COSEWIC
Assessment and Status Report

on the

Showy Goldenrod
Solidago speciosa

Great Lakes Plains Population
Boreal Population

in Canada

Great Lakes Plains Population - ENDANGERED
Boreal Population - THREATENED
2010

COSEWIC
Committee on the Status
of Endangered Wildlife
in Canada

COSEPAC
Comité sur la situation
des espèces en péril
au Canada

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

COSEWIC. 2010. COSEWIC assessment and status report on the Showy Goldenrod *Solidago speciosa* (Great Lakes Plains and Boreal Populations) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiv + 23 pp. (www.sararegistry.gc.ca/status/status_e.cfm).

Previous report(s):

COSEWIC. 2000. 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. vi + 14 pp.

Zhang, J.J. D.E.Stephenson and J.C. Semple. 1999. 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* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 1-14 pp.

Production note:
COSEWIC would like to acknowledge Jane M. Bowles and Clinton R. Jacobs for writing the status report on the Showy Goldenrod *Solidago speciosa* in Canada, prepared under contract with Environment Canada, overseen and edited by Erich Haber, Co-chair, COSEWIC Vascular Plants Species Specialist Subcommittee.

For additional copies contact:

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

Tel.: 819-953-3215
Fax: 819-994-3684
E-mail: COSEWIC/COSEPAC@ec.gc.ca
http://www.cosewic.gc.ca

Également disponible en français sous le titre Évaluation et Rapport de situation du COSEPAC sur la verge d'or voyante (*Solidago speciosa*) population des plaines des Grands Lacs et population boréales au Canada.

Cover illustration/photo:
Showy Goldenrod — Photo by Jane M. Bowles.

Catalogue No. CW69-14/201-2011E-PDF
ISBN 978-1-100-18577-4

COSEWIC
Assessment Summary

Assessment Summary – November 2010

Common name
Showy Goldenrod - Great Lakes Plains population

Scientific name
Solidago speciosa

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.

Occurrence
Ontario

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.

Assessment Summary – November 2010

Common name
Showy Goldenrod - Boreal population

Scientific name
Solidago speciosa

Status
Threatened

Reason for designation
A morphologically and ecologically distinct population has recently been found at a single location in northwestern Ontario. It occurs in a geographically distinct area from the Great Lakes Plains population. This small population may consist of only about 1000 individuals. Such geographically restricted small populations are potentially subject to negative chance events.

Occurrence
Ontario

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 Boreal population was designated Threatened in November 2010.

COSEWIC
Executive Summary

Showy Goldenrod
Solidago speciosa

Great Lakes Plains Population
Boreal Population

Wildlife species description and significance

Showy Goldenrod (*Solidago speciosa*) is a perennial plant in the aster family. Plants have as many as 30 stems up to 1.5 m tall. These are typically unbranched, smooth, and usually reddish in colour with alternate, lance-shaped leaves. The inflorescence is large and showy, up to 30 cm long, consisting of many small, bright yellow compound flower heads arranged into a panicle. Its branches are erect, and do not curve downwards like those of other large goldenrods. Flowering in Ontario starts in late August to early September and continues into mid-October.

Two subspecies of Showy Goldenrod have been recognized but only *Solidago speciosa* subspecies *speciosa* occurs in Canada. Two varieties of this subspecies are currently recognized (variety *speciosa* and variety *rigidiuscula*), but these are difficult to distinguish and have overlapping ranges in the United States. Only *S. speciosa* var. *rigidiuscula* is presently reported for Canada. However, this report also documents the occurrence of a population of Showy Goldenrod in northwestern Ontario near Kenora that differs morphologically from the Walpole Island plants. Consequently, the taxonomic status of *Solidago speciosa* requires further study.

Showy Goldenrod is a popular garden plant sold widely in the U.S. horticultural trade as evident through web advertisements from suppliers in five states. Decoctions of various parts of the plant have been used medicinally. Showy Goldenrod infected by the *Coleosporium* rust fungus can cause sickness and death in cattle and horses.

Distribution

The range of the entire species extends across much of the eastern United States, but also includes areas of Montana, Wyoming and Colorado. In Canada, Showy Goldenrod is restricted to Walpole Island First Nation (WIFN) in southwestern Ontario and another Ontario site northwest of Kenora. The latter population was recently discovered and extents the global range of the species considerably northwards. Much less than 1% of the total range of the species is in Canada.

Habitat

On WIFN, Showy Goldenrod stands are found in moist oak savannah and open tallgrass prairie on sandy loam and sandy clay loam soils. Fire is an important factor in maintaining the tallgrass prairie and savannah habitat in which Showy Goldenrod grows.

In NW Ontario, the plants are found on an open south-facing slope dominated by Porcupine Grass and Big Bluestem, fringed on the upper slope by Jack Pine, Red Pine and Eastern White Pine.

Biology

Showy Goldenrod is a perennial that reproduces primarily by seed. Longevity in the wild is unknown, but garden plants will survive several years. Plants vary in size, producing 1 to 30 or more flowering shoots.

The species is insect pollinated and the heavy, sticky pollen is carried by a wide assortment of insects including bees, wasps, flies, beetles, moths and butterflies. The caterpillars of many moths feed on various parts of this goldenrod. Additional insect feeders include various leafhoppers, lace bugs, plant bugs, and beetles. Seed predation by the larvae of an unidentified species of Casebearer Moth Family is prevalent on Showy Goldenrod at WIFN.

Population sizes and trends

In 2008, the Great Lakes Plains DU consisted of about 800 plants in two populations compared to about 1300 plants in the same area in 2003.

Part of one population was destroyed when a house was built in 2003, and a decreased frequency of fire in the savannah around the house has resulted in the loss of plants and a decline in the quality of habitat. A late spring burn in 2008 at another site appears to have reduced the number of plants. Plants have also disappeared from a small grove of trees in which the canopy cover continues to increase and where the site was not burned between 2003 and 2008. Part of one population may also have been destroyed during the expansion of a cemetery prior to the census in 2003.

The Boreal DU was only discovered in 2005; a cursory survey in 2007 documented only 30 plants. A more complete survey in 2009 recorded about 1100 plants.

Threats and limiting factors

The major limiting factor for the Great Lakes Plains DU is the decline in tallgrass prairie and savannah habitat where the species occurs. Closing in of the canopy and encroachment by shrubs such as Staghorn Sumac may be causing a decline in the vigour of some plants.

Conversion of habitat to agriculture, housing and other land uses has destroyed some sites and reduced the availability of habitat. A reduction in the frequency of fire is also reducing habitat availability. Excavation of sand, trampling, dumping and the spread of exotics are all ongoing threats. Mowing has likely caused the loss of part of one population.

No obvious threats occur for the Boreal DU.

