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

Terrestrial Species

November 2010



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Please submit your comments by

February 4, 2011, for terrestrial species undergoing **normal** consultations

and by

February 4, 2012, for terrestrial species undergoing **extended** consultations.

For a description of the consultation paths these species will undergo, please see www.registrelep-sararegistry.gc.ca/sar/listing/table_1210_e.cfm.

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. Endangered or Threatened species on Schedule 1 benefit from the protection of SARA's prohibitions and recovery planning. Special Concern species benefit from its management planning. Schedule 1 has grown from the original 233 to 470 wildlife species at risk.

The complete list of species currently on Schedule 1 can be viewed at:

www.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 Cabinet 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-government 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 September 3, 2010, 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 and 2.

Terrestrial and aquatic species eligible for Schedule 1 amendments

The Minister of Fisheries and Oceans is conducting 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 51% of the recent assessments for terrestrial species at risk occur in national parks or other lands administered by Parks Canada; Parks Canada shares responsibility for these species with Environment Canada.

Public 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 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 impacts of listing, and they are then used to draft the Minister's proposed listing recommendations for each of these species. To ensure that your comments are considered early in the process, they should be submitted before the following deadlines.

For terrestrial species undergoing normal consultations, comments should be submitted by **February 4, 2011**.

For terrestrial species undergoing extended consultations, comments should be submitted by **February 4, 2012**.

To find out which consultation paths these species will undergo (extended or normal), please see www.registrelep-sararegistry.gc.ca/sar/listing/table_1210_e.cfm.

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

Please email your comments to the SARA 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

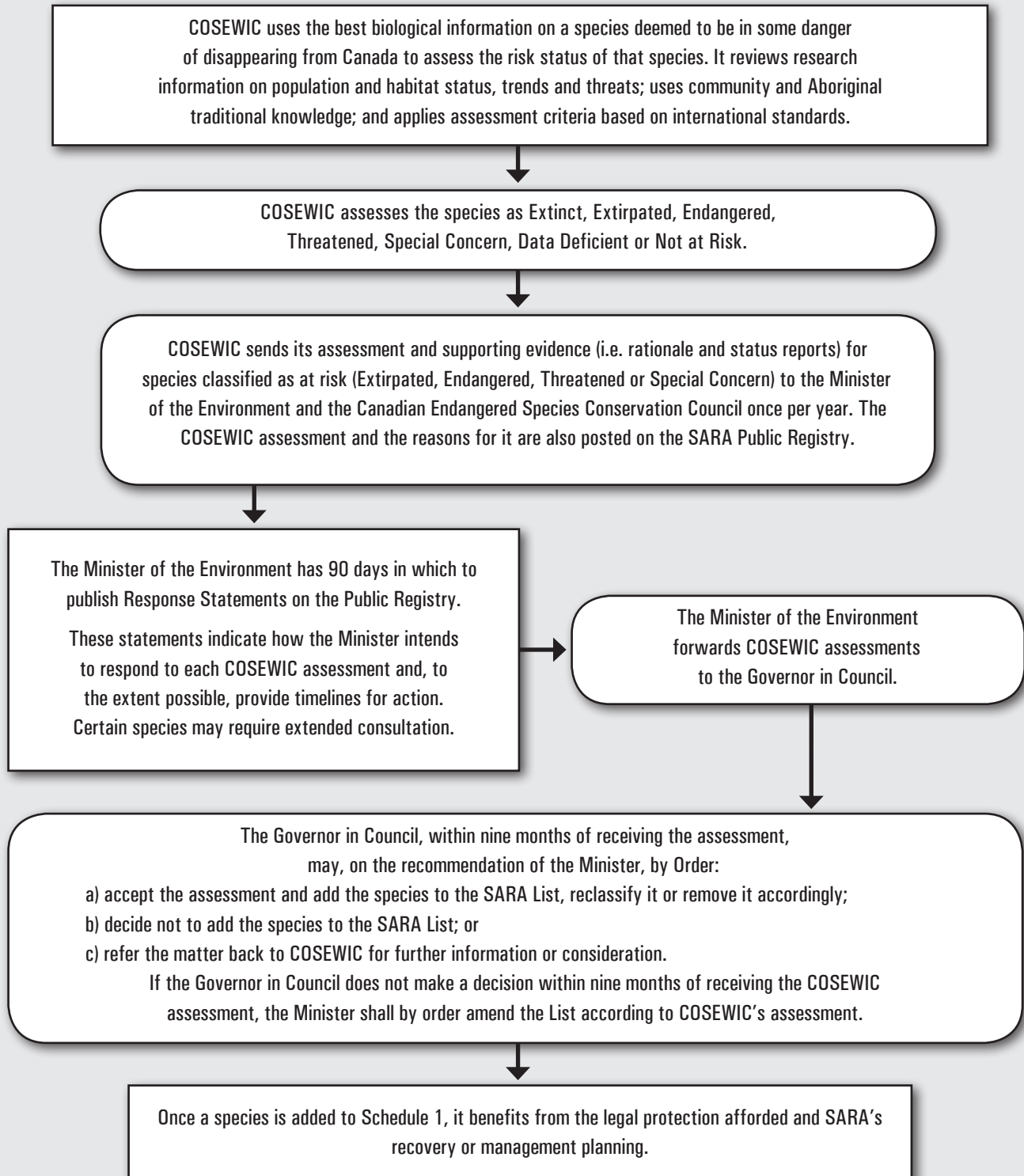
When COSEWIC assesses a wildlife species, it does so solely on the basis of the best available information relevant to the biological status of the species. COSEWIC then submits the assessment to the Minister of the Environment, who considers it when making the listing recommendation to the Governor 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 value that is placed on biodiversity.

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

The comments collected during the consultations are used to inform the Minister's recommendations to the Governor in Council for listing species at risk. The Minister must recommend one of three courses

Figure 1: The species listing process under SARA

SARA separates the scientific assessment process from the listing decision. This approach ensures that scientists can provide fully independent recommendations, and that decisions affecting Canadians are made by elected officials who can be held accountable for those decisions.



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 SARA 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 take about three months to complete, while extended consultations usually take fifteen months.

The extent of consultations needs to be proportional both to the expected impact of a listing decision or the time that may be required to consult appropriately. Under some circumstances, the Schedule 1 listing of a species 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 be provided with the opportunity to express their opinions and share ideas on how best to approach the protection and recovery of 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 December 2, 2010, on the SARA Public Registry at:

www.registrelep-sararegistry.gc.ca/sar/listing/table_1210_e.cfm

No consultations will be undertaken for species listed in Table 2, as for these species no change is being proposed.

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, to decide who should be consulted directly, the type of species, its proposed conservation status, and where it is found are taken into consideration. The first priority is then placed on engaging those who may be affected by the impacts of the automatic protections.

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.

So that it can be accessed by Aboriginal Peoples and all Canadians, this document is distributed to known stakeholders and posted on the SARA Public Registry; however, more extensive consultations may also be done through regional or community meetings or through a more targeted approach.

Environment Canada will also send 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, Environment Canada is not in a position to examine the potential impacts of recovery actions when species are being considered for listing. The reason is that recovery actions for terrestrial species are not usually automatic upon listing; in fact, usually these actions are not yet defined, so their impact cannot be fully understood. Once they are defined, efforts are made to minimize adverse social and economic impacts of listing and maximize the benefits. SARA requires 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 includes consideration of information from 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 SARA Public Registry. If the Governor in Council has decided 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 includes migratory birds, as defined by the *Migratory Birds Convention Act, 1994*, and aquatic species. 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.

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, or to damage or destroy the residence of one or more individuals of an Endangered or Threatened species. 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 SARA's protections 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 agreed 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 with the province or territory concerned before making such an order.

The Minister of the Environment or the Minister of Fisheries and Oceans may authorize exceptions to the prohibitions under SARA. These ministers 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 of the Environment or the Minister of Fisheries and Oceans must then include an explanation of why it was issued on the SARA Public Registry.

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.

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 is identified in a subsequent action plan.

Proposed recovery strategies for newly listed species are posted on the SARA 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 SARA's immediate protection 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 SARA Public Registry within three years of their 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.

THE LIST OF SPECIES PROPOSED FOR INCLUSION OR RECLASSIFICATION ON SCHEDULE 1

Status of the recently assessed species and consultation paths

In September 2010, COSEWIC submitted 36 assessments of species at risk to the Minister of the Environment for species that are newly eligible to be added to Schedule 1 of SARA. Eighteen of these are terrestrial species. COSEWIC also reviewed the classification of species already on Schedule 1, in some cases changing their status. Four terrestrial species are now being considered for down-listing on SARA (to a lower risk status) and three terrestrial species are now being considered for up-listing on SARA (to a higher risk status). In all, there are 25 terrestrial species that are eligible to be added to Schedule 1 or to have their current status on Schedule 1 changed (Table 1).

COSEWIC also submitted the reviews of species already on Schedule 1, confirming their classification. Twenty-two of these reviews were for terrestrial species. These species are not included in the consultations because there is no regulatory change being proposed (Table 2).

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 **February 4, 2011**.

Comments for terrestrial species undergoing extended consultations must be received by **February 4, 2012**.

Most species will be undergoing normal consultations. For the final consultation paths, please see:

www.registrelep-sararegistry.gc.ca/sar/listing/table_1210_e.cfm

after December 2, 2010.

For more details on submitting comments, see page 3, "Public 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
Newly Assessed Species (18)			
Endangered (13)			
Arthropods	Bert's Predaceous Diving Beetle	<i>Sanfilippodytes bertae</i>	AB
Arthropods	Bogbean Buckmoth	<i>Hemileuca</i> sp.	ON
Arthropods	Laura's Clubtail	<i>Stylurus laurae</i>	ON
Arthropods	Northern Barrens Tiger Beetle	<i>Cicindela patruela</i>	ON QC
Arthropods	Rusty-patched Bumble Bee	<i>Bombus affinis</i>	ON QC
Arthropods	Wallis' Dark Saltflat Tiger Beetle	<i>Cicindela parowana wallisi</i>	BC
Lichens	Pale-bellied Frost Lichen	<i>Physconia subpallida</i>	ON
Lichens	Vole Ears	<i>Erioderma mollissimum</i>	NB NS NL
Vascular Plants	Coast Manroot	<i>Marah oreganus</i>	BC
Vascular Plants	Four-leaved Milkweed	<i>Asclepias quadrifolia</i>	ON
Vascular Plants	Victoria's Owl-clover	<i>Castilleja victoriae</i>	BC
Vascular Plants	Virginia Mallow	<i>Sida hermaphrodita</i>	ON
Vascular Plants	Whitebark Pine	<i>Pinus albicaulis</i>	BC AB
Threatened (3)			
Birds	Bicknell's Thrush	<i>Catharus bicknelli</i>	QC NB NS
Birds	Bobolink	<i>Dolichonyx oryzivorus</i>	BC AB SK MB ON QC NB PE NS NL
Birds	Chestnut-collared Longspur	<i>Calcarius ornatus</i>	AB SK MB
Special Concern (2)			
Lichens	Oldgrowth Specklebelly Lichen	<i>Pseudocyphellaria rainierensis</i>	BC
Molluscs	Threaded Vertigo	<i>Nearctula</i> sp.	BC
Up-lists (3)			
from Special Concern to Threatened (1)			
Birds	Lewis's Woodpecker	<i>Melanerpes lewis</i>	BC
from Threatened to Endangered (2)			
Amphibians	Fowler's Toad	<i>Anaxyrus fowleri</i>	ON
Reptiles	Queensnake	<i>Regina septemvittata</i>	ON
Down-lists (4)			
from Threatened to Special Concern (3)			
Vascular Plants	Redroot	<i>Lachnanthes caroliniana</i>	NS
Vascular Plants	Tubercled Spike-rush	<i>Eleocharis tuberculosa</i>	NS
Vascular Plants	Western Blue Flag	<i>Iris missouriensis</i>	AB
from Endangered to Threatened (1)			
Mammals	Swift Fox	<i>Vulpes velox</i>	AB SK

Table 2: Terrestrial species recently reassessed by COSEWIC (species status confirmation)

Taxon	Species	Scientific name	Range
Status confirmation (22)			
Extirpated (4)			
Arthropods	Frosted Elfin	<i>Callophrys irus</i>	ON
Arthropods	Island Marble	<i>Euchloe ausonides insulanus</i>	BC
Arthropods	Karner Blue	<i>Lycaeides melissa samuelis</i>	ON
Birds	Greater Prairie-Chicken	<i>Tympanuchus cupido</i>	AB SK MB ON
Endangered (11)			
Birds	Acadian Flycatcher	<i>Empidonax virescens</i>	ON
Birds	Eskimo Curlew	<i>Numenius borealis</i>	YK NT NU AB SK MB ON QC NB PE NS NL
Birds	Mountain Plover	<i>Charadrius montanus</i>	AB SK
Birds	Whooping Crane	<i>Grus americana</i>	NT AB SK MB
Mosses	Rigid Apple Moss	<i>Bartramia stricta</i>	BC
Reptiles	Sharp-tailed Snake	<i>Contia tenuis</i>	BC
Vascular Plants	Cucumber Tree	<i>Magnolia acuminata</i>	ON
Vascular Plants	Eastern Mountain Avens	<i>Geum peckii</i>	NS
Vascular Plants	Eastern Prickly Pear Cactus	<i>Opuntia humifusa</i>	ON
Vascular Plants	Pink Milkwort	<i>Polygala incarnata</i>	ON
Vascular Plants	Virginia Goat's-rue	<i>Tephrosia virginiana</i>	ON
Threatened (2)			
Birds	Sprague's Pipit	<i>Anthus spragueii</i>	AB SK MB
Vascular Plants	Dense Blazing Star	<i>Liatris spicata</i>	ON
Special Concern (5)			
Amphibians	Great Plains Toad	<i>Anaxyrus cognatus</i>	AB SK MB
Arthropods	Monarch	<i>Danaus plexippus</i>	BC AB SK MB ON QC NB PE NS
Birds	Flammulated Owl	<i>Otus flammeolus</i>	BC
Birds	Savannah Sparrow <i>princeps</i> subspecies	<i>Passerculus sandwichensis princeps</i>	NS
Birds	Yellow Rail	<i>Coturnicops noveboracensis</i>	NT BC AB SK MB ON QC NB

THE COSEWIC SUMMARIES OF TERRESTRIAL SPECIES ELIGIBLE FOR 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 SARA Public Registry at:

www.sararegistry.gc.ca

or contact:

COSEWIC Secretariat
c/o Canadian Wildlife Service
Environment Canada
Ottawa, Ontario
K1A 0H3

Bert's Predaceous Diving Beetle

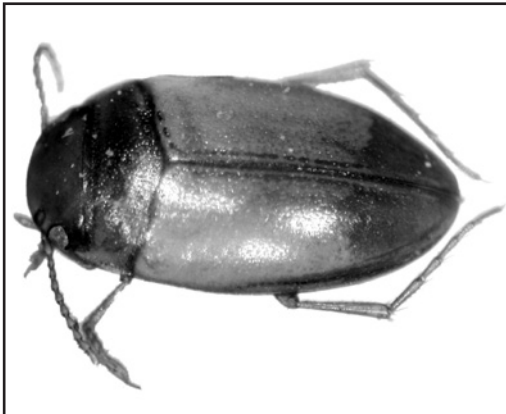


Photo: © Robert E. Roughley

Scientific name

Sanfilippodytes bertae

Taxon

Arthropods

COSEWIC Status

Endangered

Canadian Range

Alberta

Reason for Designation

Despite extensive searches, this Canadian endemic species is known from only two locations in southern Alberta, one of which has been destroyed. It is limited to springs and seepage areas along steep cliff edges

or river bends. Its habitat is declining due to trampling by livestock and lowering of the water table due to withdrawals for irrigation.

Species Information

Bert's Predaceous Diving Beetle (*Sanfilippodytes bertae*), Roughley and Larson 2000, Coleoptera: Dytiscidae) is described from the springs and seepages in the arid grasslands of southern Alberta. There are no known subspecies or forms. The adult appearance is typical of the genus except in elytral markings. Adult specimens are less than 3 mm in length, rather broadly oval in shape (length:width = 1.84 to 1.94). The head and pronotum are dark brown and the elytra are yellowish brown without yellowish spots or markings.

Distribution

The historical distribution of Bert's Predaceous Diving Beetle includes 2 and possibly 3 localities: 1) the northwest bank of the Oldman River immediately upstream of the Highway 2 crossing west of Fort MacLeod, Alberta; 2) Fort MacLeod itself; and 3) the newly discovered locality near Head-Smashed-In Buffalo Jump. Localities #1 and 2 may represent the same locality and therefore the same population; however, this remains unclear. The only record since 1984 and the only extant population is location 3.

Habitat

The habitat of Bert's Predaceous Diving Beetle is limited to springs and seepage areas in the watershed region of the Oldman River in southern Alberta. With respect to localities 1 and 2, a key element of the spring and seepage habitat was that it flowed out of the river banks at about the level of the high water (vernal flood) mark. Field surveys of springs and seeps in the region surrounding the first sampling locales recovered one specimen from the output point source of a spring near Head-Smashed-In Buffalo Jump. The habitat at this spring was characterized by a faint trickle of water exiting a crevice approximately half-way down a rocky cliff. The cliff dropped below the normal landscape of smooth hills with high winds and low vegetation by approximately 5 m. The spring exited the cliff wall approximately half way down the cliff face. The crevice where the spring exited the rock contained wet mosses and algae. Small undisturbed remnants of the above-described spring and seep habitat are very scarce in southern Alberta and many have been destroyed by cattle.

Biology

The life history characteristics of Bert's Predaceous Diving Beetle remain a mystery. All predaceous water beetle larvae and adults are predaceous, principally eating invertebrates, probably enchytraeid worms and aquatic larvae of flies (Diptera). There is no evidence to suggest that the life cycle is anything but annual and likely involves vernal breeding and oviposition with larval development during the summer, followed by a brief terrestrial pupation. The over-wintering stage is the adult. Dispersal is probably minimal (despite presence of fully formed flight wings).

Population sizes and trends

Extensive spring, summer and fall sampling efforts over a period of 18 days (approx. 180 hours) in 2008 resulted in only two specimens being recovered from a new location near Head-Smashed-In Buffalo Jump. Examination of specimens in 42 collections and extensive field work prior to this had revealed only 2 localities.



Global geographic locations of Bert's Predaceous Diving Beetle (Map courtesy of Ottomm Education).

Only 42 specimens of this species were known previously (collected in 1984) from potentially two locales near Fort MacLeod. These specimens provided the material for the original description of the species. During the course of field research, no further specimens were collected at the type locality, near Fort MacLeod, Alberta despite repeated intensive search efforts in and around the Fort MacLeod area to locate this habitat. However, two additional specimens were collected at another locale near Head-Smashed-In Buffalo Jump (the oasis). The population size of Bert's Predaceous Diving Beetle is unknown, but as with most species, a minimum population of several hundred individuals would likely be required to sustain a viable population. The data at hand is insufficient to speculate about fluctuation of these populations.

Limiting factors and threats

Bert's Predaceous Diving Beetle appears to require a very specific habitat within springs and seepages in an undisturbed area with mosses over fine particulate soil (necessary for pupation) and the appropriate fine-grained substrate of sand and other fine particulates. The most serious threats to these fragile point sources of habitat are lowering water levels in the Oldman River Basin and aggregation of livestock at these fragile habitats. Other potential threats along the Oldman River Basin (along with the associated coulees, springs and seeps) include: high water withdrawals and demands for agricultural irrigation; increasing water demands resulting from a booming economy and subsequent rapid growth; impoundments which would drown the habitat; municipal and industrial development including oil and gas; increasing demands for water for use in industry and domestic use; groundwater withdrawals; ranching practices; feedlots; human recreation and climate change. On top of the anthropogenic forces

affecting the habitats of Bert's Predaceous Diving Beetle, the required habitat is inherently sensitive. The Oldman River watershed lies within the Prairie Parkland Natural Ecozone. This ecozone includes flat and gently rolling hills covered mostly by dry mixed grasslands in southern Alberta. Since European settlement in this Ecozone, it has become one of the most developed agricultural areas in the world. Of the Ecozone's total land area of 47 million hectares, 3% of the natural environment is believed to remain intact with 70% classified as cropland and 27% as rangeland and pasture.

Special significance of the species

Springs and seepages are biologically, chemically and physically complex and fragile. Bert's Predaceous Diving Beetle is indicative of the remaining, reasonably uncompromised, spring and seepage habitat found in southern Alberta. Springs and seeps are important because their arthropod fauna includes a limited number of species and diverse and specialized organisms, including groundwater, stream and water-film specialists. Bert's Predaceous Diving Beetle might act as an indicator of occurrence of other unusual or significant species. It should be considered rare or at risk throughout its range due its highly specific and geographically isolated habitat requirements and the current scarcity of these available habitats.

Existing protection or other designations

Bert's Predaceous Diving Beetle is currently not globally or regionally listed. A new locality for Bert's Predaceous Diving Beetle is immediately south of Head-Smashed-In Buffalo Jump, a UNESCO World Heritage site. Almost certainly this locality shares the groundwater system with the UNESCO site. ■

Bicknell's Thrush



Photo: © Dan Busby

Scientific name

Catharus bicknelli

Taxon

Birds

COSEWIC Status

Threatened

Canadian Range

Quebec, New Brunswick, Nova Scotia

Reason for Designation

This species has one of the most restricted breeding ranges among the forest birds of North America. It inhabits the forests of montane and cool coastal zones, as well as high elevation regenerating forests over 600m in Quebec, New Brunswick, Nova Scotia and the northeastern United States. It winters in the Greater Antilles, where the bulk of its population appears to be in the Dominican Republic. Despite the difficulty of adequately monitoring the species, all the available indices on trends point to significant declines in population and area of occupancy. Preliminary results from the Maritimes Breeding Bird Atlas project suggest a 40% decline in the area occupied over the last three generations, while the High Elevation Landbirds Program suggests more dramatic declines in the same regions. Recent surveys in Quebec also indicate declines in some locations. While reasons for the decline are unclear, habitat loss on the wintering grounds, management practices such as pre-commercial thinning in regenerating forests and climate change are leading to a reduction of suitable high-elevation habitat.

