

Recovery Strategy for the Showy Goldenrod (*Solidago speciosa* var. *rigidiuscula*) in Canada

Showy Goldenrod



2011

Recommended citation:

Environment Canada. 2011. Recovery Strategy for the Showy Goldenrod (*Solidago speciosa* var. *rigidiuscula*) in Canada [Proposed]. *Species at Risk Act* Recovery Strategy Series. Environment Canada, Ottawa. iv + 15 pp.

For copies of the recovery strategy, or for additional information on species at risk, including COSEWIC Status Reports, residence descriptions, action plans, and other related recovery documents, please visit the Species at Risk (SAR) Public Registry (www.sararegistry.gc.ca).

Cover illustration: © Gary Allen

Également disponible en français sous le titre
« Programme de rétablissement de la verge d’or voyante (*Solidago speciosa* var. *rigidiuscula*)
au Canada [Proposition] »

© Her Majesty the Queen in Right of Canada, represented by the Minister of the Environment, 2011. All rights reserved.

ISBN

Catalogue no.

Content (excluding the illustrations) may be used without permission, with appropriate credit to the source.

PREFACE

The federal, provincial, and territorial government signatories under the Accord for the Protection of Species at Risk (1996) agreed to establish complementary legislation and programs that provide for effective protection of species at risk throughout Canada. Under the *Species at Risk Act* (S.C. 2002, c.29) (SARA), the federal competent ministers are responsible for the preparation of recovery strategies for listed Extirpated, Endangered, and Threatened species and are required to report on progress within five years.

The Minister of the Environment is the competent minister for the recovery of the Showy Goldenrod and has prepared this strategy, as per section 37 of SARA. It has been prepared in cooperation with the Government of Ontario's Ministry of Natural Resources.

Success in the recovery of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions set out in this strategy and will not be achieved by Environment Canada, or any other jurisdiction alone. All Canadians are invited to join in supporting and implementing this strategy for the benefit of the Showy Goldenrod and Canadian society as a whole.

This recovery strategy will be followed by one or more action plans that will provide information on recovery measures to be taken by Environment Canada and other jurisdictions and/or organizations involved in the conservation of the species. Implementation of this strategy is subject to appropriations, priorities, and budgetary constraints of the participating jurisdictions and organizations.

ACKNOWLEDGMENTS

Earlier drafts of this Recovery Strategy were prepared by Dr. Jane Bowles in cooperation with the Walpole Island Ecosystem Recovery Team, Tallgrass Communities Recovery Team, and Environment Canada.

Angela McConnell, Christina Rohe, Barbara Slezak, Kathy St. Laurent, Lesley Dunn and Madeline Austen of Environment Canada, Canadian Wildlife Service - Ontario, Wendy Dunford of Environment Canada, Canadian Wildlife Service – National Capital Region, Wasyl Bakowsky, Vivian Brownell, Kate Lillcrap, Mike Oldham, Eric Snyder and Allen Woodliffe of Ontario Ministry of Natural Resources and Clint Jacobs and Jared Macbeth of the Walpole Island Heritage Centre all reviewed and provided comments and advice during development of this document.

EXECUTIVE SUMMARY

Showy Goldenrod (*Solidago speciosa* var. *rigidiuscula*) is a large perennial herb with a range spread sparsely throughout much of the eastern United States and the Central Great Plains. This species grows mainly on sandy soils in open areas or under partial shade. Showy Goldenrod (*Solidago speciosa* var. *rigidiuscula*) is listed as Endangered on Schedule 1 of the federal *Species at Risk Act* (SARA).

In Canada, Showy Goldenrod (*Solidago speciosa* var. *rigidiuscula*) has only been found on the Walpole Island First Nation in the St. Clair River delta, southwestern Ontario where two extant populations currently exist. Two historic populations of the *rigidiuscula* variety from areas in Ontario, are considered extirpated; one in Lambton County and one in Perth County.

A small population of Showy Goldenrod (*Solidago speciosa*) was recently discovered northwest of Kenora, Ontario; the variety has not been named though it has been determined not to be the *rigidiuscula* variety. In November 2010, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed this Boreal population of Showy Goldenrod as threatened and occurrences in southwestern Ontario (i.e., the Great Lakes Plains population) as endangered. There are also two accounts of Showy Goldenrod (*Solidago speciosa*) of undetermined variety/population, recorded for Manitoba that require investigation. This recovery strategy addresses only the Great Lakes Plains population of Showy Goldenrod. Should the Boreal population of Showy Goldenrod be added to Schedule 1 of SARA a separate recovery strategy will be prepared.