Protection, status, and ranks

The entire species of *Solidago speciosa* is considered globally secure by NatureServe based mainly on its secure status in the U.S. where most of its range occurs. In Canada, it is listed as Endangered under Schedule 1 of the federal *Species at Risk Act*, which applies to populations on Federal Land, including Walpole Island First Nation. Identification of critical habitat for this species is still under review. In Ontario, it is ranked as critically imperilled and listed as Endangered under the *Endangered Species Act, 2007*. Because critical habitat has not yet been identified for this species in Ontario, its habitat is not protected.

Variety *rigidiuscula* is ranked by NatureServe as apparently secure globally and is not ranked in the United States. In Canada, it is ranked by NatureServe as critically imperilled and is listed as critically imperilled in Georgia and is not ranked or unrankable in the other 16 states where it occurs.

TECHNICAL SUMMARY – Great Lakes Plains Population

Solidago speciosa
Showy Goldenrod — Verge d'or voyante
Great Lakes Plains Population — Population des plaines des Grands Lacs
Range of occurrence in Canada (province/territory/ocean): Ontario

Demographic Information

Generation time (usually average age of parents in the population; indicate if another method of estimating generation time indicated in the IUCN guidelines(2008) is being used)	Several yrs
Is there an [observed, inferred, or projected] continuing decline in number of mature individuals?	Yes
Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations]	~38% decline in the last 5 years
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over the last [10 years, or 3 generations].	Unknown
[Projected or suspected] percent [reduction or increase] in total number of mature individuals over the next [10 years, or 3 generations].	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or 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?	Unlikely reversible, understood but not ceased
Are there extreme fluctuations in number of mature individuals?	No

Extent and Occupancy Information

Estimated extent of occurrence Based on the shortest land path between populations through Canada and using a 1 km width. This includes much unsuitable habitat.	8 km²
Index of area of occupancy (IAO) The actual area occupied is about 26 ha.	8 km² (2x2 km grid)
Is the total population severely fragmented? Both extant WIFN populations are viable and being monitored with the larger of the two comprising over 80% of the total population of mature plants at WIFN. The prairie habitats occupied are relatively small but dispersal of the wind-dispersed seeds between them would have been potentially possible under former natural pre-settlement conditions but perhaps unlikely at present.	No
Number of "locations" (as per definition, in relation to threat)	2
Is there an [observed, inferred, or projected] continuing decline in extent of occurrence?	No
Is there an [observed, inferred, or projected] continuing decline in index of area of occupancy?	No
Is there an [observed, inferred, or projected] continuing decline in number of populations?	No
Is there an [observed, inferred, or projected] continuing decline in number of locations?	No
Is there an [observed, inferred, or projected] continuing decline in [area, extent and/or quality] of habitat?	Decline in quality and area
Are there extreme fluctuations in number of populations?	No

Are there extreme fluctuations in number of locations (as per definition, in terms of threat)?	No
Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

Number of Mature Individuals (in each population)

Population	N Mature Individuals
#1 - WIFN	669
#2 - WIFN	124
Total	793

Quantitative Analysis

Probability of extinction in the wild is at least [20% within 20 years or 5 generations, or 10% within 100 years].	None available

Threats (actual or imminent, to populations or habitats)

Conversion to agriculture, house construction, encroachment by woody species due to lack of fire, cemetery expansion, sand extraction, mowing, trampling, dumping, invasive species, herbivory of seeds.

Rescue Effect (immigration from an outside source)

Status of outside population(s)?
USA: S2 in MD and WY
S3 in PA
S4 in IA, VA and WV
S4? KY
S5 in GA, NC and NE
Not Ranked or Unrankable in AL, AR, CO, CT, DC, IL, IN, KS, LA, MA, MI, MN, MO, MS, ND, NH, NJ, NM, NY, OH, OK, RI, SC, SD, TN, TX, VT and WI

Is immigration known or possible?	Unknown
Would immigrants be adapted to survive in Canada?	Yes
Is there sufficient habitat for immigrants in Canada?	Very limited and declining
Is rescue from outside populations likely?	**No**

Current Status

COSEWIC: Endangered (November 2010)

Status and Reasons for Designation

Status:	**Alpha-numeric code:**
Endangered	B1ab(iii,v)+2ab(iii,v); C1

Reasons 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.

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Meets Threatened A2ac+4ac based on a decline of 38% by direct observation.
Criterion B (Small Distribution Range and Decline or Fluctuation): Meets Endangered B1ab(iii,v)+2ab(iii,v) based on EO and IAO below critical values, occurrence at only two extant locations with low population sizes that have experienced continued declines in quality of habitat and number of mature individuals.
Criterion C (Small and Declining Number of Mature Individuals): Meets Endangered C1 with a total population <800 mature individuals and an observed decline of 38% in the last 5 years.
Criterion D (Very Small Population or Restricted Distribution): Meets Threatened D1 based on a population estimate that is >250 but < 1000 mature individuals.
Criterion E (Quantitative Analysis): None conducted.

TECHNICAL SUMMARY – Boreal Population

Solidago speciosa
Showy Goldenrod — Verge d'or voyante
Boreal Population — Population boréale
Range of occurrence in Canada (province/territory/ocean): Ontario

Demographic Information

Generation time (usually average age of parents in the population; indicate if another method of estimating generation time indicated in the IUCN guidelines(2008) is being used)	Several yrs
Is there an [observed, inferred, or projected] continuing decline in number of mature individuals?	No
Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations]	No decline known
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over the last [10 years, or 3 generations].	Unknown
[Projected or suspected] percent [reduction or increase] in total number of mature individuals over the next [10 years, or 3 generations].	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or 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?	N/A
Are there extreme fluctuations in number of mature individuals?	No

Extent and Occupancy Information

Estimated extent of occurrence Nominal value set equal to IAO value for 2x2 km grid Because of the recent discovery of this population, its actual EO is uncertain although considerable fieldwork has been conducted within the region (Rainy Lake-Lake of the Woods) over the last 10 years.	4 km²
Index of area of occupancy (IAO) The actual area occupied is <1 ha. There is some uncertainty as to the actual value based on the recent discovery of the population.	4 km² (2x2 km grid)
Is the total population severely fragmented? A single population	N/A
Number of "locations" (as per definition, in relation to threat)	1
Is there an [observed, inferred, or projected] continuing decline in extent of occurrence?	Unknown
Is there an [observed, inferred, or projected] continuing decline in index of area of occupancy?	Unknown
Is there an [observed, inferred, or projected] continuing decline in number of populations?	Unknown
Is there an [observed, inferred, or projected] continuing decline in number of locations?	Unknown
Is there an [observed, inferred, or projected] continuing decline in [area, extent and/or quality] of habitat?	Unknown
Are there extreme fluctuations in number of populations?	No
Are there extreme fluctuations in number of locations (as per definition, in terms of threat)?	No
Are there extreme fluctuations in extent of occurrence?	No

Are there extreme fluctuations in index of area of occupancy?	No

Number of Mature Individuals (in each population)

Population	N Mature Individuals
#3 Dufresne Island Because of the difficulty in counting mature individuals in dense patches where separation of plants was difficult, the total number based on counts and estimates may overestimate the number of mature individuals.	~1110
Total	~1110

Quantitative Analysis

Probability of extinction in the wild is at least [20% within 20 years or 5 generations, or 10% within 100 years].	None available

Threats (actual or imminent, to populations or habitats)

No imminent threats have been reported, but housing development had been proposed for this site but was halted once Showy Goldenrod was discovered.

