Ontario Species at Risk Evaluation Report for Common Hoptree (*Ptelea trifoliata*)

Committee on the Status of Species at Risk in Ontario (COSSARO)

Assessed by COSSARO as Special Concern

June 2016

Final

Ptéléa trifolié (*Ptelea trifoliata*)

Le ptéléa trifolié est un petit arbre appartenant à la famille des rues (*Rutacées*) présentant des feuilles aromatiques, alternes et trifoliées. Sa floraison survient au début de l'été; ses fleurs arborent une couleur crème et ses fruits sont secs et discoïdes. Historiquement, l'espèce est utilisée à des fins médicinales et économiques, notamment par les Premières Nations. Elle est l'hôte et la nourriture de plusieurs insectes rares.

En Ontario, le ptéléa trifolié se trouve presque exclusivement le long ou près des rives du lac Érié. En Ontario, les plantes appartiennent à la sous-espèce *P. trifoliata* ssp. *trifoliata.* À l'échelle mondiale, cette sous-espèce pousse naturellement dans l'Est de l'Amérique du Nord. On trouve souvent le ptéléa trifolié dans des zones qui subissent des perturbations naturelles, où il constitue une partie de la lisière extérieure de végétation arborescente. Ses fleurs sont pollinisées par les insectes, et ses fruits, dispersés par l'eau et le vent. Ses semis s'établissent facilement dans les milieux perturbés.

Les données sur la population du ptéléa trifolié sont limitées. Cependant, dans les milieux ayant fait l'objet de relevés comparables pour les évaluations de 2015 et de 2002, la taille des sous-populations a augmenté. On ignore si la différence est attribuable à une hausse du nombre de spécimens ou une hausse des efforts d'observation déployés à l'occasion de la plus récente évaluation.

Depuis la dernière évaluation, le changement le plus important est le recensement de plus de 10 000 spécimens matures au moyen de relevés approfondis réalisés en 2007 dans le parc national de la Pointe Pelée. Selon les observations, la population de ptéléa trifolié au Canada est maintenant 10 fois plus importante qu'en 2002; cependant, aucune donnée pertinente disponible ne permet de déterminer les tendances de la population.

Le ptéléa trifolié est passé d'espèce menacée à espèce préoccupante en Ontario vu la présence d'un nombre beaucoup plus important de spécimens et d'habitats ciblés depuis 2002.

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Executive summary

Common Hoptree is a small tree in the rue family (*Rutaceae*) with aromatic, alternate trifoliate leaves. The cream-coloured flowers bloom in early summer. The fruit is dry and disk-shaped and this species has a long history of medicinal and economic usage, including use by First Nations. It is a host or food source for several rare insects.

In Ontario, Common Hoptree occurs almost entirely along or near the Lake Erie shoreline. Plants in Ontario belong to the subspecies *P. trifoliata* ssp. *trifoliata.* Globally, this subspecies occurs naturally across eastern North America. Common Hoptree is often found in areas of natural disturbance where it forms part of the outer edge of shoreline woody vegetation. It has insect-pollinated flowers, and the fruit is dispersed by wind or water. The seedlings readily establish in disturbed sites.

Population data are limited for Common Hoptree. However, where comparable survey data for the 2015 and 2002 assessments exist, subpopulation sizes have increased. There is some uncertainty regarding how much of the difference is due to an increase in numbers versus an increase in survey effort in the most recent assessment.

The largest change since the previous assessment is the documentation of more than 10,000 mature individuals in extensive surveys of Point Pelee National Park in 2007. The known Canadian population of Common Hoptree is now more than 10 times greater than the known population in 2002; adequate data are not available to determine any population trends.

The Common Hoptree was downlisted from Threatened to Special Concern in Ontario, given the presence of substantially larger recorded population levels and new locations identified since 2002.