Threats identified to the Canadian populations of Showy Goldenrod, Great Lakes Plains population, include but are not limited to: habitat loss or degradation, changes to natural processes, invasive species, disturbance from recreational activities and seed predation. The species is also limited by its small population size and geographically-isolated population. Given that the species is found at the northern extent of its range and has a naturally limited distribution in Canada, it will likely always be vulnerable to anthropogenic and natural stressors.

Although there are unknowns regarding the feasibility of recovery, in keeping with the precautionary principle, a full recovery strategy has been prepared as would be done when recovery is determined to be feasible. The population and distribution objective is to maintain the current abundance and distribution of the two extant Canadian Showy Goldenrod, Great Lakes Plains populations.

The broad strategies to recovery include but are not limited to: protection, conservation and management of habitat, monitoring and assessment of extant population(s), outreach and education and addressing biological knowledge gaps.

Critical habitat for this species is not identified at this time. Once adequate information is obtained, critical habitat will be identified and may be described within an area-based, multi-species at risk action plan developed in collaboration with the Walpole Island First Nation. One or more such action plans will be completed for Showy Goldenrod, Great Lakes Plains population, by December 2016.

RECOVERY FEASIBILITY SUMMARY

Based on the following four criteria outlined by the Government of Canada (2009), there are unknowns regarding the feasibility of recovery of the Showy Goldenrod, Great Lakes Plains population. Therefore, in keeping with the precautionary principle, a full recovery strategy has been prepared as would be done when recovery is determined to be feasible. It may not be possible to mitigate various threats to the species.

1. Individuals of the wildlife species that are capable of reproduction are available now or in the foreseeable future to sustain the population or improve its abundance.

Yes. There are individuals capable of reproduction within the Canadian range. Individuals are also available in the United States; however, it is unknown if these populations could be used to sustain the Canadian population or improve its abundance.

2. Sufficient suitable habitat is available to support the species or could be made available through habitat management or restoration.

Yes. Sufficient suitable habitat is currently available to support the Canadian population.

3. The primary threats to the species or its habitat (including threats outside Canada) can be avoided or mitigated.

Unknown. Some threats can be avoided or mitigated through recovery actions, such as changes to natural processes, habitat loss or degradation and disturbance from recreational activities. However, it is unknown if threats such as the spread of invasive species and seed predation can be mitigated to the extent required to sustain a viable population within Canada.

4. Recovery techniques exist to achieve the population and distribution objectives or can be expected to be developed within a reasonable timeframe.

Yes. The major threat for Showy Goldenrod, Great Lakes Plains population, is the loss of the specialized tallgrass prairie and savanna habitat in which it occurs. Some occupied Showy Goldenrod habitat has been secured through habitat acquisition initiatives and the rate of habitat conversion has been reduced at Walpole Island First Nation due to efforts by the Walpole Island Heritage Centre (COSEWIC, 2009). There are some recovery techniques (i.e., prescribed burning) which would be effective in reducing the encroachment of woody species and controlling some invasive species. Recovery techniques to reduce the impacts and spread of invasive species in the long-term may require further investigation.

TABLE OF CONTENTS

PREFACE	i
ACKNOWLEDGMENTS.....	i
EXECUTIVE SUMMARY.....	ii
RECOVERY FEASIBILITY SUMMARY.....	iii
1. COSEWIC* Species Assessment Information	1
2. Species Status Information	1
3. Species Information	2
3.1 Species Description	2
3.2 Population and Distribution	2
3.3 Needs of the Showy Goldenrod	4
3.4 Biological Limiting Factors	4
4. Threats.....	5
4.1 Threat Assessment	5
4.2 Description of Threats	6
5. Population and Distribution Objectives.....	7
6. Broad Strategies and General Approaches to Meet Objectives.....	7
6.1 Actions Already Completed or Currently Underway	7
6.2 Strategic Direction for Recovery.....	9
7. Critical Habitat.....	10
7.1 Identification of the Species' Critical Habitat	10
7.2 Schedule of Studies to Identify Critical Habitat.....	10
8. Measuring Progress.....	11
9. Statement on Action Plans.....	11
10. References.....	12
APPENDIX A: Effects on the Environment and Other Species	14
APPENDIX b: Subnational Conservation Ranks of Showy Goldenrod in the United States.....	15

1. COSEWIC* SPECIES ASSESSMENT INFORMATION

Date of Assessment: November 2010

Common Name (population): Showy Goldenrod (Great Lakes Plains population)

Scientific Name: *Solidago speciosa* var. *rigidiuscula*

COSEWIC Status: Endangered

Reason for Designation: Two small populations of this showy perennial occur in remnant tallgrass prairie habitats in southwestern Ontario. Substantial declines in the number of mature individuals and the quality of habitat have been recorded and are projected to continue. Limiting factors include the encroachment of woody plants due to the lack of regular burning of the prairie habitats and other impacts such as the spread of invasive exotic plants, and seed predation that reduces the species' ability to reproduce.

