

COSSARO Candidate Species at Risk Evaluation
for
Pugnose Shiner (*Notropis anogenus*)

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

Assessed by COSSARO as THREATENED

June 2013

Final

Méné camus (*Notropis anogenus*)

Le méné camus est un poisson indigène du centre de l'Amérique du Nord qui vit dans les bassins hydrographiques du haut de la rivière Mississippi et des Grands Lacs ainsi que dans le bassin versant de la rivière Red au Minnesota et au Dakota du Nord. Le méné camus est un petit poisson qui préfère les eaux claires à débit lent ou stagnantes avec un substrat de sable et de limon et de la végétation aquatique. Au Canada, le méné camus ne se trouve qu'en Ontario en tant qu'une seule unité désignable dans une aire de répartition très fragmentée, dont les bassins versants des lacs Huron, Ste-Claire, Érié et Ontario et le fleuve St-Laurent. Au niveau mondial, le méné camus a connu un déclin; cependant, il n'existe pas de données correspondant à un déclin des populations ontariennes. Parmi les menaces directes préoccupantes, il y a la modification de l'habitat et la charge sédimentaire. Le méné camus est désigné comme étant une espèce **menacée**. Le passage de la désignation en voie de disparition à menacée a été motivé par un accroissement du nombre de nouveaux lieux de capture à la suite d'un échantillonnage ciblé depuis sa dernière évaluation en 2002, jumelé à des preuves de populations saines dans le fleuve St-Laurent.

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.

PART 1

CURRENT STATUS AND DISTRIBUTION

Current Designations:

GRANK – G3 (NatureServe, accessed 26/06/2013)

NRANK Canada – N2 (NatureServe, accessed 26/06/2013)

COSEWIC – Threatened (COSEWIC, 2013)

SARA – Endangered (Schedule 1) (Environment Canada, 2005)

ESA 2007 – Endangered (Ministry of Natural Resources, 2002)

SRANK – S2 (NatureServe, accessed 26/06/2013)

Distribution in Ontario:

The Pugnose Shiner occurs in Canada only in Ontario in a highly fragmented range including Lakes Huron, St. Clair, Erie and Ontario drainages, as well as the St. Lawrence River (COSEWIC 2013). They are currently known to occur at 16 locations, and extirpated from 3 (Point Pelee, Rondeau Bay and Gananoque River) for a total of 19 locations in Ontario, and of the 16 extant locations, 11 were discovered since 2002 (COSEWIC 2013).

Distribution and Status Outside Ontario:

The Pugnose Shiner is native to central North America, in the upper Mississippi River and Great Lakes watersheds plus the Red River drainage in Minnesota and North Dakota. The Pugnose Shiner is listed as vulnerable both globally (G3) and in the US (N3), and has experienced a reduction in area of occupancy across much of its global range (Page and Burr 2011; COSEWIC 2013; NatureServe accessed May 26 2013).

PART 2

ELIGIBILITY FOR ONTARIO STATUS ASSESSMENT

2.1 APPLICATION OF ELIGIBILITY CRITERIA

Taxonomic Distinctness

Yes The Pugnose Shiner is a phylogenetically well-established species (Schonhuth and Doadrio 2003) and is one of 15 species of *Notropis* in Canada. The Pugnose Shiner is most closely related to the Blackchin Shiner (*N. heterodon*) in Canada (COSEWIC 2013).

Designatable Units

One: A genetic analysis indicated 2 major genetic groups among all Pugnose Shiners, with all the Ontario populations clustered in a single clade within the Great Lakes – Upper St. Lawrence Freshwater Biogeographical Zone (COSEWIC 2013). Despite their fragmented and widespread distribution in Ontario, they form a single DU.

Native Status

Yes The first reports of the Pugnose Shiner in Ontario date back to the 1930's and 1940's (COSEWIC 2013).

Presence/Absence

Present: The Pugnose Shiner has been widely captured in Ontario as recently as 2010 - 2012 (COSEWIC 2013; D. Heath, Pers. Comm.)

2.2 ELIGIBILITY RESULTS

1. The putative taxon or DU is valid. **Yes**
2. The taxon or DU is native to Ontario. **Yes**
3. The taxon or DU is present in Ontario, extirpated from Ontario or extinct? **Present**

PART 3

ONTARIO STATUS BASED ON COSSARO EVALUATION CRITERIA

3.1 APPLICATION OF PRIMARY CRITERIA (Rarity and Declines)

1. Global Rank

Threatened, Based on G3 Global rank (NatureServe 2013)

2. Global Decline

Endangered It is extirpated in Ohio and may be extirpated in North Dakota (NatureServe 2013) and is declining in Michigan (Latta 2005). The long term trend for the global distribution is an unquantified 30%-70% decline, and the short term (10 years or 3 generations) trend is stable to 30% decline (NatureServe 2013).