1. Background information

1.1. Current designations

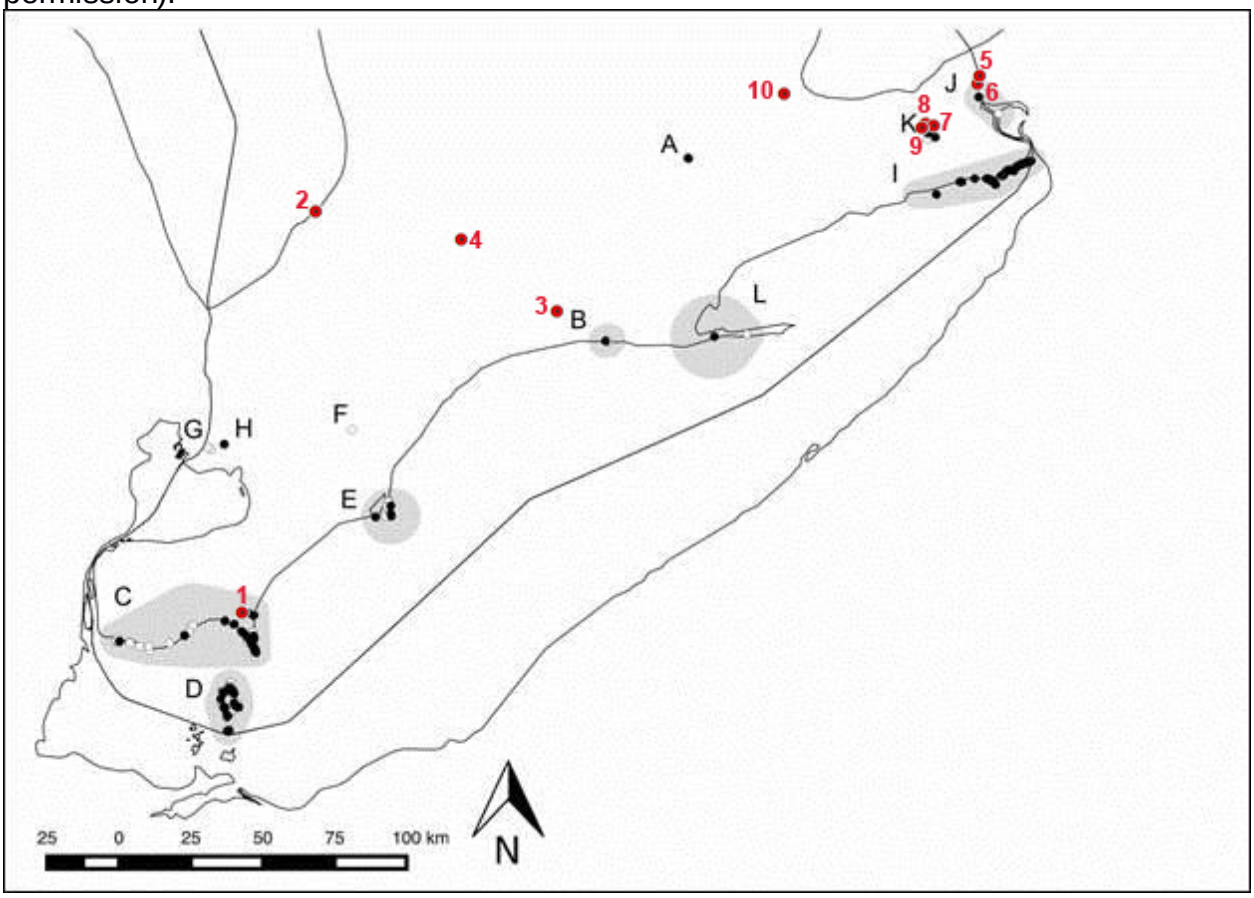
- GRANK: G5T5 (1989)
- NRANK Canada: N3
- COSEWIC: Special Concern (November 2015)
- SARA: Threatened (Schedule 1)
- ESA 2007: Threatened (2008)
- SRANK: S3

1.2. Distribution in Ontario

Common Hoptree is limited to extreme southern Ontario, primarily along the Lake Erie shoreline. In the NHIC database, Element Occurrences (EOs) are defined as groups of plants separated by 1 km. However, for shoreline species, NatureServe uses a different definition: groups of plants separated by > 10km along shorelines, or 3 km for inland sites. In this document, the current NHIC EOs are referred to as "sites", and the NatureServe EOs are referred to as "subpopulations." All known sites and subpopulations are shown in Figure 1 and Table 1 (see end of document).