Species Information

The Bicknell's Thrush is the smallest of the northern *Catharus* thrushes. Both males and females have distinctive warm brown feathers on the back, with a chestnut-brown tint on the upper tail feathers and on the primaries when the wings are folded. It is similar to the other northern *Catharus* thrushes, particularly the Gray-cheeked Thrush.

Distribution

The Bicknell's Thrush has one of the most restricted breeding ranges among the forest birds of North America and has a fragmented breeding distribution. It is limited to high elevations of the mountain ranges of the northeastern United States and southeastern Canada, as well as to some coastal and lowland areas in Canada. The species may have disappeared from some sites previously occupied, mostly at the periphery of its range.

The Bicknell's Thrush winters in the Greater Antilles, where the bulk of its population appears to be in the Dominican Republic. The species also occurs in smaller numbers in southwestern and eastern Haiti and in the Sierra Maestra of southeastern Cuba.

Habitat

The Bicknell's Thrush is a habitat specialist, generally associated with undisturbed dense habitat or disturbed areas undergoing vigorous succession (mid-successional) of Balsam Fir-dominated habitat and high stem densities (>10,000–15,000 stems/ha). Three breeding habitat types have been identified: montane/high-elevation forests, coastal lowlands and highland-industrial forests. In montane/high-elevation



Photo: © Dan Busby

areas, the Bicknell's Thrush selects undisturbed habitats and regenerating forests disturbed by fir waves, windthrows, ice and snow damage, fire, and insect outbreaks (e.g. spruce budworm infestation) and characterized by standing dead conifers and dense regrowth of Balsam Fir. The species also uses chronically disturbed, stunted-tree stands. In coastal areas it selects dense spruce-fir stands maintained by cool sea breezes and a high precipitation regime. In highland-industrial forests, the Bicknell's Thrush may be found in dense coniferous or sometimes dense mixed second-growth regenerating stands.

Biology

The Bicknell's Thrush has an unusual breeding system defined by multiple male and female partners. A single male may sire nestlings in different nests in a single season and may or may not provide food to those broods. Males are not territorial and home-ranges usually overlap. Male home-ranges may overlap two female home-ranges, which are usually discrete.

The Bicknell's Thrush has a highly skewed sex-ratio; 1 female: 1.49 to 3.0 males. Survivorship of summer-resident adults has been estimated at 0.65 ± 0.04 (\pm SE) in Vermont, and at 0.28 ± 0.11 for females and 0.63 ± 0.07 for males in Quebec. On the breeding grounds, predation may be a key limiting factor for Bicknell's Thrush productivity. The longevity record for the Bicknell's Thrush is 11 years while the annual mean age varies between 1.73 and 2.44 years. Generation time is estimated to be 2 to 3 years.

Population sizes and trends

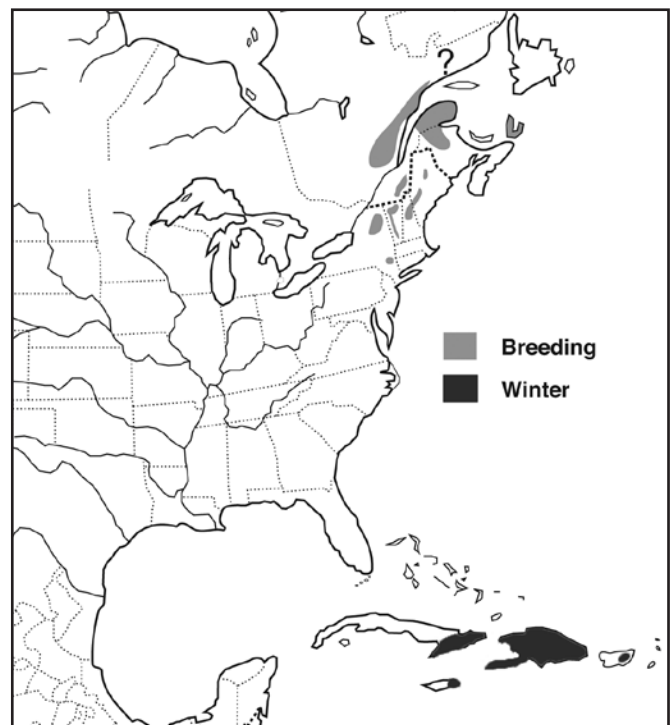
The current population estimate for the Bicknell's Thrush in Canada is between 40,570 and 49,258 birds. Results from the second Maritime Breeding Bird Atlas show a greater than 40% decline in the distribution of the species over the last 10 years. Data from the High Elevation Landbird Program also show significant declines of 20.2%/year and 18.9%/year in New Brunswick and Nova Scotia, respectively, between 2002 and 2008, which amounts to population losses of over 70%. Similarly, data from the Mont Gosford Monitoring Program in Quebec show a significant decrease in occupancy rates between 2001 and 2007 at survey sites, although

abundance in occupied sites did not differ significantly during this time.

Limiting factors and threats

On the breeding grounds, management practices, such as pre-commercial thinning, decrease breeding habitat in the medium term by significantly reducing Balsam Fir stem density. Increasing temperatures resulting from climate change are facilitating the progression in altitude of the Hardwood-Balsam Fir/Spruce-Mountain forest ecotone, thus reducing the amount of breeding habitat for the Bicknell's Thrush. The rapid expansion of communication towers, "green-energy"/ wind turbines and recreational projects in the Bicknell's Thrush breeding range also contributes to habitat loss and fragmentation.

On the wintering grounds major habitat losses have occurred on Hispaniola Island (Haiti and Dominican Republic), which is the stronghold of the species' wintering range. The conversion of those lands for human uses is likely the main driving factor of the species decline. There is no indication that this phenomenon is slowing down.



Global distribution of Bicknell's Thrush showing breeding and winter ranges (Canada, United States, West Indies).

Source: "Birds of North America Online" <http://bna.birds.cornell.edu/bna> maintained by the Cornell Lab of Ornithology, Ithaca, NY

Special significance of the species

Finding Bicknell's Thrush is a challenge for birdwatchers and ornithologists because of their remote high elevation and impenetrable forest habitat. This species also qualifies as a potential, long-term indicator of the health of subalpine forest habitats and its avian populations.

Existing protection or other designations

The Bicknell's Thrush is protected in Canada under the *Migratory Birds Convention Act, 1994* and in the U.S. under the *Migratory Bird Treaty Act, 1918*.

COSEWIC assessed this species as Special Concern in April 1999 and it is federally listed as Special Concern under Schedule 3 of the *Species at Risk Act*. It is designated as Vulnerable in Quebec, May Be at Risk in New Brunswick and Vulnerable in Nova Scotia.

In the United States, the species is on the Audubon Watchlist (Red) as well as the USFWS Birds of Conservation Concern (National concern). It is a Special Concern species and a Species of Greatest Conservation Need (SGCN) in New York, Vermont, New Hampshire, and Maine. Partners in Flight (PIF) has identified the species as the highest conservation priority among neotropical migrants in the Northeast. It appears on the World Conservation Union Red List (Vulnerable). ■

Bobolink



Photo: © Photos.com 2010

Scientific name

Dolichonyx oryzivorus

Taxon

Birds

COSEWIC Status

Threatened

Canadian Range

British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Prince Edward Island, Nova Scotia, Newfoundland and Labrador

Reason for Designation

Over 25% of the global population of this grassland bird species breeds in Canada, which is the northern portion of its range. The species has suffered severe population declines since the late 1960s and the declines have continued over the last 10 years, particularly in the core of its range in Eastern Canada. The species is threatened by incidental mortality from agricultural operations, habitat loss and fragmentation, pesticide exposure and bird control at wintering roosts.

Species Information

The Bobolink is a medium-sized passerine. Males are black below and lighter above, while females are light beige streaked with brown and could be mistaken for some species of sparrow. The Bobolink has a conical bill, rigid, sharply pointed tail feathers and long hind toenails. Male plumage outside the

breeding season and juvenile plumage are similar to that of the female. No subspecies of the Bobolink are currently recognized.

Distribution

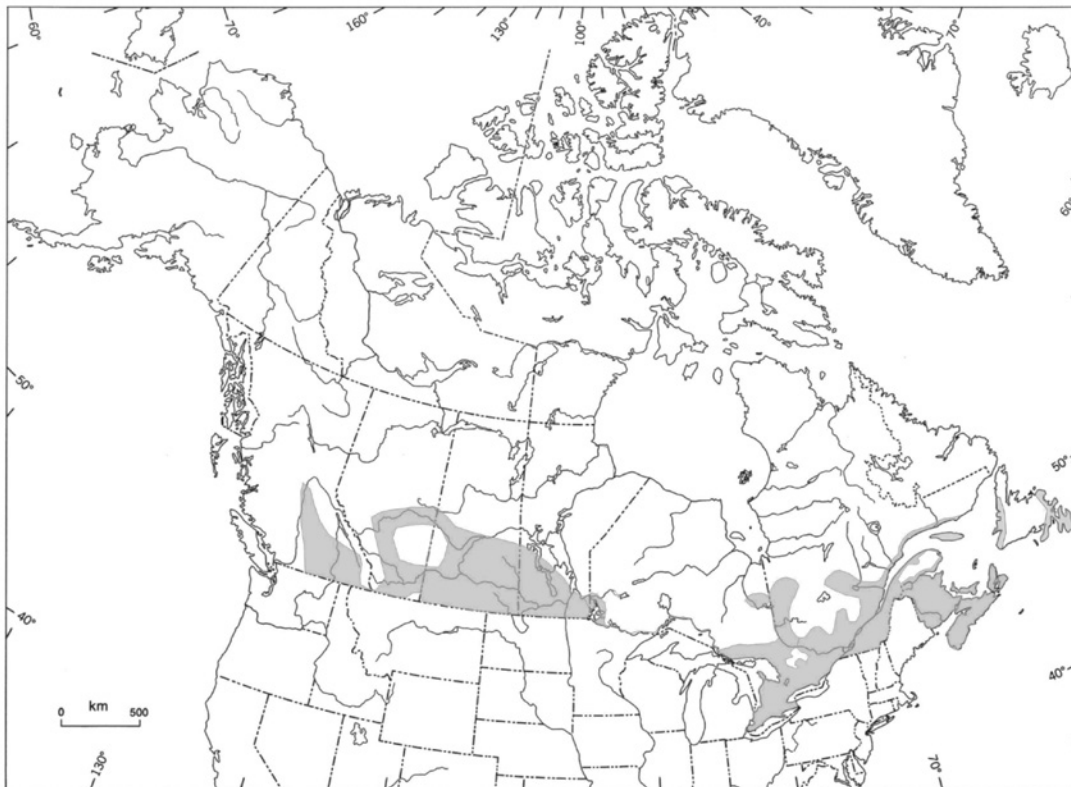
The breeding range of the Bobolink in North America includes the southern part of all Canadian provinces from British Columbia to Newfoundland and Labrador and south to the northwestern, north-central and northeastern U.S. The species is not present in the Yukon, Northwest Territories and Nunavut. The Bobolink winters in southern South America, east of the Andes in Bolivia, Brazil, Paraguay and Argentina.

Habitat

The Bobolink originally nested in the tall-grass prairie of the mid-western U.S. and south central Canada. Most of this prairie was converted to agricultural land over a century ago, and at the same time the forests of eastern North America were cleared to hayfields and meadows that provided habitat for the birds. Since the conversion of the prairie to cropland and the clearing of the eastern forests, the Bobolink has nested in forage crops (e.g., hayfields and pastures dominated by a variety of species, such as clover, Timothy, Kentucky Bluegrass, and broadleaved plants). The Bobolink also occurs in various grassland habitats including wet prairie, graminoid peatlands and abandoned fields dominated by tall grasses, remnants of uncultivated virgin prairie (tall-grass prairie), no-till cropland, small-grain fields, restored surface mining sites and irrigated fields in arid regions. It is generally not abundant in short-grass prairie, Alfalfa fields, or in row crop monocultures (e.g., corn, soybean, wheat), although its use of Alfalfa may vary with region.

Biology

The Bobolink is a semi-colonial species that is often polygamous, depending on the region and habitat conditions. The first adults arrive from their wintering grounds in mid-May. Upon arrival on the breeding grounds, the males establish their territories, performing courtship flights and songs. Females construct the nests, which are always built on the ground, usually at the base of large forbs. Each clutch



Canadian breeding range of the Bobolink.

Source: April 2010 COSEWIC Status Report

typically contains 3-7 eggs. The nestlings are fed by both parents for 10-11 days and fledglings are fed for at least one week. The Bobolink has an average life span of five years.

Population sizes and trends

In Canada, the Bobolink population is estimated at between 1.8 and 2.2 million breeding birds. North American Breeding Bird Survey (BBS) data for the period 1968 to 2008 indicate a significant decline of 5.2% per year in Canada or a loss of 88% of the population during the last 40 years. Over the most recent 10-year period (1998 to 2008), the BBS data show a significant decline of 4.6% per year, which corresponds to a population decline of 38% over this period.

Limiting factors and threats

The main causes of the decline in Bobolink populations have been identified as: 1) incidental mortality from agricultural operations such as

haying that destroy nests and kill adults, 2) habitat loss caused by the conversion of forage crops to intensive grain crops and other row crops, 3) habitat fragmentation, which promotes higher rates of predation on nests located near edges and 4) pesticide use on breeding and wintering grounds, which may cause both direct and indirect mortality.

Special significance of the species

Given its generally high abundance in forage crops and the large quantity of insect pests on which it feeds, the Bobolink may be beneficial to agriculture on the breeding grounds.

Existing protection or other designations

In Canada, the Bobolink, its nest and eggs are protected under the *Migratory Birds Convention Act, 1994*. It is ranked as globally secure (G5) by NatureServe (2009). ■

Bogbean Buckmoth



Photo: © Allan Harris

Scientific name

Hemileuca sp.

Taxon

Arthropods

COSEWIC Status

Endangered

Canadian Range

Ontario

Reason for Designation

This very rare moth is only known from New York and Ontario. In Ontario, it is found in two widely separated fens. It is susceptible to the effects of exotic invasive plants, especially European Common Reed, that are crowding out its preferred foodplant, the Bogbean, and of potential flooding or drying of habitat resulting from manipulation of water levels at the main site.

Species Information

Buckmoths (*Hemileuca*) are a relatively well-studied and diverse genus of silk moths. Although the taxonomic rank of Bogbean Buckmoth in Canada is unclear, it is the only species of *Hemileuca* in Eastern Canada, it is a highly distinctive day-flying moth and is ecologically distinct from the buckmoth found in the prairies which has a different primary plant host and prefers drier habitats.

Adult Bogbean Buckmoths are medium-sized moths with forewing lengths of 26-32 mm for males

and 32-36 mm for females. They have a distinctive black and white colouration with an eyespot on each wing.

Distribution

Bogbean Buckmoth populations are known only from Ontario and New York. All four Canadian sites are in eastern Ontario: two near Richmond south of Ottawa and two other sites approximately 50 km farther west near White Lake. Each pair of sites is considered to represent a different location with different potential threats. The actual area occupied by this species in Canada is less than 3 km².

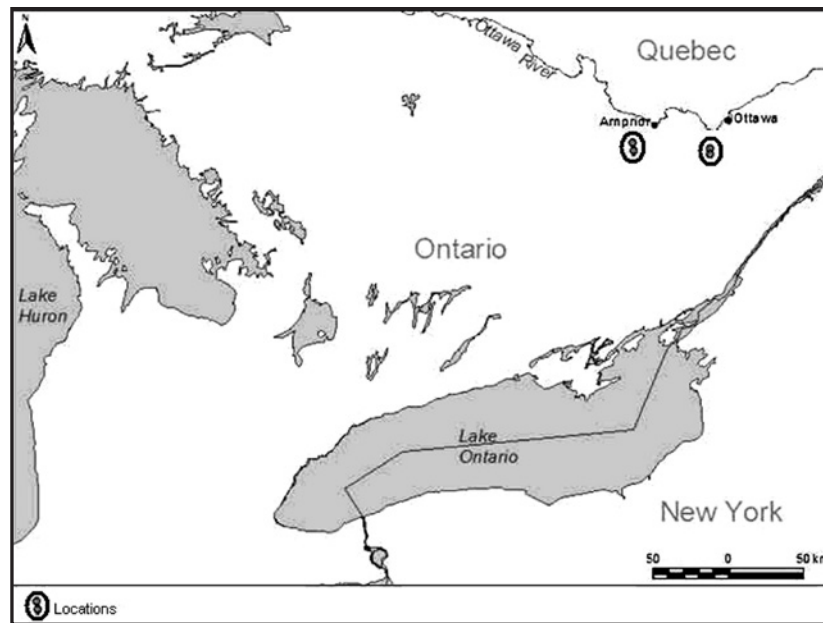
Habitat

In Canada, Bogbean Buckmoth is found in open, calcareous, graminoid and low shrub fens. Larvae are most abundant in patches of Twig Rush or Wire Sedge with shallow pools with Bogbean, its primary host. Adjacent *Sphagnum* hummocks with shrubs and stunted tamarack or cedar provide suitable pupation sites.

Biology

The Bogbean Buckmoth is a dayflying silk moth with one generation per year. Adult Bogbean Buckmoths emerge in late September and typically oviposit on Sweet Gale, Bog Birch, and other shrubs. Up to several hundred eggs are laid in a spiral ring on the stem. Eggs hatch in late May to early June and first instars communally feed primarily on Bog Cranberry for about 12 days before switching to Bogbean. Later instar larvae also eat Bog Birch, willows, and other shrubs, perhaps switching to the alternate hosts when the Bogbean is exhausted. In Ontario, adult Bogbean Buckmoths typically emerge in the third week of September. Females emerge from the pupa with fully developed eggs, attract males by emitting a pheromone, mate only once, and oviposit all eggs the same day. Adults do not feed.

The Bogbean Buckmoths might be capable of flying up to several kilometres but are not strong fliers and seldom leave fen habitats. Isolation of populations is increased by the short-lived adult stage.



Distribution of Bogbean Buckmoth in Canada.

Source: Modified from November 2009 COSEWIC Status Report

Population sizes and trends

There are no estimates for global abundance, but an annual average total of 2500 to 10,000 individuals are estimated for Ontario and New York combined. The most recent Canadian survey in 2008 observed a total of 169 larvae at the four sites and estimated a total abundance of approximately 6200 larvae in suitable habitat. This represents approximately 3000 adult buckmoths.

Bogbean Buckmoth is thought to have experienced a large (25-90%) historic global decline associated with habitat loss, particularly in the United States. Population sizes vary widely from year to year, which makes determination of long-term trends difficult, particularly at Canadian sites where they have been monitored only intermittently. Since 1979, the number of Bogbean Buckmoth larvae observed at the Richmond site has ranged from as low as one larva to thousands.

Given its habitat specificity, disjunct distribution of fen habitat, and distance from other populations in the United States, it is highly unlikely that localized extirpations in Ontario would be recolonized from New York. Genetic exchange between Canadian and US populations probably does not occur and is even unlikely between the two pairs of Canadian populations.

Limiting factors and threats

All Canadian Bogbean Buckmoth populations may be substantially threatened by a combination of habitat changes, water level fluctuations, land development, and possibly pest control programs. Habitat degradation due to invasive alien plant species is likely the most significant and imminent threat. In particular, European Common Reed and Narrow-leaved Cattail have invaded Canadian sites and may crowd out host plants and change the open aspect of the fens. Water level control at the White Lake location could substantially impact the habitat.

Special significance of the species

Bogbean Buckmoth shares its specialized habitat with a number of other rare species including the globally rare Eastern Prairie Fringed Orchid. Buckmoths are popular with naturalists and entomologists, in part due to their diurnal habits, relatively large size, and striking colouration.

Existing protection or other designations

NatureServe lists the Bogbean Buckmoth as critically imperiled globally but of uncertain taxonomy. It is listed as endangered in New York. ■

Chestnut-collared Longspur



Photo: © Nick Saunders

Scientific name

Calcarius ornatus

Taxon

Birds

COSEWIC Status

Threatened

Canadian Range

Alberta, Saskatchewan, Manitoba

Reason for Designation

This species is a native prairie grassland specialist that occurs in Alberta, Saskatchewan and Manitoba. The species has suffered severe population declines since the late 1960s, and the results of several surveys suggest that the declines have continued over the last decades albeit at a slower rate. The species is threatened by habitat loss and fragmentation from road development associated with the energy sector.

Species Information

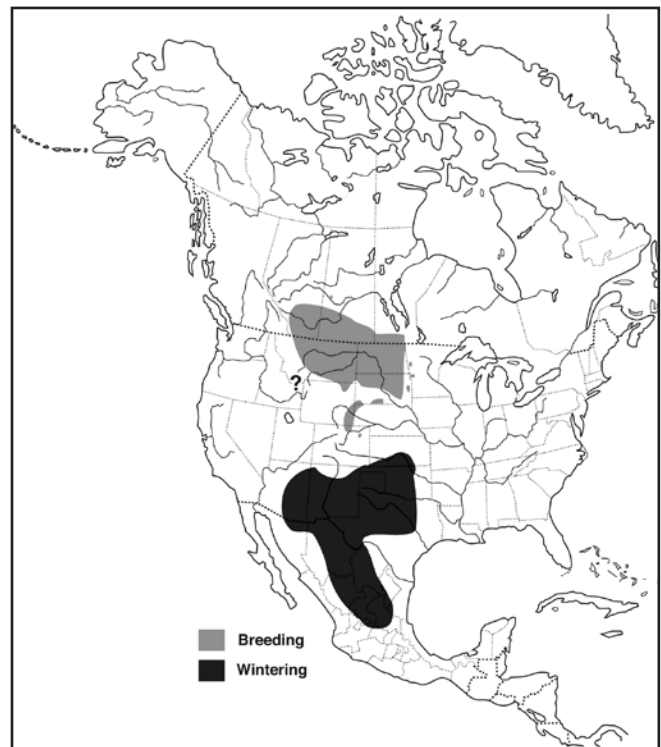
The Chestnut-collared Longspur is a medium-sized songbird. It is the smaller of two breeding prairie grassland longspur species and can be distinguished by the black triangular patch in the centre of the tail, white lesser coverts and extensive white on the outer tail coverts. Chestnut-collared Longspurs have a sweet warbling song, which is initially high and clear but ends in lower, buzzy notes. Males have a distinctive aerial display, which occurs lower to the ground than is the case in the McCown's Longspur.

