COSEWIC
Assessment and Update Status Report

on the

Wild Hyacinth
Camassia scilloides

in Canada

THREATENED
2002

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:

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Previous report:

Oldham, M.J. 1990. COSEWIC status report on the wild hyacinth *Camassia scilloides* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 1-14 pp..

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Wild hyacinth — Photograph by D. Kirk, Ontario Ministry of Natural Resources

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COSEWIC
Assessment Summary

Assessment Summary – May 2002

Common name
Wild Hyacinth

Scientific name
Camassis scilloides

Status
Threatened

Reason for designation
This species is present at only six island sites within a highly restricted and limited habitat subject to significant risks from cormorants and continued land development.

Occurrence
Ontario

Status history
Designated Special Concern in April 1990. Status re-examined and uplisted to Threatened in May 2002. Last assessment based on an update status report.

COSEWIC
Executive Summary

Wild Hyacinth
Camassia scilloides

Species information

Wild Hyacinth (*Camassia scilloides*) is a showy, spring flowering bulbous plant of the Lily family. It has star shaped flowers that are pale blue to white on a flowering stalk up to 70cm high and basal leaves that are long and narrow. It is the eastern species of *Camassia*

Distribution

It ranges from southeastern United States through the Mississippi valley to its extremely limited range in Canada, on the Lake Erie Island of Ontario.

Habitat

In Ontario it occurs in open hackberry or mixed species forests of the Erie Islands where soils are typically rich in organic matter but with limestone bedrock often only a shovel's depth away. It is a component of the spring ground flora.

Biology

Wild hyacinth is a perennial spring flowering herb that develops from a bulb. Diverse insects visit the flowers on sunny days and likely promote cross pollination. Genetic variability within colonies is indicated by the presence of both blue and white flowered plants. Seeds are dispersed from dry capsules in the fall and tend to be disseminated locally, judging from the clumping of plants and seedlings near the parent colonies.

Population sizes and trends

Five populations are large (2,000-5,000+) and stable; in the past 13 years one was lost and one is about 15% of its previous recorded size both due to intensive cormorant nesting; , and one sub-population was lost in the past 8 years due to land clearing. In the past several decades two historical populations were lost to housing development

A recent survey of all know sites, undertaken with a large crew of knowledgeable volunteers, yielded a total count of 21,212 flowering plants (the unit compared

throughout except for 700 vegetative plants where none were flowering due to cormorants). In the late 1980s, the count ranged between approximately 14,000 to 16,000 plants. This range excludes the large population on Hen Island (presently at over 5000 plants) for which no count was previously available. The 1980s total count for all populations may have been in the order of 18,000-21,000 plants, taking into consideration an estimated 4000-5000 plants for the Hen Island population. Without the threat of cormorants, there might have been an increase, but the significance of this is questionable since previously unrecorded colonies of *Camassia* were found within the known sites by the large crew of observers. However, despite the impact on the two large populations (Middle Island and East Sister Island) by cormorants, the overall population status of Wild Hyacinth appears to be stable.

Limiting factors and threats

Two historical sites have been lost (Bois Blanc and North Harbour Islands) due to clearing for housing development. More recently East Sister Island's population has been lost to the impact of Double-crested Cormorants nesting in large colonies (5,000+) and degrading both the forest trees as well as transforming the ground flora. The population on Middle Island is under threat due to the same transformation by the cormorants. A small site in the northern part of the Fish Point population complex has also been lost due to land clearing for cottage development. Other private lands are under similar threats as Pelee Island becomes more popular for recreational/seasonal homes.

Nowhere throughout its range is it considered secure; it is listed as critically imperiled to vulnerable in 11 states and Ontario.

Special significance of the species

This species was used extensively by native people in the west and likely similarly used by eastern native people in Lake Erie. It is a component of southern Ontario's diverse Carolinian flora.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) determines the national status of wild species, subspecies, varieties, and nationally significant populations that are considered to be at risk in Canada. Designations are made on all native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fish, lepidopterans, molluscs, vascular plants, lichens, and mosses.

COSEWIC MEMBERSHIP

COSEWIC comprises representatives from each provincial and territorial government wildlife agency, four federal agencies (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biosystematic Partnership), three nonjurisdictional members and the co-chairs of the species specialist groups. The committee meets to consider status reports on candidate species.

