

# Recovery Strategy for the Skinner's Agalinis (*Agalinis skinneriana*) in Canada

## Skinner's Agalinis



Photo: Jane M. Bowles

2011

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## 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 Skinner's Agalinis 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 Skinner's Agalinis 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**

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## EXECUTIVE SUMMARY

Skinner's Agalinis (*Agalinis skinneriana*) is a pale green, slender, annual herb, with a global range from Ohio and southwestern Ontario west to Minnesota and south to Oklahoma, Louisiana, and Tennessee. The species also occurs in Maryland. Although extant sites are known from 12 states, the majority of these sites are located in one state – Missouri. In Canada, there are currently two extant populations of Skinner's Agalinis on the Walpole Island First Nation in the St. Clair River delta, southwestern Ontario. The status of the Skinner's Agalinis population on the Reaume Prairie in the city of LaSalle, Essex County, southwestern Ontario has yet to be determined. Skinner's Agalinis is listed as Endangered on Schedule 1 of the federal *Species at Risk Act* (SARA).

Threats identified to the Canadian population of Skinner's Agalinis include but are not limited to: habitat loss or degradation, changes in ecological dynamics and natural processes, invasive species and disturbance. Skinner's Agalinis 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 two extant Canadian populations of Skinner's Agalinis at their current abundance and distribution.

The broad strategies to recovery include but are not limited to: protection, conservation and management of Skinner's Agalinis habitat, monitoring and assessment of extant populations, investigation of the species presence at recently (as of 1985) occupied sites 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 Skinner's Agalinis by December 2016. The identification of critical habitat on the Reaume Prairie is contingent on confirmation of Skinner's Agalinis presence at this location.

## 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 Skinner's Agalinis. Therefore, in keeping with the precautionary principle, a 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, particularly the threat of invasive 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 habitat loss or degradation, changes to natural processes and disturbance from recreational activities. However, it is unknown if significant threats such as the spread of invasive species 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 Skinner's Agalinis is the loss of the specialized tallgrass prairie habitat in which it occurs. Some occupied Skinner's Agalinis 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.

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## 1. COSEWIC\* SPECIES ASSESSMENT INFORMATION

**Date of Assessment:** May 2000

**Common Name (population):** Skinner's Agalinis

**Scientific Name:** *Agalinis skinneriana*

**COSEWIC Status:** Endangered

**Reason for Designation:** The few existing populations occur in a highly restricted geographical area. They exhibit considerable fluctuations in numbers of individuals and a reduction by more than 50% over the past decade as a result of habitat loss and alteration.

**Canadian Occurrence:** Ontario

**COSEWIC Status History:** Designated Endangered in April 1988. Status re-examined and confirmed Endangered in April 1999 and in May 2000.

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

## 2. SPECIES STATUS INFORMATION

The global conservation rank for Skinner's Agalinis (*Agalinis skinneriana*) is vulnerable<sup>1</sup>-apparently secure<sup>2</sup> (G3G4<sup>3</sup>) and the rounded global conservation rank is vulnerable (G3) (NatureServe, 2010). The distribution of Skinner's Agalinis in the United States is from Ohio west to Minnesota and south to Oklahoma, Louisiana, and Tennessee; the national conservation rank is vulnerable<sup>4</sup> (N3). Skinner's Agalinis is listed as extirpated, critically imperilled<sup>5</sup> or imperilled<sup>6</sup> in 13 of the 14 states that rank its conservation status (NatureServe, 2010, Appendix B). In Canada, Skinner's Agalinis is found only in the province of Ontario; the national and subnational conservation ranks are critically imperilled (N1 and S1, respectively) (NatureServe, 2010).

<sup>1</sup> at moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors

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

<sup>3</sup> a numeric range rank (e.g., G2G3, G1G3) is used to indicate the range of uncertainty about the exact status of a taxon or ecosystem type

<sup>4</sup> vulnerable in the nation due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation

<sup>5</sup> 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

<sup>6</sup> at high risk of extinction or elimination due to very restricted range, very few populations, steep declines, or other factors

Skinner's Agalinis is listed as Endangered<sup>7</sup> on Schedule 1 of the federal *Species at Risk Act* (SARA). In Ontario, the Skinner's Agalinis is listed as Endangered<sup>8</sup> under the provincial *Endangered Species Act, 2007* (ESA).