Canadian Occurrence: Ontario

COSEWIC Status History: The species was considered a single unit and designated Endangered in April 1999. Status re-examined and confirmed in May 2000. Split into two populations in November 2010. The Great Lakes Plains population was designated Endangered in November 2010.

*COSEWIC – Committee on the Status of Endangered Wildlife in Canada

2. SPECIES STATUS INFORMATION

The global conservation rank for Showy Goldenrod (*Solidago speciosa*) is secure¹ (G5) while the species variety (var. *rigidiuscula*) taxon is apparently secure² (T4) (NatureServe, 2010). In the United States, Showy Goldenrod is spread sparsely throughout much of the eastern and central Great Plains and the national conservation status is currently unranked³ (NNR) (NatureServe, 2010, Appendix B). In Canada, Showy Goldenrod (which hereafter, unless otherwise noted, refers to the *rigidiuscula* variety, Great Lakes Plains population) is found only in the province of Ontario; the national and subnational conservation ranks are critically imperilled⁴ (N1 and S1, respectively) (NatureServe, 2010).

Showy Goldenrod is listed as Endangered⁵ on Schedule 1 of the federal *Species at Risk Act* (SARA). In Ontario, the Showy Goldenrod is listed as Endangered⁶ under the provincial *Endangered Species Act, 2007* (ESA).

¹ common, widespread and abundant

² uncommon but not rare; some cause for long-term concern due to declines or other factors

³ a nation or state/province conservation status not yet assessed

⁴ critically imperilled in the jurisdiction because of extreme rarity or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the jurisdiction

⁵ a wildlife species facing imminent extirpation or extinction

⁶ a species that lives in the wild in Ontario but is facing imminent extinction or extirpation

The percentage of the global range found in Canada is estimated to be less than 1%. Showy Goldenrod distribution was historically, and is currently, very restricted, occurring at the northern edge of its North American range.

3. SPECIES INFORMATION

3.1 Species Description

Showy Goldenrod is a large perennial herb with large, toothed, egg-shaped lower leaves and much smaller more smooth-edged upper leaves. There are no basal leaves. The erect stems of the plant grow from a woody base to reach a height of 60 cm to 150 cm (Zhang et al., 1999). Several flowering stems may grow from one base. Flowering occurs from late September to early October. The showy flower cluster is cylindrical, consisting of many small bright yellow heads. Unlike many goldenrods, Showy Goldenrod's bracts of flowers are not spreading (Zhang et al., 1999).

3.2 Population and Distribution

Showy Goldenrod (*Solidago speciosa*) ranges globally from Ontario, Canada throughout much of the eastern United States and the central Great Plains (Figure 1). The variety *rigidiuscula* is found in oak savannas and tallgrass prairie throughout this range (Gleason and Cronquist, 1963).

In Canada, Zhang et al. (1999) reported six populations of this variety of Showy Goldenrod, all in the province of Ontario. There are currently two confirmed extant populations that exist on the Walpole Island First Nation, southwestern Ontario (Figure 2). The two populations are spread over a few prairie/savanna remnants⁷ and surveys performed in 2003 indicated that the two populations contained 1,300 plants (J. Bowles, unpublished report, 2008). Three of the six original populations, two from the Walpole Island First Nation and one from Port Franks (Lambton County), are likely extirpated; extirpation may have been caused by mowing, conversion of land for agriculture and residential development, respectively (J. Bowles, unpublished report, 2008). The other documented population, in Perth County, is considered extirpated probably due to development (i.e., commercial and industrial) (Zhang et al., 1999). The official status for three of the six populations (Port Franks and the two unconfirmed Walpole Island First Nation populations), is not confirmed (currently classified by COSEWIC as 'likely extirpated').

In 2005, a small population of Showy Goldenrod (*Solidago speciosa*) of an unnamed variety was found northwest of Kenora, Ontario; the variety has been determined to not be that of the *rigidiuscula* variety (A. A. Reznicek, pers. comm.). This new variety, referred to as the Boreal population, has recently been assessed by COSEWIC as a separate designatable unit (i.e., species) (T. Aniskowicz, pers. comm. 2010). The assessment of the new variety resulted

⁷ a remaining, usually small part

in a COSEWIC status of Threatened⁸ and its eligibility for inclusion on Schedule 1 of the *Species at Risk Act* is under consideration.

