

COSEWIC
Status Appraisal Summary

on the

Heart-leaved Plantain
Plantago cordata

in Canada

ENDANGERED
2011

COSEWIC
Committee on the Status
of Endangered Wildlife
in Canada



COSEPAC
Comité sur la situation
des espèces en péril
au Canada

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

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COSEWIC Assessment Summary

Assessment Summary – November 2011

Common name

Heart-leaved Plantain

Scientific name

Plantago cordata

Status

Endangered

Reason for designation

In Canada, only two populations of this semi-aquatic species are known both in undisturbed wet forest patches of the Carolinian zone of southwestern Ontario. The species has declined throughout its range, as a result of deterioration or loss of the clear, shallow streams and seepages in which it occurs. The small range and specific habitat requirements of this species make it vulnerable to declines in habitat quality. The main threats include timber harvesting, agricultural runoff, alteration to riparian habitats, and other activities that contribute to eutrophication or siltation of the aquatic habitat.

Occurrence

Ontario

Status history

Designated Endangered in April 1985. Status re-examined and confirmed Endangered in April 1998, May 2000, and November 2011.



COSEWIC Status Appraisal Summary

Plantago cordata
Heart-leaved Plantain
Jurisdictions: Ontario

Plantain à feuilles cordées

Current COSEWIC Assessment:

Status category:

☐ XT ☒ E ☐ T ☐ SC

Date of last assessment: May 2000

Reason for designation at last assessment: Two remaining populations with narrow habitat tolerance threatened by ongoing habitat degradation.

New reason for designation (only if different from above):

In Canada, only two populations of this semi-aquatic species are known both in undisturbed wet forest patches of the Carolinian zone of southwestern Ontario. The species has declined throughout its range, as a result of deterioration or loss of the clear, shallow streams and seepages in which it occurs. The small range and specific habitat requirements of this species make it vulnerable to declines in habitat quality. The main threats include timber harvesting, agricultural runoff, alteration to riparian habitats, and other activities that contribute to eutrophication or siltation of the aquatic habitat.

Criteria applied at last assessment: B1+2c

If earlier version of criteria was applied,¹ provide correspondence to current criteria:
B1ab(iii)+2ab(iii)

If different criteria are proposed based on new information, provide explanation:
As above, B1ab(iii)+2ab(iii). Proposed criteria have not changed.

If application of current specific criteria is not possible, provide explanation:

Recommendation: Update to the status report NOT required (wildlife species' status category remains unchanged)

Reason:

- ☒ sufficient information to conclude there has been no change in status category
☐ not enough additional information available to warrant a fully updated status report

¹ An earlier version of the quantitative criteria was used by COSEWIC from October 1999 to May 2001 and is available on the COSEWIC website: http://www.cosewic.gc.ca/eng/sct0/original_criteria_e.cfm

Evidence (indicate as applicable):**Wildlife species:***Change in eligibility, taxonomy or designatable units:*yes ☐ no ☒

Explanation:

No change since the previous assessment.

Range:*Change in Extent of Occurrence (EO):*yes ☐ no ☒ unk ☐*Change in Area of Occupancy (AO):*yes ☐ no ☒ unk ☐*Change in number of known or inferred current locations:*yes ☐ no ☒ unk ☐*Significant new survey information*yes ☐ no ☒

Explanation:

No change since previous assessment. The Canadian population still consists of two extant populations confined to southwestern Ontario at the former Camp Ipperwash in Lambton County and at the Parkhill site in Middlesex County.

Population Information:*Change in number of mature individuals:*yes ☐ no ☒ unk ☐*Change in total population trend:*yes ☐ no ☒ unk ☐*Change in severity of population fragmentation:*yes ☐ no ☒ unk ☐*Change in trend in area and/or quality of habitat:*yes ☐ no ☒ unk ☐*Significant new survey information*yes ☒ no ☐

Explanation:

Population survey information is summarized in Table 1. In 1993, the total estimated Canadian population was 8148 plants, based on most recent surveys conducted in 1993 and 1988 described in MacKinnon Hensel & Associates (1994) and Oldham and McLeod (1990), respectively. A subsequent survey at one population in 1997 (Brownell 1998) slightly increases the total estimate to 8282, though this assumes no change in numbers at the second population. Both totals are overestimates of the number of mature individuals, because immature plants and seedlings were included in survey counts at one site (Table 1).