The percentage of the global range found in Canada is estimated to be less than 5%. Skinner's Agalinis 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

Skinner's Agalinis is a pale green, slender herbaceous annual (Canne-Hilliker, 1998). In Canada, it measures between 5 cm and 35 cm in height, while the plants in the southern part of the global range may reach heights of 60 cm. Skinner's Agalinis is usually single-stemmed and unbranched (Canne-Hilliker, 1998). The leaves have short rough hairs, and typically measure between 5 mm and 20 mm long and 0.5 mm and 2.0 mm wide. The flowers last for half a day and are white to very pale pink, funnel shaped and 10 mm and 17 mm long (Canne-Hilliker, 1998). The three lower corolla<sup>9</sup> lobes are devoid of hair on the exterior and may occasionally exhibit pale yellow lines and red dots on the interior (Canne-Hilliker, 1998). In Canada, flowers are typically white, without markings in the throat. They occur singly on slender pedicels<sup>10</sup> that are longer than the leaves. Flowering is from late July to mid-September. The fruits are rounded capsules, brown to yellow in colour that split open to release numerous seeds 0.5 mm to 1.0 mm in size (Canne-Hilliker, 1998). Leaves, stems and capsules may be flushed with brownish purple in the late summer. Non-flowering plants are very similar to Gatteringer's Agalinis (*Agalinis gatteringi*) and these two plants often grow together.

#### 3.2 Population and Distribution

Skinner's Agalinis ranges globally from Ohio and southwestern Ontario west to Minnesota and south to Oklahoma, Louisiana, and Tennessee, with extant populations in Maryland (Figure 1). In Canada, Skinner's Agalinis has been found on the Walpole Island First Nation in the St. Clair River delta and on the Reaume Prairie in the city of LaSalle in Essex County, southwestern Ontario (Figure 2).

The twelve sites in Canada reported in Canne-Hilliker (2000) have been grouped into six populations (J. Bowles, unpublished report, 2009), based on a distance of more than 1 km between populations. This distance is generally used in recognizing separate occurrences/populations in the COSEWIC vascular plant reports and Natural Heritage Information Centre records. There are currently two confirmed extant populations on the Walpole Island First Nation (J. Bowles, unpublished report, 2009). Three other populations,

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<sup>7</sup> a wildlife species facing imminent extirpation or extinction

<sup>8</sup> a species that lives in the wild in Ontario but is facing imminent extinction or extirpation

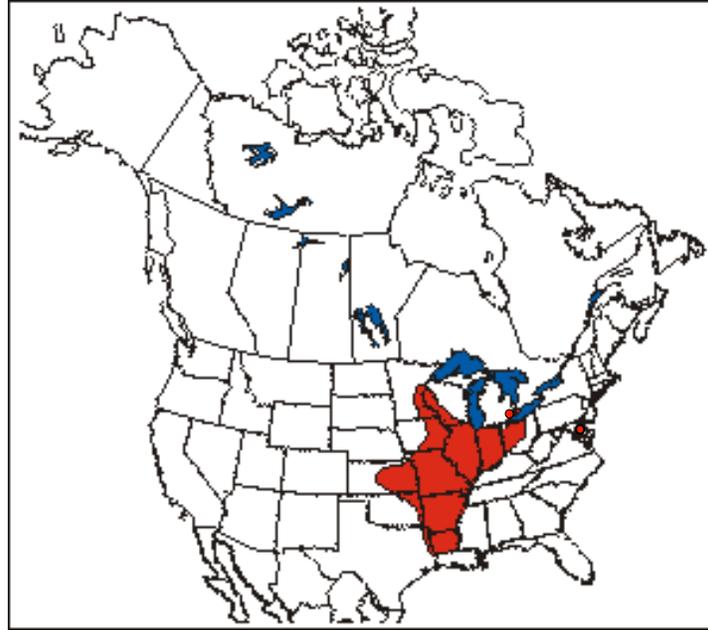
<sup>9</sup> the petals of a flower considered as a group or unit