There are two accounts of potential observations of Showy Goldenrod (*Solidago speciosa*) in Manitoba. One account, by Lowe (1943), near Waugh, Manitoba was originally discounted by Scoggan (1957) due to lack of evidence. In light of subsequent reports from nearby areas (i.e., Kenora and Winnipeg), this account should be reconsidered. Another potential account south of Winnipeg, Manitoba was reported in 1996 by Bruce Ford of the University of Manitoba Herbarium. The specimen collected from this site is currently being examined to determine the species and/or variety (B. Ford, pers. comm. 2010). Subsequent visits to the site did not relocate the species and much of the open habitat has since been planted with Christmas trees (B. Ford, pers. comm. 2010).

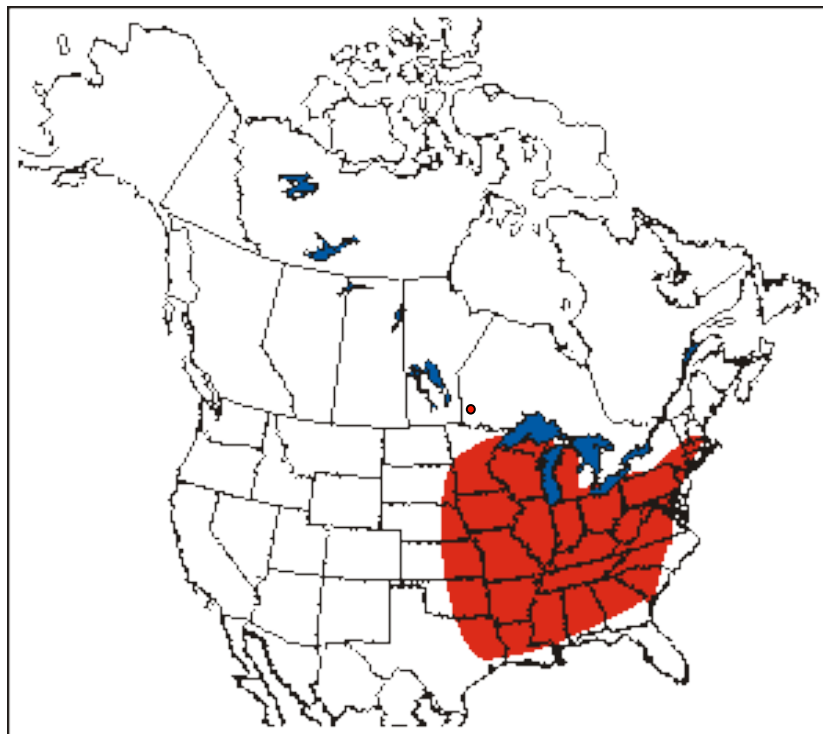


Figure 1: North American Distribution of Showy Goldenrod (*Solidago speciosa*) (Modified from: Zhang et al., 1998).

⁸ a wildlife species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction

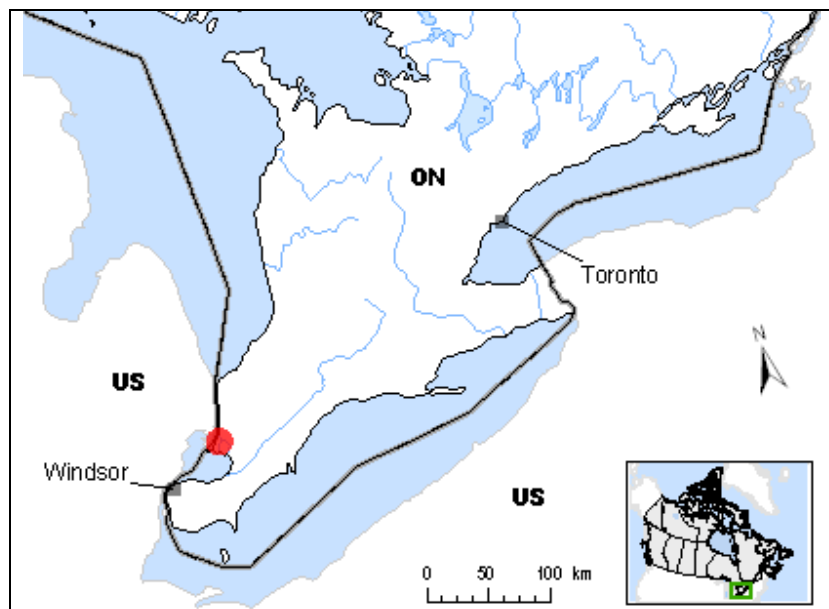


Figure 2: Canadian Distribution of Showy Goldenrod (*Solidago speciosa* var. *rigidiuscula*) (Environment Canada, 2010).

3.3 Needs of the Showy Goldenrod

Throughout its global range this variety of Showy Goldenrod occurs on sandy soils in open areas or under partial shade.

