climate in Nahanni National Park Reserve is warming and rainfall patterns are changing. Changes in groundwater discharge at hot springs due to climate change and seismic activity are potential threats. Its extremely limited range (six occurrences covering less than 10 ha in total) make it vulnerable to random environmental events.

Photo: © Allan Harris

Protection, Status, and Ranks

As all known localities of Nahanni Aster are within the boundaries of Nahanni National Park Reserve, Northwest Territories, the plant and its habitat are afforded some degree of protection under the *Canada National Parks Act* and Regulations. The species receives no specific protection under federal or territorial laws. It is ranked globally, nationally, and territorially as Critically Imperilled (G1, N1, and S1) by NatureServe and as “may be at risk” by the General Status program, both in Canada and the Northwest Territories. ■

Oregon Branded Skipper

Photo: © Jeremy Gatten

Scientific name
Hesperia colorado oregonia

Taxon
Arthropods

COSEWIC Status
Endangered

Canadian range
British Columbia

Reason for designation

This species inhabits sparsely vegetated Garry Oak and coastal sand spit ecosystems that have undergone enormous historic losses. The populations of this skipper have likely undergone similar declines and only four of sixteen sites totalling less than 16 km^2 remain extant. This habitat is fragmented and disjunct. The greatest threats this skipper faces at present, however, are the application of Btk pesticide, used to control the invasive Gypsy Moth, and vegetation succession in the open habitats.

Wildlife Species Description and Significance

The Oregon Branded Skipper (*Hesperia colorado oregonia*) is a small butterfly-like insect (wingspan 25–37 mm) in the family Hesperiidae. The dorsal wing surfaces are an overall reddish-orange with broad, dark brown wing margins and orange angular spots. The ventral wing surfaces are greenish grey with a rich brown background to the hindwing. Sexes are similar.

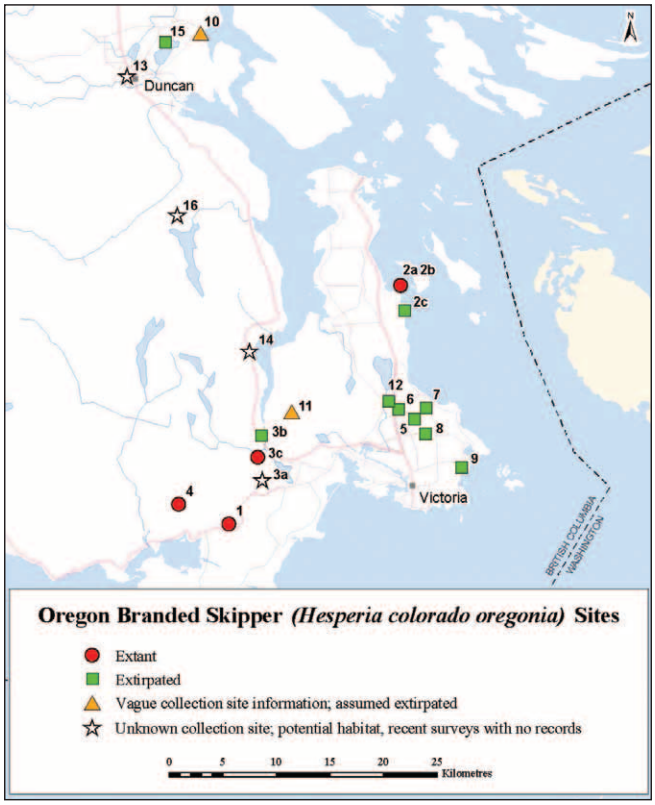
Oregon Branded Skipper eggs are hemispherical and dull, chalky white. Larvae (2–30 mm) have jet black heads, a body that is pale beige or putty colour (early moult) to brownish-purple (final moult). In the last instar, larvae are reddish with black spiracles, turning brownish-purple just prior to pupation.

Pupae have bluish-black wing cases, dull pink abdominal segments and a double row of transverse brownish dashes along the sides. Prior to pupation the transverse abdominal markings become much darker in colour.

The Oregon Branded Skipper occurs in dry Garry Oak (scrub oak ecosystem type) and coastal sand spit ecosystems, both of which are rare in southeastern British Columbia (B.C.). Conservation organizations use the skipper as an interpretive tool to represent the importance of these ecosystems.

Distribution

The Oregon Branded Skipper is at the northernmost extent of its global range on southeastern Vancouver Island, ranging south through the Puget Trough of southwest Washington State, through west-central Oregon to Trinity County in northern California. In B.C., the subspecies is recorded from southeastern Vancouver Island, from Victoria north to Shawnigan Lake and the Cowichan Valley. There are 16 known Oregon Branded Skipper sites on southeastern Vancouver Island, four of which remain extant. Based on known records the current extent of occurrence is estimated at 66 km^2 and the historical and present (combined) extent of occurrence is < 250 km^2.



Distribution of the Oregon Branded Skipper in Canada.

Source: COSEWIC. 2013. COSEWIC assessment and status report on the Oregon Branded Skipper in Canada.

Habitat

Oregon Branded Skipper habitat can be grouped into two types: 1) sparsely vegetated areas, including coastal sand and gravel spits and 2) scrub oak habitats.

Biology

Adults have been recorded from mid-July to late September with one generation per year. Oviposition has not been observed in the field, although in captivity adults laid less than 40 eggs within a two-day span. Larvae feed for approximately four months in spring and summer and construct small tent-like structures at the base of, or in close proximity to host plants, which are thought to be native bunchgrasses such as Red Fescue and Roemer's Fescue. The pupal stage lasts from early July to late August.

Population Sizes and Trends

The Canadian population probably contains fewer than 1000 individuals, but supporting documentation is lacking. The skipper has disappeared from at least three and probably twelve historical sites in the past decades. Surveys have been primarily by wandering transects through suitable habitat.

Threats and Limiting Factors

The greatest threat to individuals is deemed to be the application of Btk insecticide to control introduced Gypsy Moth. Threats to habitat include habitat conversion and loss, fire suppression, invasive non-native plant species, natural vegetative succession and storms and flooding associated with climate change.

Protection, Status, and Ranks

Most records are from private land, including five local government parks. These sites include Cordova Spit (partly a Central Saanich Park) (extant site); Goldstream, Mount Wells (Capital Regional District) (extirpated site); Mount Manuel Quimper within Sooke Hills Regional Park Reserve (extant site); Island View Beach (extirpated site); and Mount Douglas (Saanich Park) (extirpated site).

The private landowner of one site, Camas Hill, is an active steward and there is a conservation covenant on the property. A portion of Cordova Spit is within Tsawout East Saanich Indian Reserve 2 and the Tsawout First Nation has developed a *Land Code*, which identifies important natural features including the spit where Oregon Branded Skipper occurs. The B.C. *Park Act* and *Ecological Reserves Act* protect species at risk in protected areas, of which there is one historical record at Goldstream Provincial Park.

Oregon Branded Skipper is Red-listed in B.C. (S1, Critically Imperilled), nationally ranked N1 (Critically Imperilled) and globally ranked G5T3T4 (rounded to T3, Vulnerable). ■

Plains Bison and Wood Bison

Photo: © Wes Olson

Plains Bison

Scientific name
Bison bison bison (Plains Bison)
Bison bison athabascae (Wood Bison)

Taxon
Mammals

COSEWIC Status
Plains Bison: Threatened
Wood Bison: Special Concern

Canadian range
Plains Bison: British Columbia, Alberta, Saskatchewan
Wood Bison: Yukon, Northwest Territories, British Columbia, Alberta, Manitoba

Reasons for designation

Plains Bison:

This bison occurs in only five isolated wild subpopulations in Canada. There are approximately 1,200 to 1,500 mature individuals, of which about half occur in one subpopulation located outside of the historical range. The total number of individuals has increased by 36% since the last assessment in 2004, but the total remains a tiny fraction of their numbers of 200 years ago. Currently they occupy less than 0.5% of their original range in Canada. This animal continues to face a number of threats to its persistence. Further increases in population size or the addition of new subpopulations is curtailed by fragmented or unsuitable habitat that is often managed to exclude bison. An overall decline is projected for wild subpopulations because they are managed to control or reduce population size and are subject to unpredictable but potentially catastrophic future events, mainly disease outbreaks and extreme weather.

Wood Bison:

This bison only occurs in the wild in Canada. There are currently 5,136 to 7,172 mature individuals in nine isolated wild subpopulations. The population has increased since 1987, mostly due to the establishment of new wild subpopulations within the original range. About 60% of the overall population is included in Wood Buffalo National Park and surrounding areas, and is affected by two cattle diseases, bovine brucellosis and tuberculosis. Two wild subpopulations have recently experienced significant mortality events demonstrating the inherent vulnerability of small isolated populations. The Mackenzie herd decreased by 53% due to an outbreak of anthrax and the Hay-Zama decreased by 20% due to starvation during a severe winter. Further increases to the population size or the addition of new wild subpopulations is not likely, as recovery is constrained by fragmented or unsuitable habitat, road mortality, disease management associated with livestock and commercial bison operations, and disease outbreaks.

Photo: © Wes Olson

Wood Bison

Wildlife Species Description and Significance

The American bison is a member of the wild cattle family and is the largest land mammal in North America. The two recognized subspecies – Plains Bison *(Bison bison bison*) and Wood Bison (*B. b. athabascae*) – have distinct morphology, body shape, size, and pelage patterns. Phylogenetic divisions between them remain despite a massive

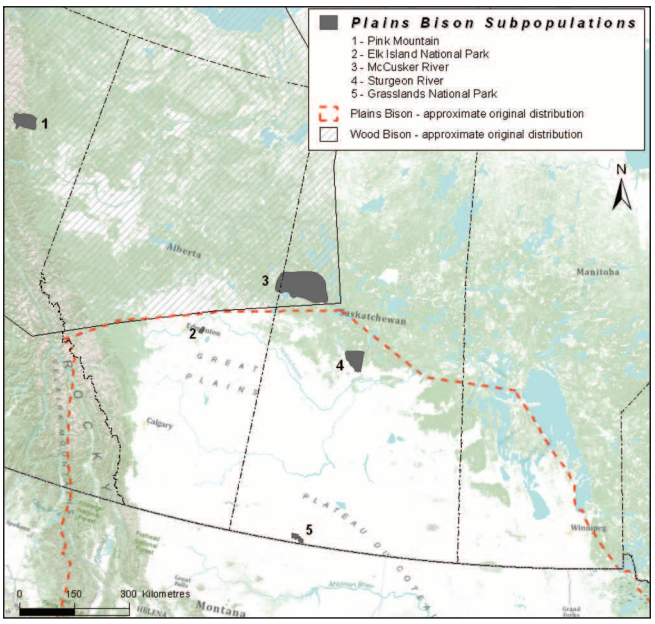
translocation of Plains Bison into the remnant Wood Bison population during the 1920s, which has had a substantial impact on their genetic and distributional integrity.