<sup>10</sup> a small stalk or stalk-like part bearing a single flower in an inflorescence

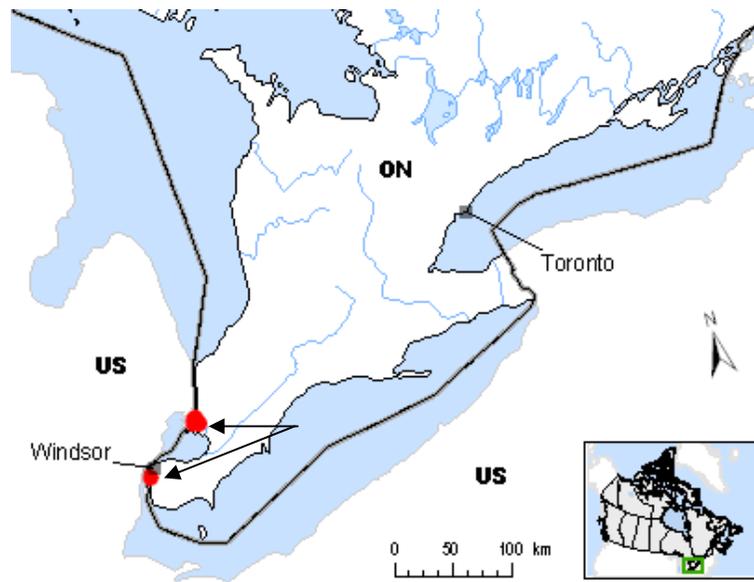
all from Walpole Island First Nation, have not been observed since 1985, 1987 and 1997, respectively (J. Bowles, unpublished report, 2009); however, suitable habitat still exists at some locations and it is possible that plants have been overlooked (J. Bowles, unpublished report, 2009). The status of the three aforementioned populations and the population on the Reaume Prairie require further investigation.

Population trends are difficult to assess for this species as previous reports state abundance in terms of “hundreds of plants” and “at least a several dozen” (Canne-Hilliker, 2000). In addition, Skinner's Agalinis is an annual species and large year-to-year population fluctuations are expected; annual monitoring over several years is necessary to detect trends in extant populations and to confirm presence or absence at sites previously occupied. This species, in particular, is slender and small (often <20 cm tall) making it difficult to see amongst taller prairie vegetation (J. Bowles, unpublished report, 2009). Canne-Hilliker (2000) reports a total of about 2,500 plants, from surveys in early September 1997, within the existing two extant populations on Walpole Island First Nation. In 2008, from surveys performed in mid-August to mid-September, approximately 23,000 plants were counted at the two extant populations on Walpole Island First Nation (J. Bowles, unpublished report, 2009). It is possible that very high water levels in 2008 created ideal germination and growth conditions accounting for the large number of plants observed (J. Bowles, unpublished report, 2009).

Canne-Hilliker (1988) reported several hundred plants on the Reaume Prairie in LaSalle. Presence of the species occurrence at the Reaume Prairie, within the last ten years, has been reported (P. Pratt, pers. comm., 2010). However, the site was examined by G. Waldron on August 25<sup>th</sup>, 2005 and by J. Bowles on September 2<sup>nd</sup>, 2008; no plants were observed on either occasion. The most likely explanation for the apparent reduction (or possible disappearance) of the population at the Reaume Prairie is the encroachment by woody species in the prairie habitat; this site has not been burned for several years and only a small amount of open prairie habitat remains (J. Bowles, unpublished report, 2009).