On the Walpole Island First Nation in the St. Clair River delta, the habitat of the Showy Goldenrod occurs with a number of other goldenrod species in rare remnants of mesic⁹ to dry open tallgrass prairie and Black Oak (*Quercus velutina*) savanna. Most plants have been located in habitats with partial shade, but have also been found in open areas. Canopy closure appears to affect the species because plants have not been found in heavily shaded sites.

Showy Goldenrod reproduces by seed. Some vegetative reproduction occurs through the formation of clones from the parent plant (Zhang et al., 1999). Pollination primarily occurs by insects and the seeds are likely wind dispersed (Zhang et al., 1999). Seeds from wild plants germinate easily and grow well under cultivation. However, plants grown *ex situ* in an experimental bed, and visited regularly by bumble bees did not set seed (J. Bowles, personal observation, 2007).

3.4 Biological Limiting Factors

Since Showy Goldenrod grows in several different prairie and savanna habitats on Walpole Island First Nation, it is unclear what factors are limiting its distribution within or across sites since it sets viable, windborne seeds that germinate easily (J. Bowles, unpublished report, 2008). Relatively small, geographically-isolated populations are prone to loss of genetic diversity and are at greater risk of being extirpated by stochastic events. Population recruitment may be limited

⁹ relating or adapted to a moderately moist habitat

by natural factors, such as the conditions existing at the northern limit of the species' range and seed predation. Canopy closure appears to affect the species, since plants are not found in heavily shaded sites (J. Bowles, unpublished report, 2008).

4. THREATS

4.1 Threat Assessment

Table 1. Threat Assessment Table – Showy Goldenrod (adapted from J. Bowles, unpublished report, 2008)

Threat	Level of Concern ¹	Extent	Occurrence	Frequency	Severity ²	Causal Certainty ³
*Habitat Loss or Degradation						
Agricultural expansion	High	Widespread	Historic/ Current	Recurrent	High	Medium
Housing development	Medium	Localized	Historic/ Current	Recurrent	High	Medium
Landscaping (e.g., mowing)	Medium	Localized	Historic/ Current	Seasonal	High	Medium
Sand extraction	Medium	Localized	Historic/ Current	Recurrent	Moderate/ High	High
*Changes in Ecological Dynamics or Natural Processes						
Alteration of fire regime (e.g., vegetation overgrowth)	High	Widespread	Current	Seasonal	High	High
*Exotic, Invasive, or Introduced Species/Genome						
European Common Reed (<i>Phragmites australis</i> ssp. <i>australis</i>)	Medium	Widespread	Anticipated	Seasonal	Unknown	Low
Sweet White Clover (<i>Melilotus alba</i>)	Medium	Widespread	Anticipated	Seasonal	Unknown	Low
Black Locust (<i>Robinia pseudoacacia</i>)	Low-Medium	Widespread	Anticipated	Seasonal	Unknown	Low
*Disturbance or Harm						
Recreational activities: incidental harm (e.g., trampling)	Medium-High	Widespread	Current	Continuous	High	High

Threat	Level of Concern ¹	Extent	Occurrence	Frequency	Severity ²	Causal Certainty ³
*Natural Processes or Activities						
Seed predation (unknown species of <i>Coleophora</i> moth)	Low-Medium	Widespread	Current	Seasonal	Unknown	Medium

¹ *Level of Concern: signifies that managing the threat is of (high, medium or low) concern for the recovery of the species, consistent with the population and distribution objectives. This criterion considers the assessment of all the information in the table).*

² *Severity: reflects the population-level effect (High: very large population-level effect, Moderate, Low, Unknown).*

³ *Causal certainty: reflects the degree of evidence that is known for the threat (High: available evidence strongly links the threat to stresses on population viability; Medium: there is a correlation between the threat and population viability e.g. expert opinion; Low: the threat is assumed or plausible).*

**Threat categories are listed in order of decreasing significance.*

4.2 Description of Threats

Habitat Loss or Degradation

Habitat loss or degradation through housing development, agricultural expansion, landscaping and sand extraction continues to threaten the Showy Goldenrod. On Walpole Island First Nation, housing construction has increased in response to critical housing shortages (Bowles, 2005). Sites where habitat has been destroyed or severely altered through housing construction, agricultural conversion and industrial development are no longer capable of supporting the species or may have caused local extirpations (Zhang et al., 1999).