Bison once served as both an ecological and cultural keystone species, having a disproportionate influence on ecological processes and biodiversity in socio-ecological systems it occupied. This animal has been important to the material and spiritual cultures of many Aboriginal peoples. Since the 1970s, Bison have also increased in economic and commercial importance. This report provides information necessary to assess the wild component of the species, in keeping with COSEWIC guidelines.

Distribution

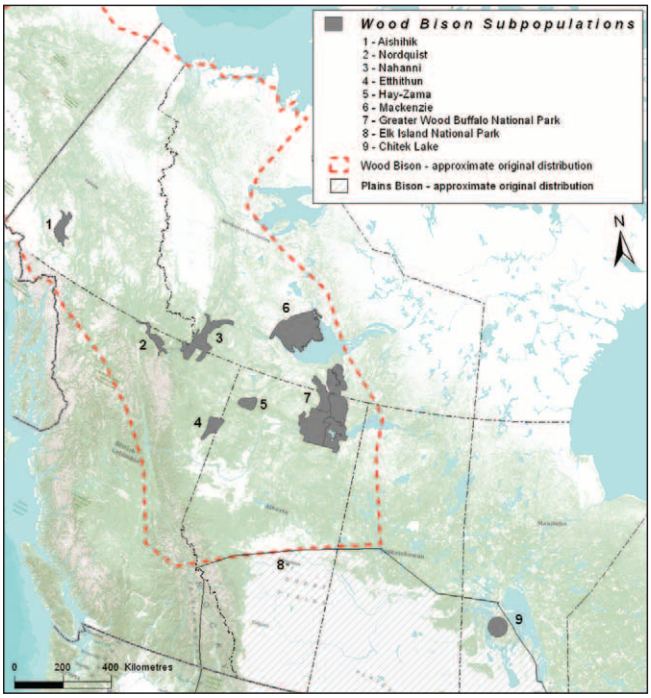
The late Holocene, pre-Columbian range of the American Bison extended from the desert grasslands of northern Mexico to the meadow systems in interior Alaska and from the woodlands of Manitoba to the Rocky Mountains. The continental divide between Alberta and British Columbia marked the approximate western extent of Plains Bison. The transition between Parklands and the Boreal Forest marked the northern extent of Plains Bison and southern limit of Wood Bison.

Both Wood Bison and Plains Bison populations declined sharply during the 1800s, largely as a result of unsustainable hunting. By the end of the 19th century the Plains Bison had been extirpated from the wild in Canada, but a small number of Wood Bison remained in what is now Wood Buffalo National Park. In 2013, wild Plains Bison occurred in five isolated subpopulations: three in Saskatchewan, one in Alberta and one in British Columbia – about 2% of their original range. There are 9 wild Wood Bison subpopulations ranging in Alberta, British Columbia, Manitoba, Yukon and Northwest Territories, occupying about 5% of their original range.



Approximate pre-settlement range of Plains Bison (dashed red line) and current distribution (gray areas) in Canada.

Source: COSEWIC. 2013. COSEWIC assessment and status report on the Plains Bison and the Wood Bison in Canada.



Approximate pre-settlement range of Wood Bison (dashed red line) and current distribution (gray areas) in Canada.

Source: COSEWIC. 2013. COSEWIC assessment and status report on the Plains Bison and the Wood Bison in Canada.

Habitat

The most important habitats for Wood and Plains Bison are those producing winter forage, consisting primarily of grasses, sedges, and rushes. Plains Bison habitat included prairie grasslands and adjacent mixed woodlands in Manitoba, central Saskatchewan, and southwestern Alberta. Conversion of native prairies to crop and livestock agriculture occurred rapidly after bison were eliminated. Loss of native rangelands is still taking place, albeit at a reduced rate. The potential for conflicts with crop agriculture and livestock grazing, including programs to control the spread of bovine tuberculosis and brucellosis from wild bison, all limit population and range expansion for wild Plains and Wood Bison in much of their range.

Biology

Female Bison typically produce their first, single calf (rarely twins) at three years of age and reproductive senescence occurs after 13 to 15 years of age. Fecundity varies between individuals and among populations depending on nutrition and heredity. Generation time for Bison is estimated at eight years. Males as young as 1.5 years can reproduce in well-nourished, captive populations, but full morphological and behavioural maturity (adulthood) is not achieved until six or seven years of age. Sub-adult males rarely have an opportunity to breed in the presence of adult males. Competition for mating opportunities among adult males is an important aspect of the evolutionary ecology of bison. Wolves, Grizzly Bears, and Coyotes are the primary predators.

Population Sizes and Trends

All wild Plains Bison subpopulations in Canada today are the descendants of approximately 81 ancestors captured in three locations in the 1870s and 1880s, and persist as a tiny fraction of their original numbers (tens of millions in North America). The 5 wild subpopulations are in Elk Island National Park and four others originating from that source. One new subpopulation was established in Grasslands National Park since the last COSEWIC status assessment in 2004. There are an estimated 2,335-2,573 Plains Bison, 1,204-1,490 of which are mature individuals. This represents a 36% increase since 2004, although one subpopulation is currently in decline. Overall, there is an unquantified but increasing trend over the past 3 generations.

The ca. 250 Wood Bison that persisted in what is now Wood Buffalo National Park into the late 1800s grew to 1,500-2,000 individuals when the Wood Buffalo National Park was established in 1922. Political exigencies resulted in the translocation of more than 6,000 Plains Bison to the Park in the late 1920s where Wood and Plains Bison subsequently interbred. All Wood Bison existing today are descendants of this mixed ancestry although have remained morphologically and genetically distinct from Plains Bison and are separately managed. Two translocations from Wood Buffalo National Park occurred during the 1960s, including one to Elk Island National Park to establish a disease-free population to support recovery. This subpopulation has directly or indirectly been the source of stock to establish 7 other subpopulations, one since the last assessment in 2001. There are between 7,642-10,458 Wood Bison in 9 wild subpopulations, of which 5,213-7,191 are mature individuals. This represents a substantial increase over the past ca. 3 generations (1987: 1,827) through significant recovery efforts, and a 47% increase since 2000. Although 8 of the 9 wild subpopulations have increased in number since the last COSEWIC assessment, 2 have experienced significant mortality since 2012 due to disease (anthrax) and starvation following a severe winter. All but 2 subpopulations number fewer than 500 individuals. The Greater Wood Buffalo National Park meta-population represents about 60% of the Canadian population of wild Wood Bison today, and they are diseased.

Threats and Limiting Factors

The overall calculated threat impact based on the World Conservation Union-Conservation Measures Partnership 'unified threats classification system' is Very High for Plains Bison and High for Wood Bison. The highest impact threat facing both is hunting and population control. Social intolerance due to perceived competition with other ungulates, disease transmission, property damage, and human safety is a significant factor determining policies that reduce, control, and limit the number of wild Plains and Wood Bison in large landscapes. Unregulated hunting of some subpopulations constrains effective population size below a threshold where small population effects may negatively impact viability.

Disease (livestock-borne and native, e.g., anthrax) and severe weather are other threats that have caused significant mortality events, both recently and historically. The continued existence of reportable cattle diseases in the Greater Wood Buffalo National Park Wood Bison meta-population is the largest threat in terms of geographic scale and potential to impact neighbouring subpopulations. Plains Bison habitat loss from conversion of native range to croplands is ongoing with the sale of public rangelands being a significant threat. Wild Plains Bison are primarily limited by land tenure and use patterns, and by land use, grazing, and animal management policies. Road mortality (Wood Bison) and genetic introgression from cattle and private bison holdings serve as localized threats for both Wood and Plains Bison. Both are also limited by founder effects and small population sizes (< 500).

Protection, Status, and Ranks

Plains Bison in Canada have no status under the federal *Species at Risk Act*. They are classified as wildlife in the provincial wildlife acts of British Columbia and Saskatchewan, but are not wildlife under provincial wildlife acts in Alberta or Manitoba. In Alberta and Manitoba, all bison considered livestock. Plains Bison are not listed under the U.S. *Endangered Species Act*, despite successive petitions to do so.

Wood Bison are listed as Threatened under Schedule I of the federal *Species at Risk Act* upon proclamation in June 2003. Wood Bison are classed as wildlife in the wildlife acts of Manitoba, Alberta, British Columbia, and the Northwest Territories. In Yukon, they are classified as a Transplanted Species in the Yukon *Wildlife Act*. Wood Bison is listed on Appendix II of CITES, and under the U.S. *Endangered Species Act* as Threatened. Globally, the IUCN Red List ranks American Bison (both subspecies) as Near Threatened. NatureServe has assigned a global rank of G4 to American Bison, with national ranks of N4 for U.S. and N3N4 for Canada. The global (and national) rank for Wood Bison is G4T2Q (N2N3) and Plains Bison G4TU (N3N4). Canada's General Status program considers American Bison (both subspecies) as At Risk and At Risk in Yukon, Northwest Territories, Alberta and Manitoba, May be at Risk in British Columbia, and Sensitive in Saskatchewan. ■

Rocky Mountain Tailed Frog

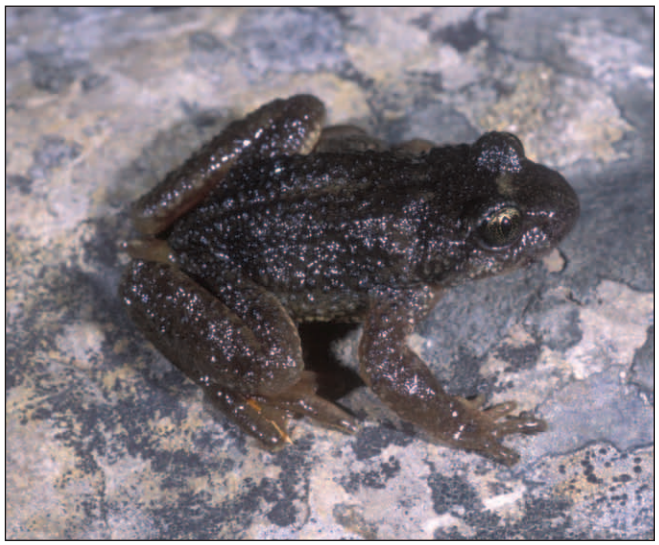


Photo: © Gary Nafis

Scientific name
Ascaphus montanus

Taxon
Amphibians

COSEWIC Status
Threatened

Canadian range
British Columbia

Reasons for designation

In Canada, this unusual stream-breeding frog is restricted to two unconnected watersheds, where it relies on small, forested fast-flowing streams. Habitat damage from sedimentation due primarily to roads, logging, and fires, and loss of terrestrial dispersal habitat from logging and wood harvesting are key threats. The total population is small, consisting of approximately 3000 adults, which increases the vulnerability of the population to environmental perturbations. Increases in habitat protection and a moratorium on mining in the Flathead River portion of the range resulted in a change of status from Endangered.