**Figure 1.** North American Distribution of Skinner's Agalinis (Modified from: Canne-Hilliker, 1988).



**Figure 2.** Canadian Distribution of Skinner's Agalinis (Environment Canada, 2010).

### 3.3 Needs of the Skinner's Agalinis

In Canada, Skinner's Agalinis grows in mesic<sup>11</sup> prairies, usually in shallow swales and depressions, and often where other vegetation is sparse. Plants are most often found in patches where the height of vegetation (usually prairie grasses) is low and there is some bare soil surface (J. Bowles, unpublished report, 2009). Reports suggest that some sites of Skinner's Agalinis on the Walpole Island First Nation in the St. Clair River delta and former sites on the Reaume Prairie have been found in scrapes where the topsoil has been removed (Canne-Hilliker, 1987; White, 2009). The soils on the Walpole Island First Nation where Skinner's Agalinis have been found are sandy loams with a mesic to moist mesic moisture regime.

Like all species within the genus *Agalinis*, it is hemiparasitic, producing specialized root structures (haustoria) that attach to the roots of host plants. Members of the genus use a diversity of host plant species as the hemiparasite, especially graminoids<sup>12</sup> (Voss, 1996; Trick, 1995). At Walpole Island First Nation, the only confirmed haustorial connection was to Little Bluestem (*Schizachryrium scoparium*) (White, 2009). Because this plant is hemiparasitic it depends on the presence of specific species to be their host plants and is difficult to cultivate (Canne-Hilliker, 1987).

The following common species associates have been noted (in decreasing order of abundance) at Walpole Island First Nation: Little Bluestem, Switch Grass (*Panicum virgatum*), Hispid Goldenrod (*Solidago hispida*), sedges (unidentified to genus or species), Dense Blazingstar (*Liatris spicata*), Big Bluestem (*Andropogon gerardii*), Prairie Loosestrife (*Lysimachia quadrifolia*), Scouring Rush (*Equisetum hyemale*), Heath Aster (*Symphyotrichum ericoides*) and Black-eyed Susan (*Rudbeckia hirta*) (White, 2009). Of these associates, sedges, Hispid Goldenrod and Black-eyed Susan are the most likely host species for the hemiparasite while Little Bluestem is the only confirmed host (White, 2009).

According to Dieringer (1999) flowers are bee-pollinated, but noted that self-pollination rates are high (70-100%) in the absence of pollinators. Self-pollination may be enhanced when the corolla, with stamen<sup>13</sup> attached, falls and the anthers<sup>14</sup> pass over the receptive stigma<sup>15</sup>. The seeds are gravity dispersed; once the leaves begin to die the plant will lean strongly towards the ground (NatureServe, 2010). Gusts of wind can carry the seeds, but usually no more than 3m; rain can assist in dispersing the seeds in habitats that have a gradient (NatureServe, 2010) and may partially account for the presence of the plant in shallow depressions. Seeds must experience a 60 day cold period of  $\leq 5^{\circ}$  C and absorb moisture in order to germinate (Canne-Hilliker, 1987; White, 2009), but germination rates are low (~ 20%). The duration for which seeds remain viable under natural conditions is unknown, though air-dried seeds can be stored for several years (NatureServe, 2010).

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<sup>11</sup> relating or adapted to a moderately moist habitat

<sup>12</sup> grasses and grass-like plants

<sup>13</sup> the male reproductive organ of a flower

<sup>14</sup> the pollen-bearing part at the upper end of the stamen of a flower

<sup>15</sup> the sticky tip of a flower pistil, on which pollen is deposited at the beginning of pollination

Skinner's Agalinis is an annual and the population of mature individuals in any year is dependent on seed availability, germination rates and growth conditions; year-to-year survival depends on the seed bank.

### 3.4 Biological Limiting Factors

Relatively small, geographically-isolated populations are prone to loss of genetic diversity and are at greater risk of being extirpated by stochastic events such as drought or flooding. Annual species that rely on yearly seed set may have increased vulnerability to stochastic events that may indirectly cause local extirpations. Elevated water levels, as a result of naturally high lake levels, have led to a reduction of Skinner's Agalinis populations through flooding and a reduction in the extent of prairie habitat (Canne-Hilliker, 2000). Population recruitment may be limited by natural factors, such as the conditions existing at the northern limit of the species' range. Shading through natural succession is also a limiting factor to the survival of the species, as it requires open areas with sparse vegetation (Canne-Hilliker, 2000).