Changes in Ecological Dynamics or Natural Processes

Showy Goldenrod requires areas of minimal to no shading. Suppression of fire can limit habitat by allowing trees and shrubs to grow and eventually shade out the species. The frequency of fire on Walpole Island First Nation is declining, mainly due to the pressure to control fire to protect housing and development; many prairie and savanna habitats are converting to woodlands (Waldron, 2001). Based on interpretation of air photos from 1972 and 1998, it is estimated that prairies at Walpole Island have been reduced from about 730 ha to about 470 ha, a loss of 36% (Crow et al., 2003). Some of this is a result of conversion to agriculture and housing, but most is due to encroachment by forest and woodland in the absence of regular fires (Bowles, 2005). The loss of oak savanna habitats on Walpole Island First Nation has been mostly attributable to closing in of the canopy (Crow et al., 2003). Conversely, a late spring fire has appeared to reduce the number of plants at one site (J. Bowles, unpublished report, 2008).

Exotic, Invasive, or Introduced Species/Genome

Invasive species such as European Common Reed, Black Locust and White Sweet Clover are invading many prairie habitats on Walpole Island First Nation (Bowles, 2005). European Common Reed, especially, is expanding rapidly in wetter prairies. Invasive species can out-compete or shade Showy Goldenrod plants, promote a decline in vigor resulting in poor growth and lower seed production and potentially contribute to loss of germination sites.

Disturbance or Harm

Pedestrian and all-terrain vehicle (ATV) trail use can result in direct damage to individual plants, through trampling and compaction of the soil making potential habitat unsuitable.

Natural Processes or Activities

The developing seeds of the Showy Goldenrod are predated by the larvae of at least one unidentified species of *Coleophora* moth. Some *Coleophora* species require specific host plants. Mammoliti (2006) studied infestation by the *Coleophora* of Showy Goldenrod on the Walpole Island First Nation (Walpole Island Heritage Centre, 2006). He found that *Coleophora* can affect up to 97% of inflorescences¹⁰, but the proportion of damaged seeds varied from about 88% to less than 40% across different sites. Even flower heads that are not predated may be covered in a web created by the insect which might inhibit pollination, further reducing production of viable seed. Consistently poor seed set over several years could lead to declines in recruitment and eventual decline of the species.

Sallabanks and Courtney (1992) suggest that high rates of seed predation in perennial species one year may not affect long-term recruitment and population size because conditions (e.g., habitat and soil conditions) existing in years of successful recruitment are more important. In Canada, seed predation should be considered a threat given Showy Goldenrod's limited abundance and distribution.

5. POPULATION AND DISTRIBUTION OBJECTIVES

The population and distribution objective is to maintain the current abundance and distribution of the two extant Canadian populations. The species was historically (100 years ago) more widespread but there is little opportunity for re-introduction into formerly occupied range due to extensive land-use change (i.e., conversion to agriculture). Showy Goldenrod distribution was historically, and is currently, very restricted, occurring at the northern edge of its North American range.

6. BROAD STRATEGIES AND GENERAL APPROACHES TO MEET OBJECTIVES

6.1 Actions Already Completed or Currently Underway

The Walpole Island Heritage Centre has monitored populations of Showy Goldenrod. A complete census of all known plants was completed in a one-year study in 2003 (J. Bowles, unpublished report, 2008). Efforts by the Walpole Island Heritage Centre to acquire and protect habitat has been undertaken and has resulted in the reduction of the rate of conversion of prairie and savanna habitat (J. Bowles, unpublished report, 2008; COSEWIC, 2009).

¹⁰ a group of flowers growing from a common stem, often in a characteristic arrangement. Also called *flower cluster*.

A small number of seeds were collected from plants on the Walpole Island First Nation in 2006 and were planted in greenhouses and experimental plots at the University of Western Ontario (UWO). Several plants have been returned to a demonstration garden on the Walpole Island First Nation and a small *ex situ* population is retained for study at UWO (J. Bowles, unpublished report, 2008). A study to attempt to identify the *Coleophora* moth predating Showy Goldenrod seeds was undertaken by the UWO (Mammoliti, 2006).

Recovery actions described in the Draft Walpole Island Ecosystem Recovery Strategy (Bowles, 2005) include raising awareness in the community about species at risk. Pamphlets, calendars, newsletter articles, posters and other promotional material have been used to raise awareness.

The Walpole Island First Nation is currently developing an ecosystem protection plan based on the community's traditional ecological knowledge (TEK).