Distribution

Chestnut-collared Longspurs breed in the short- and mixed-grass prairie regions of the northern Great Plains (prairies) of Canada and the United States. During the non-breeding season, they occur in the southern United States (western Oklahoma to southeastern Arizona) and northern Mexico.

Habitat

A native prairie grassland specialist, the Chestnut-collared Longspur typically breeds in recently grazed or mowed, arid, short- or mixed-grass prairie. The species prefers short vegetation (< 20-30 cm high), but will breed in tall-grass prairie if it is grazed or mowed. Areas with low sward densities and minimal litter depth are preferred. The topography preferred by this species is level to rolling uplands (mixed-grass and short-grass) and moist lowlands. Optimal grassland habitat in Canada for the Chestnut-collared Longspur is being fragmented by energy sector activity and other development and is being converted to agricultural use. The remaining fragmented



Global distribution of Chestnut-collared Longspur showing breeding and winter ranges (North America).

Source: "Birds of North America Online" <http://bna.birds.cornell.edu/bna> maintained by the Cornell Lab of Ornithology, Ithaca, NY

grassland is often ungrazed (idle) and therefore unsuitable for breeding.

Biology

Chestnut-collared Longspurs are monogamous and have small, often clumped territories. Following arrival on the breeding areas, males (which arrive before females) establish breeding territories generally by early to mid-May (Alberta). Females excavate and build a nest in the ground and lay 3-5 eggs which are then incubated for 10-12.5 days by the female; the male guards the nest and is active in predator defence. Both parents feed the young, which fledge after 10 days, following which they are fed by the male for a further two weeks; immature birds form flocks by late June. Generation time is likely two to three years. Nest predation accounts for a high degree of egg and nestling mortality.

Population sizes and trends

Nearly one-quarter of the continental Chestnut-collared Longspur population occurs in Canada, where the population is estimated at 600,000 birds. Over the long-term, analyses using data from Breeding Bird Surveys (BBS, 1968-2008) and Christmas Bird Counts (CBC, 1967-2008) show losses of 90% and 93% of the population, respectively. On the short-term, analyses from a variety of surveys indicate population losses ranging from 35% to 63% over the last 10 years, although surveys in high quality habitat (Grassland Bird Monitoring (GBM) program) suggest a population increase. Analysis of the variance surrounding the best trend estimate (combined BBS/GBM analysis) suggests that the probability that the Chestnut-collared Longspur population in Canada has declined by at least 30% or more over the last 10 years is 81%.

Limiting factors and threats

The greatest threat to the Chestnut-collared Longspur has been the loss and fragmentation of native prairie grassland. The remaining patches may offer suboptimal breeding conditions for the longspurs. Given their area sensitivity, grassland patches of a few hectares are likely too small for the species to persist. Additionally, idling of pastureland and habitat fragmentation and disturbance from oil and gas developments may impact Chestnut-collared Longspur populations.

Special significance of the species

The Chestnut-collared Longspur is symbolic of native prairie grasslands in the Great Plains of the United States and southern Prairies of Canada. Elders from the Blackfoot First Nation (Nitsitapii) called the Chestnut-collared Longspur *Aapinakoisittsii* (little morning bird); other sources suggest the Chestnut-collared Longspur is called *Iskiokae* (black breast).

Existing protection or other status designations

The Chestnut-collared Longspur and its eggs and young are protected under the *Migratory Birds Convention Act, 1994*. In 2008, the species was listed as Near Threatened by IUCN because of its moderately rapid population decline. Breeding populations in South Dakota, Alberta and Saskatchewan and non-breeding populations in Louisiana and Oklahoma are ranked as 'apparently secure' or 'secure' by NatureServe. All other provincial and national rankings in Canada list breeding and non-breeding populations of the Chestnut-sided Longspur as 'vulnerable', 'imperiled' or 'critically imperiled'. ■

Coast Manroot



Photo: © Matt Fairbairns

Scientific name

Marah oreganus

Taxon

Vascular plants

COSEWIC Status

Endangered

Canadian Range

British Columbia

Reason for Designation

A long-lived perennial vine occurring at only three widely separated locations in southeastern Vancouver Island and adjacent Gulf Islands. Fewer than 20 mature plants remain with no evidence of seedling production. Losses of habitat, populations and mature individuals are projected in its Canadian range. Main threats are development of the few known sites, alien species and chance events affecting the handful of remaining individuals.

Species Information

Coast Manroot (*Marah oreganus*) is a large climbing perennial of the cucumber family (Cucurbitaceae) that grows from an enlarged woody root and produces annual trailing stems with branched tendrils. The alternate stem leaves are about 20 cm long, stalked and irregularly palmately lobed. Plants produce separate whitish male and female flowers on the same plant. Male flowers are stalked, bell-shaped, with generally 5 floral parts and arranged along an

elongate central inflorescence stalk arising from the angles between the leaf stalk and stem (leaf axil). Single, stalked female flowers, with a swollen base, are also formed at the leaf axils. Ovaries develop into a prickly fruit that contains several large, smooth, heavy seeds.

Distribution

Coast Manroot occurs from southern British Columbia to central California, mostly west of the Cascade Mountains. In Canada, it only occurs in a small area extending from southeast Vancouver Island to Pender Island in the Southern Gulf Islands. The species ranges over 77 km² but the few sites where it occurs cover <12 km².

Habitat

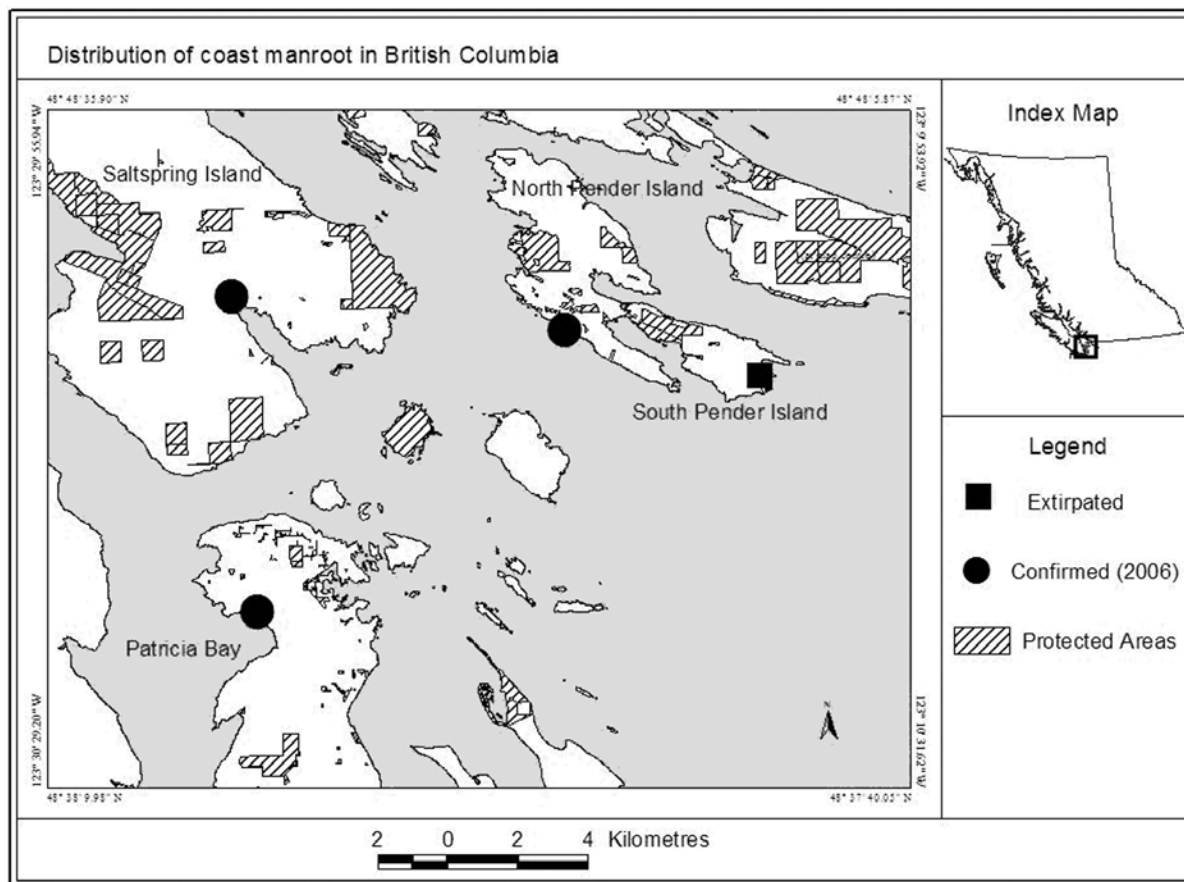
In British Columbia, habitat for Coast Manroot is correlated with the distribution of Garry Oak, which often occurs in the vicinity. The extant and historic populations occur on rocky, south-facing slopes, in roadside thickets or at the margins of wooded areas. They are found at low elevations near the coast of southeastern Vancouver Island and the southern Gulf Islands, often within 30 m of the water's edge.

Biology

This perennial herb develops one or more aerial stems yearly from an enlarged woody root. No asexual reproduction occurs. Seed germination involves a rapid downward elongation of the fused underground seed leaves (cotyledons) and the development of an underground perennial storage tube. This pattern of germination and seedling establishment is distinctive for species of the genus *Marah* and for a few other dicotyledonous plants. It is considered a complex adaptation that helps ensure fast and successful seedling establishment in seasonally arid areas, described as having a "Mediterranean" climate.

Population sizes and trends

In 2006, the Canadian population consisted of 18 mature individuals at three locations. The population at a fourth location is considered



Canadian distribution of Coast Manroot.

Source: Modified from November 2009 COSEWIC Status Report

extirpated as no plants have been observed since 1964. No data on historic numbers are available from which to derive trends in population size.

Limiting factors and threats

The primary threats to Coast Manroot are habitat loss due to development, recreational activities and invasive species. One population has disappeared due to trampling; other populations are very small and are also affected by high levels of trampling.

Special significance of the species

British Columbia populations of Coast Manroot have a high conservation value because they represent the entire Canadian population of a very narrowly distributed species. Various parts of Coast Manroot have been used for medicinal purposes by Aboriginal Peoples.

Existing protection or other status designations

Coast Manroot is not protected by any species at risk legislation in Canada. Based on NatureServe rankings, it is globally secure (G5) but critically imperiled (S1) in B.C. The species does not occur in any protected areas. ■

Four-leaved Milkweed



Photo: © Sean Blaney

Scientific name

Asclepias quadrifolia

Taxon

Vascular plants

COSEWIC Status

Endangered

Canadian Range

Ontario

Reason for Designation

Only two small extant populations are known in Canada at the eastern end of Lake Ontario, each with very low numbers of individuals. Historic populations within the Niagara Falls region are believed extirpated. Extant populations are in very rare limestone deciduous woodland communities where plants are at risk from shading by invasive Common Buckthorn shrubs and from native shrubs and trees expanding in the absence of ground fires. Residential development is a potential threat at the largest site. Future development on this site remains a reasonable possibility.

Species Information

Four-leaved Milkweed (*Asclepias quadrifolia*) is an erect herbaceous perennial of the milkweed family (Asclepiadaceae). A single unbranched stem, 30 to 80 cm tall, arises from a tough, perennial root crown. Two pairs of the opposite leaves near the top of mature plants appear four-whorled, giving the species its name. Flowers are in one to four clusters of 10 to 25

pinkish-white flowers. The species is insect-pollinated and probably self-incompatible. The fruit develops into a long, narrow, erect seed pod. Seeds have a dense tuft of long, silky, white hairs at the top to create buoyancy in aid of wind dispersal.

Distribution

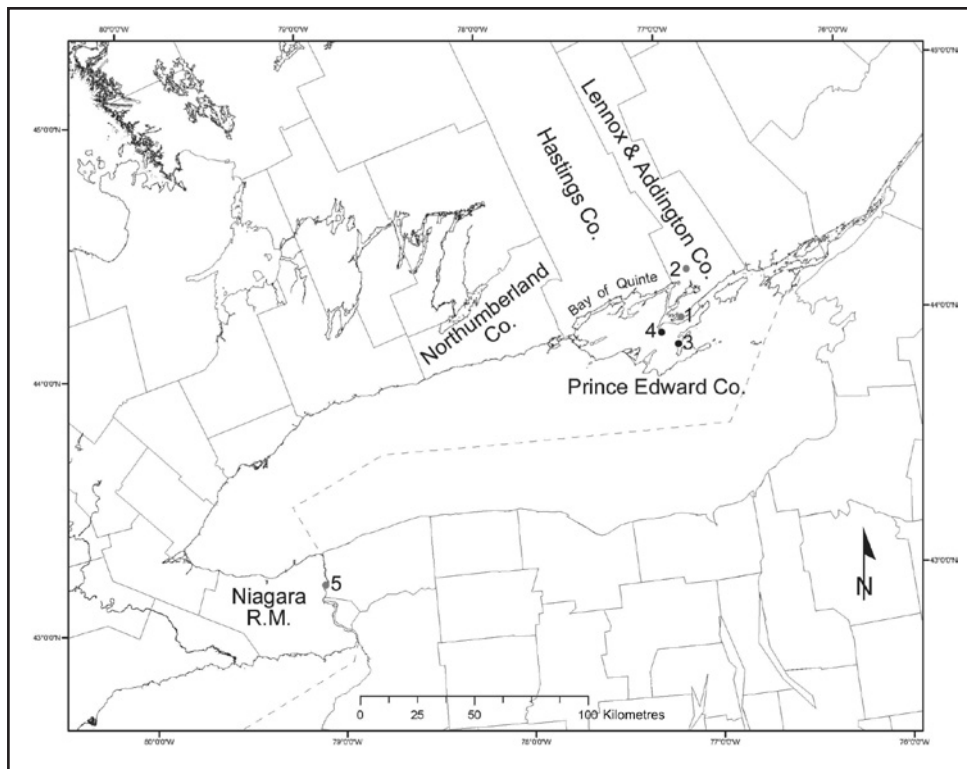
Four-leaved Milkweed occurs in the eastern United States in two disjunct regions, separated by a 150 to 400 km wide zone of almost complete absence in the Mississippi River Valley. The western region of occurrence extends from eastern Oklahoma and western Arkansas north to western Illinois and eastern Iowa. The eastern region extends from the southern Appalachian Mountains north to eastern Indiana and southern New Hampshire. The species just extends into Canada in southern Ontario at the eastern end of Lake Ontario in Prince Edward County, and the western end in the vicinity of Niagara Falls, where it is believed extirpated.

Habitat

Four-leaved Milkweed occurs in dry to mesic, relatively open deciduous forest often on rocky soils and steep slopes. It has a tendency to occur on calcareous soils, especially over limestone bedrock, but soil pH tolerance over the North American range is from slightly acidic to strongly basic. Four-leaved Milkweed in Missouri grows and reproduces better at forest edges than forest interiors due to energy limitation in deep shade. In Ontario, it occurs in open, dry-mesic woodland on fairly shallow soils on the plateau, rim or slopes of steep limestone escarpments. Prince Edward County sites are dominated by Bur Oak, Shagbark Hickory and Ironwood, with Eastern Red-Cedar, Chinquapin Oak, Sugar Maple, Basswood and White Ash. Niagara region occurrences would have been in similar habitats dominated by Red, White, Black and Chinquapin Oaks with Pignut and Shagbark Hickories and other deciduous trees.

Biology

Four-leaved Milkweed reproduces only from seed. Soil seed banking is likely only short-term (1-5 years).



Canadian occurrences of Four-leaved Milkweed (Ontario). Numbers correspond to populations in Table 3. Grey dots (1, 2, 5) are historic locations and black dots (3, 4) are extant locations.

Source: April 2010 COSEWIC Status Report

Field experiments indicate at least 5 to 10 years are required to reach maturity, with younger or resource-poor plants functioning as unisexual males. Flowering occurs from late May through June. As with most milkweeds, the species is likely largely or entirely self-incompatible. Milkweeds have a remarkably complex, insect-mediated pollination system and flowers produce copious nectar. Known pollinators include certain bees and butterflies such as skippers and the Pearl Crescent butterfly. Pollen dispersal distances are unusually high, with pollination over distances exceeding 1 km common in North Carolina. Plants develop only one, two or rarely three seed pods, averaging 35 seeds each. Mature seed pods open in autumn to release their seeds. Seed dispersal beyond 50-150 m is likely rare. The energetic requirements for flower and seed production have been extensively studied in Four-leaved Milkweed and the related forest species Poke Milkweed.

Population sizes and trends

Between 96 and 178 mature individuals are known from two extant populations: 1) between 80 and 136 mature plants over about 20 ha at McMahon Bluff and 2) between 16 and 42 mature plants over about 0.25 ha at Macauley Mountain. Seedlings are present at both sites.

Along the Niagara River, populations have declined since 1956 to the point where they are probably extirpated, based on repeated surveys of former occurrences. Historic Bay of Quinte area sites are probably also extirpated. Other undocumented population losses probably occurred with habitat loss since European settlement. There is no information on recent trends in extant Canadian populations, although limited observations do not suggest any declines since 2006-2007. Continued encroachment of the exotic Common Buckthorn and native shrubs seems likely to reduce the population at both sites over time.

Limiting factors and threats

Four-leaved Milkweed was likely always rare and local in Ontario, but massive habitat loss and fragmentation since European settlement now limits the species' future prospects. The habitat in which the species occurs falls into the Bur Oak – Shagbark Hickory – Big Bluestem community ranked critically imperiled for Ontario.

Major threats to Four-leaved Milkweed are:

1) habitat conversion – a developer proposing development on over 73% of the Canadian population has now (August 2009) sold the McMahon Bluff property, but future development of the site remains a threat; 2) habitat degradation (excessive shading) caused by the exotic Common Buckthorn and by native shrubs and trees, associated with loss of pre-settlement fire regime; 3) the invasive exotic herb Pale Swallow-wort, although not yet at known sites, is rapidly expanding in the vicinity of known sites and presents a significant threat within the next 10 to 30 years. Potential threats of unknown or lesser magnitude are: the small, isolated population and small area of occupancy at the Macauley Mountain site leading to inbreeding and risk of stochastic

loss and ATV use at the McMahon Bluff site, which is presently not a problem but could become problematic if intensified.

Special significance of the species

Four-leaved Milkweed is biogeographically interesting as one of a small suite of species with a strong southern affiliation occurring at both the eastern and western ends of Lake Ontario. It occurs in a critically imperiled habitat with two other nationally imperiled species [the sedges *Carex mesochorea* and *Carex bicknellii*]. As a disjunct at its northern limit, it may harbour unusual genetic variation for the species.

Existing protection or other status designations

Four-leaved Milkweed is globally secure but critically imperiled in Canada and Ontario. The species is potentially extirpated in Delaware, critically imperiled in Rhode Island and Kansas, imperiled in New Hampshire and sensitive in Iowa and Vermont. It has a state-level Threatened status in New Hampshire and Rhode Island and is not ranked or secure in 20 other American states. ■

Fowler's Toad



Photo: © David Green

Scientific name

Anaxyrus fowleri

Taxon

Amphibians

COSEWIC Status

Endangered

Canadian Range

Ontario

Reason for Designation

This species only occurs on sandy beaches in three disjunct areas along the north shore of Lake Erie. It has disappeared from numerous historic sites on the Lake Erie shore and continues to decline in abundance and number of populations with further habitat loss and degradation due to invasive species (Common Reed, Zebra Mussels) and anthropogenic activities including shoreline development, beach cleaning, construction of breakwalls, bulldozing of beaches, vehicle use on beaches and agricultural and industrial contaminants. In addition, a Population Viability Analysis (PVA) model suggests that over the last decade, the probability of extirpation within 20 years has increased substantially.

Species Information

Adult Fowler's Toads, *Anaxyrus fowleri*, are 50 to 80 mm in snout-vent length, with females growing larger than males. The dorsum is grey or buff, with small warts and tubercles. The belly is white with a

single, dark, pectoral spot. The male's call is a rather shrill scream. Tadpoles are up to 27 mm in total length and are mottled grey and black. Fowler's Toads have a distinctive smell, reminiscent of unroasted peanuts. Until recently, the species was assigned to the genus *Bufo*.