## 4. THREATS

### 4.1 Threat Assessment

**Table 1.** Threat Assessment Table – Skinner's Agalinis (adapted from J. Bowles, unpublished report, 2009)

Threat	Level of Concern <sup>1</sup>	Extent	Occurrence	Frequency	Severity <sup>2</sup>	Causal Certainty <sup>3</sup>
<b>*Habitat Loss or Degradation</b>						
<b>Agricultural expansion</b>	High	Widespread	Historic/Current	Continuous	High	High
<b>Housing development</b>	Medium	Localized	Historic/Current	Recurrent	Moderate	High
<b>Road construction</b>	Medium	Localized	Historic/ Anticipated	Recurrent	High	Medium
<b>*Changes in Ecological Dynamics or Natural Processes</b>						
<b>Alteration of the fire regime (e.g., shading)</b>	High	Widespread	Current	Seasonal	High	High
<b>*Exotic, Invasive, or Introduced Species/Genome</b>						
<b>Scots Pine</b> ( <i>Pinus sylvestris</i> )	High	Localized	Current	Seasonal	Moderate	Medium
<b>White Sweet Clover</b> ( <i>Melilotus alba</i> )	High	Widespread	Current	Seasonal	Moderate	Medium
<b>Canada Thistle</b> ( <i>Cirsium arvense</i> )	Medium	Widespread	Current	Seasonal	Moderate	Medium

Threat	Level of Concern <sup>1</sup>	Extent	Occurrence	Frequency	Severity <sup>2</sup>	Causal Certainty <sup>3</sup>
<b>European Common Reed</b> ( <i>Phragmites australis</i> ssp. <i>australis</i> )	Medium	Widespread	Anticipated	Seasonal	Unknown	Low
<b>Black Locust</b> ( <i>Robinia pseudoacacia</i> )	Low-Medium	Widespread	Anticipated	Seasonal	Unknown	Low
<b>*Disturbance or Harm</b>						
<b>Recreational activities: incidental harm</b> (e.g., trampling)	Medium	Widespread	Current	Continuous	Moderate	Medium

<sup>1</sup> 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).

<sup>2</sup> Severity: reflects the population-level effect (High: very large population-level effect, Moderate, Low, Unknown).

<sup>3</sup> 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 resulting from housing development, agricultural expansion, road repair/construction and other anthropogenic activities could threaten extant populations of Skinner's Agalinis and may have already caused local extirpations (Canne-Hilliker, 2000; Bowles, 2005; J. Bowles, unpublished report, 2009). On Walpole Island First Nation, increased housing construction, in response to critical housing shortages, has resulted in the loss of suitable habitat for Skinner's Agalinis.

### Changes in Ecological Dynamics or Natural Processes

In Canada, Skinner's Agalinis grows in mesic prairies often where other vegetation is sparse and bare soil is present (J. Bowles, unpublished report, 2009); periodic fire is probably required to maintain these open prairie conditions. Suppression of fire can limit habitat by allowing trees and shrubs to grow and eventually shade out the species; many prairie habitats are converting to savanna and woodlands (COSEWIC, 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). Short plants that produce small seeds, such as Skinner's Agalinis, are known to be particularly susceptible to loss in fire-suppressed prairies (Leach and Givnish, 1996). Conversely, late spring fires may contribute to the reduction of Skinner's Agalinis populations (J. Bowles, unpublished report, 2009).

Natural changes in lake levels and dredging and ditching operations, including those associated with road development and maintenance, can affect Skinner's Agalinis habitat through changes to the moisture regime (Canne-Hilliker, 2000). High water levels in the 1980s may have contributed to a decline of Skinner's Agalinis and the prairie habitat in which it exists (Canne-Hilliker, 2000).