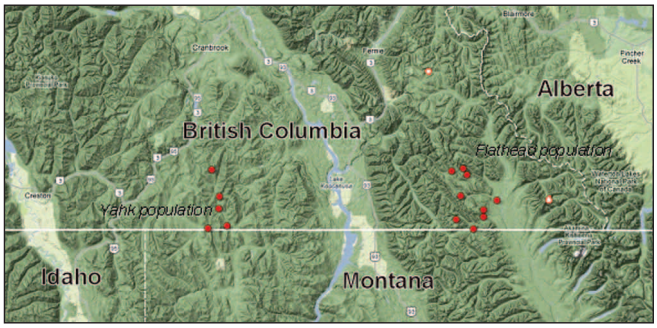
Wildlife Species Description and Significance

Adult Rocky Mountain Tailed Frogs are small frogs with a large head, a vertical pupil, broad and flattened outer hind toes and no ear drum. They vary in colour from tan or brown to olive green or red, and there is often a distinct, dark-edged copper bar between the eyes. Males have a short, conical extension of the cloaca, the source of the name “tailed frog”, which is used for copulation. The tadpoles possess an oral disc modified into a sucker for clinging to rocks in swift currents. They are mottled black and tan with a prominent, black-bordered white spot at the tip of the tail.

The two species of tailed frogs, genus *Ascaphus,* are among the most primitive living frogs in the world and are specialized for life in fast-flowing streams. Rocky Mountain Tailed Frogs are also one of the longest lived of all North American frogs and the slowest to develop, spending 3 years as tadpoles and not attaining sexual maturity until 7–8 years of age.

Distribution

Rocky Mountain Tailed Frogs occur from extreme southeastern British Columbia south through western Montana and Idaho north of the Snake River Plain to the Wallowa Mountains of northeastern Oregon and Blue Mountains of extreme southeastern Washington. In Canada, Rocky Mountain Tailed Frogs are restricted to two disjunct mountainous localities, the Flathead River watershed and the Yahk River watershed, separated by the Rocky Mountain Trench.



Distribution of the Rocky Mountain Tailed Frog in Canada. Red dots are occurrences.

Source: COSEWIC. 2013. COSEWIC assessment and status report on the Rocky Mountain Tailed Frog in Canada.

Habitat

Rocky Mountain Tailed Frogs are restricted to small, permanently flowing, middle elevation creeks in coniferous forest. They are most often associated with rapidly flowing, step-pool streams with streambeds composed largely of smooth rocks, cobbles and boulders, rather than silt, sand or pebbles.

Biology

Tailed frogs have low reproductive rates compared to other frogs, laying relatively small clutches of 50–85 colourless, pea-sized eggs every other year. They are cold-adapted and can withstand temperatures only as high as 21°C. Adult Rocky Mountain Tailed Frogs are nocturnal and extremely site-specific, generally dispersing no more than 20 m in a year. The tadpoles eat mainly diatoms scraped from submerged rocks, but transformed frogs will eat a wide variety of terrestrial arthropods. Predators of Rocky Mountain Tailed Frogs include American Dipper, Cutthroat Trout, Garter Snakes, and Western Toad.

Population Sizes and Trends

No capture – recapture surveys of Rocky Mountain Tailed Frogs have been attempted and the number of breeding adults associated with each creek is not known with certainty, but the entire Canadian population is estimated to be ca. 3000 individuals. Larval densities in Canada range from 0.06 to 1.8 individuals/m^2 of stream. No data are available to assess population trends. Although dispersal movements of Rocky Mountain Tailed Frogs are poorly known, individuals are more likely to move along stream corridors rather than overland and tend not to move very far; thus the potential for rescue from neighbouring populations in the USA is limited.

Threats and Limiting Factors

Major threats to Rocky Mountain Tailed Frogs in Canada include increases in stream sedimentation, alteration of hydrological regimes, loss of riparian forest habitat and headwater linkages, stochastic environmental and demographic fluctuations due to low population size, and climate change resulting in stream habitat contraction. Human activities associated with logging, mining and road building can exacerbate these threats. Wildfires can have a significant, negative, short-term effect on abundances of Rocky Mountain Tailed Frog tadpoles; however, this species may be able to recover from wildfire within a decade. Epizootic chytridiomycosis disease caused by the fungus *Batrachochytrium dendrobatidis* has been identified as a major threat to amphibian populations around the world, but at present there is no evidence of significant infection or disease among Rocky Mountain Tailed Frogs. A ban on mining exploration and development under the *Flathead Watershed Area Conservation Act* has reduced threats in the Flathead portion of the species' range.

Protection, Status, and Ranks

As of 2004, the Global Status rank of the Rocky Mountain Tailed Frog is G4 (apparently secure), according to NatureServe. At the national level, as of 2011, its U.S. status is N4 (apparently secure) and its Canadian and British Columbia status is N2 (imperilled).

Habitat protection has increased significantly since the previous COSEWIC status assessment in 2000. Ten Wildlife Habitat Areas (WHAs) for Rocky Mountain Tailed Frogs were established in the Flathead River watershed and another nine in the Yahk River watershed under the *Forest and Range Practices Act* in 2005. As of 2011, these WHAs are considered to be under the *Oil and Gas Activities Act.* The WHAs altogether cover 1,239 ha of habitat and are intended to protect all known breeding and adjacent foraging habitats for Rocky Mountain Tailed Frogs in British Columbia. The effectiveness of the protection in reducing chronic siltation from the surrounding landscape remains to be established and is currently monitored using sentinel sites. ■

Sweet Pepperbush

Photo: © Megan Crowley

Sweet Pepperbush

Scientific name
Clethra alnifolia

Taxon
Vascular plants

COSEWIC Status
Threatened

Canadian range
Nova Scotia

Reason for designation

This disjunct Atlantic Coastal Plain clonal shrub is restricted to the shores of six lakes in a small area of southern Nova Scotia. Newly identified threats from the invasive exotic shrub Glossy Buckthorn and eutrophication have put this species at increased risk of extirpation. Shoreline development also remains a threat.

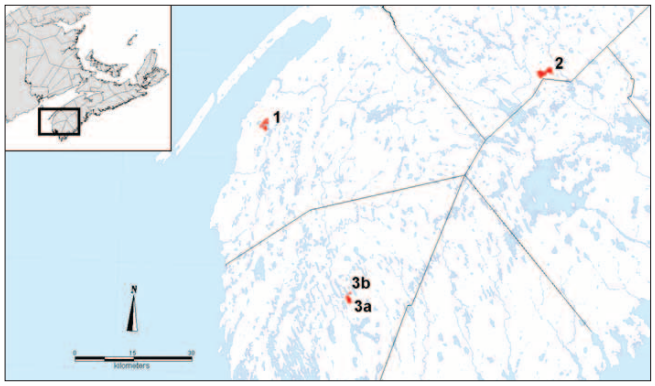
Wildlife Species Description and Significance

Sweet Pepperbush is a deciduous, woody, wetland shrub 1 to 3 m tall that can grow in a clumped form or with single stems arising from a spreading rhizome (underground stem). The dense, narrowly elongate flower clusters are 4 to 12 cm long and composed of small, white, 5-petalled flowers that are strongly fragrant. Fertilized flowers mature into dry, round capsules with many small seeds, though seed production has been reported as sometimes absent or rare in Canada.

Sweet Pepperbush is one of many nationally rare, disjunct species of the Atlantic Coastal Plain in southern Nova Scotia. Outreach programs have resulted in fairly wide understanding and appreciation of this rare flora. Sweet Pepperbush is particularly appreciated by some landowners because of its showy flowers and strong, pleasant fragrance, characteristics that have made it a widely used ornamental species with many developed cultivars. Canadian populations are isolated from others by 200+ km and are the northernmost worldwide, suggesting potential significance to the species' range-wide genetic diversity.

Distribution

Sweet Pepperbush is native to the eastern United States and southern Nova Scotia, from Maine to western Texas, primarily along the Atlantic Coastal Plain (excluding southern Florida) and into the Piedmont plateau region of the eastern USA within about 150 km of the coast. In Canada, Sweet Pepperbush is restricted to three subpopulations on six lakes in southern Nova Scotia within a 70 km by 60 km area. It has become marginally established after escaping from cultivation in Belgium, The Netherlands, and England. Canada supports less than 1% of the global population.



Distribution of Sweet Pepperbush (red dots) in Nova Scotia at 1 – Belliveau Lake, 2 – Pretty Mary Lake, Mudflat Lake and Mill Lake, 3a – Louis Lake and 3b – Canoe Lake. Dark lines are county boundaries.

Source: COSEWIC. 2014. COSEWIC assessment and status report on the Sweet Pepperbush in Canada.

Habitat

In Nova Scotia, Sweet Pepperbush is a species of acidic upper lakeshores and lakeshore forest margins, also occurring locally along shrubby and semi-forested stream margins and under Red Maple-dominated swamp forest canopy within about 20 m of shorelines. It has not been observed to flower when under dense forest canopy in Nova Scotia. Similar habitats are occupied throughout its range, but prevalence in shaded and upland areas is more frequent in the United States where occurrence in upper salt marsh margins is also noted.

Photo: © Megan Crowley

Sweet Pepperbush habitat

Biology

Sweet Pepperbush flowers in Nova Scotia from late July to early September. Pollination is primarily or exclusively by insects, especially bees. Sweet Pepperbush exhibits strong, but not complete self-incompatibility. Coupled with theorized low genetic variability, this could cause the limited seed production noted at Belliveau Lake and suspected elsewhere in Nova Scotia, where seedling establishment is rare. The tiny seeds remain in the capsules into late fall or winter and could be moved by water, wind, and vertebrates (via clinging mud). Seeds can germinate immediately after dispersal but germination is enhanced by cold stratification. Seed longevity is unknown. Average time to first flowering from seed in the field is probably more than ten years. Individual stems can live at least 28 years. Most reproduction is by spreading rhizomes which can produce new shoots up to 2.4 m from the parent plant. These allow colonization of wetter areas where seedling establishment is difficult and form a "sprout bank" that can respond rapidly to canopy openings. Time to flowering and to vegetative reproduction for new vegetative shoots is likely at least several years. Generation time could be at least 10 years. Clumps of stems (which continually resprout from the base) and complexes of connected genetic individuals are presumably much longer-lived.

Population Sizes and Trends

The Canadian population is not more than 45,471 individuals based on stem numbers estimated from comprehensive 2011 and 2012 surveys. Stems counts overestimate number of mature individuals because some tightly clumped stems are best classed as single individuals and smaller stems may be unable to reproduce sexually or vegetatively. The degree of this overestimation is unknown. Stem estimates by subpopulation are: 1) Belliveau Lake – 16,070; 2) Pretty Mary, Mudflat, and Mill lakes – 27,700; 3) Louis Lake and Canoe Lake – 1,700 individuals, with only a single individual at Canoe Lake.