Rescue Effect (immigration from an outside source)

Status of outside population(s)? USA: S2 in MD and WY S3 in PA S4 in IA, VA and WV S4? KY S5 in GA, NC and NE Not Ranked or Unrankable in AL, AR, CO, CT, DC, IL, IN, KS, LA, MA, MI, MN, MO, MS, ND, NH, NJ, NM, NY, OH, OK, RI, SC, SD, TN, TX, VT and WI	
Is immigration known or possible?	Unknown
Would immigrants be adapted to survive in Canada?	Yes
Is there sufficient habitat for immigrants in Canada?	Very limited and declining
Is rescue from outside populations likely?	**No**

Current Status

COSEWIC: Endangered (November 2010)

Status and Reasons for Designation

Status:	**Alpha-numeric code:**
Threatened	D1
Reasons for designation A morphologically and ecologically distinct population has recently been found at a single location in northwestern Ontario. It occurs in a geographically distinct area from the Great Lakes Plains population. This small population may consist of only about 1000 individuals. Such geographically restricted small populations are potentially subject to negative chance events.	

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Not applicable. Declines unknown.
Criterion B (Small Distribution Range and Decline or Fluctuation): Not applicable. EO and IAO are below critical values; however, no declines are known or projected and the population is not known to experience extreme fluctuations.
Criterion C (Small and Declining Number of Mature Individuals): Not applicable. Declines unknown.
Criterion D (Very Small Population or Restricted Distribution): Meets Threatened D1. The population estimate of 1100 mature individuals is subject to several errors including observer bias and ability to separate individuals in close proximity. Consequently, the population size may be within the maximum limit of > 250 but <1000 mature individuals.
Criterion E (Quantitative Analysis): None conducted.

PREFACE

Since the original status report was prepared in 1999, the two populations of Showy Goldenrod on Walpole Island First Nation lands (WIFN) have declined by about 38%. A morphologically different population was discovered in northwestern Ontario in 2005. A thorough survey of these plants was conducted in 2009. As a consequence, two designatable units are now recognized for Showy Goldenrod: Great Lakes Plains DU and Boreal DU. The population trend for the Boreal DU is unknown. Assuming that the population in northwestern Ontario was present at the time of the previous assessment in 2000, the total population of Showy Goldenrod may have declined about 20% by 2008. This assumes that there had been no decline in the Boreal DU.

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 (2010)

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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The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.

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WILDLIFE SPECIES DESCRIPTION AND SIGNIFICANCE

Name and classification

Scientific name: *Solidago speciosa* Nuttall, Gen. N. Amer. Pl. 2: 160. 1818.

Synonyms: *Aster speciosus* (Nuttall) Kuntze

Common Names: Showy Goldenrod, Noble Goldenrod, ozaawaabigwan, verge d'or voyante

Family Name: Asteraceae (Aster Family)

Major Plant Group: Angiosperm (dicot flowering plant)

Two subspecies are recognized in North America, *S. speciosa* subsp. *pallida*, which has a western distribution, and S. *speciosa* subsp. *speciosa* that is much more widespread throughout eastern and central North America. Only the typical subspecies *speciosa* is found in Canada. It has been divided into several varieties, but only two are recognized by Semple and Cook (2006):

Solidago speciosa Nuttall var. *speciosa*
Synonyms: *Solidago harperi* Mackenzie ex Small
S. jejunifolia E. S. Steele
S. speciosa var. *angustata* Torrey & A. Gray
S. speciosa var. *jejunifolia* (E. S. Steele) Cronquist
S. uliginosa Nuttall var. *jejunifolia* (E. S. Steele) B. Boivin

Solidago speciosa Nuttall var. *rigidiuscula* Torr. & Gray
Synomyms: *Solidago chandonnettii* E. S. Steele
S. rigidiuscula (Torrey & A. Gray) Porter
S. venulosa Greene

Morphological description

Solidago speciosa is a perennial plant with a stout woody crown (caudex) developing in older plants and has both fibrous roots and short rhizomes. Each plant may have 1 to 30, reddish stems up to 1.5 m tall (Figure 1). These stems are typically unbranched. The inflorescence is a large and showy panicle up to 30 cm long, consisting of many small bright yellow compound flower heads (Figure 2). The panicle branches are erect and do not curve downwards like those of other large goldenrods. Each compound flower head is about 4-6 mm tall and 3-4 mm across, consisting of 4-10 strap-shaped ray florets surrounding 7-10 disc florets (Hilty 2008). The ray florets are often irregularly spaced or open sequentially, giving the flower head an irregular appearance. Flowering in southern Ontario occurs in late August to early September and continues into mid-October. Seeds are yellowish brown achenes about 1.5 to 2 mm long with a spreading tuft of pappus hairs about 2-3 mm long.

Figure 1. Photo of Showy Goldenrod (*S. speciosa* var. *rigidiuscula*) on Walpole Island First Nation lands showing its growth form (Photo by Jane M. Bowles).

Figure 2. Inflorescence of Showy Goldenrod (*S. speciosa* var. *rigidiuscula*) on Walpole Island First Nation lands (Photo by Jane M. Bowles).

The two varieties of subspecies *speciosa* are distinguished based on the persistence and degree of serration of the basal leaves, and the width and stiffness of the stem leaves. In *S. speciosa* var *rigidiuscula* the alternate leaves are lanceolate or narrowly ovate, more or less hairless, with entire or slightly toothed margins, up to 15 cm long and 2 cm wide, rather stiff and becoming slightly smaller as they ascend up the stem. The lower and basal leaves are almost entire and wither before flowering time. This character distinguishes var. *rigidiuscula* from var. *speciosa,* which has broader, less stiff stem leaves (up to 5 cm wide) and coarsely toothed, persistent lower leaves (Semple 1992; Semple and Cook 2006). The two varieties have considerable overlap in their ranges in the United States and may be difficult to distinguish (Semple and Cook 2006). Showy Goldenrod is referred to as *S. speciosa* in this report except where noted.