### **Exotic, Invasive, or Introduced Species/Genome**

On Walpole Island First Nation, White Sweet Clover, European Common Reed, Black Locust and Canada Thistle are abundant and increasing (Bowles, 2005). In particular, White Sweet Clover has invaded many Skinner's Agalinis sites on Walpole Island First Nation while Scots Pine is encroaching on the Reaume Prairie. Invasive species can out-compete or shade Skinner's Agalinis 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. Pedestrian and ATV trails cross portions of the habitat of Skinner's Agalinis at the Reaume Prairie (J. Bowles, unpublished report, 2009).

## **5. POPULATION AND DISTRIBUTION OBJECTIVES**

The population and distribution objective is to maintain the two extant Canadian populations of Skinner's Agalinis at their current abundance and distribution. The species was recently (as of 1985) 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 and housing development). Skinner's Agalinis 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 Skinner's Agalinis on Walpole Island First Nation. A census of all known populations was done in 2003 and 2008; a census of one population was also done in 2006 (J. Bowles, unpublished report, 2009). The Walpole Island Heritage Centre has acquired lands for conservation which has resulted in the reduction of the rate of conversion of prairie and savanna habitat (COSEWIC, 2009; J. Bowles, unpublished report, 2009). In 2010, 10 hectares of prairie containing Skinner's Agalinis and other species at risk was acquired by the Walpole Island Land Trust.

In 2008-2009, a student (White, 2009) from the University of Western Ontario, under the supervision of Dr. J. Bowles, conducted a study to help fill some of the knowledge gaps regarding the biology and ecology of Skinner's Agalinis.

Recovery actions described in the Draft Walpole Island Ecosystem Recovery Strategy (Bowles, 2005) included raising awareness in the community about species at risk, including Skinner's Agalinis. Pamphlets, calendars, newsletter articles, posters and other promotional material have been used to raise awareness of species at risk in the Walpole Island First Nation community.

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 – Skinner’s Agalinis

Threat or Limitation	Priority	Broad Strategy to Recovery	General Description of Research and Management Approaches
All threats	High	<ul style="list-style-type: none"> <li>• Protect, conserve and manage habitat</li>   <li>• Monitor / assess populations</li> </ul>	<ul style="list-style-type: none"> <li>• Promote conservation and appropriate management of habitat supporting Skinner’s Agalinis</li> <li>• Develop and use habitat management techniques to maintain suitable habitat for Skinner’s Agalinis</li> <li>• Establish policies, agreements or other tools that protect existing Skinner’s Agalinis habitat (e.g., acquisition or conservation agreements)</li> <li>• Monitor and manage for invasive species</li>   <li>• Confirm Skinner’s Agalinis population status where required</li> <li>• Establish and implement a long-term monitoring protocol</li> </ul>
All threats	Medium	<ul style="list-style-type: none"> <li>• Outreach and education</li> </ul>	<ul style="list-style-type: none"> <li>• Promote community involvement and awareness regarding species at risk and their habitat</li> <li>• Encourage the transfer of Traditional Ecological Knowledge</li> </ul>
Knowledge Gaps	Medium	<ul style="list-style-type: none"> <li>• Conduct research and gather and transfer knowledge</li> </ul>	<ul style="list-style-type: none"> <li>• Examples of knowledge gaps: seed viability and establishment; pollination uncertainties and other factors affecting population size and recruitment; Traditional Ecological Knowledge</li> </ul>

## 7. CRITICAL HABITAT

### 7.1 Identification of the Species' Critical Habitat

At this time, the information required to identify critical habitat for the Skinner's Agalinis is not available to Environment Canada. Although the continued presence of Skinner's Agalinis populations has been confirmed (J. Bowles, unpublished report, 2009), the 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).

