

**Ontario Species at Risk Evaluation Report for
American Water Willow
Carmantine d'Amérique
(*Justicia americana*)**

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

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Assessed by COSSARO as Threatened

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Final

Carmantine d'Amérique (*Justicia americana*)

La carmantine d'Amérique (*Justicia americana*) est classée dans la catégorie des espèces menacées en Ontario par le CDSEPO.

La carmantine d'Amérique (*Justicia americana*) est une fleur sauvage aquatique qui vit dans les eaux au débit lent ou stagnantes. Ses feuilles linéaires ressemblent superficiellement à celles de certaines véritables espèces de saules, ses fleurs sont blanches et mauves et ses tiges peuvent atteindre un mètre de hauteur. Elle peut se propager par ses graines ou par multiplication végétative, par ses rhizomes rampants, mais, en Ontario, on croit qu'elle se limite à la multiplication végétative. Son aire de répartition se situe dans la majeure partie de l'est des États-Unis, puis s'étend jusqu'au Canada, de l'ouest du lac Érié au fleuve Saint-Laurent, puis jusqu'au sud du Québec.

Le bassin des Grands Lacs et du fleuve Saint-Laurent constitue son aire de répartition plus vaste pertinente sur le plan biologique en Ontario. À l'échelle mondiale, la carmantine d'Amérique n'est pas en péril, mais sa conservation est jugée préoccupante dans plusieurs administrations nordiques et elle a été récemment classée dans la catégorie des espèces préoccupantes par le COSEPAC à la suite de son évaluation. En Ontario, sa présence est connue dans un petit nombre de sous-populations, dont certaines sont maintenant considérées comme étant perdues et dont d'autres sont historiques. La dégradation de son habitat est constante, de même que les menaces des espèces envahissantes et le déclin du nombre d'individus matures est général.

La carmantine d'Amérique est considérée comme étant menacée en raison de sa petite zone d'occupation, de son petit nombre de localités et du déclin constant de sa zone d'occurrence et de la zone d'occupation, de la réduction continue de la qualité de son habitat, de son nombre de sous-populations et du nombre d'individus matures.

Le COSEPAC (2021) a évalué cette espèce et l'a classée dans la catégorie des espèces menacées en se fondant sur le critère A, alors que la population canadienne subit d'importantes pertes d'individus matures principalement liées au déclin d'une seule sous-population du Québec, mais sans que ces pertes soient suffisamment importantes si on se fonde uniquement sur les données ontariennes.

Cette publication hautement spécialisée n'est disponible qu'en anglais conformément au Règlement 671/92, selon lequel il n'est pas obligatoire de la traduire en vertu de la Loi sur les services en français. Pour obtenir des renseignements en français, veuillez communiquer avec le ministère l'Environnement, de la Protection de la nature et des Parcs au cossarosecretariat@ontario.ca

Executive summary

American Water-willow (*Justicia americana*) is an aquatic wildflower that occurs in slow-moving or still waters. It has linear leaves that are superficially similar to some true willow species, white and purple flowers and stems can grow up to one meter in height. It can propagate via seed or vegetatively, through creeping rhizomes, but in Ontario it is thought to be limited to vegetative propagation only. It is widely distributed throughout much of the eastern United States, and reaches Canada, where it is distributed from western Lake Erie into the St. Lawrence River, and up into southern Quebec. The broader biologically relevant range for Ontario is considered to be the Great Lakes – St Lawrence Basin. Globally, American Water-willow is secure but is considered a species of conservation concern in several northern jurisdictions, and was recently assessed as Threatened by COSEWIC. In Ontario, American Water-willow is known from a small number of subpopulations, including some that are now considered lost and others that are historical. There is ongoing habitat degradation and threats from invasive species, and a general decline of numbers of mature individuals.

American Water-willow is considered Threatened based on a small area of occupancy, it has a small number of locations, and there is a continuing decline in extent of occurrence, area of occupancy, quality of habitat, decline in number of subpopulation, and a decrease in number of mature individuals. COSEWIC (2021) has assessed this species to be Threatened based on Criterion A, with the Canadian population having significant losses in mature individuals largely from declines in one Quebec subpopulation but are not substantial enough using just Ontario's data.

1. Eligibility for Ontario status assessment

1.1. Eligibility conditions

1.1.1. Taxonomic distinctness

American Water-willow belongs to the genus *Justicia*, which includes a large number of described species, most of which are tropical or subtropical. American Water-willow is recognized as a distinct species and is the only representative of the genus to occur in Ontario.