A population of *S. speciosa* with characteristics not clearly fitting var. *rigidiuscula* was discovered in 2005 (Bakowsky pers. comm. 2008) in open oak-pine woodland on Dufresne Island in the Winnipeg River, just northwest of Kenora, Ontario. Plants from this site differ from the two named varieties in having sparsely hairy fruit whereas the two currently recognized varieties have hairless fruit (Semple, pers. comm. to Oldham 2006). Although hairiness can be a variable character in plants, the presence of hairy fruits in the Dufresne Island population appears to be unique in this species. Although this population was discovered recently, it occurs in a natural habitat with no weedy species present and is not near a road. Considering the size of this population, it is also inferred to have been present for some time.

Population spatial structure and variability

According to Semple (1992), southern Ontario plants are diploid (2n=18), although tetraploids and diploids are found in other parts of the species' range.

Designatable units

Solidago speciosa comprises two designatable units (DU) in Canada. The two extant populations in tallgrass prairies and savannah habitat in southwestern Ontario represent the Great Lakes Plains DU. The northern population near Kenora represents the Boreal DU. These two DUs occur in different national ecological areas as recognized by COSEWIC and are geographically widely separated spatially and latitudinally. The northern DU is also about 180 km north of the northernmost U.S. populations. The two DUs differ morphologically, and considering their broad latitudinal disjunction, may also exhibit genetic differences (although this has not yet been demonstrated).

Special significance

Showy Goldenrod is a popular garden plant sold widely in the horticultural trade in Europe and North America. Seeds and plants are available from many nurseries and seed outlets. A decoction of the root has been used for various medicinal purposes (Meeker *et al*. 1993, Moerman 1998). Hilty (2008) reports that when Showy Goldenrod is infected by the rust fungus *Coleosporium sp.*, it can cause sickness and death in cattle and horses. Like other goldenrods, it may contain a hemolytic agent that is mildly poisonous to some herbivores.

DISTRIBUTION

Global range

Solidago speciosa occurs across much of eastern North America from southern New Hampshire to Georgia in the east and North Dakota to Texas in the west, with an outlying distribution of *S. speciosa* subsp. *pallida* in western Montana, Wyoming and Colorado. Most of the range is divided between two varieties of the typical subspecies: *S. speciosa* var. *rigidiuscula* ranges westward of a line roughly from southwestern Ontario and Michigan in the north to Louisiana and Texas in the south; *S. speciosa* var. *speciosa* has a predominantly eastern range extending as far west as Louisiana, Arkansas and Missouri. The ranges of these two varieties overlap in western Mississippi, Louisiana, Arkansas, Missouri, southwest Iowa, Illinois Indiana, western Ohio and western Kentucky (Figure 3). The discovery of a previously unknown population in northwestern Ontario near Kenora extends the global range of the species considerably northwards.

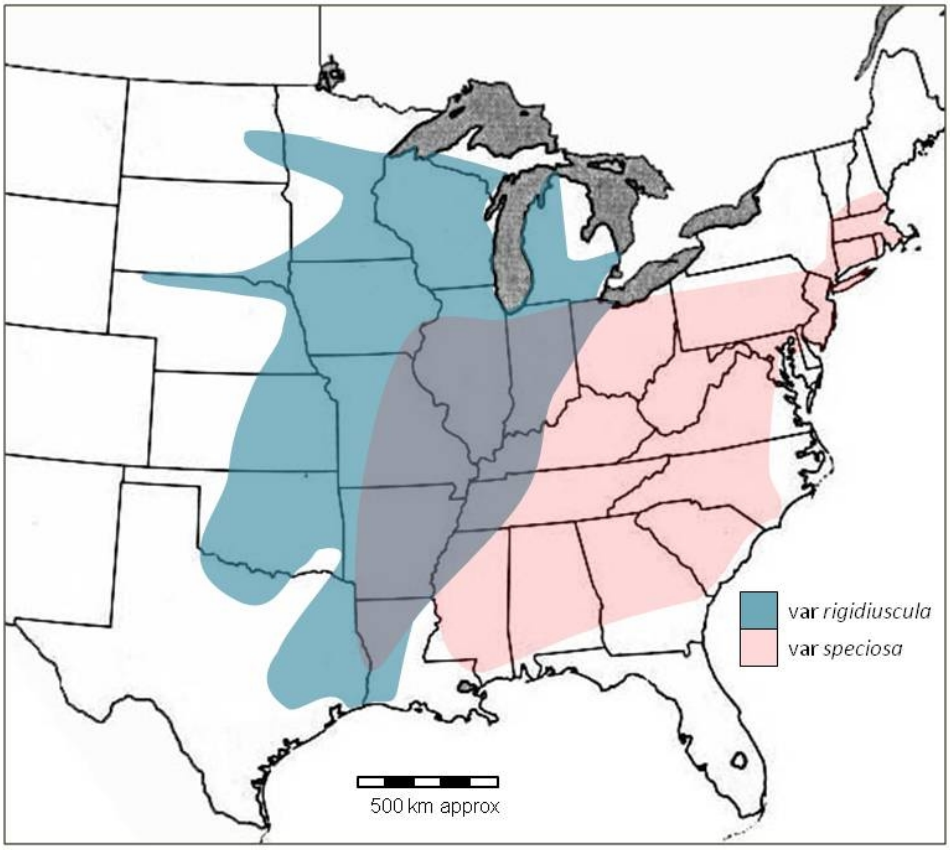

Figure 3. Distribution of Showy Goldenrod varieties in North America based on Zhang *et al*. (1999).

Canadian range

In Canada, the Great Lakes Plains Population DU is restricted to Walpole Island First Nation (WIFN) in southwestern Ontario (Figure 4). This location is about 65 km from the nearest population of the species in Michigan.

