

Ontario Species at Risk Evaluation Report

for

Warmouth (*Lepomis gulosus*)

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

Assessed by COSSARO as ENDANGERED

January, 2016

Final

Crapet sac-à-lait (*Lepomis gulosus*)

Le crapet sac-à-lait (*Lepomis gulosus*) est un crapet de petite taille, l'une des six espèces du genre *Lepomis* en Ontario. Le crapet sac-à-lait n'a pas été évalué sur le plan génétique, mais il se distingue morphologiquement des espèces apparentées et il est vraisemblablement un poisson indigène de l'Ontario. Le crapet sac-à-lait est dispersé à grande échelle dans l'est de l'Amérique du Nord, mais au Canada, il existerait uniquement dans le bassin de drainage du lac Érié. Le crapet sac-à-lait est une espèce d'eau chaude que l'on trouve dans des habitats végétalisés, généralement dans des baies peu profondes et des terres humides ou dans des ruisseaux à débit lent. Même si on connaît peu de choses sur le crapet sac-à-lait au Canada, des études réalisées aux États-Unis ont révélé qu'il parvient à maturité vers l'âge de deux ou de trois ans et que son âge maximum est de huit ans. Le crapet sac-à-lait du Canada se trouve dans trois emplacements (le parc national de la Pointe-Pelée, la baie de la pointe Long et la baie Rondeau) et, bien que la taille des populations ne soit pas connue, les registres de captures donnent à entendre que les populations sont probablement stables en Ontario. Les trois emplacements sont séparés par une distance de plus de 50 kilomètres et, comme un nombre important d'habitats sont inadéquats, une dispersion entre les emplacements est peu probable. Les menaces présumées sont notamment la perte d'habitat adéquat en raison de l'enlèvement de la végétation (y compris les plantes envahissantes), de la pollution et peut-être du changement climatique. Aucune menace précise n'est connue pour cette espèce. Le crapet sac-à-lait est en sécurité à l'échelle mondiale, mais au Canada, il est considéré comme une espèce gravement en péril à l'échelle nationale (cote N1). Le crapet sac-à-lait est actuellement inscrit comme une espèce préoccupante en vertu de la *Loi sur les espèces en péril* et de la *Loi de 2007 sur les espèces en voie de disparition*, mais il a été réévalué récemment comme une espèce en voie de disparition par le COSEPAC (mai 2015).

Le crapet sac-à-lait a été évalué comme une espèce en voie de disparition par le CDSEPO en s'appuyant sur sa répartition limitée (seulement trois emplacements isolés) et sur la diminution continue de la qualité de ses habitats en raison des espèces envahissantes, de l'enlèvement de la végétation aquatique et de la pollution. Il répond au critère B1ab(iii) + 2ab(iii).

Cette publication hautement spécialisée « Ontario Species at Risk evaluation report prepared under the Endangered Species Act, 2007 by the Committee on the Status of Species at Risk in Ontario », 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 des Richesses naturelles par courriel à recovery.planning@ontario.ca.

Executive summary

The Warmouth (*Lepomis gulosus*) is a small sunfish, one of six species in the genus *Lepomis* in Ontario. Warmouth have not been genetically assessed, but they are morphologically distinct from related species and are likely native to Ontario. Warmouth are widely distributed across eastern North America, but in Canada are only known to exist in the Lake Erie drainage. The Warmouth is a warm water species and is found in vegetated habitat, generally in shallow bays and wetlands or slow moving streams. While little is known of the Warmouth in Canada, studies in the U.S. have shown they mature at 2-3 years of age and have a maximum age of 8 years. Canadian Warmouth are found in 3 locations (Point Pelee National Park, Long Point Bay and Rondeau Bay), and while population size is not known, capture records indicate the Ontario populations are likely stable. The three locations are separated by more than 50 km with substantial unsuitable habitat, making dispersal among the locations unlikely. Inferred threats include loss of suitable habitat due to vegetation removal (including invasive plants), pollution and possibly climate change. Specific threats are not known for this species. Warmouth are globally secure, but in Canada critically imperiled nationally (N1). Warmouth are currently listed as Special Concern under both the Species at Risk Act and the Endangered Species Act; however, they have been recently re-assessed as Endangered by COSEWIC (May 2015).