1.1.2. Designatable units

There is a single designatable unit considered here for Ontario.

1.1.3. Native status

American Water-willow is native in Ontario, with the earliest known provincial record from 1879.

1.1.4. Occurrence

American Water-willow occurs in southern Ontario along Lake Erie, Lake Ontario and St. Lawrence shorelines and one subpopulation in Sharbot Lake.

1.2. Eligibility results

American Water-willow (*Justicia americana*) is eligible for status assessment in Ontario

2. Background information

2.1. Current designations

- GRANK: G5 (NatureServe 2021)
- IUCN: Least Concern (22 January 2015)
- NRANK Canada: N2N3
- COSEWIC: Threatened (April 2021)
- SARA: Threatened (Schedule 1)
- ESA 2007: Threatened (2004)
- SRANK: S2 (ranked in 2015)

2.2. Distribution in Ontario

The majority of extant and extirpated subpopulations in Ontario are along the Lake Erie shoreline with the other subpopulations found along the Welland River, St. Lawrence River and Sharbot Lake. It remains unclear if the Sharbot Lake subpopulation is extant, being treated within COSEWIC (2021) in the subpopulation synthesis as such, but extirpated within the text, and the treatment of this population has large impacts on calculating the provincial EOO and IAO values; as such, this population is considered extant for the provincial risk assessments until further study can clarify the status of this subpopulation. A total of nine subpopulations and two historical but presumed extant subpopulations are present in Ontario. Ontario Ministry of Natural Resources (2013) lists seven sites.

COSEWIC (2021) included 15 locations, with two of them historical but believed extant, but note that the small subpopulations may be short-lived. No threats subdivided any subpopulation as the threats are not specific to any one site, so they considered the range of locations to be from 11 to 15. The Welland River and Lyon's Creek sites are one subpopulation as they are contiguous. Removing the locations from Quebec, the number of locations in Ontario could range from six (excluding the extremely small, potentially short-lived subpopulations) to ten. There are 15 EOs for this species in Ontario, with a number of potential candidates being evaluated.

2.3. Distribution, status and the broader biologically relevant geographic range outside Ontario

American Water-willow is widely recorded from waterways throughout much of the eastern United States, from Vermont to Florida, west to Texas and Wisconsin, and extending up into Ontario and Quebec. The majority of states (15, including Ohio, Wisconsin, Illinois and Indiana) report this species as not ranked (SNR), with five as Secure (S5: Pennsylvania, Virginia, West Virginia, Kentucky and Georgia), three as Apparently Secure (S4: New York, North Carolina, New Jersey), one as Critically Imperiled (S1: Iowa), one as Presumed Extirpated (SX: Vermont) and one as Exotic (Delaware).

As this species is limited to margins of waterways, we consider the Great Lakes – St. Lawrence Basin as being the broader biologically relevant geographic range for the Ontario population, which includes New York, Pennsylvania, Vermont, Ohio, Michigan, Indiana, and Illinois. American Water-willow is spread through seeds and vegetative propagation (creeping rhizomes). Colonization downstream through water currents is possible in both propagation means, which suggests that upstream sites and sites adjacent to active northward currents in the Lake Erie and Lake Ontario (see <https://www.glerl.noaa.gov/res/glcfs/currents/>) could serve as potential reservoirs to Ontario populations. The Lake Erie populations are apparently stable in occurrence, with no evidence of additional populations in recent years, suggesting that propagation from current-carried propagules is either unlikely or not successful, in part due to reduced populations from upcurrent. The populations in Niagara and the Thousand Islands National Park are in substantially closer proximity to New York, where this

species is considered S5, and populations of American Water-willow are known from these New York counties (Weldy et al. 2021) but it remains unclear if propagules from these sites could establish in Canada.

There is limited data on population trends within most jurisdictions; there are documented declines in some jurisdictions, but American Water-willow is considered globally stable. Trends of habitat quality in the Great Lakes (ECCC and USEPA 2019) suggest that while the quality is stable, there remain issues regarding nutrient levels that may be a limiting factor for many species, and that invasive species are creating increased issues and deteriorating the overall quality of the Great Lakes habitats; the status of the habitat quality for coastal plants were considered poor in Lake Erie, and fair in Lake Ontario.