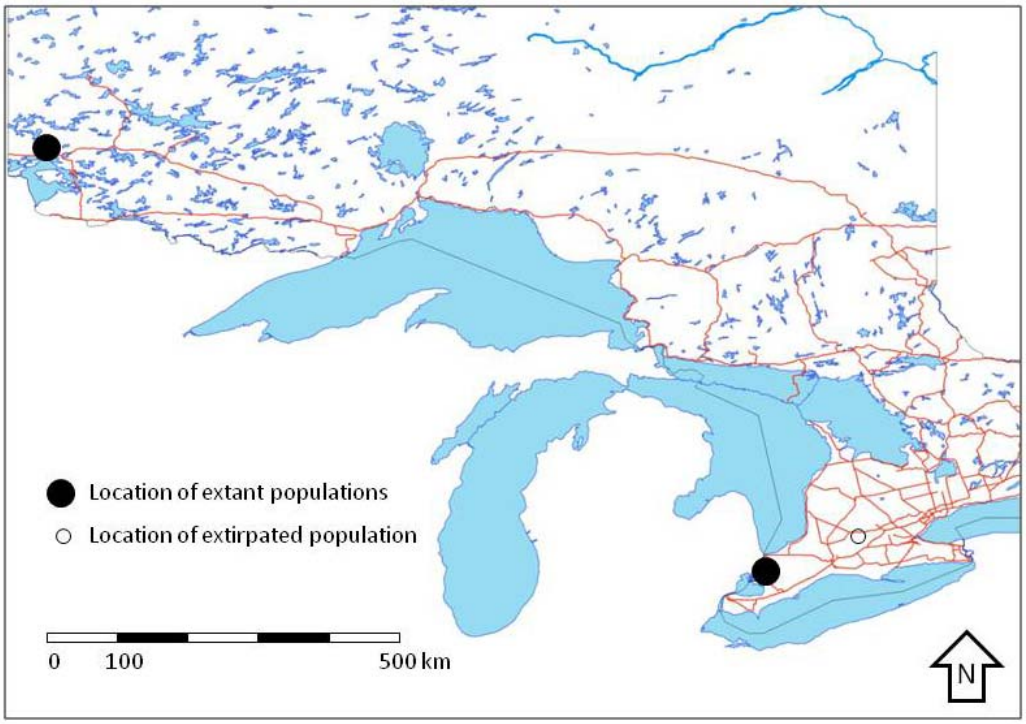

Figure 4. Distribution of Showy Goldenrod *Solidago speciosa* in Canada. Southern symbol (Great Lakes Plains DU) on Walpole Island First Nation lands represents two nearby populations of *S. speciosa* var. *rigidiuscula*. The northern location (Boreal DU) is a single population.

This DU has an index of area of occupancy (IAO) of 4 km^2 based on the number of 1 x 1 km^2 UTM grid squares occupied and an IAO of 8 km^2 based on 2 x 2 km squares. The actual area of habitat occupied is about 0.0026 km^2. The extent of occurrence (EO) is 2.2 km^2 based on a convex polygon drawn around extant stands. By COSEWIC convention when the EO is less than the IAO, the value of the EO is set to the larger of the two IAO values (8 km^2). The species is extirpated from one historic site at WIFN.

The Boreal DU (Figure 4) is about 180 km north of known populations of *S. speciosa* in Minnesota. It has an IAO of 1 km^2 based on a single 1 x 1 km^2 UTM grid square occupied and an IAO of 4 km^2 based on a single 2 x 2 km square. The EO is <1 km^2 based on a convex polygon drawn around the stands. Thus by the same convention, the value of the EO is 4 km^2.

One of two other sites listed by Zhang *et al.* (1999) within the Great Lakes Plain DU is probably extirpated. One site, east of Stratford, is now the site of heavy industry. The other record, from Port Franks was misidentified and was subsequently re-identified as *Solidago nemoralis* by J.C. Semple, a specialist in this group of plants.

Much less than 1% of the total range of the species is in Canada.

Search effort

Woodliffe and Allen (1996) conducted extensive inventories on WIFN, and the prairies and savannahs both at WIFN and other prairies in southern Ontario have been well surveyed. The locations of historic and present populations of Showy Goldenrod at WIFN are all known (Woodliffe 2002), and it is unlikely that such a showy plant would be overlooked elsewhere in southern Ontario. The populations were censused by the Walpole Island Heritage Centre in 2003 and 2008. These censuses have been carried out by J.M. Bowles and C.R. Jacobs, by staff of the Walpole Island Heritage Centre (WIHC), and by volunteers. Records of exact search times by WIHC staff and volunteers were not kept. In 2008, however, censuses were carried out on two dates, September 16 by J.M. Bowles for 2 hours and October 10 by both J.M. Bowles and C.R. Jacobs for about 5 hours, for a total of 12 person-hours. Studies on levels of seed predation were done at three sites in two populations in 2005 (Mammoliti 2006).

The Boreal Population DU on Dufresne Island was discovered by M.J. Oldham and W. Bakowsky (Natural Heritage Information Centre) and Bruce Ranta (Kenora District Biologist, Ontario Ministry of Natural Resources) in 2005. Oldham and Bakowsky have undertaken considerable fieldwork (> 100 sites visited) in the Rainy Lake – Lake of the Woods area over 10 years and feel that the species is not “significantly overlooked “ in the area (Oldham, pers. comm. 2009). The site on Dufresne Island had not been surveyed previous to the discovery in 2005. A more detailed census of the population was conducted by Bowles and Oldham in September 2009 when vegetative and flowering plants were counted.

HABITAT

Habitat requirements

Habitats for Showy Goldenrod throughout its range include mesic to slightly dry black soil prairies, sand prairies, open sandy ground, openings in rocky upland forests, oak and Jack Pine savannahs, thickets, woodland borders, associated roadsides and prairies and abandoned fields.

On WIFN, Showy Goldenrod stands are found in mesic oak savannah and open tallgrass prairie on sandy loam and sandy clay loam soils. Taxa always found associated with Showy Goldenrod in a study at three sites include Big Bluestem (*Andropogon gerardii*), Early Goldenrod (*Solidago juncea*), Bergamot (*Monarda fistulosa*), Panic Grass (*Panicum implicatum*) and Heath Aster (*Symphyotricum ericoides*) (Walpole Island Heritage Centre, unpublished data).

Fire is an important factor in maintaining the tallgrass prairie and savannah habitat in which Showy Goldenrod grows on WIFN. Plants in sites with recent fires appear large and more vigorous and had more flowering stems than plants in a site with no recent (within 5 years) fire history, and shading by shrub species such as Staghorn Sumac (*Rhus typhina*) (Bowles, personal observation).

On Dufresne Island in northern Ontario, Showy Goldenrod occurs in an open Bur Oak (*Quercus macrocarpa*) – Jack Pine (*Pinus banksiana*) woodland on a south-facing slope with Porcupine Grass (*Hesperostipa spartea*) and Big Bluestem (*Andropogon gerardii*) in the understorey.

The extent of apparently suitable habitat for both DUs is much greater than the area actually occupied by populations of Showy Goldenrod.

Habitat trends

On WIFN, habitat for Showy Goldenrod has declined over the last 100 years. Collections by Dodge in 1910 (deposited at MICH) suggest that the species was once “plentiful” on Squirrel Island, but most of the suitable habitat there has been converted to agriculture and the species is extirpated. Elsewhere on WIFN, prairie and savannah habitat continue to decline mainly through a combination of lack of fire leading to encroachment by woody species, and conversion to other land uses (for example, agriculture, recreation and house construction).

One site where a single plant of Showy Goldenrod was present in 1999 (Zhang *et al*. 1999) has been regularly mowed and the species has not been found since 2003. Portions of habitat at two other locations have been destroyed by house construction and by expansion of a cemetery respectively. One extant site has a series of vehicle tracks running through it and compaction of the soil and trampling by vehicles limits the available habitat.

No specific information is available on habitat trends for the Dufresne Island population.