As most of the Canadian Common Hoptree subpopulations are not affected by any immediate threat, there are two suggested options for assessing the number of locations: (a) number of locations is not used (i.e., the subcriteria that refer to the number of locations consequently are not met), especially if the unaffected area is more than half the taxon's range; (b) number of locations in the unaffected areas is set to the number of subpopulations in those areas, especially if there are several subpopulations (IUCN 2014). Following this guidance, number of locations is either not applicable, or equals the number of subpopulations (12).

Figure 1. Distribution of Common Hoptree in Ontario. Circles represent sites (i.e., NHIC EOs: groups of plants separated by 1 km). Open circles represent observations made prior to 2002, closed circles represent observations made between 2002 and 2014. Grey areas show the boundaries of subpopulations (i.e., NatureServe EOs: groups of plants separated by 10 km along a shoreline, or 3 km between inland sites) and are denoted by letters which correspond with those given in Table 1. Numbers represent sites known or suspected to be cultivated. Source: COSEWIC 2015 (reproduced with permission).



1.3. Distribution and status outside Ontario

The subspecies of Common Hoptree present in Canada (*P. trifoliata* ssp. *trifoliata*) occurs naturally from the lower Great Lakes to Texas, eastward from eastern Pennsylvania and southern New England to northern Florida. The full extent of the range of *P. trifoliata* ssp. *trifoliata* is unclear. Northern populations in Minnesota and Quebec are known to be introductions, as are the only known records from Rhode Island and Delaware. In the southwest, sources conflict as to the occurrence of this subspecies in Arizona and New Mexico (NatureServe 2016; USDA, NRCS 2016). Other Common Hoptree subspecies occur farther south into Florida and Mexico, and west to New Mexico and Arizona.

In the US, *Ptelea trifoliata* ssp. *trifoliata* is only ranked in New York (S1S2, Endangered) and West Virginia (S4) (NatureServe 2016). Population trend data is not available for

the New York population (NYNHP 2016), and presumably not for any of the states where it is unranked.

1.4. Ontario conservation responsibility

Less than 1% of the global range and population of Common Hoptree occurs in Ontario.

1.5. Direct threats

The primary threat to Common Hoptree in Canada is loss of habitat resulting from altered coastal processes along Lake Erie. Sand dunes and beaches are a naturally dynamic habitat maintained by erosion and deposition of sand. Shoreline hardening (i.e., through the construction of bulkheads, jetties, seawalls or groins) alters these natural processes, resulting in reduced levels of sand deposition and loss of beach and dune habitat. Historical sand mining has also affected the sand budget as it resulted in the formation of large craters in the lake bottom exacerbating shoreline erosion along Lake Erie (Dobbie pers. comm., 2015).

In the next 50 years, up to 126 ha (1.26 km^2) of habitat could be lost from Point Pelee National Park mainland (Baird and Associates Coastal Engineers 2010) where 86% of all Common Hoptrees in Canada are located. Hoptree depends on colonizing newly created beach habitat, and under current conditions habitat is not being created fast enough to counter losses due to erosion. Erosion has also been observed at Rondeau Provincial Park (OMNR 1991) and may be affecting additional sites along Lake Erie. According to the Point Pelee National Park Management Plan, erosion of the Point Pelee sand spit could be slowed if collaborative management efforts are instituted (Parks Canada Agency 2010).

In addition, reduction of early-successional habitat due to fire suppression, and reduced ice-scour along shorelines are believed to have a low, negative impact on Common Hoptree. Cottage and resort development, including beach grooming, are also a threat at some sites.

1.6. Specialized life history or habitat use characteristics

Common Hoptree occurs in areas with high natural disturbance and nutrient-poor soils. It is most abundant in habitats that are rare and declining in Ontario: naturally dynamic sandy shorelines and dunes, and limestone alvars.