6.2 Strategic Direction for Recovery

Table 2. Recovery Planning Table – Showy Goldenrod

Threat or Limitation	Priority	Broad Strategy to Recovery	General Description of Research and Management Approaches
All threats	High	Protect, conserve and manage habitat	<ul style="list-style-type: none"> • Promote conservation and appropriate management of habitats supporting Showy Goldenrod • Develop and use habitat management techniques to reduce shading of Showy Goldenrod • Establish policies, agreements or other tools that protect existing Showy Goldenrod habitat (e.g., acquisition, conservation agreements) • Monitor and manage for invasive species
	High	Monitor / assess populations	<ul style="list-style-type: none"> • Confirm Showy Goldenrod population status where required • Establish and implement a long-term monitoring protocol
All threats	Medium	Outreach and education	<ul style="list-style-type: none"> • Promote community involvement and awareness regarding species at risk and their habitat • Encourage the transfer of Traditional Ecological Knowledge
Knowledge Gaps	Medium	Conduct research and gather and transfer knowledge	<ul style="list-style-type: none"> • Examples of knowledge gaps: factors affecting distribution, population size and recruitment; assign variety and determine status of Showy Goldenrod populations found in northwestern Ontario and Manitoba; identification of unknown lepidopteran species predating Showy Goldenrod seeds; Traditional Ecological Knowledge

7. CRITICAL HABITAT

7.1 Identification of the Species' Critical Habitat

At this time, the information required to identify critical habitat for the Showy Goldenrod is not available to Environment Canada. Although the continued presence of Showy Goldenrod populations has been confirmed (J. Bowles, unpublished report, 2008), the specific data required to be able to identify critical habitat sites (i.e., location and extent of population, biophysical attributes of the habitat), are not yet available to Environment Canada. The activities to obtain the required information are outlined in the schedule of studies (Table 3).

Showy Goldenrod is typically known to be associated with areas of mesic to dry open tallgrass prairie and Black Oak savanna. Given the known historic and current threats to the species, confirmation of the location and extent of Showy Goldenrod populations is required for the identification of critical habitat. Evidence exists that indicates certain threats may have impacted portions of the population (Zhang et al., 1999; J. Bowles, unpublished report, 2008) during the elapsed time period from when location data is available to Environment Canada (ca. 1990). There is also a need to confirm the biophysical habitat attributes required by the species, to confirm the extent of these attributes where the population occurs (e.g., using Ecological Land Classification (Lee et al., 1998)), and to confirm the extent of the habitat required to meet the population and distribution objective.

Once adequate information is obtained, critical habitat will be identified and may be described within an area-based multi-species at risk action plan developed in collaboration with the Walpole Island First Nation.

7.2 Schedule of Studies to Identify Critical Habitat

Table 3. Schedule of Studies to Identify Critical Habitat

Description of Activity	Rationale	Timeline
Confirm/obtain population and habitat information at currently occupied sites.	Confirm location and extent of population. Confirm habitat associations, habitat attributes and determine extent of suitable habitat.	2011 - 2016
Develop and apply criteria to identify sites meeting critical habitat criteria.	Identify critical habitat.	2016

8. MEASURING PROGRESS

The performance indicators presented below provide a way to define and measure progress toward achieving the population and distribution objectives. Specific progress towards implementing the recovery strategy will be measured against indicators outlined in subsequent action plans.

Every five years, success of recovery strategy implementation will be measured against the following performance indicators:

- the current Canadian abundance has not decreased, and
- the current Canadian distribution has not decreased.

9. STATEMENT ON ACTION PLANS

One or more action plans will be completed for Showy Goldenrod by December 2016. Any such action plan is expected to include an area-based, multi-species approach and be prepared in collaboration with the Walpole Island First Nation.

10. REFERENCES

- Aniskowicz, T. 2010. *Correspondence with M. Austen*. December 2010. Canadian Wildlife Service – National Capital Region, Gatineau, QC.
- Bowles, J.M. 2005. Draft Walpole Island ecosystem recovery strategy. Walpole Island Heritage Centre, Environment Canada and The Walpole Island Recovery Team.
- Bowles, J.M. 2008. Unpublished report. Draft Recovery Strategy for the Showy Goldenrod in Canada. Prepared for Environment Canada, Canadian Wildlife Service – Ontario. Toronto, Ontario. 11 pp.
- COSEWIC. 2009. COSEWIC assessment and status report on the pink milkwort *Polygala incarnata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa, Ontario. 24 pp.
- Crow, C., J. Demelo, J. Hayes, J. Wells and T. Hundey. 2003. Walpole Island Land Use change 1972-1998. Unpublished class report, Department of Geography, University of Western Ontario.
- Environment Canada, 2010. Species profile: showy goldenrod *Solidago speciosa* var. *rigidiuscula*. Environment Canada, Ottawa, Ontario. Web site: http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=568
- Ford, B. 2010. *E-mail correspondence to C. Rohe*. November 2010. Professor and Curator, University of Manitoba Herbarium, Winnipeg, Manitoba.
- Gleason, H.A. and A. Cronquist. 1963. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. D. van Nostrand Company, New York. 810 pp.
- Government of Canada. 2009. *Species at Risk Act* Policies. Environment Canada. 38 pp.
- Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. Ecological land classification for southern Ontario: first approximation and its application. SCSS Field Guide FG-02. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch, North Bay, Ontario.
- Lowe, C. A. 1943. List of flowering plants, ferns, club mosses, mosses and liverworts of Manitoba. Natural History Society of Manitoba, Winnipeg, Manitoba. 110 pp.
- Mammoliti, P. 2006. Studies in seed predation of endangered showy goldenrod (*Solidago speciosa*) on Walpole Island First Nation. Unpublished Honours Thesis, Department of Biology, University of Western Ontario, London, Ontario. 34 pp.