Table 1. Condition of the Species in Adjacent Jurisdictions and Broader Biologically Relevant Geographic Range

Adjacent Jurisdictions	Biologically Relevant to Ontario (n/a, yes, no)	Condition	Notes & Sources
Quebec	Yes	Decline	COSEWIC 2021
Illinois	Yes	Unknown and only portion of state falls within the broader biological range	NatureServe 2021
Indiana	Yes/	Unknown and only portion of state falls within the broader biological range	NatureServe 2021
Manitoba	n/a	n/a	
Michigan	Yes	Unknown	NatureServe 2021
Minnesota	n/a	n/a	
Nunavut	n/a	n/a	
New York	Yes	Unknown and only portion of state falls within the broader biological range	NatureServe 2021
Ohio	Yes	Unknown and only portion of state falls within the broader biological range	NatureServe 2021
Pennsylvania	Yes	Unknown and only portion of	NatureServe 2021

Adjacent Jurisdictions	Biologically Relevant to Ontario (n/a, yes, no)	Condition	Notes & Sources
		state falls within the broader biological range	
Wisconsin	Yes	Unknown	NatureServe 2021
<i>Other Relevant Jurisdiction</i>			

2.4. Ontario conservation responsibility

3. Ontario has less than 5% of the global range of this species.

3.1. Direct threats

Major threats on Ontario subpopulations of American Water-willow are significant changes in water-levels and flow, and competition with invasive species. The invasive European Reed (*Phragmites australis australis*) and Blue Cattail (*Typha x glauca*) are both considered threats as they can form thick dense stands in the shoreline habitats, directly competing with American Water-willow. These invasive species continue to spread throughout the Ontario range of American Water-willow. Other threats include development, grazing and recreational activities that may disturb the substrate or directly cause mortality.

3.2. Specialized life history or habitat use characteristics

American Water-willow is a wetland species that occurs in shallow waterways (up to 1.2 m deep) with slow moving waters and sufficient disturbance to limit competition from other plants. Penfound (1940) indicated that American Water-willow can disperse long distances through fruit capsules, seeds and seedlings, and is occasionally found on drift and logs. COSEWIC (2021) notes that the main method of colonization is stem and stolon fragments being carried in currents, which suggests that colonization of new subpopulations is possible from other nearby jurisdictions, although there is no available evidence to support this. COSEWIC (2021) notes that propagation within Ontario is only by vegetative propagation, via creeping rhizomes and that seeds are largely unsuccessful. As American Water-willow is at the northern limit of its range, this would suggest that the genetic diversity within the provincial population is relatively low.

3.3. Existing Conservation and Recovery Actions

An initiative to improve water quality at the Dufferin Island site was undertaken in 2006 to improve habitat quality for American Water-willow. A recovery plan for American Water-willow was established (OMNR 2013), in which actions for the species included conducting surveys for American Water-willow in historical sites and sites where

suitable habitat is present, education and communication with the public and other agencies to enhance awareness, and support conservation efforts for this species. A five-year review (OMNR 2018) of the actions undertaken as a result included funding via the Species At Risk Stewardship Program (including a large project by Land Care Niagara to further study the Niagara populations and habitat requirements, which also found two new colonies of stems), efforts to minimize effects on American Water-willow, engagement with stakeholders to maintain habitat quality and manage invasive species impact. Action items that remain to be addressed are broader surveys for American Water-willow in historical locations and maintain those habitats if it is found to be present, and assess the possibility of re-establishing populations in historical areas (OMNR 2018).

4. Ontario status assessment

4.1. Application of endangered/threatened status in Ontario

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

Does not apply. COSEWIC (2021) utilized this criterion to support Threatened, based on the large decline in a large subpopulation in Quebec but there is insufficient data currently to give a trend across all known Ontario subpopulations, as three of the sites (Grenadier Island, Hill Island and Pelee Island – South Shore) only have one data point. Several sites have had significant declines over their documented time frame (Point Pelee National Park – Lake Pond site), while others have shown an increase (Welland River/Lyon's Creek site, Dufferin Island). For the sites with multiple data points, there was a general decline of an average 17% based on a generation time of 15 years, outside the threshold for this criterion, but one of the sites (Point Pelee National Park – Lake Pond) recently had only a partial count of the population that would skew declines upwards towards ~35% if considered to be complete. If all evaluations of populations were to taken together, including recently discovered sites as additions to the population, the decline would be less than 7%.