DEFINITIONS

Species	Any indigenous species, subspecies, variety, or geographically defined population of wild fauna and flora.
Extinct (X)	A species that no longer exists.
Extirpated (XT)	A species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A species facing imminent extirpation or extinction.
Threatened (T)	A species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
Not at Risk (NAR)**	A species that has been evaluated and found to be not at risk.
Data Deficient (DD)***	A species for which there is insufficient scientific information to support status designation.

* 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.

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.

Environment Canada Environnement Canada
Canadian Wildlife Service Service canadien de la faune
Canada

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

Update
COSEWIC Status Report

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2002

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SPECIES INFORMATION

Name and Classification

Camassia scilloides (Raf.) Cory, wild hyacinth, is a monocotyledonous flowering plant of the family Liliaceae. It is taxonomically distinct in its northern range. Details of related species and named subspecific taxa are given in the original status report (Oldham, 1988).

Description

Wild hyacinth is a perennial herbaceous spring flowering plant developing from a bulb with basal, keeled and linear leaves and a flowering stalk up to 70cm high with up to 100 flowers; flowers are pale blue to white with yellow anthers, star-shaped with 6 petals. For a full description see Oldham, 1988. Photographs are available at Environment Canada and ROM/OMNR species at risk web sites (also, Figure 1).

Figure 1. Photograph of *Camassia scilloides* inflorescence (D. Kirk, Ontario Ministry of Natural Resources).

DISTRIBUTION

Global Range

This species occurs naturally in the Mississippi Valley and beyond, from western Pennsylvania through Lake Erie and southern Wisconsin in the north to northwestern Georgia to eastern Texas in the south. Maps are given in the status report by Oldham (1988) as well as in White et al. (1982) and reproduced on the ROM/OMNR web site (Figure 2).