Warmouth has been assessed as Endangered by COSSARO based on its limited distribution (only three isolated locations) and continuing habitat quality decline due to invasive species, aquatic vegetation removal and pollution. It meets criterion B1ab(iii) + 2ab(iii).

1. Background information

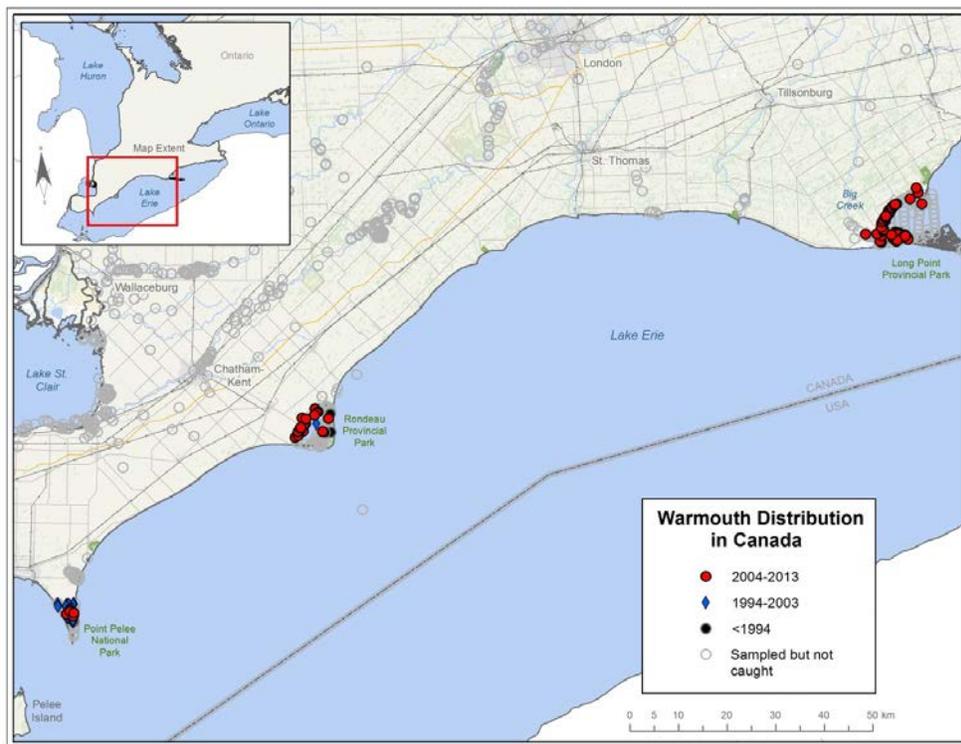
1.1. Current designations

- GRANK: G5 (NatureServe2015)
- NRANK Canada: N1
- COSEWIC: Endangered (May 2015)
- SARA: Special Concern (Schedule 1)
- ESA 2007: Special Concern (2008)
- SRANK: S1

1.2. Distribution in Ontario

Warmouth are found in three locations in Ontario, all within the Lake Erie drainage (Point Pelee National Park, Long Point Bay and Rondeau Bay; see Figure 1). The three locations are isolated due to unsuitable habitat and are likely to be affected by threats independently, hence, they constitute three locations. Warmouth were first reported in Ontario in Rondeau Provincial Park in 1966 (Crossman & Simpson 1984), and have been repeatedly reported in the three locations since then. Juvenile Warmouth have been captured at all three sites, indicating breeding populations. Although there is a report of Warmouth in a tributary of Lake St. Clair, it is not creditable - it is likely that Warmouth do not occur outside of the Lake Erie drainage.

Figure 1. Distribution of Warmouth (*Lepomis quulosus*) in Ontario (COSEWIC 2015).



1.3. Distribution and status outside Ontario

Warmouth are widely distributed and common across much of southeastern and central North America (Florida to Texas and New York to Minnesota; see Figure 2), and they have been introduced into drainages throughout the western US from New Mexico to Washington. Warmouth are found in Michigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin. Globally, Warmouth populations are thought to be stable or slightly declining.

Figure 2. Global distribution of Warmouth (COSEWIC 2015).



1.4. Ontario conservation responsibility

Ontario Warmouth constitute less than 2% of the global range (based on area estimates from global distribution maps).

1.5. Direct threats

Ontario Warmouth threats include loss of suitable habitat due to vegetation removal/alteration (including invasive plants), pollution (eutrophication) and possibly climate change. Specific threats are unknown for this species.