The former Camp Ipperwash population, located near the Lake Huron Shoreline in Lambton County, was estimated to have 3700 mature individuals in 1989 (Table 1, Oldham and McLeod 1990), and 5083 total individuals in 1993 (MacKinnon Hensel & Associates (1994). The most recent survey from 2009, estimated 3897 total individuals at this site, with most of these occurring in one of two subpopulations (subpopulation 2 included 47 individuals) (Environment Canada 2011). Note that this population was previously circumscribed into 4 subpopulations (Bownell 1988).

The Parkhill population is located in the headwaters of the Ausable River in Middlesex County. This population was surveyed in 1988, and estimated to contain approximately 3066 mature individuals and an additional 10,000 seedlings, covering about 203 m of linear habitat in low depressions in deciduous woods (Oldham and McLeod 1990). The estimate of mature individuals was slightly higher (3200 mature individuals, in 1997 (Brownell, 1988). This site was visited by Ontario Ministry of Natural Resources staff in 2006 when its condition was deemed unchanged since 1998 (A. Woodliffe, pers. comm.). In 2008, J. Jalava observed roughly 1600 mature plants and 1500 seedlings. In 2010, Jones estimated this population at 800-1100 mature individuals (and an estimated 5000 seedlings and non-reproductive individuals) (Environment Canada 2011). Thus, the number of mature individuals at the Parkhill populations has declined from 3200 mature individuals in 1997, to 1600 in 2008, and 800-1100 in 2010.

Five additional populations were considered extirpated by Brownwell (2008). Four of these were last collected prior to 1900, while the fifth has not been observed since at least 1967 (Environment Canada, 2011). These populations are not considered to represent a decline in the number of populations, as their loss predates the previous status assessment (COSEWIC 2000).

Threats:

Change in nature and/or severity of threats:

yes ☐ no ☒ unk ☐

Explanation:

The proposed recovery strategy for Heart-leaved Plantain details and ranks threats for each population (Environment Canada 2011). The most important threats are those that would affect water quality, followed by invasive species and consumptive use, with herbivory listed as a limiting factor (Environment Canada, 2011). Because Heart-leaved Plantain requires clear, intermitted streams, any activities with the potential to cause a decline in water quality represent potential threats to the persistence of Canadian populations.

At the Parkhill population, the most severe threats include nutrient loading from agricultural runoff, removal of riparian vegetation, and timber harvesting. A. Woodliffe and J. Jalava have observed recent timber harvesting activities in the vicinity of plants and noted that the bulk of fruiting and flowering plants were near the harvested area, though there were still hundreds of mature vegetative plants in shaded areas away from the harvest (A. Woodliffe pers. comm.). However, in addition to the direct impacts of timber harvesting activities to plants, impacts on water quality pose a threat to the persistence of this population.

At the former Camp Ipperwash population, in addition to nutrient loading, the recovery strategy lists detection and removal of unexploded ordinances (UXO) as the most significant threat (Environment Canada 2011). Removal of UXO is described as a high severity threat; as it is anticipated to occur, and will impact plants that occur within the area of disturbance (Environment Canada 2011). It is not known when this activity will be completed, or what measures will be taken to minimize impacts on the plants and their habitat.

Invasive species that could impact individuals or habitat of Heart-leaved Plantain include the Gray Garden Slug (*Deroceras reticulatum*) and European Common Reed (*Phragmites australis* ssp. *australis*), but the extent of impact of these invasive species on Heart Leaved Plantain in Canada is not known. European Common Reed is common and spreading in shoreline habitat in southern Ontario, and has a high potential to negatively impact the habitat of Heart-leaved Plantain if the reed becomes established in or near this habitat.