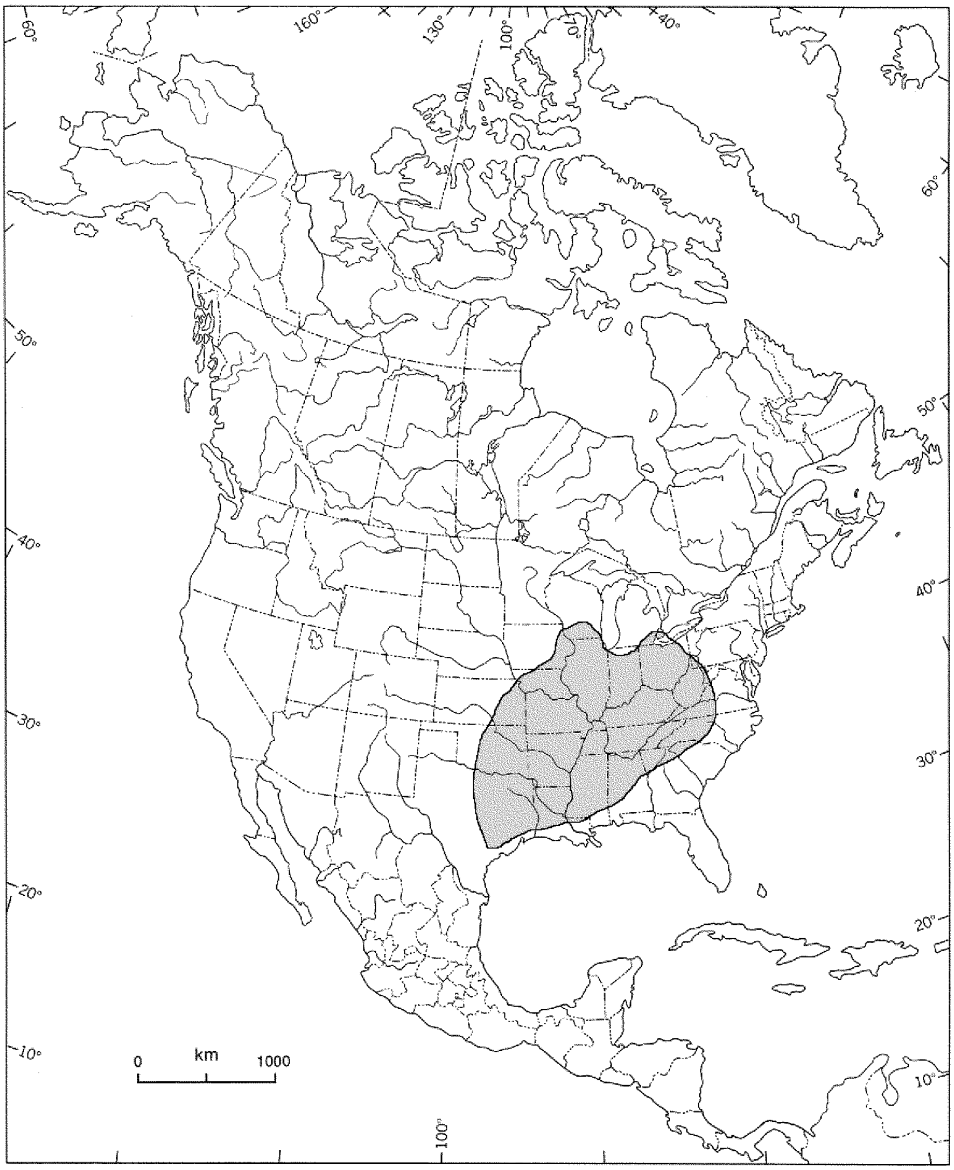

Figure 2. Global distribution of *Camassia scilloides*, (modified from White et al., 1982).

Canadian Range

In Canada it is limited to the Lake Erie Islands plus a now extirpated population on Bois Blanc Island in the Detroit River. Maps are given in Oldham (1988) and the Environment Canada web site; Figure 3 shows the current distribution.