Warmouth adults and juveniles rely on vegetated shallow water habitat (Holm et al. 2010), and removal of vegetation for human recreational purposes has historically been common within their Canadian range. Additionally, the proliferation of non-native aquatic plants (specifically Eurasian Milfoil and European Common Reed) can alter Warmouth habitat (impact not known) and efforts to control these species by mechanical or chemical removal is expected to have negative impacts on Warmouth adults and juveniles in all three locations.

Pollution, specifically eutrophication due to agricultural runoff and urban/domestic sewage, can result in low oxygen or anoxic conditions due to algal bloom die-off. Such nutrient loading has been identified as a threat for the Long Point Bay, Point Pelee National Park and Rondeau Bay aquatic ecosystems (COSEWIC 2015). These locations correspond to the Ontario Warmouth areas of occurrence, but pollution is likely less of a threat at the Point Pelee location. Agricultural practices can also contribute to elevated turbidity and Warmouth is ranked as moderately susceptible to turbidity (Trebitz et al. 2007).

Finally, while it is unclear whether water temperature changes associated with climate change would have a beneficial or detrimental effect on Warmouth in Ontario (COSEWIC 2015), a study that ranked 98 species of freshwater fishes for their susceptibility to climate change effects ranked Warmouth as the second most susceptible species due to their observed temperature preferences (Doka et al. 2006). It is thus expected that climate change will have a growing negative impact on Warmouth in Ontario.

1.6. Specialized life history or habitat use characteristics

None

2. Eligibility for Ontario status assessment

2.1. Eligibility conditions

2.1.1. Taxonomic distinctness

Yes. Warmouth is a recognized species within the genus *Lepomis* and is morphologically distinct from all congeners.

2.1.2. Designatable units

No. While the populations at the three Ontario locations are likely independent, no genetic evidence exists to justify assigning more than one DU as they reside in a single National Freshwater Biogeographic Zone.

2.1.3. Native status

Yes. Warmouth were first reported in Ontario in 1966, which is just under 50 years of known residence. While there is some dispute as to specifically when Warmouth colonized Ontario, recent introduction is unlikely based on their disjunct distribution and presence in all three of the large coastal marshes in Lake Erie.

2.1.4. Occurrence

Yes. Warmouth have been collected in Ontario as recently as 2013 (Rondeau Bay and Long Point).

2.2. Eligibility results

Warmouth (*Lepomis gulosus*) is eligible for status assessment in Ontario.

3. Ontario status assessment

3.1. Application of endangered/threatened status in Ontario

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

Does not apply. While numbers of mature individuals in the three locations is not known, capture data indicate likely stable population sizes.

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

Endangered B1 ab(iii) + B2 ab(iii): Ontario Warmouth meet the Endangered species criteria as their estimated extent of occurrence is below 5,000 km² (2409 km²) AND their index of occupancy is below 500 km² (100 km²). In addition, they exist at fewer than 5 locations (3 locations) AND, there is inferred continued decline in habitat (quality) based on ongoing agricultural runoff (all three locations) and urban wastewater discharge and runoff (primarily Rondeau and Long Point) and as well as habitat loss and disturbance due to invasive plants and plant removal (all three locations).

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

Insufficient Information. Past and current numbers of mature individuals in the three locations are not known.

3.1.4. Criterion D – Very small or restricted total population

Insufficient information. Past and current numbers of mature individuals in the three locations are not known.

3.1.5. Criterion E – Quantitative analysis

Does not apply. No analysis has been done.

3.2. Application of Special Concern in Ontario

Does not apply.

3.3. Status category modifiers

3.3.1. Ontario's conservation responsibility

Does not apply.

3.3.2. Rescue effect

Does not apply. While adjacent jurisdictions do have Warmouth, their dispersal to suitable habitat in Ontario is highly unlikely due to intervening unsuitable habitat. Human mediated movement is possible, but not warranted.

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

Warmouth (*Lepomis gulosus*) is classified as Endangered in Ontario.

It meets assessment criterion B1 ab(iii) + 2 ab(iii).

5. Information sources

COSEWIC. 2015. [COSEWIC assessment and status report on the Warmouth *Lepomis gulosus* in Canada](#). Committee on the Status of Endangered Wildlife in Canada. Ottawa. x + 47 pp.