Threats and Limiting Factors

Competition from the invasive exotic shrub Glossy Buckthorn is already occurring to a very limited extent and is likely to become more severe at the Pretty Mary-Mudflat-Mill lakes subpopulation, where thousands of mature Glossy Buckthorn plants are present on abandoned farmland adjacent to the lakes. Glossy Buckthorn is perhaps 10 km away from Belliveau Lake and 40 km away from Louis Lake and is likely to reach those sites within one to several decades. The timing and magnitude of its impact is uncertain.

Eutrophication from leaching sewage ponds on an abandoned hog farm at Belliveau Lake is changing habitat on one corner of the lake where Sweet Pepperbush occurs. Impacts on the species are unclear, but could become significant, especially if coupled with Glossy Buckthorn invasion.

Shoreline development has slowly but steadily increased on Belliveau, Pretty Mary, and Mudflat lakes over the past 30 years and will likely continue. It is also a threat on currently undeveloped Mill Lake. Landowners frequently cut and remove some (but generally not all) Sweet Pepperbush for shore access and to enhance views, with overall losses to shoreline development up to the present roughly estimated at less than 4.6%.

A long-standing but poorly maintained dam on Mill Lake may be limiting occurrence there and if it was breached it might make conditions less suitable for existing Sweet Pepperbush and allow rapid influx of Glossy Buckthorn from large nearby populations. Limited genetic variability resulting in limited seed production is speculated to be a major limiting factor in Nova Scotia, which would explain the absence of Sweet Pepperbush over vast areas of suitable habitat.

Photo: © Megan Crowley

Sweet Pepperbush flower

Protection, Status, and Ranks

About 94% of Sweet Pepperbush habitat in Canada is on private land. All of the Louis Lake – Canoe Lake population and 10% of the Belliveau Lake population are on provincial Crown land that is likely to be included in new nature reserves soon to be finalized.

Sweet Pepperbush is currently listed as Special Concern in Canada by COSEWIC and under Schedule 1 of the *Species at Risk Act* and Vulnerable under the *Nova Scotia Endangered Species Act*. It is Endangered in Tennessee under the state's *Rare Plant Protection and Conservation Act of 1985,* but has no legal protection elsewhere. Non-legal NatureServe ranks are: Globally secure (G5) and nationally (N5) secure in the United States; Critically Imperilled (N1) in Canada, Nova Scotia (S1), Tennessee (S1), and Imperiled (S2) in Maine. It is considered Sensitive in Canada and Nova Scotia by the National General Status Working Group. ■

Tweedy's Lewisia

Photo: © Amber Saundry

Scientific name
Lewisiopsis tweedyi

Taxon
Vascular plants

COSEWIC Status
Endangered

Canadian range
British Columbia

Reason for designation

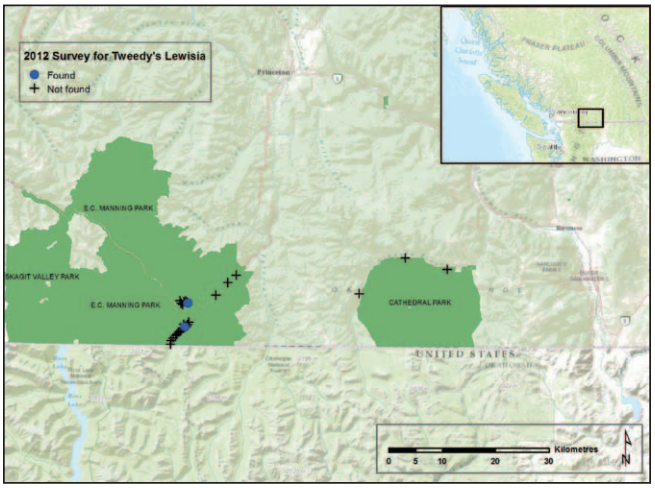
This showy perennial plant is known only from Washington and British Columbia. It exists in Canada as two small subpopulations and has undergone a decline of up to 30% in recent years, possibly due to plant collecting. The small population size and potential impact from changes in moisture regimes due to climate change place the species at on-going risk.

Wildlife Species Description and Significance

Tweedy's Lewisia is a clump-forming perennial herb arising from a thick, fleshy, reddish taproot. The evergreen, fleshy leaves form a basal cluster, from which arise multiple stems, each bearing 2-5 showy salmon-coloured, yellowish-pink or white flowers. Tweedy's Lewisia is a distinctive showy species that has long been grown as an ornamental but has a reputation for being difficult to keep alive and therefore of commercial interest only to alpine garden specialists.

Distribution

Tweedy's Lewisia occurs from south-central British Columbia south through the Wenatchee Mountains into central Washington State. In Canada, Tweedy's Lewisia is known from two sites in the Cascade Mountain Ranges, in E.C. Manning Provincial Park.



Canadian distribution of Tweedy's Lewisia. Dots indicate extant populations.

Source: COSEWIC. 2013. COSEWIC assessment and status report on the Tweedy's Lewisia in Canada.

Habitat

In Canada, Tweedy's Lewisia occurs on dry south-facing slopes, in subalpine areas within the Moist Warm subzone of the Engelmann Spruce – Subalpine Fir biogeoclimatic zone. This subzone experiences long, cold winters featuring heavy snowfall, and short, cool summers. Substantial snowpacks may persist into June. The plants occur in stable, fractured rock outcrops where needle litter accumulates; in areas with a light canopy of mature Douglas-fir, or no

trees. Most of the clumps occur on southeast-facing ledges and crevices while few were found on level surfaces. The shrub and herb layers are sparse and interspecific interactions between Tweedy's Lewisia and other low-growing species are probably weak. The habitat in the vicinity of the Site 1 subpopulation is not obviously vulnerable to any major disturbances. The habitat surrounding the Site 2 subpopulation has been significantly altered by road building and subsequent road re-alignment but there is no ongoing road building.

Biology

The Canadian population flowers between mid-June and late July. Bees and syrphid flies made up the majority of observed daytime flower visitors but it is not certain that they are the main pollinators. Tweedy's Lewisia is self-fertile and there is little difference in seed set regardless of whether plants were self-fertilized, fertilized by other plants of the same subpopulation, or fertilized by plants from distant subpopulations. The flower scapes of Tweedy's Lewisia tend to reflex if several seeds are produced, which increases the likelihood that seeds will fall close to the parent. The seeds, which have a sweet honey scent, are often dispersed by ants. Seeds germinate in the autumn or spring and existing plants break shoot dormancy as the snow is melting. Seed viability in Tweedy's Lewisia varies considerably. While germination and growth may begin soon after the seeds are sown, deposited seeds remain viable and may germinate episodically for up to 18 months.

Tweedy's Lewisia is adapted to summer drought but is not adapted to winter rains. Tweedy's Lewisia may be grazed by American Pika, Mule Deer, and Elk. The degree of herbivory tends to be highest among large subpopulations of Tweedy's Lewisia.

Population Sizes and Trends

Two extant subpopulations are currently known from Canada. The total Canadian population in 2012 was estimated at 106-107 mature individuals. The Site 2 subpopulation consists of a single mature individual and a number of juvenile plants. There is debate whether this population may have been deliberately introduced. The Site 1 subpopulation, which contains the balance of the Canadian plants (i.e., 105-106 mature individuals) is currently in decline. There is little prospect of a rescue effect from the USA because of long distance, substantial geographic barriers, and the lack of evident adaptations for long-distance transport of seeds.

Threats and Limiting Factors

The distribution of Tweedy's Lewisia in Canada is strictly limited by the relatively small area of suitable habitat within its narrow extent of occurrence. Existing subpopulations are threatened by plant collecting and more severe summer droughts as an apparent result of climate change.

Photo : © Derek Tan, Beaty Biodiversity Museum

Protection, Status, and Ranks

The Canadian population of Tweedy's Lewisia is not protected under the federal *Species at Risk Act*, provincial species at risk legislation, or CITES. Tweedy's Lewisia is ranked globally vulnerable (G3). In Canada, it is ranked as critically imperilled (N1) and has a general status rank of 2: May Be at Risk. In British Columbia, Tweedy's Lewisia is ranked critically imperilled (S1); it is a priority 1 species under the B.C. Conservation Framework and is included on the British Columbia Red List, which consists of species that have been assessed as endangered, threatened or extirpated. Inclusion on the Red List does not confer any legal protection.

The Canadian population of Tweedy's Lewisia occurs within E.C. Manning Provincial Park and is thereby offered some measure of protection under general provisions of the B.C. *Park Act*. ■

Wandering Salamander

Photo: © Scott Gillingwater

Scientific name
Aneides vagrans

Taxon
Amphibians

COSEWIC Status
Special Concern

Canadian range
British Columbia

Reason for designation

The Canadian distribution of this terrestrial salamander is restricted mainly to low elevation forests on Vancouver Island and adjacent small offshore islands in southwestern British Columbia. These salamanders depend on the availability of moist refuges and large diameter logs on the forest floor, as found in intact forests. The salamanders are threatened by logging, residential development, and severe droughts, storm events, and habitat shifts predicted under climate change. Low reproductive rate, poor dispersal ability, and specific habitat requirements contribute to the vulnerability of the species.

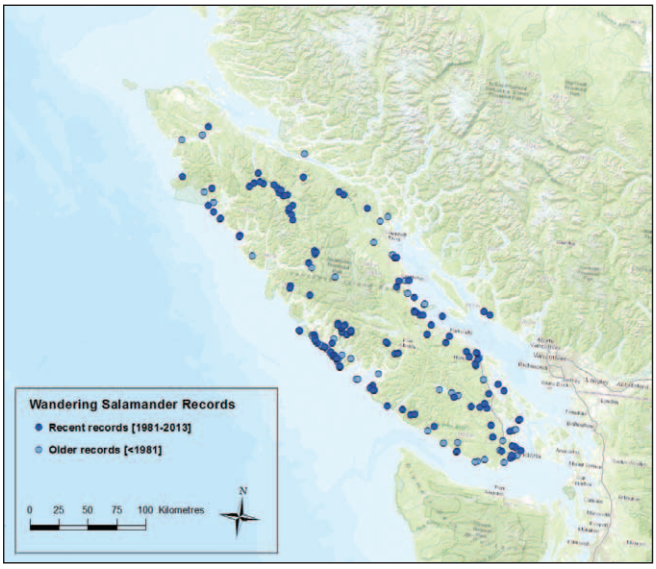
Wildlife Species Description and Significance

The Wandering Salamander (*Aneides vagrans*) is a terrestrial salamander of the family Plethodontidae, the "lungless" salamanders. It was separated from the Clouded Salamander (*A. ferreus*) in 1998 based on genetic evidence. A typical adult weighs 2–5 g and measures 75–120 mm in total length (including tail). The amount of grey and bronze mottling on the back varies with age. Relatively long legs and squared-off toe tips are thought to be adaptations for climbing trees.