Skinner's Agalinis is typically known to be associated with areas of shallow swales and depressions in mesic to moist-mesic prairies where other vegetation is sparse. Given the known historic and current threats to the species, confirmation of the location and extent of Skinner's Agalinis populations is required for the identification of critical habitat. Evidence exists that indicates certain threats may have impacted portions of the population (Canne-Hilliker, 2000; J. Bowles, unpublished report, 2009) 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 Skinner's Agalinis 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

- 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. 2009. Unpublished report. Draft Recovery Strategy for the Skinner's agalinis in Canada. Prepared for Environment Canada, Canadian Wildlife Service - Ontario, Toronto, Ontario. 22 pp.
- Canne-Hilliker, J.M. 1987. Status report on Skinner's purple false foxglove, *Agalinis skinneriana* (Wood) Britton, an Endangered Species in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 25 pp.
- Canne-Hilliker, J.M. 1988. COSEWIC Status report on the Skinner's purple false foxglove, *Agalinis skinneriana*. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 26 pp.
- Canne-Hilliker, J.M. 1998. Update status report for Skinner's agalinis (*Agalinis skinneriana*). Committee on the Status of Endangered Wildlife in Canada. 5 pp.
- Canne-Hilliker, J.M. 2000 (in press). Update COSEWIC status report on the Skinner's agalinis (*Agalinis skinneriana*) in Canada, in COSEWIC assessment and update status report on the Skinner's agalinis *Agalinis skinneriana* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa, Ontario. vi + 11 pp.
- COSEWIC. 2001. COSEWIC assessment and update status report on the white prairie gentian, *Gentiana alba*, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa.
- 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.
- Dieringer, G. 1999. Reproductive biology of *Agalinis skinneriana* (Scrophulariaceae), a threatened species. *Journal of the Torrey Botanical Society* 126:289-295.
- Environment Canada. 2010. Species profile: Skinner's agalinis. Environment Canada, Ottawa, Ontario. Web site: [http://www.sararegistry.gc.ca/species/speciesDetails\\_e.cfm?sid=190](http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=190) [accessed October 2010]
- Government of Canada. 2009. *Species at Risk Act* Policies. Environment Canada. 38 pp.

- Leach, M.K. and T.J. Givnish. 1996. Ecological determinants of species loss in remnant prairies. *Science* 273: 1555-1558.
- 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.
- 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]
- Pratt, P. 2010. *E-mail correspondence to K. St. Laurent*. November 2010. Naturalist, Ojibway Nature Centre, Windsor, Ontario.
- Trick, J., 1995. Range-wide status assessment of the pale false-foxglove *Agalinis skinneriana* (Wood) Brittonia. Green Bay Field Office, U.S. Fish and Wildlife Service. Green Bay, Wisconsin. 26 pp.
- Voss, E.G. 1996. Michigan Flora, Part III. Cranbrook Institute of Science and University of Michigan Herbarium. Ann Arbor, Michigan. 622 pp.
- White, R.M. 2009. *Agalinis skinneriana*: microhabitat and host associations on Walpole Island First Nation. Unpublished Honours Thesis, Department of Biology, University of Western Ontario. London, Ontario.

## **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 Skinner's Agalinis. 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 STATUS RANKS OF SKINNER'S AGALINIS IN THE UNITED STATES

**Table 1. List and description of various conservation status ranks for the Skinner's Agalinis in the United States (from NatureServe, 2010).**

	<b>Global (G) Rank</b>	<b>National (N) Rank</b>	<b>Sub-national (S) Rank</b>
<b>Skinner's Agalinis</b> <i>(Agalinis skinneriana)</i>	G3 (Vulnerable - vulnerable in the jurisdiction due to a restricted range, relatively few populations, recent and widespread declines, or other factors making it vulnerable to extirpation)	N3 (Vulnerable - vulnerable in the jurisdiction due to a restricted range, relatively few populations, recent and widespread declines, or other factors making it vulnerable to extirpation)	Alabama (SNR) Arkansas (SH) Illinois (S2) Indiana (S1) Iowa (S1) Kansas (S1) Kentucky (SH) Louisiana (S1S2) Maryland (S1) Michigan (S1) Mississippi (S1) Missouri (S3S4) Ohio (S1) Oklahoma (SNR) Tennessee (S1S2) Wisconsin (S2)

*S1: Critically Imperilled; S2: Imperilled; S3: Vulnerable; S4: Apparently Secure; SNR: Unranked; SH: Possibly Extirpated.*