Doka, S., C. Bakelaar, and L.D. Bouvier. 2006. Chapter 6. Coastal wetland fish community assessment of climate change in the lower Great Lakes. *In* Great Lakes Coastal Wetland Communities: Vulnerability to Climate Change and Response to Adaptation Strategies. Edited by J. I. L. Mortsch, A. Hebb, and S. Doka. Environment Canada and Fisheries and Oceans Canada, Toronto, ON. p. 101-128.

Holm, E., N.E. Mandrak, and M. Burrige. 2010. The ROM field guide to freshwater fishes of Ontario. Second Printing. Royal Ontario Museum, Toronto, ON. 462 p.

NatureServe. 2015. [NatureServe Explorer: An online encyclopedia of life](#) [web

application]. Version 7.1. NatureServe, Arlington, Virginia. [website accessed 21 November 2015].

Trebitz, A.S., Brazner, J.C., Brady, V.J., Axler, R., D.K.Tanner. 2007. Turbidity tolerances of Great Lakes coastal wetland fishes. *N. Am. J. Fish Management* 27: 619-633.

Appendix 1: Technical summary for Ontario

Species: Warmouth (*Lepomis gulosus*)

Demographic information

| Demographic attribute | Value |
|---|--|
| Generation time. | 2-3 years |
| Is there an observed, inferred, or projected continuing decline in number of mature individuals? | Unknown |
| 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 |
| Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations. | Unknown |
| Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over any 10 years, or 3 generations, over a time period including both the past and the future. | Unknown |
| 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. (Request value from MNRF or use http://geocat.kew.org/) | 2409 km ² |
| Index of area of occupancy (IAO). (Request value from MNRF or use http://geocat.kew.org/) | 100 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. Yes |

| | |
|--|------------------------|
| Number of locations (<i>as defined by COSEWIC</i>). | 3 |
| Number of NHIC Element Occurrences (<i>Request data from MNR</i>) | n/a |
| Is there an observed, inferred, or projected continuing decline in extent of occurrence? | No |
| Is there an observed, inferred, or projected continuing decline in index of area of occupancy? | No |
| Is there an observed, inferred, or projected continuing decline in number of populations? | No |
| Is there an observed, inferred, or projected continuing decline in number of locations? | No |
| Is there an observed, inferred, or projected continuing decline in [area, extent and/or quality] of habitat? | Yes, (habitat quality) |
| 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 | N of mature individuals |
|--|--------------------------------|
| Point Pelee National Park Unknown | Unknown |
| Rondeau Bay Unknown | Unknown |
| Long Point Bay/Turkey Point Marshes/Big Creek | Unknown |

Quantitative analysis (population viability analysis conducted)

Unknown.

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? | Yes |
| Is there sufficient suitable habitat for immigrants in Ontario? | Unknown |

| | |
|---|----------|
| Is the species of conservation concern in bordering jurisdictions? | Yes |
| Is rescue from outside populations reliant upon continued intensive recovery efforts? | Probably |

Appendix 2: Jurisdiction status rank and decline

Information regarding rank and decline of Warmouth

| Jurisdiction | Subnational rank | Population trend | Sources |
|---------------------|-------------------------|----------------------------|------------------|
| Ontario | S1 | Unknown | COSEWIC 2015 |
| Quebec | Not Present | n/a | n/a |
| Manitoba | Not Present | n/a | n/a |
| Michigan | S5 | Stable or slowly declining | NatureServe 2015 |
| Minnesota | SNA | n/a | NatureServe 2015 |
| Nunavut | Not Present | n/a | n/a |
| New York | SNA | n/a | NatureServe 2015 |
| Ohio | S4 | Stable or slowly declining | NatureServe 2015 |
| Pennsylvania | S3 | Stable or slowly declining | NatureServe 2015 |
| Wisconsin | S4 | Stable or slowly declining | NatureServe 2015 |

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

GRANK: global conservation status assessments

IAO: index of area of occupancy

MNRF: Ministry of Natural Resources and Forestry

NHIC: Natural Heritage Information Centre

NRANK: National conservation status assessment

SARA: Species at Risk Act

SNA: not applicable

SRANK: subnational conservation status assessment

S1: Critically imperiled

S3: Vulnerable

S4: Apparently secure

S5: Secure

COSEPAC: Le Comité sur la situation des espèces en péril au Canada