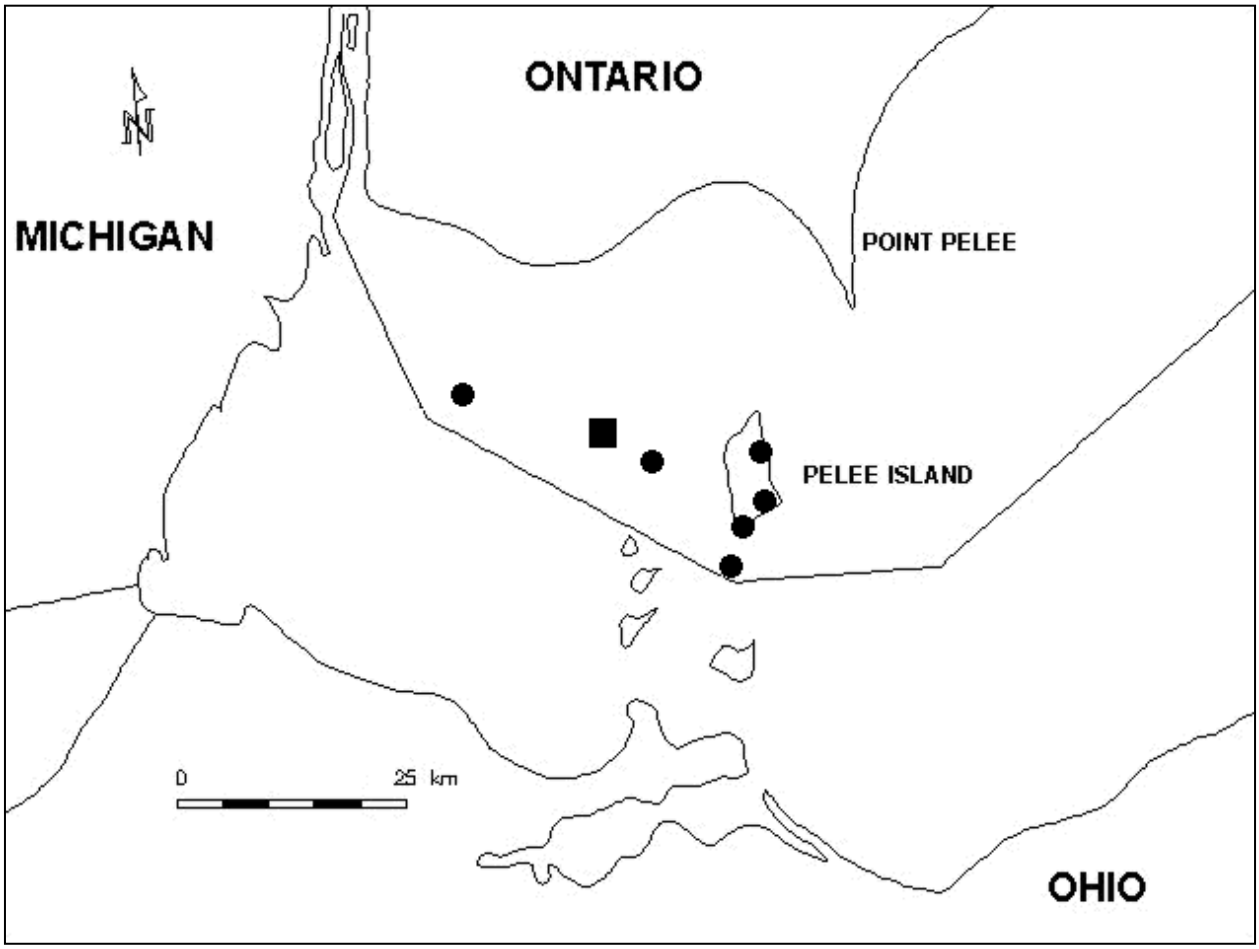

Figure 3. Distribution of *Camassia scilloides* in Canada (found only on the Lake Erie Islands of Ontario); all populations, represented by round dots, were extant in 2001, that on East Sister Island (square dot) was recently extirpated.

HABITAT

Habitat requirements

In Canada, wild hyacinth occurs in open deciduous forests and hawthorn scrub in areas where the limestone bedrock in near the surface, but with rich clay to organic soils. The climate is moderated by Lake Erie with a long growing season and typically a dry summer.

Trends

Suitable habitat is experiencing only minor losses in the last 10-20 years, mostly on Pelee Island. However, habitat on islands with nesting Double Crested Cormorants (East Sister and Middle) are experiencing severe degradation and resultant population losses, from complete extirpation on East Sister Island to declines down to about 15% on Middle Island, and here only suppressed vegetative plants remain where it had been

recorded previously. The habitat of one unquantified population at Mosquito Point (North end of Fish Point) is no longer present in an area being cleared for cottage development. Other habitats and their populations appear to be holding well, compared to previous rough estimates during the 1980s.

Protection/Ownership

Middle Island is under the management of Point Pelee National Park, East Sister Island and Fish Point are provincial nature reserves. Stone Road Alvar is a nature reserve with various parts owned by the Federation of Ontario Naturalists, the Nature Conservancy of Canada (NCC) and the Essex Region Conservation Authority. Some adjacent lands are owned by conservation minded landowners, including one site with an NCC conservation easement. Hen Island is owned by the Quinnebog Fishing Club (Ohio). Other sites are privately owned.

BIOLOGY

General

Wild hyacinth flowers in mid-spring (mid to late May) when pollinating insects are abundant. Similar to other woodland spring ephemerals, leaves and fruiting stalks die down by mid-summer. From field observations, seeds are produced in large numbers and germination occurs the next spring as the soil warms (the latter from author's garden observations). Seed dispersal appears to be directly from the dry, dehiscent capsules on the tall fruiting stalks; the dry hard seeds do not seem to be attractive to woodland dispersal agents (such as ants) that would take the seeds further. Vegetative proliferation from bulb offsets is recorded as not usual (Oldham, 1988). Recent field observations supported this.

Reproduction

Flowers were observed with a variety of insect visitors on sunny days: butterflies, bumblebees, metallic green/bronze bees, small solitary bees, bee flies, syrphid flies, hover flies, but few or none on cloudy/rainy days.

During the field work for this study a group of hyacinths was excavated to observe indications of possible vegetative reproduction. Several mature bulbs were closely examined and no signs of vegetative offshoots or bulblets were seen. However, numerous small bulbs were among the mature flowering size bulbs and clearly separate from them, suggesting that these were seedlings of different ages. This conclusion was supported by the occurrence of mixed flower colours within colonies (white to very pale blue to pale blue), an indication of genetic variation that would not be expected with colonies developed only from vegetative proliferation.

Survival

Individual plants are likely long-lived, with little change in location from different observations over the past two decades. Natural threats to survival have only recently been noted, due to the rapid proliferation of Cormorant colonies on the smaller islands (their high numbers and direct impact on the ground as well as their rich excrement kills much of the vegetation including trees where they nest, and later supports a dense, competitive weed population). As recently as 1993 cormorant nesting areas were mapped as “rare animal sites” on Middle Island. The *Camassia* population on Middle Island has been severely reduced and apparently lost on East Sister Island, as observed in May of 2001. No indication of significant herbivory or uprooting of bulbs was observed at any of the populations.