Distribution

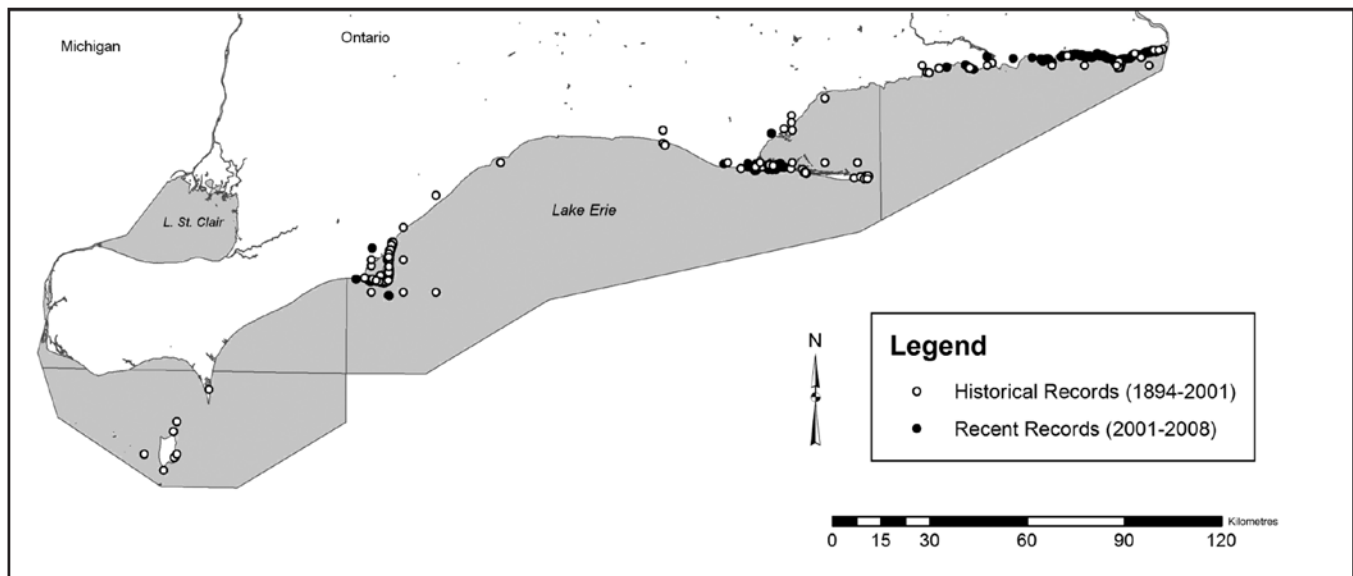
Although Fowler's Toads inhabit much of North America east of the Great Plains and south of the Great Lakes, they occur in Canada only along the northern shore of Lake Erie in extreme southern Ontario. The species is now restricted to Rondeau Provincial Park, Long Point, and the shore from Low Point to Fort Erie (Niagara). It is considered extirpated from numerous historic sites. The Canadian Extent of Occurrence, exclusive of uninhabitable shoreline and open water of Lake Erie, is approximately 1,200 km². Area of inhabited shore line is estimated at no more than 65 km².

Habitat

Fowler's Toads occur along the Lake Erie shoreline where there are well-drained sandy soils or sand dunes, sandy beaches, sandy deciduous woodland, and rocky, poorly vegetated areas. Eggs and tadpoles need sparsely vegetated ponds, sandy bottomed pools, shallow rocky shoals or rocky pools. These habitats are unstable and are subject to the lake's naturally dynamic processes of erosion and sand deposition, storms and fluctuating water levels. The complex life cycle of the toad requires both aquatic and terrestrial habitats. Fowler's Toad habitats are in general decline, principally due to shoreline development, beach stabilization, vehicular traffic and recreational



Photo: © Ryan M. Bolton



Canadian records of Fowler's Toad.

Source: Modified from April 2010 COSEWIC Status Report

use at Niagara, and the spread of the invasive Common Reed, *Phragmites australis australis*, at Long Point and Rondeau Provincial Park. Much of the range of Fowler's Toad in Canada is Crown Land, including provincial parks and national wildlife areas at Rondeau Provincial Park and Long Point, although 91% of the shoreline in Niagara is privately owned.

Biology

Adult male Fowler's Toads congregate to call at aquatic breeding sites in late spring, to attract females. The larval period takes 40 to 60 days and newly metamorphosed toadlets emerge in midsummer. First-year growth is rapid and most individuals attain adult size in one year. Fowler's Toads appear to have a potential life span of 3 to 5 years, but annual mortality is high at all life stages.

Fowler's Toads are insectivores specializing on ants and beetles. Snakes, particularly gartersnakes, *Thamnophis* spp., are the toad's main predators and are undeterred by the toads' noxious skin secretions. Fowler's Toads otherwise avoid predation chiefly by digging beneath the surface of the soil.

Fowler's Toads can be found nightly sitting in shallow water or on wet sand along the beach.

Generally sedentary, most individuals move no more than a few metres along the shoreline throughout the year. However, a few individuals have moved over 10 km in a year.

Fowler's Toads are known to hybridize with American Toads, *Anaxyrus americanus*, at Long Point, yet introgression appears to be limited.

Population sizes and trends

The total abundance of adult Fowler's Toads in Canada cannot be determined with precision, primarily due to stochastic fluctuations in population size. The best estimate is an effective population size of under 5,000 adult toads. Rescue effect between populations, or from U.S. populations on the south shore of Lake Erie, is highly unlikely.

A population viability analysis, using the program VORTEX, and based on current distribution and estimates of abundance and demographic characteristics of Fowler's Toads in Canada, indicates a greater than 20% probability of extirpation of Fowler's Toads from Canada within 20 years, and nearly 100% probability of extirpation within 100 years, under all scenarios.

Limiting factors and threats

Fowler's Toad is threatened principally by loss and degradation of its shoreline beach and dune habitat. Threats include: shore development and artificial coastline stabilization including construction of break walls, roads, parking lots, piers and groynes; intensive mechanical beach maintenance activities such as grading, grooming and clearing of algae using beach grooming machines or bulldozers; intensive human recreational use of beaches and dunes, including vehicular traffic; loss and degradation of habitats due to invasive species, particularly Zebra Mussels (*Dreissena polymorpha*) and Common Reed, and agricultural and industrial contaminants.

Special significance of the species

Perhaps the greatest significance of this species is that it has been the subject of the longest (>30 years) population and demographic study of a Canadian amphibian. This research has elucidated much of the nature of demographic, intrinsic, and extrinsic factors on population fluctuations and abundance in

an anuran species. In addition, the impacts of humans on the species are now becoming understood. Adult Fowler's Toads are important small insectivores, specializing in ants and beetles, whereas their tadpoles are significant detritivores in small ponds, rocky pools and embayments.

Existing protection or other status designations

The majority of Fowler's Toad habitat in the Rondeau Provincial Park and Long Point areas is located within protected areas where there is no direct threat from industrial or urban development. However, there is little direct legal protection for the species along the Niagara shoreline outside of James N. Allan Provincial Park. Currently, Fowler's Toad is listed as Threatened under Schedule 1 of the federal *Species at Risk Act* and under Ontario's *Endangered Species Act 2007*. It is also listed as a "specially protected amphibian" under Ontario's *Fish and Wildlife Conservation Act*. The species is not listed as a species of concern in the United States nor in any of the states adjacent to Ontario. ■

Laura's Clubtail



Photo: © Allen Harris

Scientific name

Stylurus laurae

Taxon

Arthropods

COSEWIC Status

Endangered

Canadian Range

Ontario

Reason for Designation

This attractive dragonfly of eastern North America is known from only two locations in unusual fast-moving sandy streams in southwestern Ontario. The species has a very small range in Canada and there is evidence of continuing decline of habitat.

Species Information

Laura's Clubtail *Stylurus laurae* is a member of the family Gomphidae, the clubtail dragonflies, and the order Odonata, the dragonflies and damselflies. Laura's Clubtail is a relatively large member of the genus, with a total length of 60-64 mm. The front of the thorax has two divergent pale stripes that do not connect with the collar. The collar is broken with a dark line. The abdomen is dark laterally with a narrow yellow middorsal stripe that breaks into dashes at the tip of the abdomen which is moderately clubbed in males, less so in the females.

Distribution

The range of Laura's Clubtail includes Ontario and 17 states in the eastern US. The global maximum extent of occurrence encompasses about 1.5 million km². The known Canadian range of Laura's Clubtail consists of Big Creek and Big Otter Creek in southern Ontario. The species was first discovered in Canada in 1999. The maximum extent of occurrence in Canada encompasses 256 km², but it occupies an area of less than 22 km² (using a 1 km X 1 km grid) or 60 km² (using a 2 km X 2 km grid).

Habitat

Larvae typically inhabit small to medium sized unpolluted streams with sand or silt substrate. Streams usually have overhanging trees and shrubs. Adults disperse to riparian forest after emerging and typically perch by hanging from vegetation, 0.5 to 6 m above the water. Males are seldom seen and apparently spend most of their time high in trees. Logging and land clearing for agriculture in the late 1800s caused extensive soil erosion but in the early 1900s, reforestation efforts were implemented and forest cover increased to present levels. Although terrestrial habitat may have improved, aquatic habitat appears to be declining with trends toward increased pollution with chloride, nitrate and phosphorous, this made more serious by concentration due to continuing water removal for irrigation. Irrigation



Distribution of Laura's Clubtail in Canada.

Source: Modified from April 2010 COSEWIC Status Report

and other water uses within the watershed can significantly reduce stream flow within both creeks, particularly during dry summers, increasing oxygen demand and reducing habitat. Dams in the watersheds of Big and Big Otter creeks have likely already caused loss of riffle habitat in reservoirs, higher water temperatures, and altered erosion and sedimentation.

Biology

Adults fly between mid July and mid August in Ontario. Mating habits have not been described. Larvae spend most of their time buried just below the surface of the sediment, breathing through the tip of the abdomen raised above the sediments.

The duration of the larval stage is unknown, but is probably two or more years. Before the final molt, larvae crawl onto the sandy riverbank. Newly emerged adults disperse inland to avoid predation until the exoskeleton hardens and they are able to fly swiftly.

Adults are probably generalist and opportunist predators, feeding on small flying insects. Larvae ambush prey from the sediments using their prehensile labium.

Predators on adults include birds, frogs and larger dragonflies. Larvae are eaten by waterbirds, fish, turtles, larger dragonfly larvae, and other predatory insects.

Population sizes and trends

Laura's Clubtail was first discovered in Canada in 1999 and is known to occur at two locations. An accurate estimation of population size is not available. No population trend information is available.

Threats and limiting factors

Aquatic habitat degradation through pollution, water removal for irrigation and invasive species (especially Round Goby) are the most significant threats to Laura's Clubtail. Accidental deaths through vehicle collisions and impoundment of running waters by dams are potential threats at Canadian locations.

Special significance of the species

Laura's Clubtail is too uncommon and obscure through most of its range to be known by most people, but dragonflies in general are increasingly popular as indicated by increasing numbers of field guides and organized dragonfly count events. It is also an indicator species of good water quality.

Existing protection or other designations

Laura's Clubtail is ranked globally as apparently secure. It is ranked as critically imperilled in Canada and apparently secure in the US, but is not protected by species at risk legislation in either country. At the state/provincial level, it is ranked as critically imperilled in Ontario and critically imperilled to vulnerable in eight of the 17 states in which it occurs. No known Canadian sites are within provincial or federal parks. River habitats in Canada are protected under the federal *Fisheries Act* with respect to fish habitat. ■

Lewis's Woodpecker



Photo: © United States Fish and Wildlife Service

Scientific name
Melanerpes lewis

Taxon
Birds

COSEWIC Status
Threatened

Canadian Range
British Columbia

Reason for Designation

In Canada, this woodpecker breeds only in British Columbia. Its population is small, with fewer than 1000 individuals, and there is evidence of ongoing declines in parts of its Canadian range where it has been monitored over time. The global population (Canada and the USA) is also showing significant declines. Threats include habitat loss and degradation from increasing urban and agriculture development, and fire suppression. Recent surveys have shown the species to be far less numerous than previously believed.

Species Information

The Lewis's Woodpecker is a medium sized (26-28 cm) woodpecker with dark green upperparts (back of head, back, wings and tail), a silvery grey collar, maroon face and pink breast and belly. Sexes are similar in appearance, with the male being slightly brighter than the female. Juveniles are darker than adults and either lack or have subdued grey, maroon and pink in their plumage.

Distribution

The Lewis's Woodpecker occurs only in western North America, where its breeding distribution is approximately the same as the range of Ponderosa Pine. In Canada, it occurs only in valleys of the southern interior of British Columbia, where it currently breeds as far north as the Fraser Basin (near the confluence of the Fraser and Chilcotin Rivers). Within this range, its distribution is patchy, with birds concentrated in areas with suitable habitat.

Habitat

Lewis's Woodpeckers require open habitat with scattered or edge trees. Large open areas are necessary for foraging. Trees are used as hawking perches and for nesting. Large-diameter trees, either living, with partial decay, or dead, with more advanced decay, are especially valuable for nest sites. A diverse ground cover of low shrubs, grasses and herbaceous plants that produce berries or provide habitat for insects is an important habitat component. Three



Global distribution of Lewis's Woodpecker showing breeding, winter and year-round ranges (North America).

Source: "Birds of North America Online" <http://bna.birds.cornell.edu/bna> maintained by the Cornell Lab of Ornithology, Ithaca, NY

distinct habitats are used by the species: open forest or grassland with scattered trees, riparian forests adjacent to open areas, and burns.

Biology

Most Lewis's Woodpeckers in Canada are migratory, returning to their breeding habitats in early May. They raise a single brood each season and show strong nest site fidelity. The average clutch size in British Columbia is 4.8 eggs. Both adults tend the nest. The diet during the nesting period is mainly free-living insects. Wild and cultivated fruits are also consumed depending on availability.

Adults and juveniles form pre-migrant flocks in late August through early September. They typically depart British Columbia in late September, although a few individuals stay in the southern Okanagan Valley if the weather conditions and food supply are favourable.

Population sizes and trends

The Canadian breeding population is estimated at 630-920 mature individuals based on surveys conducted through most of the range in 2006 and 2007. The only information on potential change in abundance over time comes from the East Kootenay Trench, where approximately one quarter of the Canadian population occurs. Surveys conducted in this area in 1997/98 and again in 2007 show a 22% reduction in the number of nests recorded during this period.

Limiting factors and threats

Habitat loss and degradation are considered to be the greatest threats to Lewis's Woodpeckers. Urbanization, increasingly industrialized agricultural practices and forestry practices have all contributed to habitat loss and degradation. Removal of trees for firewood, human safety or aesthetic reasons

reduces habitat quality by eliminating nest trees, a critical habitat feature for this species. Many decades of fire suppression in Ponderosa Pine forests has resulted in infilling by Douglas-fir and reduction of open pine forests which are suitable for this species. Competition from the introduced European Starling may be a threat to Lewis's Woodpeckers in areas where European Starling populations are high and nest sites are scarce. Accidental mortality of breeding adults through collision with vehicles may affect populations around highway corridors, many of which are in prime Lewis's Woodpecker valley bottom habitat.

Special significance of the species

The Lewis's Woodpecker is a unique woodpecker in behaviour and appearance. It is sought after by recreational birders and is an indicator species for fire-maintained Ponderosa Pine ecosystems. Woodpeckers are also culturally significant to First Nations people.

Existing protection or other status designations

The Lewis's Woodpecker and its eggs and active nests are protected from direct persecution under the *Migratory Birds Convention Act, 1994* (Canada) and the *British Columbia Wildlife Act* of 1982 in British Columbia. COSEWIC designated this species as Special Concern in November 2001, and it is currently designated as Special Concern, under Schedule 1 of the *Canadian Species at Risk Act*. Guidelines for habitat conservation are also provided to the forest harvesting industry under the *British Columbia Forest and Range Practices Act* Identified Wildlife Management Strategy (2004). These guidelines provide suggestions for maintaining trees suitable for nesting through establishment of wildlife tree retention areas in suitable sites scattered across a landscape-level planning area. ■

Northern Barrens Tiger Beetle



Photo: © Michael Runtz

Scientific name

Cicindela patruela

Taxon

Arthropods

COSEWIC Status

Endangered

Canadian Range

Ontario, Quebec

Reason for Designation

This showy metallic green beetle inhabits sandy, open forest habitat dominated by pine and/or oak trees. Found in northeastern and north-central North America, it is globally imperiled reaching its northern limit in southern Ontario where it is currently found at only two localities. The species has disappeared from one well known historic site. Habitat loss resulting from natural succession and increased pedestrian traffic are significant threats.

Species Information

Northern Barrens Tiger Beetle (previously known as Patterned Green Tiger Beetle) is a member of the family Carabidae, order Coleoptera. Three subspecies of *Cicindela patruela* have been described, of which only the nominate subspecies *patruela* is found in Canada. This subspecies is recognized by its dull metallic green colour with a complete white middle band on the wing covers. It is 12-14.5 mm long.

Distribution

The historic range of Northern Barrens Tiger Beetle includes Ontario, Quebec, and 24 states in the north-central and eastern US. Its occurrence is discontinuous and very local throughout its range. In Canada, it is historically known from three locations in Ontario and Quebec. It is believed extirpated at one of these sites, possibly extant at another and currently definitely known at only one. The only confirmed extant site in Canada is at Pinery Provincial Park.

Habitat

Northern Barrens Tiger Beetle occurs along dry, sandy trails, little-used roads, and other small openings in oak-pine savannahs and mixed woods. Larvae use similar habitat, typically off to the side of paths in more consolidated soil and sparse ground cover of bracken fern, blueberries, grasses, mosses and lichens. Northern Barrens Tiger Beetle is often restricted to small areas within large patches of seemingly suitable habitat.



Photo: © Michael Runtz



Global distribution of Northern Barrens Tiger Beetle.

Source: Modified from November 2009 COSEWIC Status Report

Biology

Northern Barrens Tiger Beetle has a 2-year life cycle. New adults typically emerge in early fall to feed, overwinter in burrows, and emerge the following spring to mate and lay eggs. Post-breeding adults may persist through most of the summer. Eggs hatch in early summer and each larva digs a burrow. Larvae become second or third instars by the autumn, overwinter underground, then continue through the second spring and summer as third instars before pupating in late summer.

Adult Northern Barrens Tiger Beetle are active during warm, sunny weather, consuming a wide range of small invertebrates, particularly ants. Larvae are also predators, lying in ambush at the top of their burrows and grabbing passing prey. The adult beetles are preyed upon by robber flies and a variety of generalist predators.

Population sizes and trends

Northern Barrens Tiger Beetle numbers are low globally for such a widespread insect, and the species appears to be declining throughout much of its range. It is apparently extirpated at one of the three known Canadian occurrences. The total population size at Pinery Provincial Park is estimated at only 400-1000 individuals including both larvae and adults, but this is only a very general estimate. Numbers of Northern

Barrens Tiger Beetle observed at one of the subsites at Pinery Provincial Park appear to have declined over the past 15 years and trends at the other nearby subsite are unknown. Information on population numbers is considered insufficient for assessment purposes.

Limiting factors and threats

Northern Barrens Tiger Beetle is at the northern limit of its range and has restricted habitat preferences. It is considered moderately to extremely threatened in its global range primarily due to habitat loss and degradation. In Canada, it is threatened by habitat degradation due to natural succession of savannah and woodland habitat to more shaded conditions, particularly as a consequence of lack of natural fire.

Special significance of the species

Tiger beetles have long been the study of amateur and professional entomologists and are important models for the study of ecology and evolution. Although Northern Barrens Tiger Beetle is too uncommon and obscure through most of its range to be known by most people, tiger beetles are increasingly popular for wildlife viewing as evidenced by the recent publication of a number of field guides. They are the first group of beetles to become part of the trend toward insect viewing which has grown to some extent out of birdwatching. This species and other tiger beetles serve as useful environmental indicators as part of the National General Status Ranking Process.

Existing protection or other status designations

Northern Barrens Tiger Beetle is ranked globally and in the US as vulnerable. It is not ranked nationally in Canada, but is critically imperiled in Ontario and presumed extirpated in Quebec, and is imperiled or vulnerable in all the states from which it is known. It listed as Special Concern in Minnesota, Wisconsin and Michigan, and Endangered in Maryland. The only extant Canadian population is within Pinery Provincial Park where management provides an opportunity for, but not assurance of, protection of this insect and its habitat. ■

Oldgrowth Specklebelly Lichen



Photo: © Margaret Symon

Scientific name

Pseudocyphellaria rainierensis

Taxon

Lichens

COSEWIC Status

Special Concern

Canadian Range

British Columbia

Reason for Designation

This foliose, tree-inhabiting lichen is endemic to old-growth rainforests of western North America. In Canada, it is limited to coastal or near-coastal areas of southern British Columbia. Recent discoveries of additional records have only slightly expanded the known range of occurrence, and the lichen remains threatened by ongoing loss of old growth forests through clear-cut logging. The low dispersal ability of its heavy propagules contributes to its rarity, as does its restriction to nutrient hotspots, such as dripzones under old Yellow-cedars, toe slope positions, and sheltered seaside forests. It tends to occur discontinuously and on very few trees in the stands where it is established.

Species Information

The Oldgrowth Specklebelly lichen (*Pseudocyphellaria rainierensis* Imsh.) is a distinctive macrolichen characterized by large, draping, curtain-like lobes, a pale greenish-blue upper surface, a green algal photobiont (accompanied by a cyanobacterial photobiont in the form of internal cephalodia), ragged, lobulate to isidiate lobe margins, and a pale

lower surface bearing scattered small white spots (pseudocyphellae).