2. Eligibility for Ontario status assessment

2.1. Eligibility conditions

2.1.1.Taxonomic distinctness

Yes.

2.1.2.Designatable units

No.

2.1.3.Native Status

Yes.

2.1.4.Occurrence

Extant.

2.2. Eligibility results

Common Hoptree (*Ptelea trifoliata*) is eligible for status assessment in Ontario.

3. Ontario status assessment

3.1. Application of endangered or threatened status in Ontario

3.1.1.Criterion A – Decline in total number of mature individuals

Insufficient information.
Projected habitat loss at Point Pelee may eliminate most of the existing subpopulation at that site within 50 years. Given the generation time of Common Hoptree is estimated to be as long as 20 years, this falls within three generations. As such, Criterion A3 could be applied to Common Hoptree: a projected reduction of more than 50% of the total number of mature individuals based on a decline in the quality of habitat within three generations. Accepting this analysis would lead to a status of Endangered.

However, the actual impact of erosion at Point Pelee is uncertain. The extent of habitat that will be lost is unclear, as is the capacity of Common Hoptree to colonize the retreating shoreline. Furthermore, the threat is not expected to manifest within 10 years, and the situation should be clearer at subsequent status reviews of this species. In light of these considerable uncertainties, this criterion is not applied.

3.1.2.Criterion B – Small distribution range and decline or fluctuation

Does not apply.
Common Hoptree meets the threshold for Endangered under B2 since AOO is 172 km^2 However, it does not meet any of the supporting criteria under B2a, B2b or B2c. Subpopulations are not severely fragmented (B2a) or subject to extreme fluctuations (B2c). There are insufficient data to determine if there is an ongoing decline (B2b). Although there has been an observed population increase at monitored sites since 1982, it is not clear whether this represents an increasing trend, or reflects increased recent survey effort. For more information see COSEWIC (2015) technical summary, page vi.

3.1.3.Criterion C – Small and declining number of mature individuals

Does not apply.
The total number of mature individuals is above all thresholds.

3.1.4.Criterion D – Very small or restricted total population

Does not apply.
The total number of mature individuals exceeds thresholds.

3.1.5.Criterion E – Quantitative analysis

Insufficient information.
No quantitative analysis completed.

3.2. Application of Special Concern in Ontario

Common Hoptree may be near to qualifying for a higher status, if the anticipated threat of shoreline erosion continues. Possible habitat loss at Point Pelee National Park could lead to substantial declines in the population of the largest subpopulation, such that it could then qualify for listing as Endangered under category A3 (reduction of > 50% in total number of mature individuals over three generations, see above), or Threatened under category C (< 10,000 total individuals) and C1 (an estimated population decline of 10% within three generations). It is also of concern that the mainland Point Pelee population currently accounts for 86% of the total Ontario population. Small changes could lead to Common Hoptree qualifying as Endangered under C2b, (one subpopulation has > 95% of all mature individuals). For these reasons, Special Concern status is considered appropriate.

3.3. Status category modifiers

3.3.1.Ontario's conservation responsibility

Does not apply.

3.3.2.Rescue effect

Insufficient information.
Insufficient data is available to apply this criterion. Immigration from Michigan or Ohio is possible, and such immigrants are likely capable of surviving in Ontario. However, the frequency of such immigration is unknown, and would depend upon the availability of suitable habitat. Furthermore, habitat loss is the most likely cause of the Ontario population declining to the point that rescue is necessary for its ongoing persistence. In this case, rescue would not be possible because sufficient suitable habitat would presumably be unavailable.

3.4. Other status categories

3.4.1.Data deficient

Does not apply.

3.4.2.Extinct or Extirpated

Does not apply.

3.4.3.Not at risk

Does not apply.

4. Summary of Ontario status

Common Hoptree (*Ptelea trifoliata*) is classified as Special Concern in Ontario because the species is likely to become Threatened or Endangered if factors suspected of negatively influencing the persistence of the species are neither reversed nor managed with demonstrable effectiveness.

5. Information sources

Ambrose, J.D. 2002. Update COSEWIC status report on the common hoptree *Ptelea trifoliata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 14 pp.