- NatureServe. 2010. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Web site: <http://www.natureserve.org/explorer> [accessed November 2010]
- Reznicek, A. A. *Correspondence with W. Bakowsky*. Curator of Vascular Plants, University Herbarium, University of Michigan, Ann Arbor, Michigan.
- Sallabanks, R. and S.P. Courtney. 1992. Frugivory, seed predation and insect-vertebrate interactions. *Annual Review Entomology* 37: 377-400.
- Scoggan, H. J. 1957. Flora of Manitoba. Bulletin No. 140, Biological Series No. 47. National Museum of Canada, Ottawa, Ontario. 619 pp.
- Waldron, G.E. 2001. Update COSEWIC status report on the white prairie gentian *Gentiana alba* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa, Ontario. 21 pp.
- Walpole Island Heritage Centre. 2006. Walpole Island Heritage Centre News. Volume 4: Issue 5. March 2006. 6 pp.
- Zhang, J.J., D.E. Stephenson, and J.C. Semple. 1998. Status Report on Species at Risk in Canada. Showy Goldenrod, *Solidago speciosa* Nuttall var. *rigidiuscula* Torrey & Gray (Asteraceae). Committee on the Status of Endangered Wildlife in Canada. Ottawa, Ontario. 1 - 22 pp.
- Zhang, J.J., D.E. Stephenson and J.C. Semple. 1999 (in press). COSEWIC status report on the showy goldenrod *Solidago speciosa* var. *rigidiuscula* in Canada, in COSEWIC assessment and status report on the showy goldenrod *Solidago speciosa* var. *rigidiuscula* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa, Ontario. vi + 14 pp.

APPENDIX A: EFFECTS ON THE ENVIRONMENT AND OTHER SPECIES

A strategic environmental assessment (SEA) is conducted on all SARA recovery planning documents, in accordance with the *Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals*. The purpose of a SEA is to incorporate environmental considerations into the development of public policies, plans, and program proposals to support environmentally sound decision-making.

Recovery planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that strategies may also inadvertently lead to environmental effects beyond the intended benefits. The planning process based on national guidelines directly incorporates consideration of all environmental effects, with a particular focus on possible impacts upon non-target species or habitats. The results of the SEA are incorporated directly into the strategy itself, but are also summarized below in this statement.

This recovery strategy will clearly benefit the environment by promoting the recovery of the Showy Goldenrod. Like other species of goldenrod, this plant appears to be an important source of pollen for bees, wasps, flies and other insects. A variety of insects use the flower clusters to roost. Because Showy Goldenrod flowers late in the season it may provide an important late season food source for bumble bees (*Bombus* spp.) and other insects. The potential for the strategy to inadvertently lead to adverse effects on other species was considered. The SEA concluded that this strategy will clearly benefit the environment and will not entail any significant adverse effects. The reader should refer to the following sections of the document in particular: Species Needs, Population and Distribution Objectives and Broad Strategies and General Approaches to Meet Objectives.

APPENDIX B: SUBNATIONAL CONSERVATION RANKS OF SHOWY GOLDENROD IN THE UNITED STATES

Table 1. List and description of various conservation status ranks for the Showy Goldenrod in the United States (from NatureServe, 2010).

	Global (G) Rank	National (N) Rank (United States)	Sub-national (S) Rank
Showy Goldenrod (<i>Solidago speciosa</i> var. <i>rigidiuscula</i>)	G5T4 (Secure – common; widespread and abundant/Apparently Secure - uncommon but not rare; some cause for long-term concern due to declines or other factors)	NNR (Unranked - nation or state/province conservation status not yet assessed)	Arkansas (SNR) Georgia (S1) Illinois (SNR) Indiana (SNR) Iowa (SNR) Kansas (SNR) Kentucky (SU) Michigan (SNR) Minnesota (SNR) Missouri (SNR) Nebraska (SNR) Ohio (SNR) Oklahoma (SNR) South Dakota (SNR) Tennessee (SNR) Texas (SNR) Wisconsin (SNR)

S1: Critically Imperilled; SNR: Unranked; SU: Unrankable