BIOLOGY

Life cycle and reproduction

Showy Goldenrod is a perennial that reproduces primarily by seed. Longevity is unknown in the wild, but garden plants will flower in their first year and survive several years. Plants sometimes produce off-shoots on short rhizomes, but most individual plants are distinct, single or multi-stemmed clumps. Crowley *et al*. (undated) found that Showy Goldenrod puts little energy into clonal growth. Although plants vary in size, the relationship between age and size of plant, if any, is unknown. Considering that this species rarely produces short rhizomes, each clump of one to many stems is regarded as a single mature individual that increases in size and vigour with age.

Showy Goldenrod in Canada begins to flower in mid- to late August and continues into mid-October in the south. Fruit ripen within a few weeks of flowering. Typically, goldenrods are insect-pollinated and Showy Goldenrod is no exception. The pollen is heavy and sticky and carried by a wide assortment of insects including bees, wasps, flies, beetles, moths and butterflies (Hilty 2008).

Seed collected from plants in the fall of 2005 germinated readily under greenhouse conditions in the spring of 2006, after being kept at 5^{o}C for about 100 days. Plugs from these seeds that were planted in a garden bed at Walpole Island Heritage Centre during the summer of 2006 flowered in their first year (Bowles and Jacobs, personal observation). Jolls and Werner (1989) found that 65% of the mass of *S. speciosa* achenes was embryo and that the seeds were larger than those of most goldenrods. They suggested that large seeds and proportionally large embryos may assist the species in establishing in habitats, such as prairies, with intense competition from other plants.

Plants may produce between one and 30 flowering stems (Walpole Island Heritage Centre, unpublished data). The average number of stems is different among different populations on WIFN (2-3 stems per plant in Population 2 compared with 5-8 in Population 1). Observations suggest that plants in shaded conditions have fewer flowering stems than those in open prairie.

Herbivory

Hilty (2008) reports that the caterpillars of many moths feed on various parts of this goldenrod and others. Other insect feeders include various leafhoppers, lace bugs, plant bugs, and beetles.

Seed predation by the larvae of an unidentified species of *Coleophora* moth, of the Casebearer Moth Family (Coleophoridae), is prevalent on Showy Goldenrod at Walpole Island First Nation. Mammoliti (2006) found that infestation rates varied between 70 and 100% of flowering stems at different sites. The number of uneaten seeds varied from about 15% on plants in sites where the infestation rates were highest to 60% where the infestation rates were lowest. It is not clear how significant this predation is for the species.

Signs of *Coleophora* presence include dried and shrivelled flower heads, chewed flower heads, and flower heads bound together by silky threads (Mammoliti 2006). Some flower heads display signs of damage early in their development, even before anthesis, while others contain a larva but show little outward indication of infestation. Members of the family *Coleophoridae* are easily recognized because a larva will construct a case out of parts of their host plant. Late in the season, the cases of the larvae on Showy Goldenrod are covered with white pappus hairs cut from the achenes (J.M. Bowles, pers. observation, 2004; Figure 5).

Figure 5. Photograph of the *Coleophora* seed predator of Showy Goldenrod (*Solidago speciosa* var. *rigidiuscula*) on Walpole Island First Nation lands showing the case made of pappus hairs (Photo by Jane M. Bowles).

Seeds may also be eaten to a limited extent by the American Goldfinch (*Spinus tristis*) and other seed-eating birds.

Mammalian herbivores, including deer, rabbits and groundhogs, occasionally eat the leaves, stems, and flowers of Showy Goldenrod (Hilty 2008), although no significant herbivory of vegetative plant parts has been observed on WIFN.

Dispersal

The seed morphology of Showy Goldenrod, an achene with a moderate-sized pappus, suggests that wind is at least partially responsible for seed dispersal. The limited distribution and patchy nature of the species on WIFN and Dufresne Island, even where apparently suitable habitat exists, suggests that long-distance dispersal and seedling establishment may be rare. Dispersal of seeds from heads infested by the *Coleophora* moth is probably further limited by the dense web that binds the flower heads together.

Interspecific interactions

The inflorescences of Showy Goldenrod are visited by a wide variety of insects in a number of orders. Presumably the nectar and pollen rewards are high, but bees and wasps have also been observed roosting amongst the flower heads on cool nights. Because Showy Goldenrod flowers so late, often well into October, it may provide an important late-season food source for pollinators such as bumble bees.

Coleophora moths are often very specific to their host species (Arnot 1985). There are approximately 1400 species of *Coleophoridae* known worldwide, mostly in genus *Coleophora* (Arnett 2000). The *Coleophora* attacking Showy Goldenrod on WIFN has not been identified, but if it is a host-specific species, its population in Canada is necessarily restricted to the populations of Showy Goldenrod.

Adaptability

The habit of Showy Goldenrod does not appear greatly different from those of other large goldenrod species such as Tall Goldenrod (*Solidago altissima*) with which it often grows; however it has much more restricted habitat requirements than this widespread and abundant species, suggesting that it is less adaptable. Hartnet (1993) suggested that clonal growth is generally important to establishment of perennial species in prairies, but, Crowley *et al.* (undated) found that compared with *S. altissima*, Showy Goldenrod puts little energy into clonal growth. Clonal spread is certainly limited and most individual plants form distinct and compact clumps.

Jolls and Werner (1989) found that achenes of Showy Goldenrod are larger than those of other *Solidago* species, with a proportionally larger embryo. Barker (1972) found that herbaceous species that were exposed to drought or had high levels of competition tended to have larger seeds. The relatively large seeds of Showy Goldenrod may be an adaptation to establishing in the drought and intense competition in prairies (Zhang *et al*. 1999).

Showy Goldenrod is often grown as a garden plant, and in the presence of abundant moisture and the absence of competition can grow aggressively. There is no evidence that wild populations of Showy Goldenrod in Canada have weedy or aggressive tendencies.

POPULATION SIZES AND TRENDS

Sampling effort and methods

Each census consisted of traversing the Showy Goldenrod sites and recording the GPS waypoint location of plants and counting the number of individuals at each GPS waypoint. The number of flowering stems was also recorded at each waypoint. Because plant individuals are usually distinct (based on the distance from nearest neighbouring plant), the number of flowering stems was recorded as an indicator of the condition of the plants and is not a census of plant numbers.

Abundance

There were estimated to be 1900 plants of Showy Goldenrod in Canada in 2009.

There are two extant populations of Showy Goldenrod on Walpole Island First Nation (Table 1). In 2008, one population (Population 1) comprised three main subpopulations and some individual outliers up to 450 m away. The subpopulations spread over approximately 0.5 ha, 2.4 ha and 2.2 ha with counts of 180 plants (843 flowering stems), 124 plants (909 flowering stems) and 365 plants (1886 flowering stems) respectively in 2008.

Table 1. Population estimates for Showy Goldenrod (Great Lakes Plains DU) in Canada.