Baird, W.F., and Associates Coastal Engineers Ltd. 2008. Colchester to Southeast Shoal Littoral Cell Study Final Report. Prepared for Essex Region Conservation Authority, Essex, Ontario. Project No. 11210.000. iii + 92 pp.

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COSEWIC. 2015. COSEWIC Assessment and Status Report on the Common Hoptree, *Ptelea trifoliata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa.

International Union for the Conservation of Nature (IUCN). 2014. The IUCN Red List of Threatened Species. Version 2014.2. Accessed October 2014.

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NatureServe. 2016. NatureServe Explorer: An online encyclopedia of life. Version 7.1. Accessed May 2016.

New York Natural Heritage Program (NYNHP). 2013. Online Conservation Guide for *Ptelea trifoliata* ssp. *trifoliata*. Accessed April 2015.

Ontario Ministry of Natural Resources (OMNR). 1991. Rondeau Provincial Park Management Plan. Ontario Ministry of Natural Resources, Toronto, Ontario. 27 pp.

Parks Canada Agency. 2010. Point Pelee National Park of Canada Management Plan. Parks Canada Agency, Leamington, Ontario. xiv + 81 pp.

United States Department of Agriculture, Natural Resources Conservation Service (USDA, NRCS). 2016. The PLANTS Database. Accessed May 2016.

Appendix 1: Technical summary for Ontario

Species: Common Hoptree, *Ptelea trifoliata*

Demographic information

Demographic attribute	Value
Generation time. Based on average age of breeding adult: age at first breeding = X year; average life span = Y years.	No demographic information is available. COSEWIC assessment reported it as 3-20 years. Three years is certainly an underestimate. Based on the IUCN recommendations, it should be at least 10 years, and likely more.
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	Unknown. Very limited data suggests an increasing population, but based on an unrepresentatively small proportion of the total Ontario population.
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.	Unknown
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations.	Unknown. In the few subpopulations where data is available, numbers appear to be increasing.
Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations.	Unknown. Continued population growth at many sites seems likely, but is suspected to be offset by habitat reduction over the next 10 years.
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over any 10 years, or 3 generations, over a time period including both the past and the future.	Unknown. Increases observed at a small subset of sites.
Are the causes of the decline a. clearly reversible and b. understood and c. ceased?	a. Not applicable b. Not applicable c. Not applicable
Are there extreme fluctuations in number of mature individuals?	No

Extent and occupancy information in Ontario

Extent and occupancy attributes	Value
Estimated extent of occurrence.	12485 km^2
Index of area of occupancy (IAO).	172 km^2
Is the total population severely fragmented? (i.e. is >50% of its total area of occupancy is in habitat patches that are (a) smaller than would be required to support a viable population, and (b) separated from other habitat patches by a distance larger than the species can be expected to disperse?)	a. No b. No
Number of locations (*as defined by COSEWIC*).	Either not applicable, or 12
Number of NHIC Element Occurrences	48 (some uncertainty due to older EO definition for shoreline species used by NHIC)
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	Uncertain
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	Uncertain
Is there an observed, inferred, or projected continuing decline in number of subpopulations?	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?	Yes
Are there extreme fluctuations in number of populations?	No
Are there extreme fluctuations in number of locations?	No
Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

Number of mature individuals in each sub-population or total population (if known)

Sub-population (or total population)	N of mature individuals
Brant County	9
Elgin County	73
Essex County 1	10,413
Essex County 2	1,459
Chatham-Kent County 1	100
Chatham-Kent County 2	6
Lambton County 1	2
Lambton County 2	9

Niagara Regional Municipality 1	202+
Niagara Regional Municipality 2	Unknown
Niagara Regional Municipality 3	Unknown (excluded as planted)
Norfolk County	6
Total	~12,000 (estimate accounts for uncertainties)

Quantitative analysis (population viability analysis conducted

Not available.