Dispersal

Seeds are dispersed from dry dehiscent seed capsules, some of which fall over before opening, suggesting that seeds are not dispersed very far from the colony of flowering bulbs. The dry hard angular seeds appear to have no further dispersal adaptation once they leave the capsule. The clustering of plants, the mixed flower colours and numerous non-flowering plants within the colony supports this interpretation. Within a habitat there may be several colonies in dense clusters; it is uncertain what dispersal mechanism originates a new colony.

Nutrition and Interspecific Interactions

Robust colonies occur on sites of rich soil under partial shade, but often with no more than 10 cm. of soil (Stone Road Alvar population observations). Pollinating insects are likely important for good seed development, but comparisons with bagged flowers excluding pollinators would confirm this.

Double-crested Cormorants are having a devastating effect on populations on East Sister Island (no sign of survivors in 2000 (M.J. Oldham, pers. comm.) and May of 2001 during field observations for this report, and greatly reducing the population on Middle Island (May 2001 observations).

Adaptability

On the Erie Islands the habitat for this species appears to be limited to rich soil over limestone, even though the soil may be thin in some areas, and generally under light to moderate shade from forest trees overhead. To the south it is reported in floodplain woods where the soil would be deeper.

POPULATION SIZES AND TRENDS

Populations were resurveyed in 2001 and compared with earlier records (table 1). Numbers are based on flowering stalks (one per bulb). Non-flowering immature bulbs were not included (except for Middle Island) since it is very difficult to separate leaves from underground bulbs or the leaves of flowering plants. Previous counts were rough estimates and lacking for Hen Island. If a similar number is assumed for Hen Island in the 1980s, then the two totals become very similar and the difference likely does not represent a significant increase.

Table 1. Ontario Populations of *Camassia scilloides.*

Population	Location	Core, 1948	Oldham, 1988	2001 survey
1. Pelee Island:	Fish Point 1 Fish Point 2		325-375 150-200	Total: 2090
2.	Stone Road Alvar 1 Stone Rd. A 2 Stone Rd. A . 3		1,000-2,000 1 3	 Total: 4,485
3.	Middle Pt. M. Pt., E. (new)		2,500-3,000	4750 112
4.	Middle Island, M.I., S. (new)		5,000+	(700 veg. only) 865
5.	Middle Sister I.	+	5,000+	3,230
6.	Hen Island	+	+	5680
EXTIRPATED				
1a.	P.I., Fish Pt., Mosquito Pt. #			0
7.	E. Sister Island		100-300	0
8.	N. Harbour I.	+	0*	
9.	Bois Blanc I. (Detroit R.)	(Last recorded in 1882)	0*	
Total			14,000-16,000	21,212 in flower

+ / 0 : presence (numbers not specified) / absence
* : habitat altered or destroyed and no longer present, from recent intensive field checks by Oldham and Waldron.
# : Kamstra, et al.,1993, population noted, without count.

LIMITING FACTORS AND THREATS

Three sites, Mosquito Point (a sub-population of Fish Point), North Harbour Island and Bois Blanc Island have been lost due to human activity. The first, due to recent cottage lot development less than 10 years ago; North Harbour was recorded by Core (1948), and Bois Blanc was collected by Macoun in 1882.

Double Crested Cormorants have recently experienced a major expansion of their populations in the lower Great Lakes and are known to be nesting on several of the Erie Islands. They have significantly impacted the wild hyacinth populations on East Sister Island (now extirpated), greatly reduced the large population on Middle Island, and

impacted other fauna and flora, especially the ground flora, through direct contact and their nutrient-rich excrement.

SPECIAL SIGNIFICANCE OF THE SPECIES

Camassia bulbs are starchy and edible. The western species (*C.leichtlinii* and *C. quamash*) were used as a staple food by native people as well as by early European explorers. There are 76 citations on the Native American Ethnobotany Database (some of the older ones are for *C. scilloides*, but all with western references, thus for the species *sensu lato*, not as we now know it now). Native people traveling through the Erie Islands likely utilized this species in a similar manner, and may have deliberately or accidentally introduced them to these islands.

Camassia bulbs are often available in the specialty horticultural trade, but more commonly the western species (*C. leichtlinii* and *C. quamash*).

EVALUATION AND PROPOSED STATUS

Existing Protection or Other Status

The Nature Conservancy gives this species a global rank of G4G5; however there is no state/province where it is ranked as Secure (S5) or even Apparently Secure (S4). It is listed as Critically Imperiled (S1) in three states (North Carolina, Pennsylvania, and Wisconsin), Imperiled (S2) in 6 states (Georgia, Louisiana, Michigan, Mississippi, South Carolina, and Virginia) and Ontario, and Vulnerable (S3) in two states (Indiana and Iowa), by the most recent listing of 2000, accessible through the NatureServe web site.