Distribution

The Wandering Salamander has a small global range split between coastal parts of northwestern California and extreme southwestern British Columbia. It is absent from intervening areas in Washington and Oregon. Its Canadian distribution is largely restricted to low-elevation forests on Vancouver Island and adjacent small offshore islands; there is one locality on the Sunshine Coast on mainland British Columbia.

Approximately 60% of the species' global range is in Canada. Genetic similarities link populations on southern Vancouver Island with those from Humboldt County, California. The most likely explanation for this disjunct distribution is dispersal from California via natural log-rafting on north-flowing ocean currents. Other possibilities have been suggested, including glacial refugia on the west coast of Vancouver Island or inadvertent introduced to Vancouver Island in the late 1800s in shipments of Tanoak bark.



Distribution of the Wandering Salamander in Canada.

Source: COSEWIC. 2014. COSEWIC assessment and status report on the Wandering Salamander in Canada.

Habitat

The Wandering Salamander depends on cutaneous respiration. As a result, it is restricted to moist microhabitats. The salamanders are primarily found under bark and/or within cavities and cracks of decaying wood. Females lay eggs within large (50 cm or more in diameter), moderately decayed logs. Where suitable downed wood or rubble/talus is available, the salamanders can persist in logged areas, edges of forests, or even residential yards, but they are most abundant in mature and old coniferous forest stands. Wandering Salamanders live in trees as well as on the ground. They have been recorded from a height of 57 m in the canopy of a Sitka Spruce tree on Vancouver Island.

Habitat quality for the species has deteriorated over the past 30 years. Clearcut logging has altered 20 to 26% of the forests within the range of the Wandering Salamander on Vancouver Island. The construction of the new Island Highway has displaced salamanders and fragmented the species' habitat.

Biology

The female lays a small clutch of 3–28 eggs in late spring or summer and attends to her eggs until they hatch in late summer or early fall. Young undergo direct development and emerge from nests as independent juveniles. They take at least 3 years to reach sexual maturity. Females reproduce every other year or less often. The average age of adults (generation time) is approximately 8–11 years. Individual salamanders may live up to 20 years.

Population Sizes and Trends

Population trends of the Wandering Salamander in British Columbia are virtually unknown. Its distribution is patchy in British Columbia with abundance varying greatly among sites. Wandering Salamanders were detected at 37% (N=183) of the sites sampled for salamanders from 1981–2013 (over the past three generations). These records suggest that the species remains widespread across its range. Apparent declines have been noted in one area of northern Vancouver Island, but historical sites have not been systematically revisited.

Threats and Limiting Factors

Across their Canadian range, Wandering Salamanders are threatened by logging, which continues to alter and fragment habitats across Vancouver Island, and severe and prolonged droughts predicted to become more common under climate change scenarios. In addition, residential and other human developments threaten local populations, and tsunami events could eliminate some populations in low-lying coastal areas. About 80% of the species' range is within actively managed forest, and at least 55 sites are threatened by logging. There are 25 occupied sites in the Coastal Douglas-fir biogeoclimatic zone, which is subject to severe droughts and habitat alteration under climate change. Low reproductive rate, poor dispersal ability, and specific habitat requirements of the salamanders contribute to their vulnerability to perturbations.

Protection, Status, and Ranks

Most of the range and occurrences are on unprotected provincial or private forestry lands. Approximately 9% of the species' range and 17% of the known records on Vancouver Island are within protected areas. Globally, the Wandering Salamander is on the IUCN Red List of Threatened Species as "near threatened" (NT). NatureServe ranking of the species is "apparently secure" (G4). In Canada and British Columbia, the species' ranking is "vulnerable to apparently secure" (N3N4/S3S4), and it is on the provincial Blue list of species at risk. It was ranked as "Secure" in British Columbia and Canada by the General Status Program. ■

Water Pennywort

Photo: © Megan Crowley

Scientific name
Hydrocotyle umbellata

Taxon
Vascular plants

COSEWIC Status
Special Concern

Canadian range
Nova Scotia

Reason for designation

This species is known from only three disjunct lakeshore locations in southern Nova Scotia, one of which was discovered since the last assessment. Alterations and damage to shorelines from shoreline development and off-road vehicles are ongoing threats, and water level management is a potential threat at one lake. Increased competition from other plants caused by eutrophication is a potential major future threat.

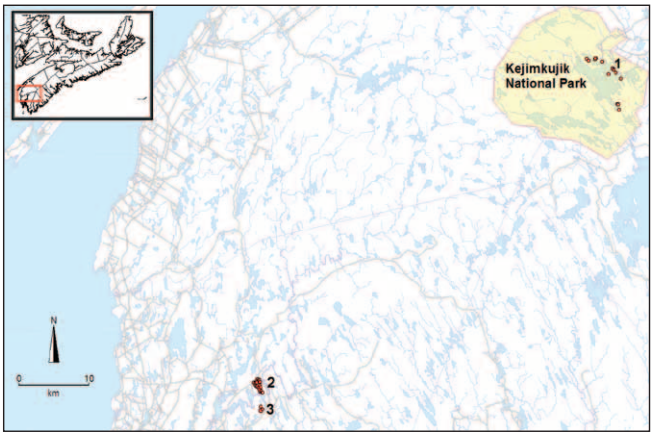
Wildlife Species Description and Significance

Water Pennywort is a perennial herb with creeping stems that root at the nodes. The round, shallowly lobed leaves are 1-5 cm wide on erect petioles (leaf stems) attaching in the centre of the leaf. Petioles are 5-20 cm in terrestrial plants and up to 150 cm on floating leaves in standing water. The tiny, white flowers are in a round cluster at the tip of a leafless stem. Fruiting has not been seen in Canada.

Water Pennywort co-occurs in southern Nova Scotia with many other disjunct species of the Atlantic Coastal Plain. This group of species is known and appreciated by many cottagers and residents. Populations in Nova Scotia are the northernmost worldwide and 410+ km from the nearest American sites.

Water Pennywort can be used as a salad herb, an aquarium plant or a ground cover in gardens. In the United States it can be a lawn weed and an impediment to navigation in canals. It has been extensively investigated in relation to treatment of nutrient-enriched wastewater, and has potential for use in removing heavy metals from water. It is a traditional treatment for anxiety in South America, and in high concentrations has narcotic effects. Extracts have been shown to have herbicidal effects.

Distribution



Distribution of Water Pennywort in Nova Scotia at 1 – Kejimkujik National Park, 2 – Wilsons Lake and 3 – Springhaven Duck Lake.

Source: COSEWIC. 2014. COSEWIC assessment and status report on the Water Pennywort in Canada.

Water Pennywort is native from central and northern South America and the Caribbean into California and along the Atlantic coast of the United States north to Massachusetts, with localized, disjunct occurrences in inland areas north to Michigan, Indiana, Ohio, and New York. Occurrence in Canada is limited to two areas of southern Nova Scotia: two sites in southern Yarmouth County and one 70 km northeast in Kejimkujik National Park. It is introduced in Thailand, New Zealand and reportedly Myanmar.

Habitat

In Nova Scotia, Water Pennywort occurs on broad sand and gravel lakeshores within the zone flooded in winter (which protects against cold-induced mortality) and exposed in summer, and on permanently inundated lakeshores in water depths to about 1.5 M. Canadian habitats are acidic and nutrient poor which, along with ice scour and wave action, limits more competitive species. Two of the three subpopulations are on large catchment area lakes with high water level fluctuation, typical of rare Atlantic Coastal Plain flora habitat. Further south, Water Pennywort occupies a wider range of habitats including various nutrient-rich and disturbed, moist sites.

Photo: © Megan Crowley

Water Pennywort colony

Biology

Water Pennywort is a perennial herb that reproduces sexually and disperses by seed elsewhere, but in Canada is known to reproduce and disperse only through vegetative growth and fragmentation of the creeping stems. Roots are present on all but the most recently produced nodes, so survival of small fragments is possible. In Canada, ice movement is likely a significant cause of fragmentation. “Mature individuals” are thus single stem segments having sufficient roots to survive if severed from the parent plant. Number of leaves is a good metric for “individuals”, assuming each internode has the potential to be a fragment.

Plants flower from late July into September in Canada. Flowering is initiated only in low water and occurs on a very low proportion of nodes; large patches can be completely infertile. Insect pollination is undescribed but likely important outside Canada. Individual stem segments are reported as mostly not exceeding 1.5 years of age in Canada and under optimal conditions growth can be very rapid. Subpopulation size can fluctuate substantially (though under one order of magnitude) with water levels.

Population Sizes and Trends

The Canadian population is estimated in the hundreds of thousands of individuals, with fluctuation between 121,000 and 498,000 (mean 289,000) at Kejimkujik National Park estimated in 2004 to 2012 surveys. Numbers are unknown but likely of a similar order of magnitude at Wilsons Lake and are in the lower thousands (perhaps 10,000 to 20,000) at Springhaven Duck Lake. Populations appear to have been stable since the previous status report, based on annual surveys from 2004 to 2012 at Kejimkujik National Park, repeated comprehensive shoreline surveys at Wilsons Lake, and absence of observed disturbance at Springhaven Duck Lake. Future shoreline development at Wilsons Lake is likely but development impacts are likely to remain small unless future development is of a different nature than existing development.

Threats and Limiting Factors

Eutrophication associated with mink farm waste is a potential future threat at Wilsons Lake and Kejimkujik National Park, where new farms could be built upstream. The mink industry is large and expanding in southern Nova Scotia and mink farms have the potential to affect entire river systems. Despite Water Pennywort's tolerance of eutrophication in southern areas, eutrophication-induced increases in competition from more common, less stress-tolerant plants would likely threaten Canadian occurrences.

Shoreline development is an ongoing threat only at Wilsons Lake, where 87% of occupied habitat is adjacent to private land. About 40% of occupied shoreline abuts 19 developed and 12 undeveloped cottage lots, and 47% abuts two large private properties with no cottage development, but with a recently completed access road suggesting potential for future development. No new building has occurred in occupied areas on Wilsons Lake over the past decade and numbers within developed areas have appeared stable over that period. New development is likely to have at least some impact on numbers.

A small dam just downstream from Springhaven Duck Lake may be raising lake water levels and reducing Water Pennywort numbers and vigour. Off-highway vehicle impacts are also occurring at Wilsons Lake, where habitat damage was liberally estimated at less than 9% in 2011.