Distribution

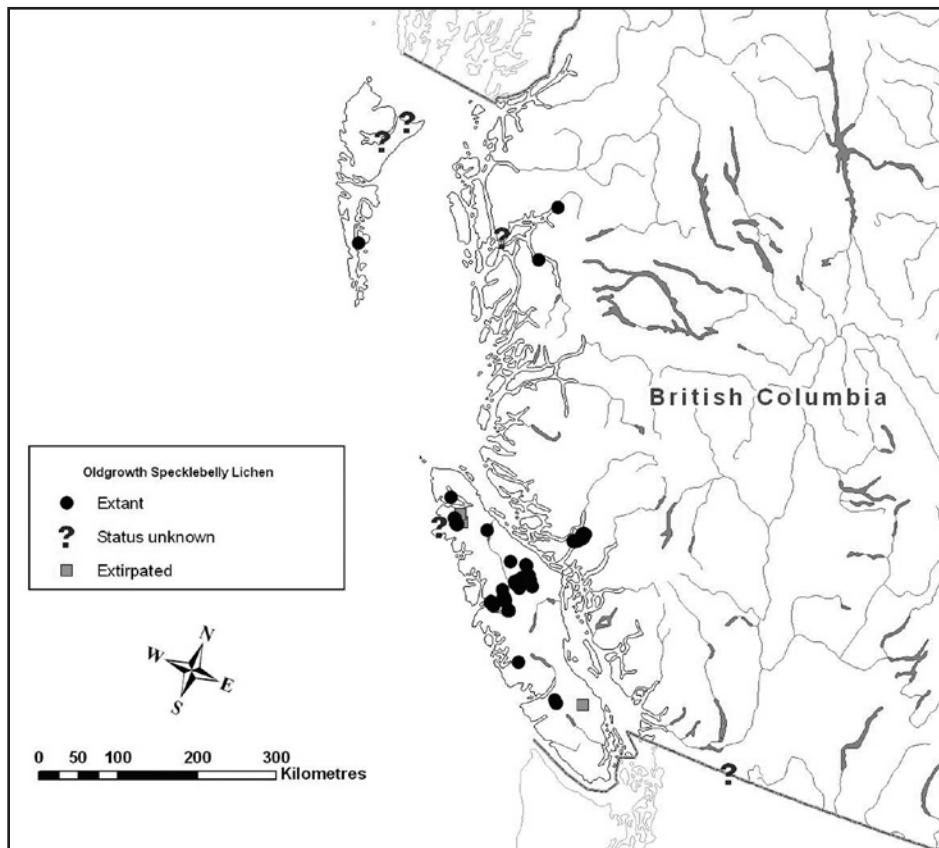
Oldgrowth Specklebelly is endemic to western North America, where it grows in humid coastal regions from southeast Alaska (58°N) to Oregon (43°N). In the northern portions of its range, it is restricted to within a few kilometres of the ocean, though in southern Canada it extends somewhat farther inland. In Washington and Oregon it is mostly absent from the immediate coast, occurring instead along the windward slopes of the Cascades.

Habitat

In Canada, Oldgrowth Specklebelly colonizes the branches and trunks of conifers in ecologically stable lowland to mid-elevation oldgrowth forests, especially in localized nutrient hotspots. Nutrient hotspots tend to develop in three situations: (1) within the drip zones of large old Yellow-cedar trees, usually on hillsides; (2) in the (nutrient receiving) toe-slope position at the base of hillsides, particularly in localities underlain by calcareous bedrock; and (3) in well ventilated seaside trees in coves sheltered from storm winds. The first habitat type appears to be of greater importance in the northern portion of the range, where climatic conditions suitable to Oldgrowth Specklebelly overlap with the highly acidic Coastal Crystalline Belt. Farther south, in southern British Columbia and adjacent portions of the U.S. northwest, toe-position localities assume greater importance. Here large old Yellow-cedar trees carry soil nutrients into the forest canopy, and so create the elevated nutrient conditions required for successful establishment by Oldgrowth Specklebelly.

Biology

Oldgrowth Specklebelly is an asexual species in which reproduction depends on the propagation and dissemination of thallus fragments, largely in the form of marginal lobules – probably an adaptation for rapid colonization of nutrient-enriched conifer branches prone to heavy overgrowth by mosses. Because marginal lobules are relatively heavy, they can be expected to disperse over only short



Known distribution of Oldgrowth Specklebelly Lichen in Canada.

Source: Modified from April 2010 COSEWIC Status Report

distances from the host lichen. Presumably this helps to explain this species' highly discontinuous occurrence, which is further enforced by its specific requirement for nutrient-enriched microsites. Rates of dispersal to new host trees are thus very slow in Oldgrowth Specklebelly, apparently operating at a time scale of hundreds of years even within a single stand. Deep shade is detrimental to this species, as is exposure to full sunlight; only in open, humid, stable forest ecosystems does Oldgrowth Specklebelly encounter environmental conditions suitable both for establishment and growth. Oldgrowth stands are thus critical to the long-term persistence of this species.

Population sizes and trends

Oldgrowth Specklebelly has been documented in Canada from 51 localities. At least five of these localities, however, no longer support this species, while its status at another six localities is unknown. Recent thallus counts across the remaining 41 localities yielded 2277 thalli. At a

majority of these localities, moreover, Oldgrowth Specklebelly colonizes only one or a few host trees. Its absence from apparently suitable old growth forests elsewhere is presumably owing to inefficient dispersal. This is especially the case in northern portions of the range, where it is restricted mostly to the dripzones of Yellow-cedar. South of about 51° N, it seems to be somewhat more broadly distributed, relying both on Yellow-cedar and on old growth forests occurring in nutrient-receiving toe-position sites. Both habitat types are in rapid decline owing to resource extraction.

Limiting factors and threats

Oldgrowth Specklebelly is confined in Canada to coastal temperate rainforests older than about 200 to 300 years. Here it is further restricted to the branches and trunks of conifers growing in nutrient hotspots, especially nutrient-receiving toe-positions and the dripzones of large old Yellow-cedar trees. Because such habitats types are necessarily

restricted to very old forest ecosystems, it is clear that oldgrowth is critical to the long-term survival of Oldgrowth Specklebelly. Hence any human activity or natural process that results in a loss or significant reduction in oldgrowth constitutes a major threat to this species. On northern Vancouver Island, nearly half of the original oldgrowth forest land base within the horizontal and elevational range of Oldgrowth Specklebelly has been harvested, most of it within the past 25 years. In a rainforest region where wildfire is rare, industrial-scale forestry thus stands as by far the most important cause of decline in Oldgrowth Specklebelly – both as a result of habitat loss *per se*, and, in the long term, of ongoing fragmentation of the remaining oldgrowth islands.

Special significance of the species

Oldgrowth Specklebelly is an indicator of long-term environmental continuity in the oldest coastal temperate rainforests of western North America.

Existing protection or other designations

Five of the 51 Canadian localities from which Oldgrowth Specklebelly has been documented to date are situated in permanently designated protected areas (National or Provincial Parks). This species has recently been confirmed as extant at only two of these five localities since 2003. Eighteen additional localities receive partial, unlegislated protection within Wildlife Tree Retention Areas, Oldgrowth Management Areas, and Riparian Reserve Zones. Four localities (and a possible fifth locality) are known to have been extirpated by forest harvest, and the remaining 24 localities are on public lands that are potentially available for forest harvest. ■

Pale-bellied Frost Lichen



Photo: © Natalie Cleavitt

Scientific name

Physconia subpallida

Taxon

Lichens

COSEWIC Status

Endangered

Canadian Range

Ontario

Reason for Designation

This lichen is an eastern North American endemic that, in Canada, is restricted to 2 known locations in southern Ontario. The lichen grows as an epiphyte on hardwoods and requires bark with high pH and high moisture holding capacity. Only 45 individuals are known, growing on 16 trees. The lichen appears to have suffered a dramatic population decline throughout its range since the early 1900s; in Canada 4 historical sites have been lost. The major threat to the lichen is air pollution and timber harvest.

Wildlife species description and significance

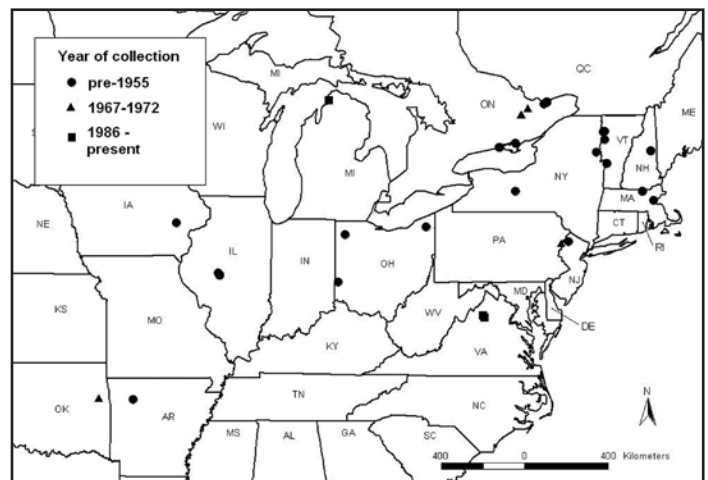
Physconia subpallida is a rosette forming foliose lichen that can be strikingly white in the field. There are several distinctive characters that separate it from other eastern North American *Physconia* lichens including: 1) absence of common means of asexual production in lichens (isidia and soredia), 2) presence of fruiting bodies (apothecia) and/or lobules, and 3) a pale undersurface with spreading attachment structures (rhizines) in distinct clusters.

Physconia subpallida is an eastern North American endemic. It is the only eastern North American member of the genus that is commonly fertile, has lobules, and has a pale undersurface. These unique characters increase the importance of this species to understanding the genus as a whole. Two distinct forms of this lichen are known. One form is commonly fertile with flattened appressed lobules and the other form is generally sterile with cylindrical erect lobules. This presents a opportunity to investigate the development of apothecia and study the expression of the same morphological structures in a single fungal genome.

As a lichen that appears to be extremely sensitive to air pollution, *Physconia subpallida* may be a valuable indicator of forest health and air quality in southern Ontario.

Distribution

Physconia subpallida is an eastern North American endemic occurring only in the United States and Canada. It is known, at least historically, from Massachusetts and New Hampshire west to southern Ontario, Michigan, and eastern Iowa south to central Illinois, Ohio, and Virginia. It is also disjunct in the Ozarks region of eastern Oklahoma and northwestern Arkansas. In Canada, *P. subpallida* is restricted to southern Ontario where it is at the northern edge of its range. There are only two known locations.



North American distribution of Pale-bellied Frost Lichen.

Source: Modified from November 2009 COSEWIC Status Report

Habitat

This lichen mainly grows as an epiphyte on hardwood trees, but has also been collected from fence rails and rocks, including limestone. The host trees *P. subpallida* is known to occur on include: *Fraxinus* sp. (Ash), *Juglans nigra* (Black Walnut), *Ostrya virginiana* (Hop-hornbeam), and *Ulmus* sp. (Elm; including *Ulmus americana*). At the two known extant sites in Canada the lichen is restricted to *Ostrya virginiana*. The lichen seems to require a substratum with relatively high pH and moisture holding capacity.

Biology

Physconia subpallida can reproduce via sexually and asexually produced spores. It may also be able to reproduce asexually via dispersal of lobules. However, the lichen lacks common means of asexual production in lichens (isidia and soredia), and it is possible that the larger lobules are not as easily dispersed as these more common, smaller propagules.

Population sizes and trends

The vast majority of collections from throughout the range of the lichen were made before 1973 with four recent collections from Canada and two from the USA. In Canada, there are a total of two extant and approximately four historical (last documented over 100 years ago) populations, and the lichen appears to have suffered a dramatic decline in populations since

the early 1900s. None of the historical populations documented in southern Ontario is thought to occur today. One of the extant populations (Billa Lake in Lanark County) appears to have remained stable since its discovery in 2004 although more time and additional survey work are needed to determine the stability of this population. A comparison of recent collections with older herbarium collections indicates that both the frequency of apothecia and the size of thalli have decreased over time.

Threats and limiting factors

Habitat availability for this lichen in southern Ontario has been negatively affected, over the past century, primarily by air pollution as well as by changes in land use and forest composition. The two extant Canadian populations are both currently unprotected on provincial lands that are open to logging operations. Improvements in air quality have significantly decreased sulfate deposition and so this rare lichen may be able to expand its populations in the long-term.

Existing protection or other designations

There is currently no legal protection for *Physconia subpallida*. The lichen has previously been assigned a provincial conservation status rank of S1 (critically imperiled) in Ontario and a global conservation status rank of G3 (uncommon worldwide). ■

Queensnake



Scientific Name

Regina septemvittata

Taxon

Reptiles

COSEWIC Status

Endangered

Canadian Range

Ontario

Reason for Designation

This species has a restricted and shrinking distribution in southwest Ontario. It consists of scattered small populations which are isolated due to habitat fragmentation and the species' limited dispersal capacity. Over the last decade, the number of extant locations has declined and the species' riparian and riverine habitat has continued to be lost and degraded. The species is limited by its extremely specialized diet and threatened by decline in its prey of freshly moulted juvenile crayfish. Other threats include persecution and effects of invasive Zebra Mussels and Common Reed.

Species information

The Queensnake is a slender, medium sized, semi-aquatic snake. Its average snout-vent length is about 40-50 cm, with total length averaging 40 to 60 cm to a maximum of about 90 cm. The dorsal colour is brown or dark olive with three narrow black stripes running down the midline and along each side. The belly is

pale yellow or cream with four dark brown to black longitudinal stripes, often becoming mottled with age.

Distribution

The Queensnake is relatively widespread in eastern North America, ranging from southeastern Pennsylvania, western New York and southwestern Ontario, west to southeastern Wisconsin and south to the Gulf Coast from the Florida panhandle to eastern Mississippi. The Canadian range is highly localized and sporadic and is restricted to southwestern Ontario. The Queensnake occurs west of the Niagara Escarpment, from the northern portion of the Bruce Peninsula, south to Lake Erie and west to Essex County.

Habitat

Queensnakes are most commonly associated with rocky streams and rivers, but are also occasionally found in marsh, pond, and lake shore habitats. This highly aquatic species is usually found within 3 m of the shoreline and only at sites where there is an abundance of crayfish, its primary food source.



Biology

Queensnakes feed almost exclusively on freshly moulted crayfish. In Ontario, they are generally active from late April to late September and likely hibernate communally. In parts of the U.S., female Queensnakes reach sexual maturity in 3 years, and males in 2 years. Mating can occur in either spring or early autumn. The Queensnake is viviparous, with 5 to 23 young usually being born in late August or September.



Global Range of the Queensnake (Canada and United States).

Source: April 2010 COSEWIC Status Report, courtesy of the Natural Heritage Information Centre

Population sizes and trends

Only one Ontario population has been surveyed thoroughly enough to estimate population size. Thus overall abundance in the province is difficult to estimate. Of the approximately 29 known populations (Element Occurrences or EOs) in Ontario, 14 have been reconfirmed since 1990, and 15 are “historic” (no confirmed records in past 20 years) or extirpated. Targeted recent efforts to locate Queensnakes at 14 of these 15 sites have failed to find any specimens. No snakes have been observed at nine EOs in over 30 years and these nine populations are considered extirpated. One additional EO has no sightings recorded since 1997 despite repeated surveys from 2002 to 2010. Thus, significant losses appear to have occurred in many parts of the known Canadian range of this species. Queensnakes have been found at four previously unknown sites since 2000, but these are unlikely to represent newly established populations.

Limiting factors and threats

Loss, fragmentation and degradation of habitat and decline in prey abundance represent the most significant threats to Queensnakes in Ontario. The narrow fringe of riparian habitat necessary for Queensnakes’ survival has been greatly reduced in both quality and quantity. Urbanization surrounding riparian habitat has decreased water quality and increased fortification of banks, water diversion and removal, spread of exotic vegetation, and threats from human presence. In agricultural areas, livestock with free access to riverbanks, farming to the edge of waterways, and clearing of vegetation and debris along shorelines have further degraded shoreline and aquatic habitats and added silt and contamination from increased erosion. Natural and artificially induced plant succession (non-native species), most notably of large woody vegetation and invasive *Phragmites*, has also reduced habitat quality and abundance at historic Queensnake sites. Additionally, direct human persecution and accidental mortality through human recreational activities further contribute to losses.

The Queensnake’s specialized diet makes it exceptionally vulnerable to declines in prey (crayfish) populations. Any factors that negatively impact crayfish will similarly affect Queensnakes. In many areas, the larger non-native Rusty Crayfish (*Orconectes rusticus*) is displacing native crayfish, though the impact of this introduced crayfish on Queensnakes is currently unknown. Similarly, occupation of Queensnake habitat by Zebra Mussels (*Dreissena polymorpha*), Round Goby (*Neogobius melanostomus*), Common Carp (*Cyprinus carpio*) and invasive, non-native vegetation may threaten some populations.

Special significance of the species

The Queensnake reaches the northern limit of its range in southern Ontario, and therefore snakes in this region may have genetic characteristics distinct from more centrally located populations. In the few Ontario watersheds where the Queensnake occurs, the species may serve as an indicator of environmental quality because its aquatic habits and specialized diet may make it particularly susceptible to water and prey contamination. In addition, its crayfish prey

is vulnerable to contamination and increased silt in the water, and declines in crayfish numbers will be reflected in the viability of Queensnake populations. The highly specialized feeding behaviour of the Queensnake make it an interesting species from ecological and evolutionary perspectives.

Existing protection or other designations

The Queensnake is legally protected under the *Ontario Fish and Wildlife Conservation Act* as a specially protected reptile, which prohibits the collection, hunting, possession or sale of reptiles except under authority of a licence. As a provincially Threatened species, it is protected under the *Ontario Endangered Species Act* (2007) and its habitat will be legally regulated. Because the majority of

Queensnake habitat in Ontario occurs within the floodplains of streams and rivers, the habitat is afforded some protection from development through the *Conservation Authorities Act*. The *Provincial Policy Statement* (PPS) issued under Section 3 of the *Planning Act* states that development and site alteration will not be permitted in the significant habitat of endangered and threatened species. Additionally, the *Fisheries Act* prohibits harmful alteration, disruption or destruction of fish habitat, and therefore could provide indirect protection for aquatic Queensnake habitat as well. In 2002, the Queensnake was designated as Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The species is currently listed on Schedule 1 of the federal *Species at Risk Act* (SARA), which protects its habitat on federal lands. ■

Redroot



Photo: © Nova Scotia Museum of Natural History
– Alex Wilson

Scientific Name

Lachnanthes caroliniana

Taxon

Vascular plants

COSEWIC Status

Special Concern

Canadian Range

Nova Scotia

Reason for Designation

A highly disjunct Atlantic Coastal Plain species restricted in Canada mainly to two connected, extensive, lakeshore populations in southern Nova Scotia. Comprehensive new surveys and other information indicate that the risk of extinction for this species is less than previously thought. Its lakeshore habitat has been subject to slow but steady loss and decline in quality due to cottage and residential development for 30 to 40 years. Losses are likely to continue through the foreseeable future with new development and intensification of existing development, but the proportion of habitat currently developed is still low and the species' locally widespread occurrence and asexual reproduction mitigates the threat of extirpation in the short term.

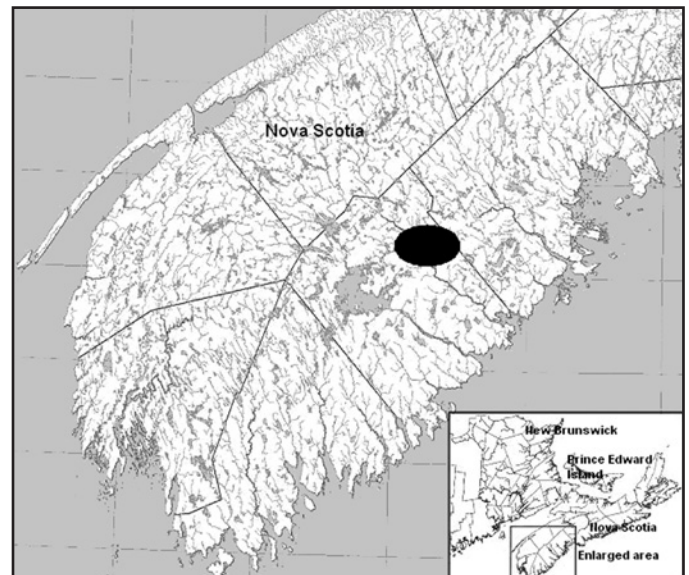
Species information

Redroot (*Lachnanthes caroliniana*) is an herbaceous perennial within the monocot family Haemodboraceae. Its common name comes from the bright orange-red

rhizomes, usually visible at or near the soil surface, and its red sap. Redroot has an erect, unbranched stem 15 to 40 cm tall (to 100+ cm in the southern part of its range), and is white-wooly when young, becoming tawny-hoary with age. The leaves are mostly basal and iris-like in shape and arrangement. Inflorescences are tight, flat-topped clusters of flowers having 6 dull yellow petal-like tepals. Under the most recent taxonomic treatment, Redroot is the only species in the genus *Lachnanthes* and the only Canadian and North American member of its predominantly tropical family. Despite a variety of synonyms having been applied to Redroot, there has never been any dispute regarding its taxonomic rank or its status as a distinct species.

Distribution

Redroot is fairly common within about 120 km of the Atlantic coast from eastern Louisiana to North Carolina and in southern New Jersey. It is rare in every other jurisdiction in which it occurs, from Virginia to Long Island, New York and in Nova Scotia. In Canada, Redroot is known from eight connected lakes in southern Nova Scotia. Its Extent of Occurrence is 117 km² but it occupies less than 1.24 km² of actual habitat.



Canadian distribution of Redroot.

Source: Modified from November 2009 COSEWIC Status Report

Habitat

Redroot is a species of wet, acidic, nutrient-poor habitats, occurring primarily within the seasonally inundated shoreline zone of lake and pond shores in the northern part of its range. In the southern portion of its range, it also occurs in wet depressions within mesic pine forests and savannas and is frequent within these habitats in anthropogenically disturbed areas such as trails, ruts and ditches. In Nova Scotia, it is found on lakeshores on boulder, cobble, gravel, sand and peat substrates where seasonal flooding, wave action and ice-scour limit the establishment of more competitive species. Redroot tends to be most abundant on windward (west and south-facing) shores where wave action and ice scour are greatest. Although it can occur in areas remaining shallowly inundated throughout most years, flowering occurs primarily toward the landward limit of its shoreline distribution.

Population sizes and trends

Redroot population estimates could vary considerably depending on the percentage of infertile plants, making up about 99.9% of the total population, that are considered to be sufficiently mature to be reproductive, both asexually and sexually. Relative size of fertile and infertile plants suggests some portion of infertile plants are likely mature. In 2007, the estimated number of fertile plants was 1,000 to 1,100 whereas the total number of stems was roughly estimated at 675,000 to 750,000 in two extensive populations. However, perhaps only about 80% + (~ 540,000 to 600,000) might be considered sufficiently mature so as to be able to reproduce asexually and sexually. Population trends cannot be directly assessed, but based on habitat trends, populations are likely to have been slowly and continuously declining for more than the past three generations (15 years) as a result of cottage and residential development, which is likely to continue through the foreseeable future. Neither previous nor near-future losses are likely to exceed 30% of the total population.