Site	1999 (Zhang *et al.*, 1999)	2003 (WIFN database)* Plants (Flowering stems)	2008 (WIFN database) Plants (Flowering stems)
Walpole Island First Nation: Population 1	1) not reported 2 & 3) 50-75 plants = 75 total in 40 m^2	1) 448 (2725) 2) 380 (2253) 3) 411 (2873) = 1239 (7851)	1) 180 (843) 2) 124 (909) 3) 365 (1886) = 669 (3638)
Walpole Island First Nation: Population 2	53 plants = 53 total in 50 m^2	1) 46 (90) 2) 22 (90) = 70 (180)	1) 68 (110) 2) 56 (152) = 124 (262)
Walpole Island First Nation: Population 3	1 plant	0 plants	Probably extirpated
Walpole Island First Nation: Population 4 (Squirrel Island)	Probably extirpated. Recorded as "plentiful" by Dodge in 1910 on specimen at MICH	Probably extirpated	Probably extirpated
Port Franks	Probably extirpated	N/A	Specimen at UWO collected by Cook in 1960 on which this record was based was identified as *S. nemoralis* by Semple.
Perth County	Extirpated. Area under heavy industrial development.	N/A	Extirpated

* Walpole Island Heritage Centre (2003)

Population 2, approximately 4.3 km from Population 1 was estimated to consist of two subpopulations within about 0.4 ha and 0.2 ha of habitat containing a total of 124 plants with 262 flowering stems in 2008.

At Dufresne Island in 2007, about 30 individuals were counted in two slightly separate groups (Bakowsky, pers. comm. 2008). A more detailed census by Bowles and Oldham in September 2009 resulted in a count (with the occasional estimate of plants in larger patches) of 830 vegetative plants and 280 flowering plants totalling ~1110 mature individuals. This does not represent a sudden large increase in numbers of plants. Considering that some estimates had to be made when plant clumps grew closely together and individual plants could not always be readily separated, the total number of mature individuals given here may be an overestimate of actual numbers present.

Fluctuations and trends

The Great Lakes Plains DU on WIFN appears to be declining. Herbarium specimens collected in September 1910 suggest that Showy Goldenrod was “plentiful” on Squirrel Island, part of WIFN, where it is now extirpated. A population consisting of a single plant, recorded there by Zhang *et al.* (1999) has since disappeared and is presumed extirpated because the site is mowed.

Apparent increases in the population estimates between the previous status report (Zhang *et al*. 1999; COSEWIC 2000) and 2003 (Table 1) are entirely due to the search effort. The authors of the 1999 report did not contact the Walpole Island Heritage Centre when doing their fieldwork and populations they located were mainly based on herbarium records, not local knowledge.

Population 1 has declined from approximately 1240 plants in 2003 to 670 plants in 2008 (46% decline). Part of Population 1, recorded by Zhang *et al.* (1999), was destroyed, prior to the 2003 census by WIHC, when a house was built. All three of the subpopulations in this population declined between the 2003 and 2008 census (Table 1). Plants in Subpopulation 1 (reduced from 448 in 2003 to 180 in 2008) were not as abundant after a burn in the spring of 2007 (Bowles, pers. observation) and a late burn in the spring of 2008 may have further reduced the population (Jacobs, pers. observation). Part of the reduced numbers in Subpopulation 2 may be accounted for by a less extensive search in 2008 that missed some plants, but this would only account for about 40 plants in a reduction from 380 to 124. The frequency of burns has also been reduced at this site since the house was built. The vegetation is denser, with a higher proportion of grasses (Jacobs, pers. observations). Plant vigour, assessed by the number of flowering stems was 2725 (six flowering stems per plant in 2003) and 909 (7.3 stems per plant in 2008). Plants in Subpopulation 3 may be slightly fewer (411 compared with 365), but their vigour appears to have declined from 2873 flowering stems (an average of 7 flowers stalks per plant) in 2003 to 1886 (about 5 stems per plant) in 2008.

The number of plants in Population 2 appears to have increased from about 70 (with 180 flowering stems) in 2003, to about 123 plants (with 262 flowering stems) in 2008 (75% increase), but the area occupied has declined. Vigour was also slightly reduced in 2008, with an average of 2.2 flowering stems per plant in 2008 compared with 2.6 in 2003. Plants that were present in 2003 in a small grove of trees in which the canopy cover continues to increase were not detected in 2008. This portion of the site was not burned between 2003 and 2008. Part of this population was destroyed during the expansion of a cemetery prior to the census in 2003 (Jacobs, pers. obs.).

The overall decline in Showy Goldenrod censused at WIFN between 2003 and 2008 was about 38% (from about 1300 plants in 2003 to about 800 in 2008). The trend in the population size of the Boreal DU on Dufresne Island is unknown. The site was first discovered in 2005.

Assuming that the Dufresne Island population was present in 2003 but had simply not been discovered, a total of ~2400 (1309 + 1110) plants may have been present between both DUs in 2003. This also assumes that there had been no decline at the Dufresne Island population between 2003 and 2009. With the loss of ~500 plants at WIFN by 2008, an overall decline of ~20% over the last five years would have occurred for Showy Goldenrod in Canada.

Rescue effect

The likelihood of natural reintroduction (rescue) of the WIFN population is minimal because of the distance (*ca*. 65 km) to adjacent populations in Michigan that are separated by water. There are no current records in areas of Michigan immediately adjacent to WIFN (Reznicek, pers. comm. 2008). Introduced plants would probably be able to survive in Canada. The patchy distribution of the species at WIFN and the limited extent of the population at Dufresne Island suggest that this species is not a good long-distance disperser, at least over the short term. Clearly, the species expanded its range into Ontario during post-glacial times when suitable habitats were more extensive in the region. Suitable habitat may exist in other locations in Ontario, but there are no current records of Showy Goldenrod in other places.

THREATS AND LIMITING FACTORS

The major limiting factor for this species on WIFN, has been the decline in tallgrass prairie and savannah habitat where it occurs. Tallgrass prairie is critically imperilled in Ontario (Bakowsky 1996). Fire is extremely important in maintaining the open prairie conditions required by this species. The lack of regular burns at WIFN, resulting in the encroachment by shrubs such as Staghorn Sumac at the savannah sites, is likely the greatest threat and may be causing a decline in the vigour of some plants.

Anthropogenic factors are important at Walpole Island First Nation in reducing the amount of natural prairie habitat by conversion to agriculture and housing and other land uses, and reducing the frequency of fire. Populations on Squirrel Island have been extirpated due to conversion to agriculture. The rate of conversion of prairie to agriculture has been reduced on WIFN because of an active campaign by the Walpole Island Heritage Centre to lease the land for conservation, but the threat remains. Part of one subpopulation for Showy Goldenrod at WIFN is protected under a leasing agreement by the Walpole Island Heritage Centre.