Protection, Status, and Ranks

Water Pennywort is listed as Threatened in Canada by COSEWIC and under Schedule 1 of the *Species at Risk Act* and Endangered in Nova Scotia under the *Nova Scotia Endangered Species Act*. It is Endangered with protection under state law in Connecticut and Ohio. Water Pennywort is Critically Imperilled (N1) in Canada and Nova Scotia (S1) and is At Risk in Nova Scotia and Canada. It is globally secure (G5), nationally secure in the United States (N5), and is SH (Possibly extirpated) in Pennsylvania, S1 (Critically Imperilled) in Connecticut and Ohio, and S3 (Vulnerable) in New York. ■

Western Bumble Bee – *occidentalis* and *mckayi* subspecies

Photo: © Rehanon Pampell

Western Bumble Bee *mckayi* subspecies

Scientific name
Bombus occidentalis occidentalis
Bombus occidentalis mckayi

Taxon
Arthropods

COSEWIC Status
occidentalis subspecies: Threatened
mckayi subspecies: Special Concern

Canadian range
occidentalis subspecies: British Columbia, Alberta, Saskatchewan
mckayi subspecies: Yukon, Northwest Territories, British Columbia

Reason for designation

The *occidentalis* subspecies:

This bumble bee ranges in Canada from British Columbia (south of approximately 55-57ºN), through southern Alberta east to southern Saskatchewan. Approximately 30-40% of its global range is in Canada. Once considered one of the most common and widespread bumble bees in western Canada, this subspecies has experienced a significant (> 30%) decline in recent years and has been lost from a number of sites in the southern portions of its range where it was once abundant. It has among the highest parasite loads (particularly the microsporidian *Nosema bombi*) of any bumble bee in North America. Ongoing threats to the species, particularly within the southern portions of its range, include pathogen spillover from commercially managed bumble bee colonies, increasingly intensive agricultural and other land use practices, pesticide use (including neonicotinoid compounds), and habitat change.

The *mckayi* subspecies:

This subspecies ranges in Canada from northern British Columbia (north of approximately 55-57ºN) through southern Yukon and westernmost Northwest Territories; at least 50% of its global range is in Canada. Recent surveys in northwestern Canada and Alaska suggest that it is still common. However, the southern subspecies of the Western Bumble Bee is experiencing a serious, apparently northward-moving decline, and because the causes of this decline are unknown, the northern subspecies faces an uncertain future. Recent studies in Alaska suggest that this subspecies has among the highest parasite loads (particularly the microsporidian *Nosema bombi*) of any bumble bee species in North America. Other potential threats include the unknown transmission of disease from exotic bumble bee species introduced for pollination in greenhouses (ongoing in the Yukon), pesticide use (including neonicotinoid compounds), and habitat change.

Wildlife Species Description and Significance

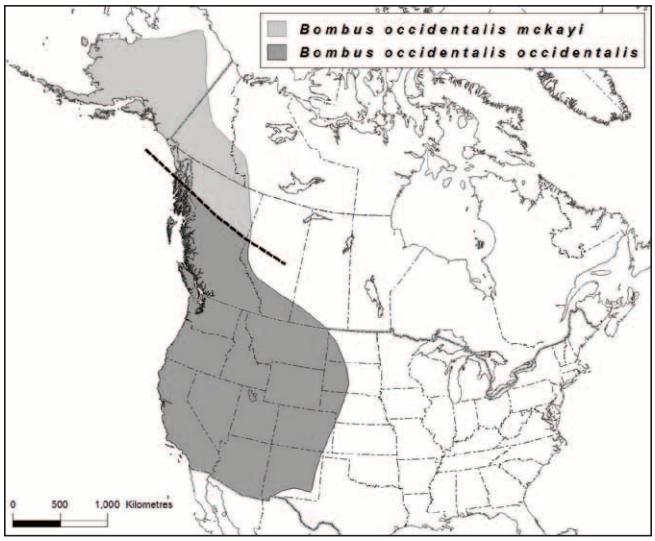
Western Bumble Bee, *Bombus occidentalis* Greene, is one of five North American members of the subgenus *Bombus sensu stricto*. It is a medium-sized (1–2 cm) bumble bee with a short head. The abdomen is colour variable, but all individuals have a transverse band of yellow hair on the thorax in front of the wing bases, and the tip of the abdomen is almost always white.

Bumble bee taxonomy is widely debated, including the taxonomic history of Western Bumble Bee. The species was once considered synonymous with Yellow-banded Bumble Bee; however, recent genetic work confirms these two species as separate. Additional recent taxonomic work further splits Western Bumble Bee into two separate subspecies: *Bombus occidentalis occidentalis* and *Bombus occidentalis mckayi*, based on genetic, morphological and distributional information.

Distribution

Western Bumble Bee ranges throughout most of western North America. Subspecies *occidentalis*

ranges from central California north to northern British Columbia, and east into southern Saskatchewan and South Dakota. Subspecies *mckayi* ranges from central-northern British Columbia northward into the Yukon, Northwest Territories and Alaska.



Global range map of the Western Bumble Bee showing the distribution of both subspecies; *B. o. occidentalis* (below line) and *B. o. mckayi* (above line).

Source: COSEWIC. 2014. COSEWIC assessment and status report on the Western Bumble Bee, *occidentalis* subspecies and the *mckayi* subspecies in Canada.

Habitat

Western Bumble Bee lives in a diverse range of habitats, including mixed woodlands, farmlands, urban areas, montane meadows and into the western edge of the prairie grasslands. Subspecies *mckayi* is seemingly restricted to the Boreal and Cordilleran Ecological Areas. Western Bumble Bee has been recorded gathering pollen and nectar from the flowers of a variety of plant genera. Like many bumble bees, it typically nests underground in abandoned rodent burrows or within hollows in decaying wood.

Biology

Western Bumble Bee has an annual life cycle. Mated queens (colony founders) emerge from wintering sites in the spring and search for potential nest sites. Once a nest site is chosen, the queen then forages for pollen and nectar, returning to the nest site to lay eggs which will eventually produce a brood of workers. Workers emerge and take over nest care, pollen and nectar foraging. In late summer, males and new queens are produced. These reproductive individuals leave the colony, mate, and only the mated queens enter hibernation while all other castes, including the old queen, perish at the onset of colder temperatures.

Population Sizes and Trends

Subspecies *occidentalis* continues to be recorded throughout most of its historical range in Canada, although at fewer sites and with lesser abundance: relative abundance data within the past ten years suggests a probable decline of more than 30%. In the regions in Canada where subspecies *occidentalis* has been most studied (i.e., southern BC and AB), significant declines in relative abundance have occurred at all surveyed sites within the last three decades. Subspecies *mckayi* is more commonly observed, and with a constant abundance, although there is little historical data for this subspecies from which to derive trends.

Threats and Limiting Factors

Possible threats to subspecies *occidentalis* may include the transfer of pathogens from managed bees used for greenhouse pollination that have escaped. Additional regional threats include agricultural pesticide and chemical use, and habitat loss.

Photo: © Cory S. Sheffield

Western Bumble Bee *occidentalis* subspecies

Protection, Status, and Ranks

There is currently no legal protection in Canada for either subspecies of Western Bumble Bee. All members of subgenus *Bombus* appear to be globally declining. ■

Western Grebe

Photo: © Nicholas Laporte

Western Grebe

Scientific name
Aechmophorus occidentalis

Taxon
Birds

COSEWIC Status
Special Concern

Canadian range
British Columbia, Alberta, Saskatchewan, Manitoba

Reason for designation

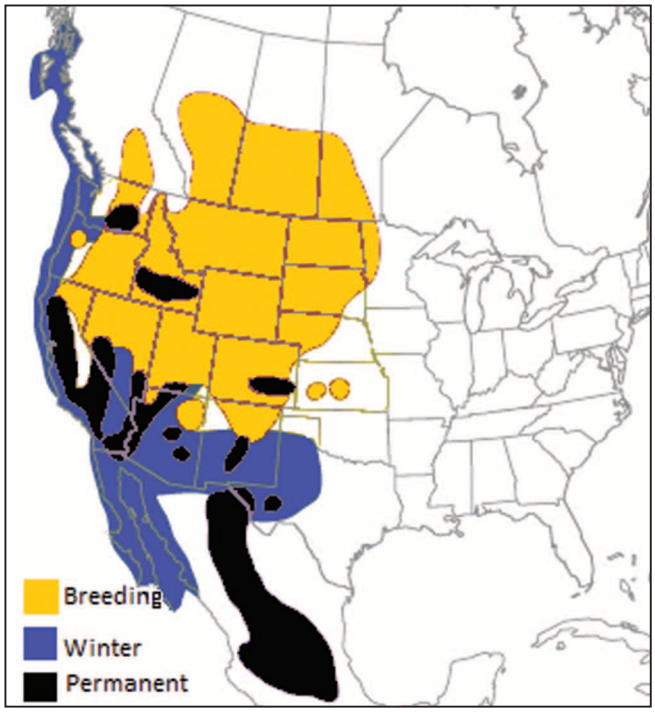
Although population declines have occurred within this waterbird's Canadian wintering area on the Pacific coast, this could largely be the result of a southern shift in wintering distribution rather than a true loss in population size. Nevertheless, on a continental scale, wintering populations have undergone a 44% decline from 1995 to 2010 based on Christmas Bird Count data. Some of this decline may also be the result of declines on the Canadian breeding grounds. In addition, this species' propensity to congregate in large groups, both in breeding colonies and on its wintering areas, makes its population susceptible to a variety of threats, including oil spills, water level fluctuations, fisheries bycatch, and declines in prey availability.

Wildlife Species Description and Significance

The Western Grebe is a large and conspicuous waterbird. Adapted for an aquatic lifestyle, with lobed feet set well back on a streamlined body, Western Grebes are powerful swimmers but awkward on land. Their white throat, breast and belly contrast with the black and grey plumage of their crown, neck, back and wings. They have bright red eyes and a long, pointed yellowish-green bill. The Western Grebe has been suggested as a bioindicator for wetland ecosystems.

Distribution

The Western Grebe breeds in British Columbia, Alberta, Saskatchewan, Manitoba, and throughout the western United States. It is a colonial breeder, with an uneven and clustered breeding distribution. It winters mainly in coastal areas from southern Alaska to Mexico, and on inland lakes, particularly in the southern portion of its range. Large numbers formerly occurred in the Salish Sea (Strait of Georgia, Juan de Fuca Strait, and Puget Sound), but in recent years the wintering distribution has apparently shifted southward to California.



Global range of the Western Grebe.

Source: COSEWIC. 2014. COSEWIC assessment and status report on the Western Grebe in Canada

Habitat

Western Grebes nest on marshes and lakes with stands of emergent vegetation, stable water levels, extensive areas of open water, and sufficient populations of prey fish. During migration, they stop mainly on large lakes, but sometimes also use sloughs and river backwaters. On their coastal wintering grounds, they are generally found in sheltered salt or brackish water, in bays, inlets, estuaries, lagoons, and channels.