Protection:

Change in effective protection:

yes ☒ no ☐

Explanation:

Heart-leaved Plantain is listed as endangered under the Ontario *Endangered Species Act 2007*, Schedule 1 (ESA 2007), and as Endangered under SARA. A national recovery strategy has been proposed and focuses on maintaining and enhancing the wooded stream habitat of Heart-leaved Plantain populations in Canada (Environment Canada 2011).

Rescue Effect:*Evidence of rescue effect:*yes ☐ no ☒

Explanation:

The two remaining Canadian populations persist in a fragmented landscape and have little chance of rescue from populations in the U.S. In addition, populations of Heart-leaved Plantain have declined throughout the species' range except for Missouri, where the species appears to be stable. Mymudes and Les (1993) note that across its North American range, Heart-leaved Plantain is extirpated from 57 percent of its historic localities. They cite siltation, pollution, stream rerouting, logging, and site conversion to pasture as major threats. The species is thought to be extirpated in 5 states and the District of Columbia, and is imperiled or critically imperiled in 10 additional states (NatureServe 2010).

Quantitative Analysis:*Change in estimated probability of extirpation:*yes ☐ no ☒ unk ☐

Details:

No quantitative analysis has been conducted for this species.

Summary and Additional Considerations: [e.g., recovery efforts]

Heart-leaved Plantain is still known from its two extant Canadian populations in southwestern Ontario. The population at former Camp Ipperwash has remained stable, but surveys indicate that the number of mature individuals at the Parkhill population may be declining. Inconsistent survey methods prevent clear inference of trends. Recent timber harvesting activities in the woodlot at the Parkhill site have occurred. No immediate impact has been noted, but over the longer term, such activities may contribute to decline in quality of the aquatic habitat.

List of authorities contacted:

Al Sandilands, Consulting Biologist, Gray Owl Environmental

P. Allen Woodliffe, District Ecologist, Ontario Ministry of Natural Resources, Chatham, Ontario

Sources of information:

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Author of status appraisal summary:
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Table 1: Population survey information by survey year for the two known extant Canadian populations.

Site	1988-1989	1993	1997	2007	2008	2009	2010
Ipperwash, Subpop. 1	~3700 (mature) ¹	5082 ("ramets", probably a count of total individuals) ^{2,3}				3850 (total) ^{4,7}	
Ipperwash Subpop. 2 (Discovered 1993) ⁵		1 plant		15-20 (total) ^{6,7}		47 (mature) ^{4,7}	
Parkhill population	~3066 (mature) 10469 (seedlings) ¹		~3200 (mature) ⁸		1600 (mature) ⁹		800-1100 (mature); 5000 (juvenile) ¹⁰

1. Reported in Oldham and McLeod (1990)
2. "Total" indicates that counts included mature and juvenile individuals
3. MacKinnon Hensel & Associates (1994)
4. Neegan Burnside (2009)
5. Sutherland *et al.* (1994)
6. Neegan and Burnside (2008)
7. Sandilands and Mainguy, pers. comm. to R. Boles, July-Aug. 2011
8. Brownell (1988)
9. J. Jalava, surveyor
10. Jones (2010)

TECHNICAL SUMMARY

Plantago cordata

Heart-leaved Plantain

Plantain à feuilles cordées

Range of occurrence in Canada: Ontario

Demographic Information

Generation time <i>Not known with certainty. Plants are perennial; seeds are short-lived.</i>	2-3 years
Is there an observed continuing decline in number of mature individuals? <i>Surveys suggest a possible decline at Parkhill population, but survey methods and sampling frequency is sparse. In addition, juvenile plants are more abundant in recent surveys.</i>	Possibly
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations	Unknown
Observed percent reduction or increase in total number of mature individuals over the last 10 years, or 3 generations.	Unknown
Projected percent increase in total number of mature individuals over the next 10 years.	Unknown
Inferred percent increase in total number of mature individuals over any 10 years, or 3 generations period, over a time period including both the past and the future.	Unknown
Are the causes of the decline clearly reversible and understood and ceased?	No
Are there extreme fluctuations in number of mature individuals?	No