Houses are continuously built on WIFN in tallgrass prairie and savannah habitat. Part of stand 2 of Population 1 was lost to house construction in 2003. No burns have been conducted at this stand since 2003. Previous to house construction, burns were conducted most but not every year as they were at stand 1. Stand 3 of this population has been burned only twice since 2003.

Expansion of a cemetery, just prior to the 2003 census, and excavation of sand, now halted, have threatened Population 2, part of which is close to a frequently used vehicle track and subject to occasional trampling and dumping. Mowing has likely caused the loss of part of one population.

Invasive species including White Sweet Clover (*Melilotus alba*) and Giant Reed (*Phragmites australis*) are of concern on WIFN and are causing a decline in habitat quality in prairie and savannah habitats. Both species are present in or adjacent to some stands of Showy Goldenrod. Canopy closure at Population 2, which results from lack of regular burns, also appears to be causing a decline in suitable habitat.

The larva of an unidentified species of *Coleophora* moth destroys up to 85% of seeds in some populations.

No threats to the Boreal DU are known. The population is present on provincial Crown Land. Previous attempts to have the land ceded to the local township for development purposes were halted once Showy Goldenrod was found on the property (Bakowsky and Oldham, pers. comm. 2010).

Although the lack of regular burns and the spread of woody vegetation appears to be the main threat to both WIFN populations, two locations rather than one are recognized because the rate of woody plant incursion will vary depending on the different frequencies of burns for the two populations. One location consists of the smaller Population 2 which is most closely linked spatially with stands (subpopulations) 2 and 3 of Population 1 and a second location consisting of the more open and separate stand 1 of Population 1.

PROTECTION, STATUS, AND RANKS

Legal protection and status

Showy Goldenrod is listed as Endangered under Schedule 1 of the federal *Species at Risk Act*. General prohibitions under the Act apply to populations on federal land, including Walpole Island First Nation. Identification of critical habitat for this species is still under review. In Ontario, it is listed as Endangered under the *Endangered Species Act, 2007*.

Non-legal status and ranks

NatureServe (2009) has determined a Global rank of G5 (secure) for the entire species and a U.S. National rank of N5 (secure). In Canada, it has a National rank of N1 (critically imperilled) and in Ontario it is ranked S1 (critically imperilled). It is listed as S2 (imperilled) in Maryland and Wyoming and S3 (vulnerable) in Pennsylvania. It is listed as S4 (apparently secure) or S5 (secure) in seven states and as SNR (Not ranked) in the 28 other states where it occurs (Table 2).

Table 2. Conservation status rank for *Solidago speciosa* and *Solidago speciosa* var. *rigidiuscula* in the United States and Canada (NatureServe, 2009).

Taxon	S-rank	State / Province
	S1	Ontario
	S2	Wyoming, Maryland
	S3	Pennsylvania
	S4	Iowa, Kentucky (S4?), Virginia, West Virginia
	S5	Georgia, Nebraska, North Carolina
S. speciosa	SNR or SU	Alabama, Arkansas, Colorado, Connecticut, District of Columbia, Illinois, Indiana, Iowa, Kansas, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Vermont, Wisconsin.
S. speciosa var. *rigidiuscula*	S1	Ontario, Georgia
	SNR or SU	Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, Ohio, Oklahoma, South Dakota, Tennessee, Texas, Wisconsin

Solidago speciosa var. *rigidiuscula* is listed G5T4 (apparently secure) and NNR (not ranked) in the U.S. (NatureServe 2009). In Canada, it is ranked N1 (critically imperilled). It is listed as S1 (critically imperilled) in Georgia and SNR or SU (not ranked or unrankable) in the other 16 states where it occurs.

Habitat protection/ownership

Ownership of Showy Goldenrod sites on WIFN is divided, with one population on Band-owned lands (Population 2) and the other (Population 1) on private lands held under Certificates of Possession (under the *Indian Act*). A portion of the habitat for Population 1 is leased for conservation purposes. Both populations of Showy Goldenrod on WIFN are in, or adjacent to, areas that have been recognized by the Band Council as Significant Natural Heritage Sites. This status provides recognition, but no formal protection. The Walpole Island Heritage Centre is active in landowner contact and all landholders are aware of the populations of Showy Goldenrod on their property. The Draft Walpole Island Ecosystem Recovery Strategy (Bowles, 2005a) identifies general threats and actions to protect habitat on WIFN, The draft recovery strategy for Showy Goldenrod (Bowles 2005b) identifies specific threats to the species.

The Dufresne Island population occurs on provincial Crown Land.

ACKNOWLEDGEMENTS AND AUTHORITIES CONTACTED

This report was funded by Environment Canada through the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The following individuals have been of assistance by supplying data and information for this report, their help and cooperation is appreciated: Dean Jacobs, Sam Brinker, Wasyl Bakowsky, and Michael Oldham. In addition a number of people have assisted with census fieldwork at Walpole Island First Nation, especially the landholders who allowed access to their property and Naomi Williams and Chris Crow who assisted with the 2003 census.

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Dean Jacobs, Director, Walpole Island Heritage Centre, Walpole Island First Nation.

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BIOGRAPHICAL SUMMARY OF REPORT WRITERS

Jane M. Bowles received her PhD from the University of Western Ontario in 1980. She has over 25 years of experience as a freelance ecologist in southern Ontario, doing life science inventories, pursuing research in conservation ecology and working with species at risk. She has worked with the Walpole Island Heritage Centre on their species at risk and habitat stewardship programs since 2003 . She has been a member of the Vascular Plant Specialist Sub-Committee of COSEWIC since 2002 and a member of COSSARO since 2006. She sits on the recovery teams for Wood-poppy, Lake Huron Dune Grasslands/Pitcher's Thistle, Tallgrass, Carolinian Woodlands and Walpole Island First Nation. She is an Adjunct Professor at the University of Western Ontario where she has also been Curator of the Herbarium and Director of the Sherwood Fox Arboretum since 2005.

Clinton R. Jacobs is an Anishnaabe from Walpole Island First Nation – Bkejwanong Territory and has been Natural Heritage Coordinator for Walpole Island Heritage Centre (WIHC) since 1998. He is part of the team of the WIHC's Natural Heritage Program, which includes species at risk and habitat stewardship program. He manages species-at-risk monitoring, management, outreach and education programs on Walpole Island First Nation (WIFN) as well as the land securement program. He advises and supervises research activities on WIFN in collaboration with various universities. He is familiar with all populations of plant species at risk on Walpole Island and supervises field crews who conduct monitoring and census. He is well recognized in the community and has ongoing regular contact and communication with landholders. He has reviewed and commented on numerous single species recovery strategies. He sits on the Walpole Island Ecosystem Recovery Team.

COLLECTIONS EXAMINED

No herbarium specimens were examined during the preparation of this report.