Biology

The Western Grebe is the most gregarious species of North American grebe; wintering flocks of over 10,000 individuals have been observed and nesting colonies can contain thousands of pairs. It engages in complex courtship rituals and is seasonally monogamous. Pairs build a nest together, which they defend aggressively, and they alternate incubation duties. The downy young leave the nest immediately after hatching and are then brooded on their parents' backs. Western Grebes are mainly piscivorous and both parents feed the young, until they are independent at about 8-10 weeks of age. They usually produce one clutch per year. Typical clutches contain 1-4 eggs and annual productivity ranges from 0.39 to 0.88 young per breeding adult.

Population Sizes and Trends

The Western Grebe is a challenging species to monitor, and survey efforts at breeding colonies have been intermittent, and thus it is difficult to accurately estimate breeding numbers or trends in abundance. The North American breeding population of Western Grebes is estimated to be ~100,000 mature individuals, including at least 20,500 in Canada. Colony sizes range from a few individuals to over 5000 birds. Most of the Canadian breeding population is concentrated in 12 colonies in Alberta and Manitoba, with ~25% breeding at a single colony in Manitoba.

Although the Christmas Bird Count is not a particularly robust method for surveying this species, results for the 15-year period from 1995-2010 suggest that the continental population declined by 44%, while numbers wintering in Canada have apparently declined by 87%. Reduction in the Canadian wintering population may represent a shift in geographic distribution of wintering birds rather than a true loss in the overall population size.

Threats and Limiting Factors

On breeding areas, the primary threats to Western Grebes are human disturbance of colonies (e.g., by powerboats and personal watercraft) and habitat degradation (especially destruction of emergent vegetation). Their breeding success and survival can also be negatively impacted by fluctuations in water levels during nesting, disturbance leading to predation on eggs, introduction of non-native fish, recreational and commercial fisheries, declines in prey availability (e.g., due to winterkill of fish), and chemical pollution and contaminants. On coastal wintering areas, oil spills are a major threat. Additional threats in coastal areas include low-volume chronic oil pollution, other chemical pollution and contaminants, harmful algal blooms, bycatch in gillnet fisheries, mortality in derelict fishing gear, changes in prey availability and/or abundance, and possible increases in predation by Bald Eagles.

Protection, Status, and Ranks

Of former and current breeding colonies, 40 are on lakes adjoining or within provincially protected areas and two are in federal Migratory Bird Sanctuaries/National Wildlife Areas. Most of the land surrounding lakes with Western Grebe colonies is privately owned. Western Grebes are protected in Canada under the *Migratory Birds Convention Act*. In British Columbia, they are on the Red List, and in Alberta they are listed as Sensitive and a Species of Special Concern. In Saskatchewan and Manitoba, they are not provincially listed as species at risk. On the IUCN Red List they are ranked as Least Concern, their NatureServe status is Globally Secure, and they are ranked nationally as Secure by the National General Status Program. The Northern Prairie and Parkland Waterbird Conservation Plan lists the Western Grebe as a species of High Concern. Likewise, the species is assigned a high conservation priority in Canada's Waterbird Conservation Plan, and is ranked as high concern in the Waterbird Conservation Plan for the Northern Prairie and Parkland region. ■

Western Waterfan

Photo: © David Richardson

Western Waterfan

Scientific name
Peltigera gowardii

Taxon
Lichens

COSEWIC Status
Special Concern

Canadian range
British Columbia

Reason for designation

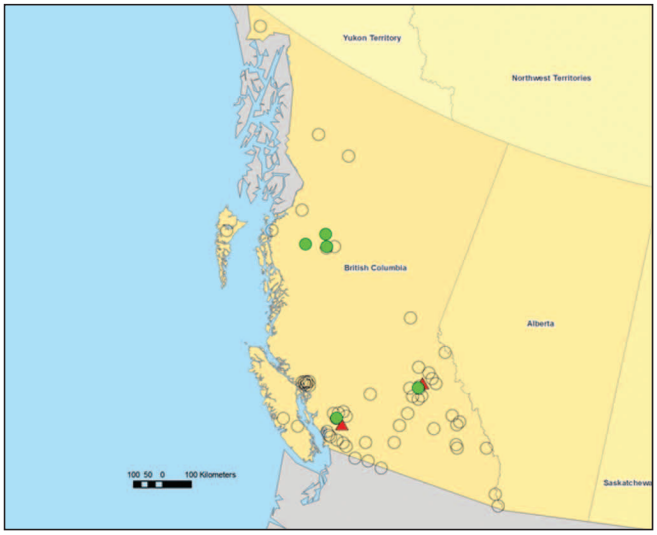
This lichen is endemic to western North America. There are only five known occurrences in Canada, all in British Columbia, and two former occurrences appear to be extirpated. This lichen is unique in growing at or below water level in clear, permanent, unshaded alpine or subalpine streams. Habitat loss is likely to result from temperature increases caused by climate change. Because of that change, larger plant species currently below the subalpine zone will be able to grow at higher elevations. Subalpine meadows are therefore predicted to become increasingly colonized by shading vegetation. Also, increasing drought will transform permanent watercourses into ephemeral streams.

Wildlife Species Description and Significance

The Western Waterfan is a leafy lichen that forms semi-erect, small rosettes that are attached to rocks by holdfasts. The lichen is olive-black and jelly-like when wet but slate gray to black and crisp when dry. The upper surface is smooth and dull, and the lower surface similar except for the presence of distinct pale veins. There are no vegetative propagules. The fruit bodies of this lichen are reddish-brown and contain sacks of colourless, elongate, ascospores. The photosynthetic partner is a cyanobacterium. The Western Waterfan is one of very few leafy lichens that can grow at or below water level.

Distribution

The Western Waterfan is only found in western North America, occurring from northern Washington to Alaska. In Canada, the Western Waterfan is restricted to British Columbia and has been found near the towns of Clearwater, Smithers, Terrace and Whistler. The best estimate from the 2011 surveys in Canada is that there are currently five locations for Western Waterfan. Recent surveys indicate that two additional occurrences – one near Fight Lake, Clearwater, and one near Garibaldi Lake, Whistler – are extirpated.



Distribution of the Western Waterfan in Canada. Green dots show occurrences where the lichen has been found. Open black circles show areas searched unsuccessfully since 1970. The red triangles are occurrences with known historical records of this lichen that were not relocated during the 2011 field surveys.

Source: COSEWIC. 2013. COSEWIC assessment and status report on the Western Waterfan in Canada.

Habitat

The Western Waterfan is found growing at or below water level, in spring-fed streams, in open subalpine and sometimes alpine meadows, above about 1200 m

elevation a.s.l. The streams are usually one metre or less across with flowing, cool, silt-free water of neutral pH and conductivity near 8 µS/cm.

Biology

Fruit bodies are common in the Western Waterfan. It is suspected that when thalli are at or above water level, the fungal spores are shot into the air. If they land on a rock in a stream with appropriate water quality, they germinate and are attracted to nearby compatible cyanobacteria, which become enveloped by the fungal strands and eventually grow into a visible lichen. The generation time for lichens varies from ten years in rapidly colonizing lichens, to more than 17 years for old-growth forest species.

Western Waterfan produces no specialized vegetative propagules, but it is likely that asexual reproduction and dispersal are achieved when small pieces of lichen break off and become attached downstream. The cyanobacteria within the lichen provide the fungus with carbohydrates and are also able to fix atmospheric nitrogen.

Population Sizes and Trends

Historical records of the Western Waterfan have not included estimates of the numbers of mature plants at each site. Abundance varies greatly among locations; in some there are only a few thalli (colonies), while in others the lichen colonizes almost every stone in a stream. In the latter case, colonies are difficult to count, because adjacent individuals often overlap. The Canadian population estimate in 2011 was in the range of 727-1,000 mature individuals, and even allowing for the possibility of a further discovery, it seems unlikely that the total population of this lichen in Canada will exceed 2,000 mature individuals (colonies). However, there is not enough documentation over a long enough time period to make an accurate evaluation.

Threats and Limiting Factors

The main threat to the Western Waterfan is climate change, especially in the interior mountain ranges of B.C. By 2050, summer temperatures are expected to rise by 3-4°C, and summer moisture deficit is also expected to increase. The combined impact of these changes will be severe at all elevations. For subalpine snowmelt-fed streams that support the Western Waterfan, widespread conversion of permanent watercourses to ephemeral streams is anticipated. This and the rising tree line will dramatically restructure all alpine communities. For a rare species like the Western Waterfan, widespread contraction of available habitat could have severe consequences. In addition, in coastal B.C. the winters are likely to become shorter and wetter, while the summer season will be longer and drier. There may be a decline in snowpack with more freeze-thaw events, resulting in denser snow with more crusts and icy layers. Again, such changes could adversely affect Western Waterfan populations.

The second most important factor affecting the Western Waterfan is human disturbance. Mountain roads, often developed to allow tourists to visit subalpine areas, can concentrate water flow and divert natural water drainage systems. At higher elevations, path building / use (pedestrian, ski, ATV, snowmobile) and culvert installation threaten Western Waterfan habitat by changing water flows and increasing sediment loads.

Protection, Status, and Ranks

In Canada, the Western Waterfan is listed by NatureServe (2013), as S1S2 for British Columbia, where it is deemed vulnerable to trail development (B.C. CDC). The global status of the Western Waterfan is designated as G4 or 'Apparently Secure' (NatureServe 2013). In the USA, the state-level rankings range from S1 (critically imperiled) in Montana and Alaska, to S2 (imperiled) in Washington and S3 (vulnerable) in California; there is no ranking for Oregon.

Only the population on Trophy Mountain in Wells Gray Provincial Park and those in the Black Tusk area in Garibaldi Park are afforded some measure of protection because they are in provincial parks. The others are on Crown land and so not protected by designation or by legislation. ■

Wolverine

Photo: © Rollin Verlinde

Scientific name
Gulo gulo

Taxon
Mammals

COSEWIC Status
Special Concern

Canadian range
Yukon, Northwest Territories, Nunavut, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, Newfoundland and Labrador

Reason for designation

This wide-ranging carnivore has an estimated Canadian population likely exceeding 10,000 mature individuals. Although population increases appear to be occurring in portions of the Northwest Territories, Nunavut, Manitoba and Ontario, declines have been reported in the southern part of the range, e.g. in British Columbia, and populations in a large part of the range (Quebec and Labrador) have not recovered. The species may be extirpated from Vancouver Island. Population estimates are very limited, and trends are not known. Most data are limited to harvest records, and harvest levels may be under-reported because many pelts used domestically are not included in official statistics. There is no evidence, however, of a decline in harvest over the last 3 generations. This species' habitat is increasingly fragmented by industrial activity, especially in the southern part of its range, and increased motorized access increases harvest pressure. Climate change is likely impacting animals in the southern part of the range, and this impact is expected to increase northward. The species has a low reproductive rate, is sensitive to human disturbance, and requires vast secure areas to maintain viable populations.