Extent and Occupancy Information

Estimated extent of occurrence <i>Calculated EO is 1</i>	~24 km ²
Index of area of occupancy (IAO)	~24 km ² (2x2 km)
Is the total population severely fragmented?	no
Number of "locations*" <i>Each of the two populations is considered a single location based on the scale of the most likely severe threat (habitat degradation or loss).</i>	2
Is there an observed continuing decline in extent of occurrence?	No
Is there an observed and projected continuing decline in index of area of occupancy?	No
Is there an observed continuing decline in number of populations?	No
Is there an observed continuing decline in number of locations?	No
Is there an observed continuing decline in quality of habitat? <i>Habitat quality is inferred to have declined</i>	Yes
Are there extreme fluctuations in number of populations?	No
Are there extreme fluctuations in number of locations*?	No
Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

* See definition of location.

Number of Mature Individuals (in each population)

Population	Number of Mature Individuals
Former Camp Ipperwash – 2 subpopulations (2009 survey)	3897
Parkhill (2010 survey)	800-1,100
Total	4697-4997

Quantitative Analysis

Probability of extinction in the wild <i>Not done.</i>	N/A
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Threats (actual or imminent, to populations or habitats)

Habitat loss or degradation through: Nutrient loading from agricultural runoff Removal of riparian vegetation (highest probability at Parkhill population) Timber harvesting (highest probability at Parkhill population) Ditching / draining (highest probability at Parkhill population) Removal of unexploded explosive ordinances (former Camp Ipperwash population) Invasive and introduced species (Gray Garden Slug and European Common Reed)

Rescue Effect (immigration from outside Canada)

Status of outside population(s)? <i>Ranked N4 (Apparently Secure) in the U.S., but Possibly Extirpated (SH) in District of Columbia, Florida, Iowa, Kentucky, Maryland, and Virginia. The species is ranked S1 (Critically Imperiled) in Alabama, Illinois, Indiana, Michigan, Mississippi, North Carolina, Ohio, Tennessee and Wisconsin; Imperiled (S2) in Arkansas, Vulnerable (S3) in New York and Georgia, and S3S4 in Missouri (NatureServe 2010).</i>	
Is immigration known or possible? <i>Seed dispersal is highly unlikely</i>	No
Would immigrants be adapted to survive in Canada?	Yes
Is there sufficient habitat for immigrants in Canada?	No
Is rescue from outside populations likely? <i>The two remaining Canadian populations persist in a fragmented landscape and rescue from U.S. populations is unlikely. In addition, populations of Heart-leaved Plantain have declined drastically throughout its range except for Missouri, where it appears to be stable.</i>	No

Current Status

COSEWIC: Endangered (November 2011)

Status and Reasons for Designation

Status: Endangered	Alpha-numeric code: B1ab(iii)+2ab(iii)
Reasons for designation: In Canada, only two populations of this semi-aquatic species are known both in undisturbed wet forest patches of the Carolinian zone of southwestern Ontario. The species has declined throughout its range, as a result of deterioration or loss of the clear, shallow streams and seepages in which it occurs. The small range and specific habitat requirements of this species make it vulnerable to declines in habitat quality. The main threats include timber harvesting, agricultural runoff, alteration to riparian habitats, and other activities that contribute to eutrophication or siltation of the aquatic habitat.	

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Not applicable. No documented decline
Criterion B (Small Distribution Range and Decline or Fluctuation): Meets Endangered B1ab(iii)+2ab(iii). EO and IAO are both below thresholds, there are fewer than 5 locations, and habitat is declining.
Criterion C (Small and Declining Number of Mature Individuals): Not applicable. Exceeds thresholds for number of individuals, and does not meet decline threshold.
Criterion D (Very Small or Restricted Total Population): Meets Threatened D2 with fewer than 5 locations.
Criterion E (Quantitative Analysis): Not done.



COSEWIC HISTORY

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

COSEWIC MANDATE

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

COSEWIC MEMBERSHIP

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

DEFINITIONS (2011)

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

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

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

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



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