Limiting factors and threats

Shoreline development is the major anthropogenic threat. Approximately 95% of the 690 buildings around lakes supporting Redroot have been built in the past 40 years. Several hundred cottages and homes likely have Redroot on their properties with more built annually. Where Redroot and shoreline development coincide, there is most often some but not complete loss of habitat and populations. No more than about 6% of available shoreline on lakes where Redroot is present has been developed at present but about 89% of that shoreline is in private hands. Shoreline development is unlikely to eliminate the species entirely but ongoing losses through new development and intensification of existing development are likely to continue through the foreseeable future.

With about 99.9% of plants infertile, a low rate of flowering and seed production, different from the southern part of the range, may be a natural limiting factor. This does not appear to limit persistence at known sites but could explain the limited Nova Scotia distribution and extensive unoccupied but apparently suitable habitat both near known populations and further south in Nova Scotia.

Special significance of the species

Redroot is biogeographically interesting, even among the many Atlantic Coastal Plain disjuncts in southern Nova Scotia, because of its strongly southern distribution in its American range. Being highly disjunct at the extreme northern limits of the species' distribution, the Canadian population could be significant for the genetic diversity of the species. Aboriginal peoples, including Mi'kmaq in Nova Scotia, have used the plant as a dye and medicine and Redroot extracts have been shown to have a phototoxic effect on microorganisms. Redroot's unusual biochemistry has also been investigated and further work could reveal useful economically valuable properties. Redroot has also been noted as a waterfowl food source, but due to its rarity it is probably not important in that regard in Canada.

Existing protection or other designations

Redroot is rare in ten of 17 provinces and states in which it occurs and has an additional province or state status designation in seven of those jurisdictions. Redroot was assessed by COSEWIC as Threatened in May 2000, and is protected as a

Threatened species under the federal *Species at Risk Act* and the Nova Scotia *Endangered Species Act*. Alteration of its shoreline habitat is regulated by the province, although lack of public knowledge and compliance and lack of resources for government enforcement limits the extent to which regulations actually protect Redroot. ■

Rusty-patched Bumble Bee



Photo: © Johanna James-Heinz

Scientific Name

Bombus affinis

Taxon

Arthropods

COSEWIC Status

Endangered

Canadian Range

Ontario, Quebec

Reason for Designation

This species, which has a distinctive colour pattern, was once commonly found throughout southern Ontario. Active searches throughout its Canadian range have detected only one small population over the past seven years which suggests a decline of at least 99% over the past 30 years. It is threatened by disease, pesticides, and habitat fragmentation, each of which could cause extirpation in the near future.

Species information

The Rusty-patched Bumble Bee (bourdon à tache rousse) (*Bombus affinis*) is one of five North American members of the subgenus *Bombus*. It is a medium to large-sized bumble bee with several distinguishing characters. Males and workers have a second abdominal segment that is half reddish-brown and half yellow. Queens can be difficult to distinguish from some other species.

Distribution

This species ranges from southern Ontario and southwestern Quebec in the north, south to Georgia and west to the Dakotas. In the southern parts of its range it occurs primarily at high elevations.

Habitat

The Rusty-patched Bumble Bee has been recorded from diverse habitats including mixed farmland, sand dunes, marshes, urban and wooded areas. It has been recorded feeding from a variety of plant genera for pollen and nectar. It usually nests underground in abandoned rodent burrows.

Biology

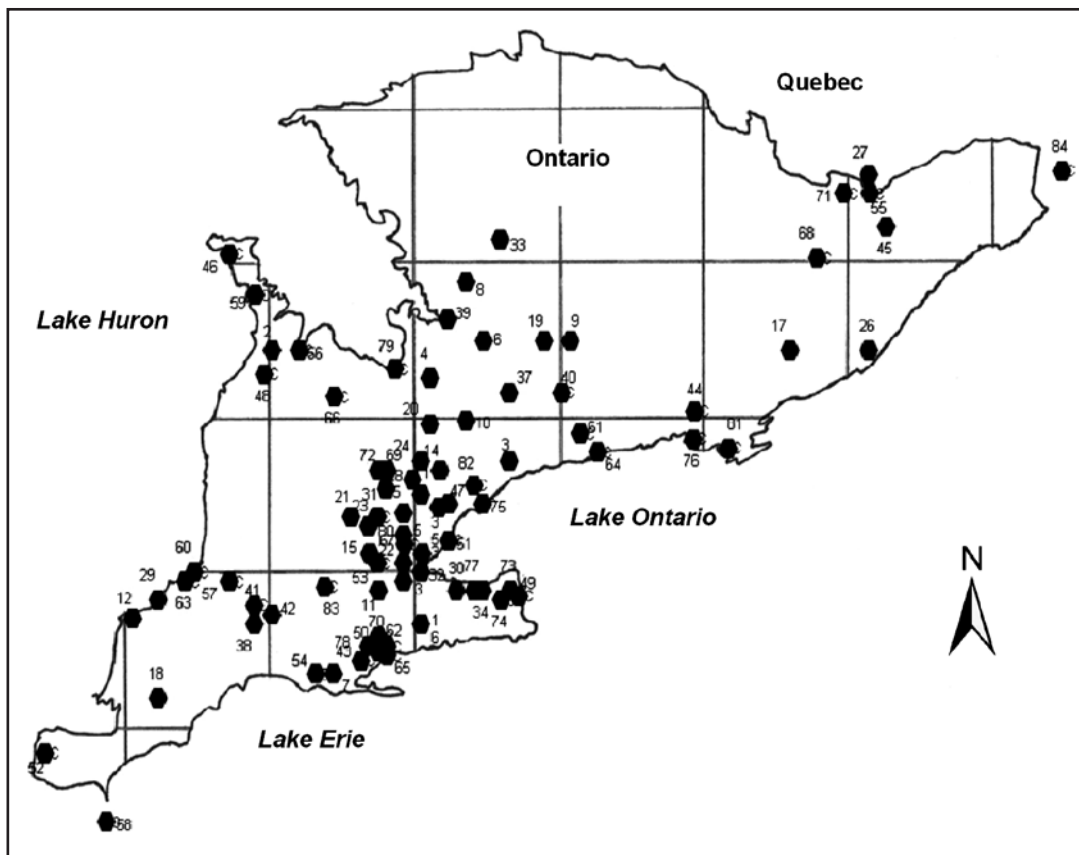
This species, like all bumble bees, has an annual life cycle. Mated queens emerge from diapause in the spring and look for potential nest sites. The queen then forages and lays eggs to produce a brood of workers. Workers hatch and take over nest care and foraging. Towards late summer, males and new queens are produced. These reproductive individuals leave the colony and mate. Mated new queens go into hibernation while all other castes perish. Like other bumble bees, Rusty-patched Bumble Bee individuals have warning colouration and females will sting when touched.

Population sizes and trends

In the 1970s, the Rusty-patched Bumble Bee was relatively common compared to other bumble bee species. Dramatic declines were noticed by the mid-1990s in Canada and in the USA. In Canada, only three specimens were observed (one in 2005 and two in 2009) despite extensive targeted searches from 2005-2009.

Limiting factors and threats

The reason for the sudden decline of this previously common species throughout its large range is unknown. It has been hypothesized that the species suffered from introduced diseases from managed bumble bees used for greenhouse pollination.



Rusty-patched Bumble Bee records from 1899 to 2000 in Canada (Ontario and Quebec).

Source: Modified from April 2010 COSEWIC Status Report

Additionally, habitat loss and the widespread use of a new group of pesticides likely pose substantial threats.

Special significance of the species

The Rusty-patched Bumble Bee is in flight for a longer period than are most other Bumble Bees and it visits numerous plant genera in many habitat types. Thus, it is likely an important pollinator of both agricultural crops and native flowering plants. The loss of this species may result in increased vulnerability of native mammals, birds and other organisms which rely

on pollinated plants for food and shelter. This species has also been used in the past for scientific study as it is easily reared in captivity and has become an important reference species for research in physiology and sociobiology.

Existing protection or other designations

The Rusty-patched Bumble Bee is listed on the Xerces Society's red-list of pollinator insects as 'Imperiled'. No practical or legal protection exists in Canada or the USA. ■

Swift Fox



Photo: © Lu Carbyn

Scientific Name

Vulpes velox

Taxon

Mammals

COSEWIC Status

Threatened

Canadian Range

Alberta, Saskatchewan

Reason for Designation

This species was extirpated from Canada in the 1930s. Following reintroduction programs in Alberta and Saskatchewan initiated in 1983, they have re-established populations in these areas and in northern Montana. Population numbers and distribution have increased since that time, with the current estimate in Canada having doubled to 647 since the last COSEWIC assessment in 2000. Connectivity between populations has also improved during this time, particularly through northern Montana. Since 2001, population numbers and distribution have remained stable and habitat for this species within Canada appears to be saturated. Most improvement in overall population status can be attributed to populations in Montana, which are still demonstrating increasing trends in numbers and distribution. Deteriorating habitat in Canada and the threat of disease (as seen in other canids) could threaten the continued recovery of this species.

Species information

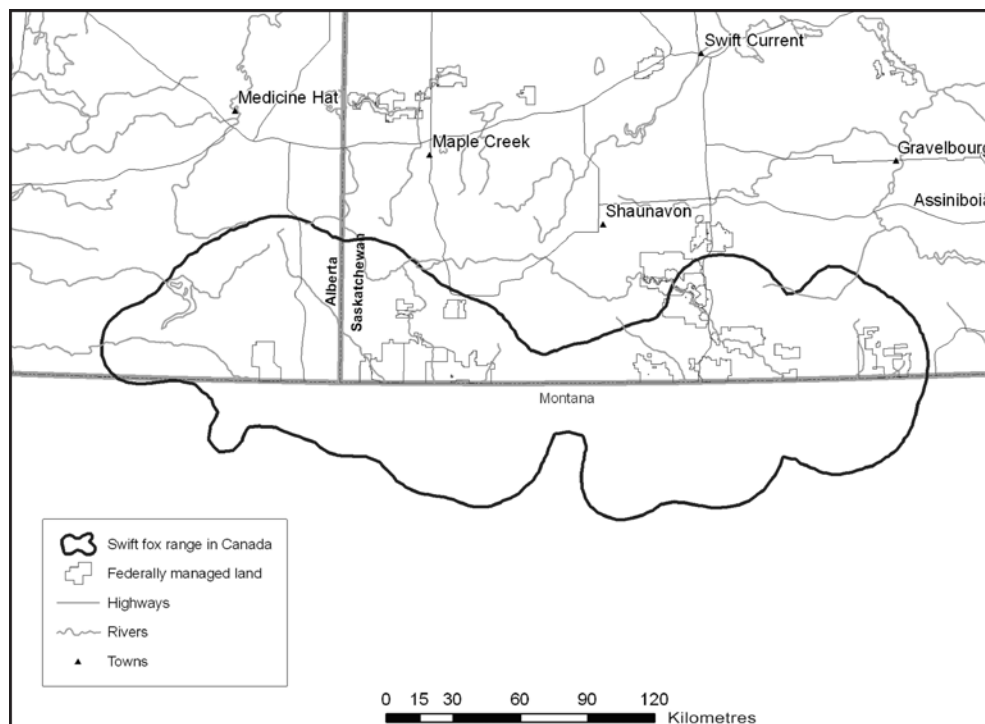
Standing 30–32 cm at the shoulder with a body mass of 1.6–3.0 kg, the Swift Fox (*Vulpes velox*) is North America's smallest canid. Males are slightly larger than females. The fur is long and dense in winter. The upper parts are generally dark buffy-grey, the sides, legs, and beneath the tail are orange-tan, and the undersides are buff to pure white. In summer, the fur is shorter and more rufous. Swift Foxes have black patches on either side of their muzzles and black-tipped tails.

Distribution

The historic range of Swift Foxes extended from central Alberta, south to central Texas, and from North Dakota, west to central Colorado. In Canada, they originally occurred from the Pembina Hills in Manitoba, across southern Saskatchewan, and west to the foothills of the Rocky Mountains in Alberta. Having disappeared from Canada by the 1930s their current presence on the Canadian prairies is a result of a reintroduction program initiated in 1983. Most Swift Foxes currently occur in the southernmost portion of the prairies near the Alberta-Saskatchewan border, in and around Grasslands National Park in south-central Saskatchewan.

Habitat

Swift Foxes generally inhabit short- or mixed-grass prairie on level terrain or gently rolling hills. They usually select areas with short, sparse vegetation and topographic features like canyons, steep hills, or coulees. The quality of Swift Fox habitat is related to prey availability (particularly fossorial mammals) and predator abundance. They prefer relatively dry areas, and avoid cropland, fragmented habitats, and those with large elevation changes. Swift Fox range encompasses some of the most modified landscapes in North America, and conversion of native prairie to agriculture has been implicated as a primary reason for the historical range contraction of this species. Current estimates indicate that only 25–30% of original Canadian grassland habitat remains, and that at least 70% of native Canadian prairie has been converted for agricultural use. Energy development and associated road networks are currently the dominant agent of land use change.



Current Swift Fox distribution in Canada and northern Montana.

Source: November 2009 COSEWIC Status Report, courtesy of Parks Canada

Biology

Swift Foxes are opportunistic foragers that eat mammals, birds, insects, plants, and carrion, as well as bird eggs. Diet reflects the diversity and abundance of local prey species, and is highly seasonal. Swift Foxes either dig their own dens or modify those of other species. They are one of the most burrow-dependent canids, using dens throughout the year as refugia from predators, protection from extreme weather, shelter to prevent excess water loss, periodic resting cover, and as places to raise young. In Canada, Swift Foxes begin breeding in mid-February, and after a 51-day gestation, females have litters of 2–6 kits. Kits disperse between 9.5 and 18 months of age over distances typically less than 15 km from the natal area. Swift Foxes that survive their first year usually live for 3–7 years. They are territorial, with home ranges averaging 32 km² in size – larger than they are within core Swift Fox range, reflecting the more marginal habitat at the range periphery. Coyotes (*Canis latrans*) are the primary predator, followed by Golden Eagles (*Aquila chrysaetos*), and American Badgers (*Taxidea taxus*).

Population sizes and trends

The most recent population estimates in Canada indicate there are approximately 647 Swift Foxes in Canada, divided between the Alberta-Saskatchewan border (Border) population (513) and the Grasslands National Park (GNP) population (134). Over time, the populations from these two original reintroduction sites have become one meta-population, together with northern Montana, with evidence of long-distance dispersal throughout. Overall, Swift Fox populations in Canada increased by 130% between 1996 to 2006, although these estimates are overly precise because there are no confidence limits associated with these data. Swift Fox population density in Canada (Border and GNP populations only) is about 5.5 foxes/100 km², and the sex ratio is 52 males:48 females.

Limiting Factors and Threats

The primary well-documented natural factor limiting Swift Fox abundance and distribution in Canada is predation by Coyotes and Golden Eagles. Habitat

loss, degradation and disturbance from development activities is a growing concern within Swift Fox range. Although there is no evidence to date that disease has caused significant Swift Fox mortality, the potential exists, in light of high seroprevalence to several diseases, the small and connected population, and the well-recorded incidence of disease having suddenly decimated other endangered canid populations. Competition with Coyotes and Red Foxes (*Vulpes vulpes*) are an additional potential limiting factor. Other threats to Swift Foxes in Canada include poisoning, trapping, and vehicle collisions.

Special significance of the species

Able to run at speeds of up to 60 km/h, Swift Foxes are one of the fastest animals in North America. As meso-predators, they are important to the biodiversity of the Canadian prairies. Swift Foxes also play a vital role in the spirituality of some of Canada's First Nation cultures.

Existing protection or other designations

Globally, the Swift Fox is ranked as Least Concern by the *International Union for Conservation of Nature [IUCN] Red List of Threatened Species*. In May 2000, COSEWIC assessed the Swift Fox as Endangered. Currently, the Swift Fox is listed on Schedule 1 of the *Species at Risk Act*. Provincially, Swift Foxes are listed as Endangered under the *Alberta Wildlife Act and Regulation* and the *Saskatchewan Wildlife Habitat Protection Act*. About 45% of Swift Fox captures during the 2005–2006 census were located within one Swift Fox home range on federal lands under various levels of protection. ■

Threaded Vertigo



Photo: © Kristina Ovaska

Scientific Name

Nearctula sp.

Taxon

Molluscs

COSEWIC Status

Special Concern

Canadian Range

British Columbia

Reason for Designation

This minute terrestrial snail species is at the northern extent of its range, and found in lowland areas around the Strait of Georgia and on southern Vancouver Island. Most individuals live on the bark of Bigleaf Maple trees and appear to have poor capacity for dispersal between trees and sites. Removal of trees and habitat degradation due to urban expansion, roads and associated infrastructure, forestry, and agriculture are the main threats.

Species information

The Threaded Vertigo is a minute land snail with a high, rather cylindrical shell. The shell is about 2.4–3.3 mm high, dull, dark brown, and somewhat coarsely marked with fine, parallel growth lines. Within the opening of the adult shell, there are four white denticles (tooth-like protuberances); the immature shell lacks denticles. The Threaded Vertigo is currently without a formal scientific name due to its convoluted nomenclatural history, but the validity of the species is not in question.

Distribution

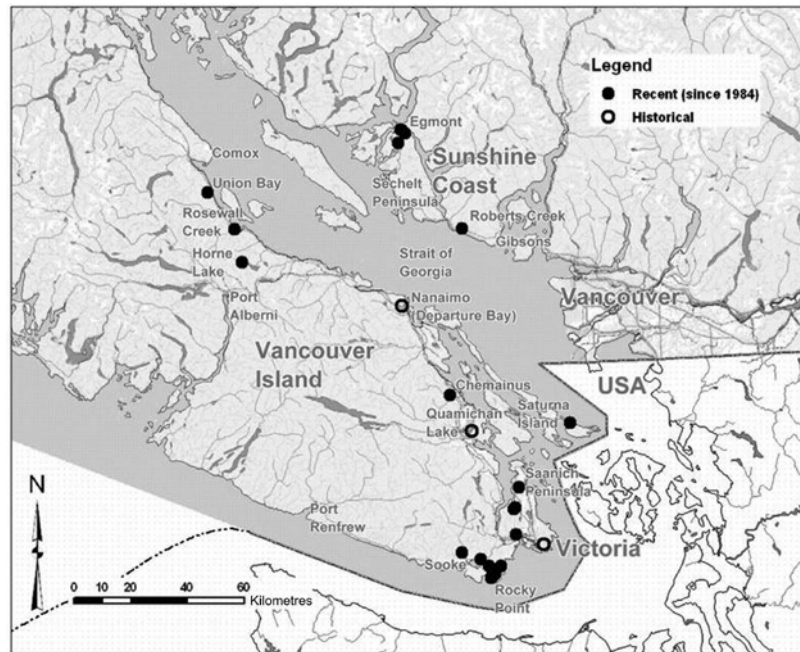
The global range of the species extends from southwestern British Columbia through western Washington State and Oregon to west-central California. In Canada, the species occurs on southern Vancouver Island, Saturna Island, and the Sunshine Coast on mainland British Columbia. There are 24 recent (since 1984) distribution records. On Vancouver Island, clusters of sites occur within the Capital Regional District (Victoria area), but the species is known from only scattered sites along the east coast, northward to just south of Courtenay. In the Strait of Georgia, the species is known from one site on Saturna Island. On the Sunshine Coast (B.C. mainland), it occurs at several places between Gibsons and Egmont.

Habitat

In British Columbia, the snails occur in moist deciduous and mixed-wood forests at low elevations, usually below 200 m. They are often associated with Bigleaf Maples and an understory of ferns and shrubs characteristic of moist, rich sites. Older riparian forests containing groves of large maples appear to be particularly suitable. The snails are largely arboreal and encountered most frequently on trunks of maples, where they occur within crevices of grooved bark or moss mats. They are occasionally found on other deciduous trees, on fern fronds, or on the ground within the leaf litter. The snails have a patchy distribution both within and among forest stands, and aggregations occur on some trees while others are devoid of snails.

Biology

Little is known about the biology of the Threaded Vertigo, and hence information has to be extrapolated from similar, related species. Like most land snails, the Threaded Vertigo is hermaphroditic (possesses both male and female reproductive organs), but the extent of cross-fertilization is not known. In similar species, eggs are laid singly. The lifespan is probably short, two years or less. The snails hibernate in winter and probably aestivate during dry periods in summer. Movements and active dispersal are limited, but passive transport on falling leaves during windstorms is plausible. The snails have been found in small



Canadian distribution of the Threaded Vertigo in southwestern British Columbia.

Source: April 2010 COSEWIC Status Report

groves of trees near roadsides and busy recreational trails, suggesting that they can tolerate some habitat disturbance, provided suitable moist microhabitats remain available.

Population sizes and trends

Few data are available on population sizes or trends. On occupied trees, 1–12 snails were found during searches of the lower 2 m of the trunk during field verification surveys on Vancouver Island and the Sunshine Coast. The snails appear to occur at much lower densities within the litter layer. Surveys in 2008 showed that the species has persisted at many sites over several years, but the size and viability of local populations are unknown.

Limiting factors and threats

The distribution of the species coincides with densely populated and highly modified parts of British Columbia. Much of the land conversion is historical in these lowland coastal areas, but human developments continue to encroach on remaining natural areas concomitant with an expanding population. Housing developments, road building and other associated infrastructure, agriculture, and forestry are shrinking

and fragmenting habitats. Most records for this species are from parks or federal lands protected from land conversion, but potential habitats on private lands throughout most of the species' range continue to diminish. Populations in protected areas are not necessarily secure due to habitat degradation from intensive recreational or other uses, and invasion by introduced plants and animals.

Special significance of the species

The species is of no known socio-economic or cultural significance. It contributes to the biodiversity of the rich, extraordinary arboreal communities supported by Bigleaf Maples. At suitable moist sites, epiphytic mosses, liverworts, lichens, ferns, and other vascular plants drape large old maples, in turn providing habitat for a variety of fungi, invertebrates, and other organisms. The ecological roles and services of the different components of these arboreal communities, including the Threaded Vertigo, are yet to be elucidated.