It has been listed as a species of Special Concern by COSEWIC but is currently without formal protective status in Ontario. While many of the populations were secure at the most recent field observations in May 2001, one population appears extirpated due to the cormorants nesting on East Sister Island, and under severe impact on Middle Island, the latter of which was a very large population. Others have been lost due to habitat conversion for building development at Mosquito Point (recently) and North Harbour and Bois Blanc (historically).

Assessment of Status and Author's Recommendation

The comparison of counts of those with past estimates has not changed substantially; the more thorough search has found populations not counted before so the slight increase likely is not significant. Several sites have been completely lost (East Sister Island, Mosquito Point) or experienced severe declines (Middle Island) since the original status report of 1988. Some of the sites are federal, provincial or NGO nature reserves, others are without protection and subject to development

pressures as seasonal recreational housing increases on Pelee Island. This could also be a threat to Middle Sister Island.

Proposed Status: Threatened. Cormorants have transformed habitat on East Sister Island and Middle Island. Habitat has also been lost due to land clearing for housing on North Harbour and Bois Blanc Islands, and a subpopulation of Fish Point at Mosquito Point. Several sites are not secure and could come under threat of land clearing: lands of Middle Pt., private lands near the Stone Road Alvar and Middle Sister Island. The Hen Island population co-exists with a long established fishing club, whose forests have been invaded by garlic mustard and Norway maple, increasing the ground level competition and canopy shading which likely will eventually severely impact this and other species of the ground flora.

TECHNICAL SUMMARY

Camassia scilloides	
Wild Hyacinth	Camassie faux-scille
Range of Occurrence in Canada: Ontario, Lake Erie islands only	
Extent and Area information	
• *Extent of occurrence (EO)(km²)*	4.5 km²
• *specify trend (decline, stable, increasing, unknown)*	Stable, but some habitats not secure
• *are there extreme fluctuations in EO (> 1 order of magnitude)?*	No
• *Area of occupancy (AO) (km²)*	1.1 km²
• *specify trend (decline, stable, increasing, unknown)*	Stable, but some popula-tions lost, others not secure.
• *are there extreme fluctuations in AO (> 1 order magnitude)?*	No.
• *Number of extant locations*	6
• *specify trend in # locations (decline, stable, increasing, unknown)*	1 complete loss, 1severe decline, others stable.
• *are there extreme fluctuations in # locations (>1 order of magnitude)?*	No.
• *Habitat trend: specify declining, stable, increasing or unknown trend in area, extent or quality of habitat*	Currently stable, but private land not secure.
Population information	
• *Generation time (average age of parents in the population) (indicate years, months, days, etc.)*	Likely 2-4 years.
• *Number of mature individuals (capable of reproduction) in the Canadian population (or, specify a range of plausible values)*	21,200
• *Total population trend: specify declining, stable, increasing or unknown trend in number of mature individuals*	Slight increase, but may represent more intensive survey.
• *if decline, % decline over the last/next 10 years or 3 generations, whichever is greater (or specify if for shorter time period)*	Decline in 2 populations in 13 years: one to 0%, the other to 15%.
• *are there extreme fluctuations in number of mature individuals (> 1 order of magnitude)?*	Individuals long-lived and populations mostly stable.
• *Is the total population severely fragmented (most individuals found within small and relatively isolated (geographically or otherwise) populations between which there is little exchange, i.e., ≤ 1 successful migrant / year)?*	Total population fragmented between different islands. Some movement within large sites.
• *list each population and the number of mature individuals in each*	1.Fish Pt. (Pelee Is.) 2090 2. Stone Rd. Alvar (PI) 4485 3. Middle Pt. (PI) 4860 4. Middle Is. 865 5. Middle Sister Is. 3230 6. Hen Is. 5680 7. E. Sister Is. 0
• *specify trend in number of populations (decline, stable, increasing, unknown)*	1 lost, 1 severe decine, 5 stable.
• *are there extreme fluctuations in number of populations (>1 order of magnitude)?*	Other than 1 lost and one severe decline, no.
Threats (actual or imminent threats to populations or habitats)	
-Cormorant nesting on two islands (East Sister and Middle Is.) -Land being developed for seasonal housing (actual, Mosquito Pt., potential elsewhere on Pelee Is., Middle Sister Is.). Historical sites on Bois Blanc and N. Harbour Is. lost to housing development.	