Rescue effect

Rescue effect attribute	Likelihood
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Possibly
Would immigrants be adapted to survive in Ontario?	Probably
Is there sufficient suitable habitat for immigrants in Ontario?	No
Is the species of conservation concern in bordering jurisdictions?	Yes - Endangered in New York state
Is rescue from outside populations reliant upon continued intensive recovery efforts?	Unknown

Appendix 2: Adjoining jurisdiction status rank and decline

Information regarding rank and decline for Common Hoptree

Jurisdiction	Subnational rank	Population trend	Sources
Ontario	S3	Uncertain	COSEWIC 2015
Quebec	Introduced	N/A	COSEWIC 2015
Manitoba	Not present	N/A	COSEWIC 2015
Michigan	Unranked	Not tracked	NatureServe 2016
Minnesota	Introduced	N/A	NatureServe 2016
Nunavut	Not present	N/A	COSEWIC 2015
New York	S1S2	Unknown	http://www.acris.nynhp.org/guide.php?id=9334
Ohio	Unranked	Not tracked	NatureServe 2016
Pennsylvania	S2	Unknown	NatureServe 2016
Wisconsin	S2	Unknown	NatureServe 2016

Acronyms:
AOO: area of occupancy
COSEWIC: Committee on the Status of Endangered Wildlife in Canada
COSSARO: Committee on the Status of Species at Risk in Ontario
EOO: extend of occurrence
ESA: Endangered Species Act
GRANK: global conservation status assessments
IAO: index of area of occupancy
MNRF: Ministry of Natural Resources and Forestry
NHIC: Natural Heritage Information Centre
NNR: Unranked
NRANK: National conservation status assessment
SARA: Species at Risk Act
SRANK: subnational conservation status assessment
S1: critically imperiled
S2 : Imperiled
S3: Vulnerable

Table 1. Current abundance data for all known subpopulations of Common Hoptree in Canada. All counts are of mature trees (reproductive or similar size). Sites discovered since the previous status report are italicized. Information based on COSEWIC (2015).

County or Region	Sub-population	Site	No. Mature Individuals (Year)	Status
Brant	A	(1) Hardy Road	9 (2014)	Extant
Elgin	B	(2) Port Burwell Provincial Park	73 (2014)	Extant
Essex	C	(3) Colchester Public Beach	0 (2000)	Unknown
Essex	C	(4) 1 km North of Colchester	7 (2000)	Unknown
Essex	C	(5) Lypps Beach	4 (2000)	Unknown
Essex	C	(6) Fox Creek Conservation Area	1 (2000)	Unknown
Essex	C	(7) Linden Beach	No plants located (2000)	Extirpated
Essex	C	(8) Cedar Beach Conservation Area	No plants located (2014)	Extirpated
Essex	C	(9) 1.5 km West of Comet	7 (2000)	Unknown
Essex	C	(10) Holiday Beach Conservation Area	42 (2014)	Extant
Essex	C	(11) Hillman Marsh Conservation Area	No plants located (2014)[a]	Unknown
Essex	C	(12) Point Pelee National Park mainland	~10,351 (2008)	Extant
Essex	C	(13) Seacliff Beach (West of Leamington ferry dock)	1 (2007)	Presumed Extant
Essex	D	(14) Fish Point Provincial Nature Reserve	134 (2014)	Extant
Essex	D	(15) Stone Road Alvar	112 (2014)	Extant
Essex	D	(16) West Shore Pump Station	115 (2014)	Extant
Essex	D	(17) Red Cedar Savannah	46 (2014)	Extant
Essex	D	(18) Middle Point	42 (2014)	Extant
Essex	D	(19) Lighthouse Point Nature Reserve	460 (2014)	Extant
Essex	D	(20) *Gibwood property*	0 (2014)	Extant
Essex	D	(21) Middle Island,	550 (2012) [b]	Presumed