Existing protection or other designations

The Threaded Vertigo was designated Special Concern by COSEWIC in April 2010. ■

Tubercled Spike-rush



Photo: © Ruth Newell

Scientific Name

Eleocharis tuberculosa

Taxon

Vascular plants

COSEWIC Status

Special Concern

Canadian Range

Nova Scotia

Reason for Designation

In Canada, this sedge is known to exist only along peaty and sandy shorelines at six lakes in southwestern Nova Scotia. The use of all-terrain vehicles along the shores of the two larger lakes, where most of the Canadian population occurs, has degraded portions of the species' habitat. Cottage development and related impacts (water quality and habitat disturbances) are currently limited threats that have the potential to increase in the future. More intensive surveys of lakeshore habitats indicate that the species is somewhat more abundant than previously documented.

Species information

Tubercled Spike-rush (*Eleocharis tuberculosa*) is a perennial species of sedge. It is named for the prominent tubercle that adorns its fruit, distinguishing it from other similar species. The species grows in dense tufts or clumps, with stalks up to 40 cm tall, each with a pair of blade-less basal leaves. The inflorescence is reduced to a single terminal spike of

numerous, petal-less flowers containing both a pistil and stamens; each flower is concealed by a single scale. Many fertile stems can be produced from a single clump.

Distribution

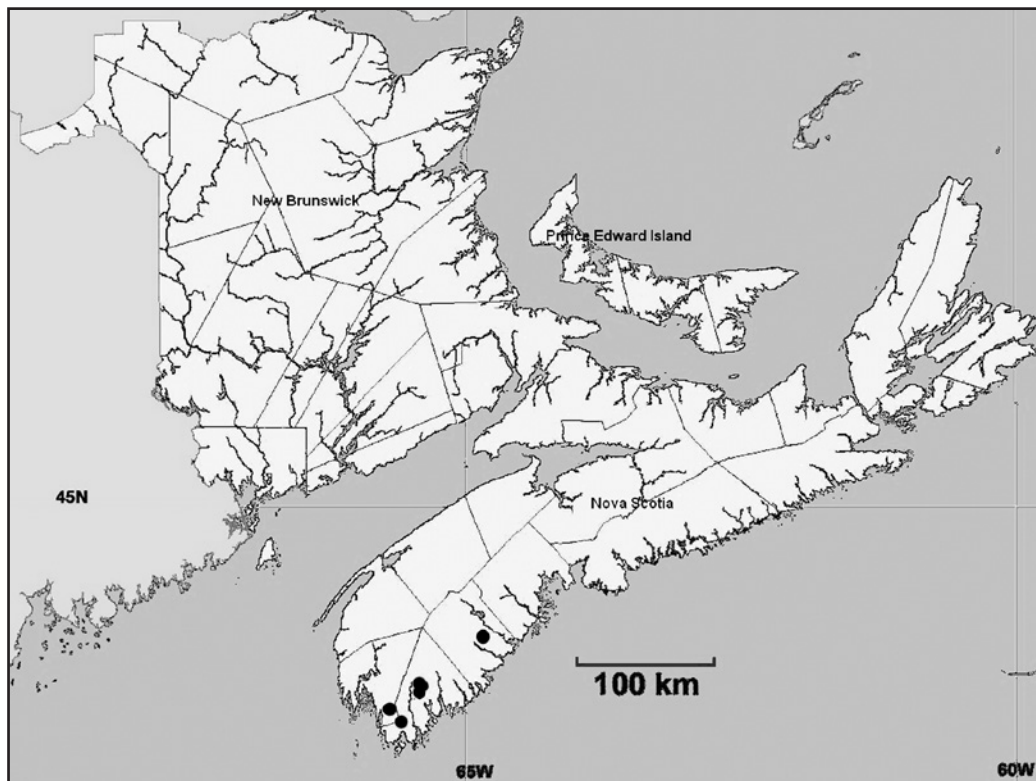
Tubercled Spike-rush is endemic to the Atlantic coastal plain. It is most common in the southern portion of its range, along the coastal plain from Texas to New Jersey. It is rare in the northeast USA, and in Canada is only known from five populations on six lakes in southwestern Nova Scotia. Its range in Canada covers an area of only 873 km². The populations, however, only occupy an area of habitat covering less than 1 km².

Habitat

In the Canadian portion of its range, Tubercled Spike-rush is restricted to open, peaty or sandy substrates and floating peat mats along lakeshores. It occurs within the shoreline zone that is annually flooded in spring and is frequently flooded during wet years in late summer and autumn, making detection difficult in some years. It is a relatively weak competitor, and requires periodic disturbance from flooding and ice scour to prevent more competitive species from crowding it out of available lakeshore habitat.

Biology

The species is a perennial, potentially fairly long-lived, although there is no direct evidence on longevity. It produces abundant seed in Nova Scotia, but no tests of seed viability or field observations of reproduction by seed are known. It appears not to reproduce vegetatively beyond expanding the size of its tight clumps, meaning that the clumps function as individuals for the purposes of assessment. It has been observed spreading within a lake via fragmentation and drifting of the peat mats on which it occurs. Waterfowl could be important in longer-distance dispersal. Evidence from other spike-rush species of fluctuating wetlands and other Atlantic Coastal Plain shoreline species suggests longer-term seed banking may be significant to its persistence at a site, but the importance of seed banking vs.



Canadian range of Tubercled Spike-rush, indicated by dots.

Source: Modified from April 2010 COSEWIC Status Report

vegetative survival during extended periods of high water is not known.

Population sizes and trends

Total numbers are not well defined. The Barrington Lake population was estimated in 2008 at 150,000 to 200,000. Great Pubnico Lake has a large and widely distributed population of “many thousands” over its 10 km length. The three other populations are much smaller, with best estimates of between 50 and 2,000+ individuals. Localized monitoring at Barrington Lake suggested declines since 2004 because of ATV disturbance but it is not clear what proportion of the Canadian population the apparent declines might represent or even whether declines are occurring across the whole Barrington Lake population. Plants were not found at the Western Lake subpopulation (only 4 plants known previously) in 2008, where the shoreline was flooded because of beaver damming. The Little Ten Mile population discovered in 2009 was also inundated because of beavers. Beaver-induced

flooding could have neutral or positive impacts on the longer term if the water level is later reduced, since the species is noted as requiring water level fluctuation and is likely well adapted to it, but the length of time mature plants or the seed bank can survive inundation is not known.

Limiting factors and threats

The peat substrate that *E. tuberculosa* depends upon is fragile and sensitive to human activity. ATV use appears to pose some threat to the largest population at Barrington Lake. Shoreline development is ongoing at Barrington Lake and to a lesser extent at Great Pubnico Lake. It likely contributes to increased ATV traffic within shoreline populations of Tubercled Spike-rush, but its direct impacts have been minor and localized to this point relative to the whole Canadian population. Shoreline development is anticipated to remain a relatively small threat through the next 10 years.

Special significance of the species

Eleocharis tuberculosa is biogeographically interesting, as one of a suite of Atlantic Coastal Plain endemics with disjunct populations in Nova Scotia. As a highly disjunct occurrence at the extreme northern limit of its range, the Nova Scotia populations may harbour significant genetic diversity for the species.

Existing protection or other designations

COSEWIC assessed *Eleocharis tuberculosa* as Threatened in May 2000; currently, it is listed as

Threatened on Schedule 1 by the Canadian *Species at Risk Act* and as Threatened on the Nova Scotia *Endangered Species Act*. It is Endangered in Maine, Pennsylvania and New Hampshire (where it is only known from historic records) and is Threatened in New York. It is more common further south in its range. Its habitat in Nova Scotia is generally provincial Crown land shoreline, and slightly over half of the shoreline frontage in areas supporting the species is on provincial Crown land. Crown land status does not appear to limit ATV disruption of the species' habitat. ■

Victoria's Owl-clover



Photo: © Matt Fairbairns

Scientific Name

Castilleja victoriae

Taxon

Vascular plants

COSEWIC Status

Endangered

Canadian Range

British Columbia

Reason for Designation

This small annual herb is confined to a very small area of British Columbia and one site in adjacent Washington State. The species is restricted to seasonally wet microhabitats within the highly fragmented and declining Garry Oak ecosystem. Five of the nine Canadian populations disappeared before 1957 and one other population may have been recently extirpated. The three to four extant populations are subject to ongoing competition with several invasive exotic plants and two of the populations are very small and occur in areas used for recreational activities where trampling is a continuing problem.

Species information

Victoria's Owl-clover (*Castilleja victoriae*) is a newly described species, previously misidentified as Paintbrush Owl-clover (*C. ambigua* ssp. *ambigua*). It is a small herb of the broomrape family with alternate, hairy, lobed stem leaves and no basal rosette. The

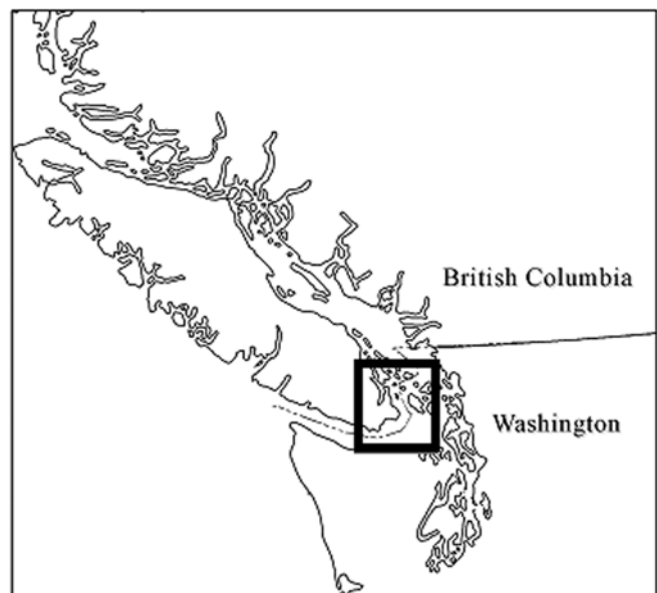
wider and more deeply lobed upper leaves grade into the floral bracts. The sepals are fused into a five-lobed calyx, and the petals are fused into a 2-lipped flower 10-18 mm long. The lower lip is lemon-yellow with minute white tips on each of the three lobes. The upper lip is slightly longer than the lower lip and creamy white. The fruits are brown, 2-celled capsules that split at the tip when the seeds are ripe. Each capsule bears 30-70 brown seeds with a sculptured seed coat.

Distribution

Victoria's Owl-clover is only found in a small area extending from southeast Vancouver Island east to the San Juan Islands of Washington State. Its range in Canada encompasses a narrow strip of coastline totalling about 9 km².

Habitat

Victoria's Owl-clover occurs in vernal seeps and along the margins of vernal pools within 50 m of the ocean. The sites are wet to inundated in autumn, winter and spring but dry during the summer. The actual total area of habitat occupied is only 600 m².



Global distribution of Victoria's Owl-Clover.

Source: Modified from April 2010 COSEWIC Status Report

Biology

Victoria's Owl-clover is a bee-pollinated annual that flowers and fruits in late spring and early summer. Seeds appear to delay germination until their dormancy is broken by cool weather.

Population sizes and trends

In 2006, the global population consisted of four or five populations with a sum of 7,000-8,000 mature individuals. Approximately 98% of the global population is found on one Canadian site. Three other Canadian populations have been reported in recent years. One of these may have become extirpated as no plants have been observed over the past three years and the population numbered less than 10 plants in each of the two previous years. Two Canadian populations each consisted of less than 150 individuals in the past four years and occupy patches of less than 10 m². Only one population has ever been found in the United States. It consisted of 164 individuals in 2006 and many of these plants may have died from drought before they had a chance to flower and set seed.

Extensive urban and residential development occurred in the primary habitat of Victoria's Owl-clover before the species was recognized so the

magnitude of long-term population trends is unknown. Nevertheless, five or six of the nine populations reported in Canada have become extirpated since the species was first collected in the late 19th century.

Limiting factors and threats

The primary threats to Victoria's Owl-clover are posed by habitat loss and/or degradation due to urban/residential development, recreational activities and invasive species. Two populations have disappeared due to habitat loss, two other populations are small and affected by trampling, and one population has been lost due to trampling.

Special significance of the species

Canadian populations of Victoria's Owl-clover have a high conservation value because they represent almost the entire global population of what is a narrowly distributed endemic. No specific ATK is known for this recently recognized species.

Existing protection or other status designations

Victoria's Owl-clover is not currently protected by any species at risk legislation. Part of one population occurs within a provincial Ecological Reserve. ■

Virginia Mallow



Photo: © Melinda Thompson Black

Scientific Name

Sida hermaphrodita

Taxon

Vascular plants

COSEWIC Status

Endangered

Canadian Range

Ontario

Reason for Designation

This globally rare showy perennial herb of the mallow family occurs in open riparian and wetland habitats where it reproduces by seed and asexually by spreading rhizomes. Only two small populations, separated by about 35 km, are known from southwestern Ontario where they are at risk from continued decline in habitat area and quality due to an aggressive invasive grass and quarry expansion.

Species information

Virginia Mallow (*Sida hermaphrodita*) is a tall perennial herb of the mallow family. Plant height varies from 1-3 m. It has deeply lobed, toothed, maple-like leaves with the lobe tips dramatically elongated. The inflorescence produces clusters of white flowers from August to October (or first frost). Seeds are shed throughout the winter and germinate in early spring.

Distribution

The distributional range of Virginia Mallow is centred in the Appalachian Mountains and extends outward into both the Mississippi watershed and the Atlantic watershed. In Ontario, this species occurs in two areas, Niagara Region and Haldimand County, with one population in each. The species is extremely rare in the Great Lakes drainage region where it is at its northern limit.

Habitat

This species is a plant of open, moist, sunny to partly shaded riparian habitats. Soil samples for populations in the United States indicate that all soils where Virginia Mallow is found are relatively sandy with fairly low organic matter content. The pH is neutral to slightly acidic and there are usually soluble salts available to the plants. In Ontario, this species occurs in disturbed situations; however, the habitat is consistent with other presumed native occurrences elsewhere and the species is not commonly grown horticulturally in North America.

Biology

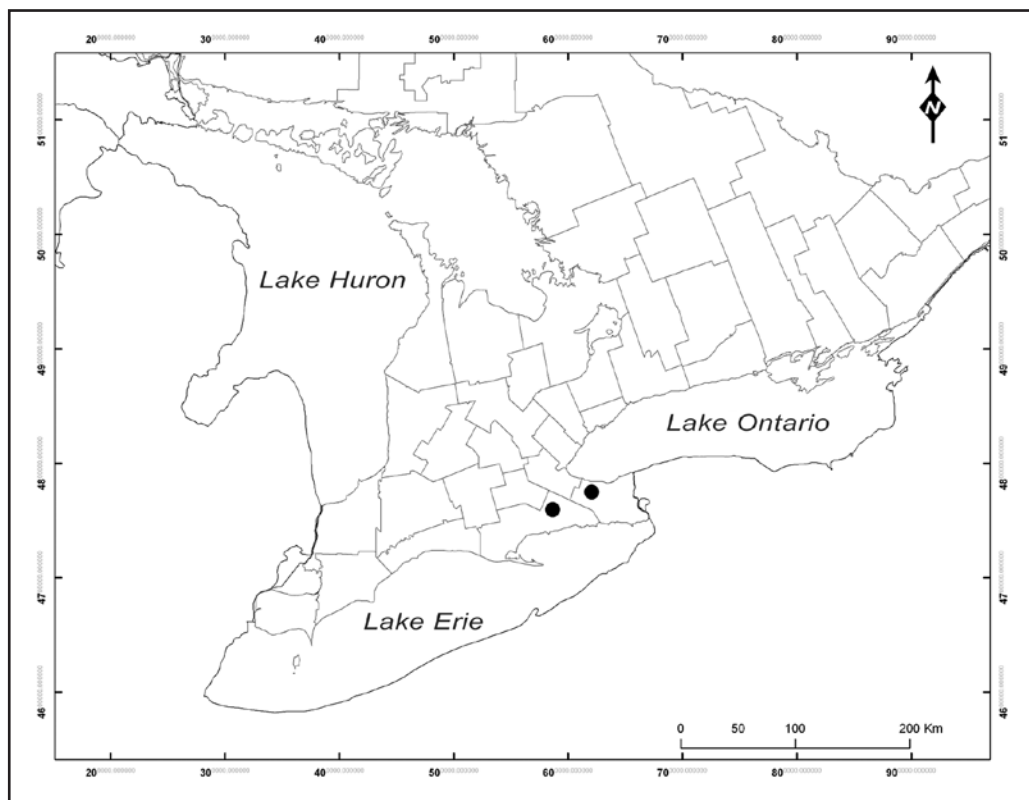
Virginia Mallow is a clonal perennial spreading by rhizomes. A large plant can produce several thousand seeds, most of which are viable. Flowering begins in early August and continues until a hard frost occurs. The suspected method of seed dispersal is by water.

Population sizes and trends

Two populations of this species are extant in Ontario. At least 2500 flowering stems have been documented. The actual number of individual plants is difficult to determine due to the species' spread by rhizomes.

Limiting factors and threats

Habitat destruction seems to be the most detrimental limiting factor for this species throughout its range, including Ontario. Undisturbed riparian woodlands with natural openings and stream terraces are exceptionally rare in Ontario and in the United States. The quality of the species' habitat continues to



Canadian distribution of Virginia Mallow, Ontario.

Source: Modified from April 2010 COSEWIC Status Report

decline in Ontario. Specific threats include the spread of Common Reed, an aggressive exotic grass, quarry expansion, and pipeline maintenance activities.

Special significance of the species

Although this species is not grown or used extensively in North America, it is cultivated frequently in Poland and Russia for a number of purposes. The most important use of Virginia Mallow in these countries is as biomass for creating energy from a renewable source of fuel. Another identified use of this plant is in the paper and cellulose industry, because the content of cellulose, resins and wax in the stems of the plant is comparable with that found in spruce and pine. Virginia Mallow survives until the first frost and is therefore useful in apiculture. It contains substances similar to medical comfrey and could be used in the pharmaceutical industry. Virginia Mallow has been used for planting in chemically degraded

terrain and garbage dumps. It can also be grown on slopes of eroding terrain.

There is no evidence that this species has any aboriginal traditional uses. This is likely due to the fact that the species is quite rare in North America and has a limited range.

Existing protection or other status designations

Virginia Mallow is considered rare throughout most of its range in the USA with NatureServe assigning a vulnerable Global Conservation Rank. The species is listed as critically imperiled in Indiana, Maryland, and Virginia and possibly extirpated in Tennessee. In Canada, it is ranked both nationally and provincially as critically imperiled. Populations in Canada currently have no legal protection. ■

Vole Ears



Photo: © Robert Cameron

Scientific Name

Erioderma mollissimum

Taxon

Lichens

COSEWIC Status

Endangered

Canadian Range

New Brunswick, Nova Scotia, Newfoundland and Labrador

Reason for Designation

This large foliose lichen is known in Canada only from Nova Scotia, New Brunswick, and the island of Newfoundland, where it inhabits cool, humid and coastal conifer forests dominated by Balsam Fir. Although there are 24 known sites for the lichen in these regions, few individuals (133 thalli) are known. While recent surveys have increased the number of known locations, the lichen has been extirpated from 11 sites in the last 30 years. This lichen is a sensitive indicator of air pollution and acid precipitation, which are its main threats. Other threats include forest harvest and browsing by moose.

Wildlife species description and significance

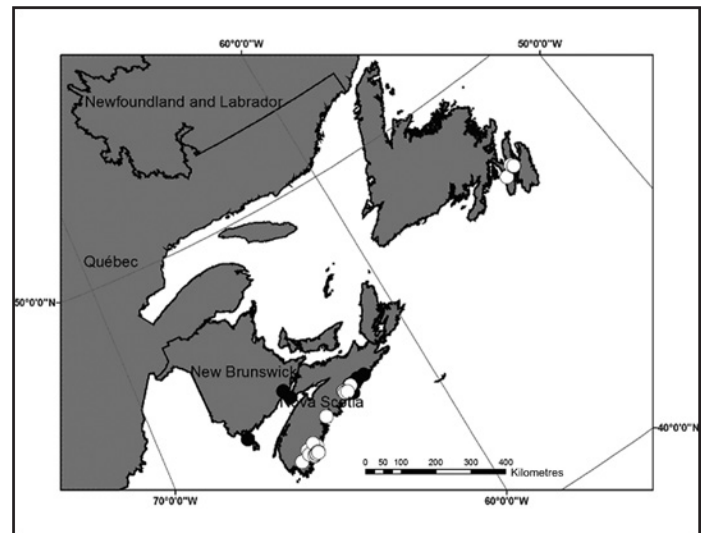
Erioderma mollissimum is a foliose macrolichen with a felty, grey-brown upper surface. When wetted, it turns grey-green. The thallus is up to 12 cm broad and is comprised of radiating, loosely attached lobes to 1 cm in width. The lower surface lacks a cortex

(outer protective layer), and except near the pale, bare margins is densely hairy and light-brown. Granular, bluish soredia (asexual propagules) are produced along the lobe margins and may also form in tiny patches on the upper surface of older lobes. The photosynthetic component of this lichen has been identified as *Scytonema*, a cyanobacterium that is rare in lichens occurring north of subtropical regions.

E. mollissimum is part of a group of rare cyanolichens found only in humid coastal forests of eastern North America. The Canadian populations of *E. mollissimum* are disjunct from other populations in the world which have a mainly tropical/subtropical distribution. The group of cyanolichens to which *E. mollissimum* belongs are useful indicators of effects of acid precipitation and air pollution.

Distribution

Erioderma mollissimum occurs mainly in montane tropical and subtropical cloud forests. Most of its known occurrences are in Central and South America, at elevations of 1600 to 3400 m. It occurs disjunctly in eastern North America, coastal southwestern Europe, and east Africa. In North America, it is known only in the Great Smoky Mountains (Tennessee and North Carolina), and in foggy, coastal areas of Atlantic Canada.