Rescue Effect (immigration from an outside source)	
• *does species exist elsewhere (in Canada or outside)?*	Canada: no. USA, yes.
• *status of the outside population(s)?*	In the USA, S1 in 3 states, S2 in 6, none S4 or S5.
• *is immigration known or possible?*	Very unlikely.
• *would immigrants be adapted to survive here?*	Likely if from northern source.
• *is there sufficient habitat for immigrants here?*	Secure habitat is occupied; problem is loss or degradation of habitat.
Quantitative Analysis	
I population lost, 1 in severe decline in past 13 years. Comparative counts: 1988: 14,975; Spring 2001: 15,520 (with a more intensive search)	

ACKNOWLEDGEMENTS

The following people helped with the May 2001 field survey: Gerry Waldron, Lindsay Rodger, Mary and John Celestino, Paul O'Hara and Bruno and Elenor Sfalcin. Gerry Waldron also provided information from surveys to Bois Blanc Island in 1999 and areas of similar habitat around Amherstburg's alvars. Mike Oldham provided the NHIC Element Occurrence reports and other details from his many observations of these populations. Scott Hughes provided photographic documentation of the expedition and Lyle Geauvceau piloted his boat through Lake Erie fog and other hazards, with the help of a Garmin GPS-12, a borrowed chart and the long dormant navigational skills of the author. Funding provided by the Canadian Wildlife Service, Environment Canada.

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Oldham, M.J., 1983. Environmentally Significant Areas of the Essex Region. Essex Region Conservation Authority, Essex, ON. 426 pp.

Oldham, M.J., 1988. Status Report on Wild Hyacinth, Camassia scilloides (Raf.) Cory, a threatened species in Canada. COSEWIC, Ottawa.

White, D.J., R.V. Maher & G.W. Argus, 1982. *Camassia scilloides* (Raf.) Cory, Wild Hyacinth, in G.W. Argus, K.M Pryer, D.J. White & C.J,. Keddy (eds.), 1982-87. Atlas of Rare Vascular Plants of Ontario. Nation Museum of Natural Sciences, Ottawa.

Pertinent Web Sites

Environment Canada: Species at Risk in Canada. www.speciesatrisk.gc.ca/

Native American Ethnobotany Database, compiled by Daniel Moerman. http://herb.umd.umich.edu/

NatureServe, Association for Biodiversity Information. www.natureserve.org

Ontario Natural Heritage Information Centre (NHIC) www.mnr.gov.on.ca/mnr/nhic/nhic.html

ROM/OMNR: Royal Ontario Museum/ Ontario Ministry of Natural Resources Species at Risk Module. www.rom.on.ca/cgi-bin/cbcb/fastfact.pl?speciesID=8

BIOGRAPHICAL SUMMARY OF CONTRACTOR

John Ambrose came to the University of Guelph Arboretum in 1974, after receiving a PhD in Botany from Cornell University. At the Arboretum, in addition to being the Curator, he developed a program based on the rare woody plants of the Carolinian Zone of southern Ontario, including field surveys, status reports and detailed studies of their population and reproductive biology. After 17 years there, he moved to the Toronto Zoo as Curator of Botany/ Manager of Horticulture. There he developed new natural habitat exhibits and a naturalization program for peripheral lands of the site, in addition to his exhibit responsibilities. These reflect his growing interest in restoration ecology. In 1999 he left the Zoo to teach a new course in restoration ecology at the University of Guelph. He currently is self-employed and continues to work with endangered species recovery planning, serving on three recovery teams for Carolinian trees.

AUTHORITIES CONSULTED

Parks Canada and Ontario Ministry of Natural Resources were contacted for permission to enter public lands , and following knowledgeable people: Mike Oldham and NHIC, Allen Woodliffe, Gerry Waldron, and two local knowledgeable landowners on Pelee Island: Mary Celestino and Ben Porchuk.

COLLECTIONS EXAMINED

With good data on collection and site records from the up-dated element occurrence reports of the Natural Heritage Information Centre (NHIC, 2000) and the COSEWIC status report (Oldham, 1988), researching time was concentrated on going to all of the sites on the Erie Islands where this species has been reported in Canada. Population densities and other characteristics were compared with those recorded earlier. About 64 person-hours were spent in the field for updating the status of this species.