Wildlife Species Description and Significance

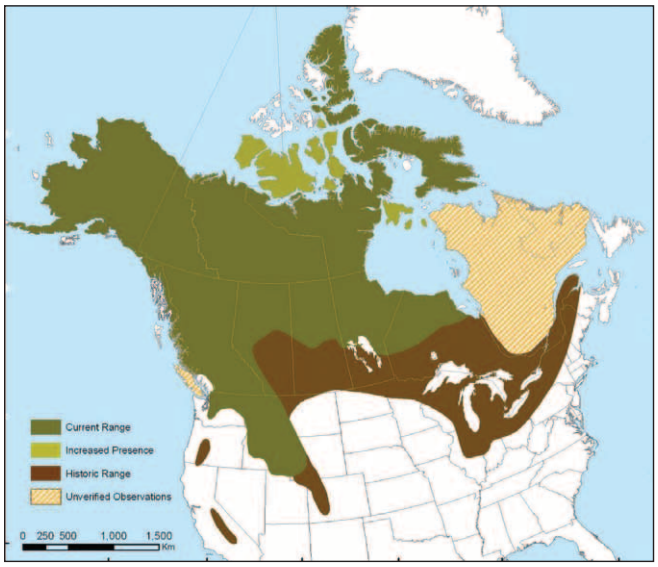
Wolverines are a stocky, medium-sized carnivore and the largest terrestrial member of the weasel family. They have long, glossy coarse fur, which varies from brown to black, often with a pale facial mask and stripes running laterally from the shoulders, crossing just above the tail. The skull structure is robust, allowing it to crush and consume bones and frozen carcasses. Adult males weigh 13 to 18 kg and adult females weigh 7.5 to 12.5 kg.

A single subspecies, *Gulo gulo luscus*, ranges across most of Canada. Further studies are required to determine if the Vancouver Island population is a separate subspecies, *G. gulo vancouverensis*. A single designatable unit is recognized for the Canadian population.

Wolverines may indicate ecosystem health, given their dependence on extensive connected ecosystems that support ungulates and large carnivores which create opportunities for scavenging. They are a valuable furbearer in the fur trade, and many furs that do not enter the fur trade are used locally, especially in the Arctic, where its frost-resistant fur is used for parka trim.

Distribution

Wolverines are found across northern Eurasia and North America. In Canada, they are found in northern and western forested areas, in alpine tundra of the western mountains, and in arctic tundra. It is not known whether Wolverines currently occupy Vancouver Island, Québec, or Labrador. Range reductions began in the 19th century, and subpopulations were extirpated from New Brunswick, southern Ontario, and from the aspen parkland of Manitoba, Saskatchewan and Alberta.



North American distribution of Wolverine.

Source: COSEWIC. 2014. COSEWIC assessment and status report on the Wolverine in Canada.

Habitat

A wide variety of forested and tundra vegetation associations are used by Wolverines. Habitats must have an adequate year-round supply of food, mainly consisting of smaller prey such as rodents and Snowshoe Hares, and the carcasses of large ungulates, like Moose, Caribou, and Muskox. Females den under snow-covered rocks, logs or within snow tunnels. Wolverines reproduce in areas where snow cover persists at least into April.

Biology

Most females breed after they are 2 or 3 years of age and produce on average 2 kits per litter. Wolverine home ranges are 50-400 km^2 for females (smallest during denning periods) and 230-1580 km^2 for males. Home ranges may overlap within and between sexes but home ranges of reproductive females do not overlap. Home range size in the eastern range is unknown. Wolverine densities are low and range from about 5 to 10/1,000 km^2. Wolverines are scavengers and predators, often caching food for future use. Wolverines face mortality from predation and starvation. Anthropogenic sources of mortality include trapping, hunting, and road kill.

Population Sizes and Trends

Confidence regarding population size and trend is debated because most population data are derived from harvest records and the proportion of unreported harvest varies across their range. The Canadian population size is unknown but likely > 10,000 adults. Wolverine have been extirpated (or likely extirpated) in much of southern and eastern Canada. Wolverine observations continue to be reported in the range of the eastern sub-population (Québec and Labrador), but no observation has been verified since 1978. The last verified record on Vancouver Island was in 1991 and it is likely that they have been extirpated. There is concern that decline may be occurring in BC and parts of Alberta where Southern and Central Mountain Caribou, their primary prey, continue to decline and habitats are fragmented. Field studies since 2003 suggest Wolverines are more abundant in parts of the Northwest Territories (NWT) and Nunavut than previously thought. The sub-population in the NWT barren ground region may be decreasing while recent records in western Arctic islands suggest population increase, although it is unknown if these are resident or transient animals. Population trends are unknown, but based on numerous sources such as field studies, ATK, and trapper surveys, they are believed to have been stable over parts of the northern range for the last 3 generations (22.5 years). Wolverines in northern Manitoba and Ontario may be increasing; aerial surveys in northern Ontario have shown an eastward range reoccupation towards James Bay and Québec.

Threats and Limiting Factors

The variability in trap effort, the uncertainty on actual harvest levels in some jurisdictions, and increased access and efficiency of hunting using snowmobiles raises concerns over potential overharvest and the ability to document population size and trends. Transportation corridors, forestry, hydroelectric developments, oil and gas and mineral exploration and development increase access for harvest and contribute to permanent, temporary or functional habitat losses (sensitivity to disturbance), which may destabilize populations.

The decline in Caribou as a source of scavenged meat, particularly in Québec and Labrador where few Wolverines may persist, may limit population recovery. Other factors that may limit populations include harvest, disturbance of denning areas, threats to habitats, and population fluctuations in Wolves and other carnivores that provide scavenging opportunities. The Threats Calculator calculated an overall threat impact of medium.

Protection, Status, and Ranks

This species was assessed as Endangered by COSEWIC in 2003 and is listed on Schedule 1 of the *Species at Risk Act* (SARA). The Western Population (labelled western sub-population in this report) was assessed as Special Concern by COSEWIC in 2003, but was not listed under SARA due to concerns expressed by the Nunavut Wildlife Management Board. Provincial designations are Endangered in Labrador, and Threatened in Ontario and Québec (note: 'Threatened' is equivalent to Endangered in Québec). Remaining provincial designations range from no ranking to Sensitive or Special Concern. NatureServe (2013) rankings are Critically Imperilled (S1) in Québec and Newfoundland and Labrador, and Imperilled (S2) in Ontario. The Vancouver Island population is Imperilled. Wolverines are protected from non-Aboriginal harvest in Québec, Newfoundland and Labrador, and Ontario, although unreported harvest may be occurring. Aboriginal harvest would be in the northern part of the range (i.e., James Bay and Northern Québec Agreement area). Wolverines are trapped and hunted in most other areas of their confirmed range.

Habitat Protection and Ownership

Numerous protected areas exist within the Wolverine's range but refugia larger than 20,000 km^2 may be required to maintain a Wolverine population. Many northern national, provincial and territorial parks allow trapping. In southern parks, population recovery may be impacted by road developments that can act as barriers to movements, and activities such as skiing and snowmobiling that may disturb denning females. ■

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Species by Scientific Name

Species by Province and Territory of Occurrence

Quebec

Saskatchewan

Yukon

GLOSSARY

Aquatic species: A wildlife species that is a fish as defined in section 2 of the *Fisheries Act* or a marine plant as defined in section 47 of the Act. The term includes marine mammals.

Canada Gazette: The *Canada Gazette* is one of the vehicles that Canadians can use to access laws and regulations. It has been the "official newspaper" of the Government of Canada since 1841. Government departments and agencies as well as the private sector are required by law to publish certain information in the *Canada Gazette*. Notices and proposed regulations are published in the *Canada Gazette*, Part I, and official regulations are published in the *Canada Gazette*, Part II. For more information, please visit **canadagazette.gc.ca**.

Canadian Endangered Species Conservation Council: The Council is made up of federal, provincial and territorial ministers with responsibilities for wildlife species. The Council's mandate is to provide national leadership and coordination for the protection of species at risk.

COSEWIC: The Committee on the Status of Endangered Wildlife in Canada. The Committee comprises experts on wildlife species at risk. Their backgrounds are in the fields of biology, ecology, genetics, Aboriginal traditional knowledge and other relevant fields. These experts come from various communities, including, among others, government and academia.

COSEWIC assessment: COSEWIC's assessment or re-assessment of the status of a wildlife species, based on a status report on the species that COSEWIC either has had prepared or has received with an application.

Federal land: Any land owned by the federal government, the internal waters and territorial sea of Canada, and reserves and other land set apart for the use and benefit of a band under the *Indian Act*.

Governor in Council: The Governor General of Canada acting on the advice of the Queen's Privy Council for Canada, the formal executive body which gives legal effect to those decisions of Cabinet that are to have the force of law.

Individual: An individual of a wildlife species, whether living or dead, at any developmental stage, and includes larvae, embryos, eggs, sperm, seeds, pollen, spores and asexual propagules.

Order: Order in Council. An order issued by the Governor in Council, either on the basis of authority delegated by legislation or by virtue of the prerogative powers of the Crown.

Response statement: A document in which the Minister of the Environment indicates how he or she intends to respond to the COSEWIC assessment of a wildlife species. A response statement is posted on the Species at Risk Public Registry within 90 days of receipt of the assessment by the Minister, and provides timelines for action to the extent possible.

RIAS: Regulatory Impact Analysis Statement. A description of a regulatory proposal that provides an analysis of the expected impact of each regulatory initiative and accompanies an Order in Council.

Species at Risk Public Registry: Developed as an online service, the Species at Risk Public Registry has been accessible to the public since proclamation of the *Species at Risk Act* (SARA). The website gives users easy access to documents and information related to SARA at any time and location with Internet access. It can be found at **www.registrelep-sararegistry.gc.ca**.

Schedule 1: A schedule of SARA; also known as the List of Wildlife Species at Risk, the list of the species protected under SARA.

Up-listing: A revision of the status of a species on Schedule 1 to a status of higher risk. A revision of the status of a Schedule 1 species to a lower risk status would be down-listing.

Wildlife Management Board: Established under the land claims agreements in northern Quebec, Yukon, Northwest Territories, British Columbia and Nunavut, Wildlife Management Boards are the "main instruments of wildlife management" within their settlement areas. In this role, Wildlife Management Boards not only establish, modify and remove levels of total allowable harvest of a variety of wildlife species, but also participate in research activities, including annual harvest studies, and approve the designation of species at risk in their settlement areas.

Wildlife species: Under SARA, a species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus. To be eligible for inclusion under SARA, a wildlife species must be wild by nature and native to Canada. Non-native species that have been here for 50 years or more can be considered eligible if they came without human intervention.

www.**ec.gc.ca**

Additional information can be obtained at:

Environment Canada
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10 Wellington Street, 23rd Floor
Gatineau QC K1A 0H3
Telephone: 1-800-668-6767 (in Canada only) or 819-997-2800
Fax: 819-994-1412
TTY: 819-994-0736
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