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

Meets **Threatened** under Criterion B2 ab(i, ii, iii, iv and v). American Water-willow reaches the threshold for Endangered of B2, having an IAO less than 500 km² (between 24 – 40 km², based on treatment of historical sites). It meets subcriterion a for Threatened in having six to 10 locations where it is known to be extant and meets subcriteria b (i, ii, iii, iv, and v), having observed and inferred decline in the EOO, AOO, quality of habitat, number of locations and number of mature individuals. With several sites having recently been lost or projected to become lost, EOO, AOO and the number of locations are observed or projected to decline, the quality of habitat is declining due to threats posed by invasive species, and there is a decline in observed number of mature individuals as discussed in Criterion A.

COSEWIC (2021) did not use this criterion as it did not meet two of the subcriteria for the the entirety of the Canadian population

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

Does not apply. Number of mature individuals is close to 200,000.

4.1.4. Criterion D – Very small or restricted total population

Does not apply. Number of locations and number of mature individuals exceeds thresholds.

4.1.5. Criterion E – Quantitative analysis

Does not apply. No quantitative analysis has been done.

4.2. Application of Special Concern in Ontario

Does not apply as it meets criteria above.

4.3. Status category modifiers

4.3.1. Ontario's conservation responsibility

Ontario's population of American Water-willow represented less than 5% of the global range, making its conservation responsibility low.

4.3.2. Status modification based on level of risk in broader biologically relevant geographic range

No modification is made. The BBRGR is considered for American Water-willow in Ontario as the Great Lakes – St Lawrence Basin. The other jurisdictions included within this BBRGR where American Water-willow occurs are Wisconsin, Michigan, Indiana, Illinois, Ohio, Pennsylvania, New York, Quebec, and Vermont. Four of these jurisdictions list it as SNR (Wisconsin, Illinois Indiana and Ohio), one is S5 (Pennsylvania), one is S4 (New York), two are S2 (Michigan and Quebec), and one is SX (Vermont). For the two jurisdictions with S4 or S5, both have sites where American Water-willow occurs within this BBRGR region (Kartesz 2015), but only a small portion of Pennsylvania and about half of New York fall within this region, which makes consideration of the broader state rankings problematic as the majority of occurrences of American Water-willow in these states falls outside the BBRGR. Furthermore there is no data regarding population trends in the BBRGR relevant part of those populations, with the larger number of occurrences of American Water-willow in these states occurring outside this region.

4.3.3. Rescue Effect

Does not apply as there is no indication of rescue effect on Ontario subpopulations. Although it is possible that American Water-willow propagules would be able to be transported long distances, there has been insufficient data to suggest that this is happening and providing any measure of rescue effect.

4.4. Other status categories

4.4.1. Data deficient

Does not apply as there is sufficient information available for assessment.

4.4.2. Extinct or extirpated

Does not apply as there is a viable population in Ontario.

4.4.3. Not at risk

Not applicable as it qualifies under other criteria above.

5. Summary of Ontario status

American Water-willow (*Justicia americana*) is classified as Threatened in Ontario based on meeting criterion B2 ab(i, ii, iii, iv and v). This status is consistent with COSEWIC, but the application of criteria differs due to difference in the provincial population with the national population (which includes Quebec subpopulations). No change is made in status from its previous assessment in 2004.

This status of this species is consistent with the definition of Threatened under the Endangered Species Act, 2007.

6. Information sources

Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2021. COSEWIC assessment and status report on the American Water-willow *Justicia americana* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 36 pp.

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Ontario Ministry of Natural Resources. 2018. 2018 five-year review of progress towards the protection and recovery of Ontario's species at risk. [website, accessed 17 November 2021].

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Weldy, Troy, David Werier, and Andrew Nelson. 2021. New York Flora Atlas. [S. M. Landry and K. N. Campbell (original application development), USF Water Institute. University of South Florida]. New York Flora Association, Albany, New York. [website accessed 20 September 2021].