County or Region	Sub-population	Site	No. Mature Individuals (Year)	Status
		Point Pelee National Park		Extant
Chatham-Kent County	E	(22) Rondeau Provincial Park	69 (2005) [b]	Presumed Extant
Chatham-Kent County	E	(23) Erieau	31 (2006)	Presumed Extant
Chatham-Kent County	F	(24) 3.5 km east of Thamesville	6 (2000)	Unknown
Lambton County	G	(25) Chematogan: River Road, (Walpole Island)	2 (2000)	Unknown
Lambton County	H	(26) Old Ferry Road and Snye Road, (Walpole Island)	8 (2007)	Presumed Extant
Lambton County	H	(27) *Bluewater Line*	1 (2011)[c]	Presumed Extant
Niagara Regional Municipality	I[f]	(28) *Long Beach Conservation Area*	7 (2011)[c]	Presumed Extant
Niagara Regional Municipality	I[f]	(29) *Morgan's Point Conservation Area*	No mature individuals reported (2009)[d]	Presumed Extant
Niagara Regional Municipality	I[f]	(30) *Nickel Beach and Lorraine (Cassaday) Point*	6 (2014)	Extant
Niagara Regional Municipality	I[f]	(31) *Lorraine Bay*	No abundance data (Parks Canada Agency 2012)	Presumed Extant
Niagara Regional Municipality	I[f]	(32) *Cedar Bay Road beach access*	~10 (2014)	Extant
Niagara Regional Municipality	I[f]	(33) *Sherkston Shores*	33 (2014)	Extant
Niagara Regional Municipality	I[f]	(34) Point Abino	31 (2014)	Extant
Niagara Regional Municipality	I[f]	(35) *Crystal Beach*	4 (2014)	Extant
Niagara Regional	I[f]	(36) *Bernard Avenue beach access*	~30 (2010)	Presumed Extant

County or Region	Sub-population	Site	No. Mature Individuals (Year)	Status
Municipality				
Niagara Regional Municipality	I[f]	(37) West of Windmill Point	Large grove (2011)	Presumed Extant
Niagara Regional Municipality	I[f]	(38) Stonemill Road	No plants located (2014)	Extirpated
Niagara Regional Municipality	I[f]	(39) Bertie Bay Road and adjacent beach	41 (2014)	Extant
Niagara Regional Municipality	I[f]	(40) Crescent Beach	10 (2010)	Presumed Extant
Niagara Regional Municipality	I[f]	(41) *Kraft Drain Mouth*	No mature individuals reported (2007)	Presumed Extant
Niagara Regional Municipality	I[f]	(42) Erie Beach/Waverly Beach Park	~30 (2010)	Presumed Extant
Niagara Regional Municipality	J	(43) Niagara Glen	Several shrubs (1989)	Unknown
Niagara Regional Municipality	J	(44) Navy Island	No abundance data (1998)	Unknown
Niagara Regional Municipality	K	(45) 1.5 km North-Northwest of Ridgeville	No plants located (2014)	Extirpated
Niagara Regional Municipality	K	(46) Fonthill, off Forest Hill Boulevard	No plants located (2005)[c]	Unknown
Niagara Regional Municipality	K	(47) Ridgeville Cemetery	No plants located (1982)	Extirpated
Norfolk County	L	(48) Long Point Biosphere Reserve	6 (Cairns pers. comm. 2014)	Extant
		TOTAL[e]	**~12,000**	

[a] For Hillman Marsh Conservation Area, plants may have been overlooked during surveys completed in 2014 as Common Hoptrees were observed in 2007. A thorough survey of the area should be conducted before this site is assumed to be extirpated.
[b] Total counts of mature individuals are approximate for Middle Island and Rondeau Provincial Park.
[c] Abundance data based on observations reported to the Natural Heritage Information Centre (NHIC), but which have only undergone preliminary review.

[d] Morgan's Point Conservation Area was established in 2009 as part of mitigation measures by LCN (NHIC 2014). It is unclear if any of the ~150 individuals planted have matured.
[e] The total number of mature individuals has been rounded to the nearest thousand to account for uncertainty.
[f] Sites 30 through 34 and 35 through 42 occur more or less continuously along the Lake Erie shoreline, however, some of the sites (e.g., Sherkston Shores west and Windmill Point) are currently recognized by NHIC as distinct Element Occurrences. Consequently, they are maintained as separate entities here.