Current and historical Canadian distribution of Vole Ears. White circles indicate current known occurrences, black circles indicate historical occurrences.

Source: November 2009 COSEWIC Status Report

Habitat

In Canada, *Erioderma mollissimum* occurs in cool, humid coastal coniferous forests dominated by Balsam Fir. Cool summers, relatively warm winters and high rainfall are characteristics of these forests. Peatland density is high in the coastal forests and *E. mollissimum* is often found close to these wetlands. *E. mollissimum* is found on trunks of Balsam Fir on the island of Newfoundland and on Balsam Fir, Red Maple and Yellow Birch in Nova Scotia. In New Brunswick, one thallus was found on moss-covered rock.

Biology

E. mollissimum is part of a group of lichens known as cyanolichens. Species of this group consist of a fungal partner and a cyanobacterium, which photosynthesizes and fixes atmospheric nitrogen. Apothecia (sexual reproductive structures containing ascospores) are extremely rare in North America. Reproduction is either through fragmentation or specialized structures called soredia. Lichen soredia are larger than ascospores and this limits dispersal. Dispersal is likely not more than hundreds of metres for *E. mollissimum*. Fragmentation provides dispersal, but only on the same host tree as the parent thalli. However, it may play a role in long-term persistence within sites. *E. mollissimum* requires a very humid environment to thrive and is sensitive to acid rain and other air pollutants.

Population sizes and trends

There are only 133 documented adult and 50 juvenile *E. mollissimum* in Canada. Nova Scotia has the largest known population with 118 adults and 23 juveniles at 20 occurrences. On the Avalon Peninsula

of Newfoundland there are 4 known occurrences with 15 adults and 27 juveniles. There is evidence to suggest a possible decline in population, particularly in Nova Scotia. At least 80% of sites in Nova Scotia known from the early 1980s no longer support *E. mollissimum*. Occupancy rates of habitat patches also appeared to have declined in Nova Scotia. *E. mollissimum* is most likely extirpated from New Brunswick.

Threats and limiting factors

Like other cyanolichens, *E. mollissimum* is extremely sensitive to air pollution and acid rain. Although acidifying pollutants in eastern North America are predicted to decline in the next 12 years, proposed developments in Newfoundland, New Brunswick and Nova Scotia may locally increase pollutants. Logging may limit available habitat and loss of forests from other developments is also occurring. Decreases in frequency of fog and herbivory by introduced slugs may also be a threat.

Existing protection or other designations

E. mollissimum is not currently listed under SARA nor is it protected by provincial legislation. It has been assigned a red status (known or thought to be at risk) by the Province of Nova Scotia, S1 by the Atlantic Canada Conservation Data Centre and has a G-rank of 4/5. There is only one occurrence at the present time, that at Thomas Raddall Provincial Park, Nova Scotia, where *E. mollissimum* is within a fully protected area. The occurrences near Blandford, Webber Lake and Dooks Pond, NS may, however, receive protection in the near future. All the occurrences in Newfoundland are on crown land but have no legal protection. ■

Wallis' Dark Saltflat Tiger Beetle

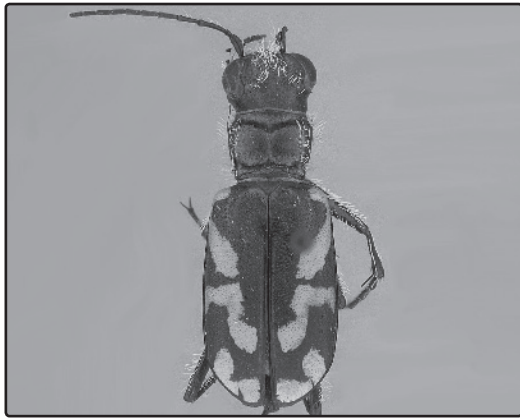


Photo: © David H. Kavanaugh, California Academy of Sciences

Scientific Name

Cicindela parowana wallisi

Taxon

Arthropods

COSEWIC Status

Endangered

Canadian Range

British Columbia

Reason for Designation

This distinctively marked beetle is historically known from five locations in a region where urban and agricultural expansion have reduced and continue to reduce habitat. Extensive recent searches have failed to find the beetle and it may occur at only a single location. The index of area of occupancy is small and there is potential future decline in habitat and in number of individuals due to development.

Species information

Wallis' Dark Saltflat Tiger Beetle (*Cicindela parowana wallisi*), also sometimes called the Parawana Tiger Beetle in BC, is a medium-sized tiger beetle (approximately 1.2 cm long), the only subspecies of *Cicindela parowana* Wickham known to inhabit Canada. Tiger beetles are recognizable by their long, slender legs and antennae, saber-like mandibles and bulbous eyes. In British Columbia, Wallis' Dark Saltflat Tiger Beetle is easily identified by the pattern of markings on the dark background colour of the elytra (hardened front wings).

Distribution

Wallis' Dark Saltflat Tiger Beetle is associated with the arid habitat of the Great Basin region, extending globally from Vernon, BC (Canada) to southern Oregon (United States), with populations in Washington State as well.

The Okanagan Valley in southern British Columbia, from Vernon south to Oliver, contains the total historical distribution of Wallis' Dark Saltflat Tiger Beetle in Canada. Most specimens were collected in Penticton and the Oliver-Okanagan Falls area between 1909 and 1953; the date of the single Vernon record is unknown but is probably early in the 1900s. The only record since the 1950s is from Manuel's Canyon near Oliver in 1996.

Habitat

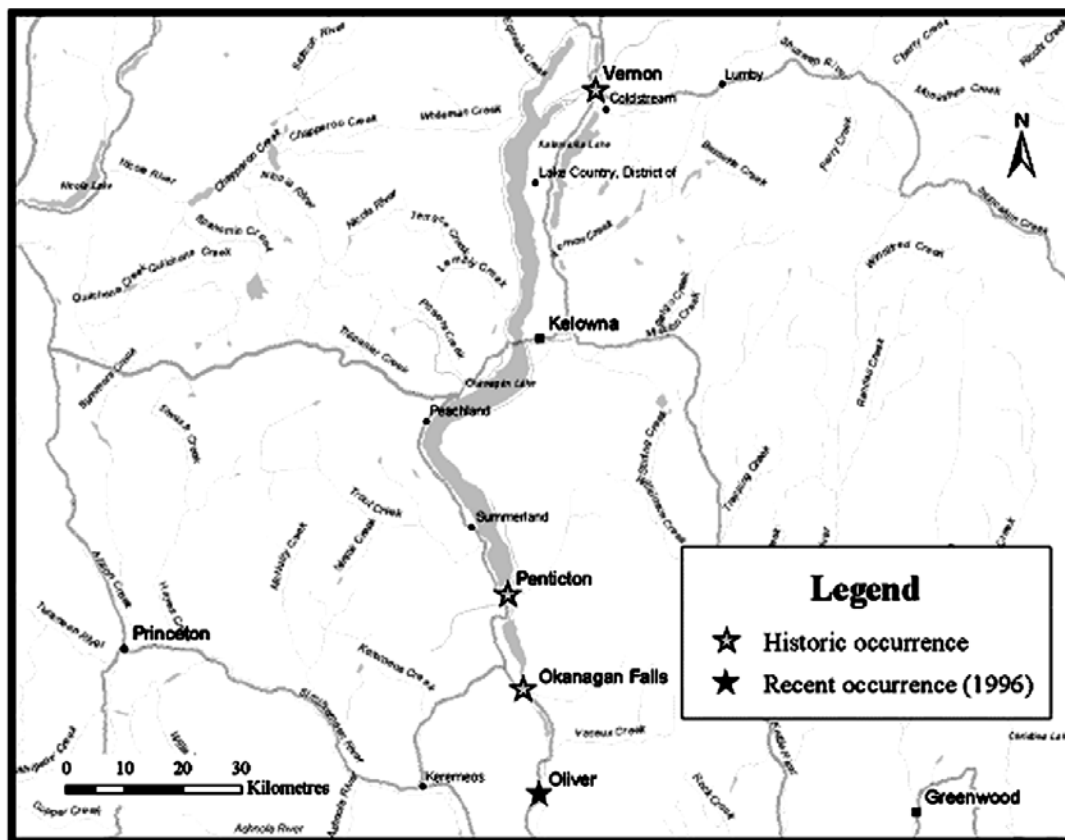
Wallis' Dark Saltflat Tiger Beetle is thought to differ from many other tiger beetles in its preference for slightly dry, chalky alkaline soils. Field surveys of sites where specimens were collected, in addition to aerial photos from the period, suggest that it is also associated with moderate ground cover. Currently, small remnants of these habitats exist in the South Okanagan Valley, although some are in areas that are undergoing development.

Biology

Wallis' Dark Saltflat Tiger Beetle is active from May until June, with a second activity period in August. Eggs are probably laid in soil either in spring or fall and the larvae live in subterranean burrows for one or two years. Adults live for 8 – 10 weeks and feed in similar habitat to the larvae, eating any arthropods of the same size as itself or smaller. Although the beetle is associated with alkaline soils, no physiological mechanism for this relationship has been proposed.

Population sizes and trends

Calculation of population sizes and trends for Wallis' Dark Saltflat Tiger Beetle is not possible at this time, given the sparse data that are available. There has been a decrease in the number of specimens collected (only one specimen since the early 1950s).



Historic and recent locations for Wallis' Dark Saltflat Tiger Beetle in British Columbia, Canada.

Source: Modified from November 2009 COSEWIC Status Report, courtesy of Byron Woods, Ministry of Environment, British Columbia

Limiting factors and threats

In general, tiger beetles appear to be sensitive to soil disturbances such as beach groomers and soil compaction from vehicles. Although these beetles are not particularly shy of humans, conversion of their habitat to paved roads or residential housing would undoubtedly result in population declines. The habitat of Wallis' Dark Saltflat Tiger Beetle is readily damaged and is rapidly being converted for agriculture, housing and recreation in the south Okanagan Valley. Much of this habitat, including the presumed type locality at Penticton, was destroyed in the past 50 or 100 years.

Special significance of the species

Wallis' Dark Saltflat Tiger Beetle is a charismatic predator in a scarce habitat in the Okanagan Valley, a region with special natural habitats that are under

considerable stress from development and other factors. Globally, tiger beetles are extensively studied and very popular as a result of their attractive metallic colouration. They are the only group of beetles for which a North American field guide is available and one of very few beetle groups for which popular regional guides are also available.

Existing protection or other designations

Wallis' Dark Saltflat Tiger Beetle is globally listed as G4 and provincially listed as S1 with a BC list status of "red". ■

Western Blue Flag



Photo: © Joyce Gould

Scientific Name

Iris missouriensis

Taxon

Vascular plants

COSEWIC Status

Special Concern

Canadian Range

Alberta

Reason for Designation

This showy perennial is restricted to ten native sites and is also present at a few sites where it is believed to have been introduced. It occurs primarily in the grasslands of southern Alberta. Several new populations have been discovered since the species was last assessed. The area occupied and total population size of native plants are now known to be larger than previously determined. The total Canadian population appears to be stable but fluctuates in size. The species is subject to ongoing competition from invasive plants, but trampling in areas heavily grazed by cattle has been largely mitigated by recovery actions.

Species information

Western Blue Flag, a long-lived perennial, is a member of the Iris family. Flowering stalks produce two to four showy flowers in various colours of pale to deep blue and lavender, with a rare white form

found occasionally. Each flower has purple veins that radiate from a bearded yellow spot on each of three outer sepals (segments) that are recurved and spread outward. Three petals and three styles on the inner segments of the flower are erect or arch upwards and bloom sequentially, often on a leafless stem or sometimes having one leaf. Pale blue-green sword-like leaves folded lengthwise grow from the base of the stem, which reaches a height of 30 to 60 cm. The species is sometimes called the Rocky Mountain Iris.

Distribution

Western Blue Flag is a North American species that is widely distributed throughout the western United States. In Canada, the species is known from a site as far north as Banff National Park, Alberta, as well as sites in the Calgary region. However, these sites are of unknown origin and appear to be beyond the native range of the species which occurs within a narrow band near the U.S.-Canada border extending from the west portion of the Milk River Ridge to west of Carway, Alberta. In total, there are 17 documented populations (native and introduced), only 10 of which are considered native. The following seven populations are considered to be beyond the native range and are not included for assessment purposes; they are also of unknown or introduced origin or no longer extant: four extant populations of unknown origin (Fort Macleod, Calgary Airport, Banff National Park, and Park Lake), one introduced and extant population (Frank Lake), and two extirpated (University of Calgary and Picture Butte). The species was formerly considered to occur in British Columbia but those specimens are now considered to be another species, *Iris setosa* Pallas ex Link.

The species, including all 17 native, unknown, and introduced populations occurring from the U.S.-Canada border to Calgary and Banff National Park extends over an area of about 22,000 km². However, the actual range of the ten native populations near the U.S.-Canada border covers an area of only about 250 km². Most of the intervening area between the native populations and those northward as far as Banff is unsuitable habitat for the species with the actual area of habitat occupied by native plants being about 3 km².



Canadian distribution of Western Blue Flag occurrences. Populations of known native range occur along the U.S.-Canada border.

Source: April 2010 COSEWIC Status Report

Habitat

Native populations of Western Blue Flag are located in the Foothills Fescue and Foothills Parkland natural subregions in Alberta. Some populations of unknown origin are located in other subregions, including the Mixedgrass (Park Lake and Fort McLeod) and Montane (Banff). Habitat preference for the Western Blue Flag is within a narrow zone of moist meadows through a transition zone of drier

upland slopes and wet meadows or seepage springs. Its occurrence is usually on level or slightly sloping ground with an abundance of subsurface moisture. Soil conditions in the spring are damp, but are well drained and drier by the middle of summer. Western Blue Flag is often found near willow thickets around moist depressions, with some sites on dry upland areas in Rough Fescue communities.

Biology

This species reproduces both sexually and asexually. The linear growth and branching of the rhizomes is able to withstand trampling and allows it to spread quickly when competing vegetation is removed. A three-chambered capsule containing the smooth, dark brown seeds can be dispersed by wind, water and other methods. Seeds require a germination period of two to three months, with flowers produced in the second or third year. Flowers appear from mid-June through early July in Alberta and are adapted to bee pollination.

Population sizes and trends

The total native Canadian population in 2009 was estimated at between 110,000 and 120,000 stems; however, some sites were not visited. This estimate has significantly increased since the last COSEWIC report in 1999 of 7500 stems. Since 1999, two populations previously recorded no longer exist and two are considered to possibly be extirpated. A number of new populations have been discovered within the known native range and a series of other populations have been found disjunct from the known native populations. The increase in population size and number of previously unidentified sites is more an indication of increased cooperation and participation by land managers and land owners, increased search effort and public interest in conservation and management activities of this species, than it is an actual increase in the number of existing populations; presumably, the “new” populations existed previously, but there are no data to confirm this.

Monitoring of these sites demonstrates naturally fluctuating numbers of stems and flowers over the years; however, the population appears to be stable.

Limiting factors and threats

The main limiting factors and threats to Western Blue Flag include the loss of habitat (including alteration and fragmentation of landscapes), competition from introduced/invasive species, grazing pressure, alteration of hydrology, collection for horticultural and medicinal uses and herbicide use. The species does benefit from light to moderate grazing.

Special significance of the species

Western Blue Flag has a narrow environmental tolerance with specific habitat requirements. The species is found in some of the most threatened landscapes in Alberta. No information has been found on Aboriginal or confirmed human use in Canada for Western Blue Flag; however, medicinal and ceremonial uses have been reported for first nations in the United States.

Existing protection or other designations

COSEWIC assessed this species as Threatened in May 2000 and it is currently listed on Schedule 1 of the *Species at Risk Act*. In Alberta, the species was also originally designated Threatened in 2000 but was later designated to a lower risk category of Species of Special Concern in 2005. ■

Whitebark Pine



Photo: © Peter Achuff

Scientific Name

Pinus albicaulis

Taxon

Vascular plants

COSEWIC Status

Endangered

Canadian Range

British Columbia, Alberta

Reason for Designation

This long-lived, five-needled pine is restricted in Canada to high elevations in the mountains of British Columbia and Alberta. White Pine Blister Rust alone is projected to cause a decline of more than 50% over a 100 year time period. The effects of Mountain Pine Beetle, climate change, and fire exclusion will increase the decline rate further. Likely, none of the causes of decline can be reversed. The lack of potential for rescue effect, life history traits such as delayed age at maturity, low dispersal rate, and reliance on dispersal agents all contribute to placing this species at high risk of extirpation in Canada.

Species information

Whitebark Pine (*Pinus albicaulis*) is a five-needled pine, typically 5-20 m tall with a rounded to irregular crown. Its egg-shaped seed cones (5-8 cm long by 4-6 cm wide) are dark brown to purple and remain on the tree unless removed by animals. The seeds are large for a pine at 7-11 mm long, chestnut brown and wingless.

Distribution

Whitebark Pine occurs in high-elevation forests in the mountains of western Canada and the USA. In Canada, it extends from the Canada-USA border to about 200 km north of Ft. Saint James in the Coast Mountains and to about 150 km north of Jasper in the Rocky Mountains. The range of the species in Canada extends over an area estimated to be 190,067 sq km or about 56% of its global range.

Habitat

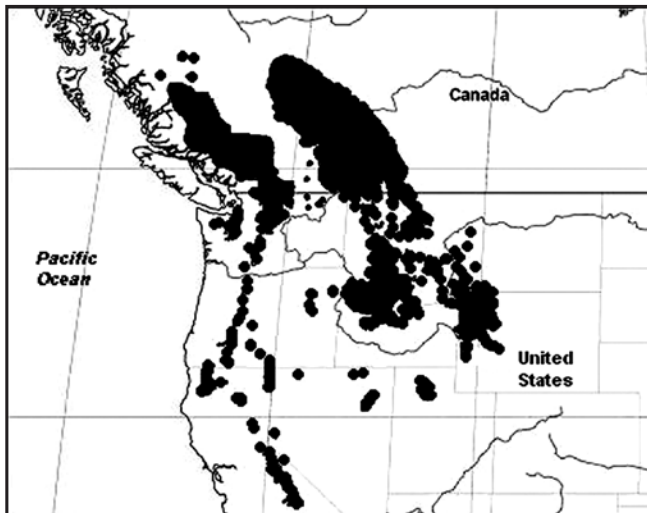
Whitebark Pine occurs at or close to treeline, forming both open and closed forests, often in association with Engelmann Spruce and Subalpine Fir. Regeneration occurs primarily on sites disturbed by fire or avalanche, which provide the open habitat required by this shade-intolerant species. Habitat quality is declining across its range due to fire exclusion and competition from other trees. Nearly all Whitebark Pine forest occurs on public lands.



Photo: © Peter Achuff

Biology

Whitebark Pine is a long-lived species, often living to more than 500 years and sometimes more than 1000 years. Cones are typically first produced at 30-50 years but no sizable crop is produced until 60-80 years and cone production is irregular with some years of no or very low production. The generation time (average age of trees) is approximately 60 years. Whitebark Pine is obligately dependent on Clark's Nutcracker to disperse seeds for regeneration. Cones do not open to release the



Global range of Whitebark Pine.

Source: Modified from the April 2010 COSEWIC Status Report

seed, rather seeds must be removed by the bird and cached in the ground. The seeds are a rich food source and are used by many birds and mammals, including Black and Grizzly bears.

Population sizes and trends

The number of mature Whitebark Pine trees in Canada is estimated to be about 200 million. Populations in Canada and the USA are declining due to the combined effects of White Pine Blister Rust, Mountain Pine Beetle, fire exclusion, and climate change. The population in Waterton Lakes National Park has been declining at 3.5%/year, which translates into a 97% decline within 100 years. In the Rocky Mountains of Alberta and British Columbia, the decline rate is 1.5%/year, which over 100 years is 78%. The estimated population decline in all of Canada is more than 50% over the next 100 years. Rescue from populations in the USA is not a realistic possibility given the extent and severity of threats there.

Limiting factors and threats

Whitebark Pine is imminently and severely threatened throughout its range by four human-

influenced factors: White Pine Blister Rust (an introduced species), Mountain Pine Beetle, fire exclusion, and climate change. Although each of these factors alone pose significant threats to Whitebark Pine, they interact and reinforce each other to further increase the severity of the impacts.

Special significance of the species

Whitebark Pine is keystone species at the centre of a high-elevation network of plants and animals, enabling increased biodiversity. It provides food and habitat for numerous birds and mammals. It facilitates the establishment and growth of other plants in the harsh, upper subalpine environment and helps regulate snowpack and runoff, providing watershed stability. The seeds were used as food by Aboriginal peoples.

Existing protection or other designations

Whitebark Pine is globally assessed overall as *Vulnerable* (high risk of extinction in the wild in the medium-term future) by IUCN.

In Alberta, it has been assessed as *Endangered* and has been listed by the Minister of Sustainable Resource Development as *Endangered* under the *Alberta Wildlife Act*. This currently provides no legal protection but measures have been taken to ensure that, outside of protected areas, it is not inadvertently harvested and that planning for harvesting, fire management, and Mountain Pine Beetle management takes it into account.

In British Columbia, it is ranked as S3? (Special Concern/Vulnerable) and is blue-listed. This provides no legal protection and Whitebark Pine has been harvested in some areas, although the extent is not clear. However, British Columbia government agencies have suggested voluntary conservation measures. About 26% of Whitebark Pine range in British Columbia occurs in protected areas.

In the USA, the Natural Resources Defense Council petitioned the US Fish and Wildlife Service in December 2008 to list Whitebark Pine as *Endangered* under the US *Endangered Species Act*. ■

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none

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 *Canada Gazette*, Part I, and Official regulations are published in *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, governments 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 (OIC). 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 SARA 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.

SARA Public Registry:

Developed as an online service, the SARA 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 the *Species at Risk Act* (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:

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.