Appendix 1: Technical summary for Ontario

Species: American Water-willow (*Justicia americana*)

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.	10 – 15 years
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	Probably. Some populations are growing, while one population appears to be in decline.
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.	Ranges from 7% to 35% depending on data values used, but unclear due to variation in sampling efforts
Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations.	Unknown; data not sufficient to calculate decrease of individuals, but spread of invasive species likely to impact quality of habitat and cause decline
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.	Ranges from 7% to 35% depending on data values used, but unclear due to variation in sampling efforts
Are the causes of the decline (a) clearly reversible, and (b) understood, and (c) ceased?	a. Unknown b. Unknown c. Unknown
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 (EOO). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i>	~35 000 km ² , estimated from available data using geocat.kew.org

Extent and occupancy attributes	Value
Index of area of occupancy (IAO). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i>	_40_ km ² , estimated from available data, including historical sites using geocat.kew.org
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. <i>See Definitions and Abbreviations on COSEWIC and IUCN websites for more information on the term "location". Use plausible range to reflect uncertainty if appropriate.</i>	6 – 10 locations
Number of NHIC Element Occurrences <i>Request data from MNRF.</i>	15 with additional EO candidates under evaluation
Is there an observed, inferred, or projected continuing decline in extent of occurrence?	Several subpopulations are growing, while one subpopulation is thought to be in decline
Is there an observed, inferred, or projected continuing decline in index of area of occupancy?	Yes, several sites have disappeared in the past 45 years and are now considered either historical or extirpated
Is there an observed, inferred, or projected continuing decline in number of sub-populations or EOs?	Yes, based on loss of several subpopulations over the last three generations.
Is there an observed, inferred, or projected continuing decline in number of locations?	Yes, based on loss of several subpopulations over the last three generations.
Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat?	Yes, due to encroachment of invasive plants and development
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)	Number of mature individuals
Point Pelee National Park	11,420 (2014, partial count)
Welland River/Lyon's Creek	108,691(2018)
Dufferin Island	19,520 (2018)
Pelee Island - South shore	150 (2007)
Hill Island	59,007 (2008)
Grenadier Island	3,600 (2008)
Marina of Leamington	18 (2018)
Sharbot Lake	0 (2018 not observed; previous survey: number of stems unknown)

Quantitative analysis (population viability analysis conducted)

Probability of extinction in the wild is unknown.

Threats

The following threats, listed from highest to lowest, were assigned and calculated by COSEWIC (2021): Invasive alien species (Very High – High impact), Dams and water management/ use (Medium – Low), Climate change (Medium – Low impact), Recreational activities (Low impact) and Housing & Urban areas (Low impact). The greatest perceived threat by COSEWIC was extreme water-level fluctuations during certain times of the life cycle that are sensitive to these changes. These fluctuations are considered to be caused largely by human activity and climate change. High water levels can also cause significant erosion. The threat from competition with several invasive semi-aquatic plants was ranked higher due to future consideration.

Rescue effect

Rescue effect attribute	Value
Does the broader biologically relevant geographic range for this species extend beyond Ontario?	Yes
Status of outside population(s) most likely to provide immigrants to Ontario	S2 (Michigan), SNR (Ohio) and S4 (New York)
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Possible
Would immigrants be adapted to survive in Ontario?	Probably
Is there sufficient suitable habitat for immigrants in Ontario?	Probably
Are conditions deteriorating in Ontario?	Probably
Is the species of conservation concern in bordering jurisdictions?	Yes. S2 (Michigan) and SX (Vermont)

Rescue effect attribute	Value
Does the broader biologically relevant geographic range for this species extend beyond Ontario?	Yes
Is the Ontario population considered to be a sink?	No
Is rescue from outside populations likely?	Unlikely

Sensitive species

American Water-willow is not considered a data sensitive species.

Acronyms

COSEWIC: Committee on the Status of Endangered Wildlife in Canada
COSSARO: Committee on the Status of Species at Risk in Ontario
ESA: Endangered Species Act
EO: Element occurrence (as defined by NHIC)
EOO: extent of occurrence
GRANK: global conservation status assessments
IAO: index of area of occupancy
IUCN: International Union for Conservation of Nature and Natural Resources
MNRF: Ministry of Natural Resources and Forestry
NHIC: Natural Heritage Information Centre
NNR: Unranked
NRANK: National conservation status assessment
SARA: Species at Risk Act
SNR: unranked
SRANK: subnational conservation status assessment
S1: Critically Imperiled
S2: Imperiled
S3: Vulnerable
S4: Apparently Secure
S5: Secure
IUCN: International Union for Conservation of Nature and Natural Resources
CDSEPO: Le Comité de détermination du statut des espèces en péril en Ontario