3. Northeastern North America Ranks

Endangered The Pugnose Shiner is ranked as extremely rare [SX, SH, S1 or S2] in 6 out of the 8 (75%) northeastern North American jurisdictions where it occurs (Appendix 1).

4. Northeastern North America Decline

Not applicable The global and Northeastern North America ranges for the Pugnose Shiner are very similar (occurrences in Iowa and North Dakota are at the periphery of the range). Therefore the Global Decline criterion was used instead of the Northeastern North America Decline.

5. Ontario Occurrences

Threatened There are 11 Element Occurrences in Ontario for the Pugnose Shiner (NHIC); however, that number was based on data from 2009. Extensive sampling by DFO in 2010 and other sampling increased the number of known Pugnose Shiner locations from 2002 to present to about 16 extant occurrences in Ontario with 3 additional apparently extirpated occurrences (COSEWIC 2013).

6. Ontario Decline

Insufficient information The number of known Ontario Pugnose Shiner locations has risen since 2002, and the Index of area of occupancy increased from 88 km² to 306 km² (COSEWIC 2013). However this was almost certainly due to increased sampling effort and efficiency (COSEWIC 2013) – population numbers and census numbers are not known.

7. Ontario's Conservation Responsibility

Threatened The Ontario Pugnose Shiners likely constitutes less than 10% of the global range (COSEWIC 2013; Dextrase 2002); however as measured by convex polygon (estimated from figures in COSEWIC 2013) the proportion would likely be above 10%.

Although no global data exist on numbers of fish, estimates indicate that the St. Lawrence River Pugnose Shiner populations likely constitute the most robust group currently existing throughout their entire range (N. Mandrak, DFO, Pers. Comm.).

3.2 APPLICATION OF SECONDARY CRITERIA (Threats and Vulnerability)

8. Population Sustainability

Insufficient information There is no evidence for reproductive failure or recruitment failure in Ontario as the fish are short-lived (3 years); however, no PVA has been performed (COSEWIC 2013). The distribution of Pugnose Shiner in Ontario is “severely fragmented” (COSEWIC 2013), and a minimum area for population viability analysis for Pugnose Shiner (Venturelli *et al.* 2010) indicates that at least 8 of the currently known locations are likely to fall below the minimum required for population viability (COSEWIC 2013).

9. Lack of Regulatory Protection for Exploited Wild Populations

Not in any category The Pugnose Shiner is listed as Endangered under Ontario’s *Endangered Species Act, 2007*, as well as Canada’s *Species at Risk Act* (Schedule 1). The Canadian *Fisheries Act* may provide protection for Pugnose Shiner’s habitat through their co-existence with sport fish species. There is no commercial harvest of this fish in Ontario, and they are not legal baitfish in Ontario.

10. Direct Threats

Threatened The Pugnose Shiner is highly vulnerable to elevated turbidity and reduced water quality in their preferred habitat of low flow streams and lakes. Specific direct threats judged to be of high threat status include; habitat modifications (6/11 (55%) of assessed sites), nutrient loading (7/11 (64%) of assessed sites) and sediment loading (7/11 (64%) of assessed sites) (COSEWIC 2013). Additional direct threats include; loss of aquatic vegetation, exotic species, baitfish capture, and changes in food web (predators) (COSEWIC 2013; Bouvier *et al.* 2010).

11. Specialized Life History or Habitat-use Characteristics

Not in any category The Pugnose Shiner uses slow-moving and standing clear water (low turbidity) in lakes, rivers and stagnant channels with sand and silt substrate. The Pugnose Shiner is usually associated with aquatic vegetation. The Pugnose Shiner’s habitat is not limiting in Ontario, although habitat at capture locations may be limiting population growth and persistence (COSEWIC 2013).

3.3 COSSARO EVALUATION RESULTS

1. Criteria satisfied in each status category

Number of primary and secondary criteria met in each status category:

ENDANGERED – [2/0]

THREATENED – [3/1]
SPECIAL CONCERN – [0/0]

Number of Ontario-specific criteria met in each status category:

ENDANGERED – [0]
THREATENED – [2]
SPECIAL CONCERN – [0]

2. Data Deficiency

No The number of criteria assessed as “insufficient information” is one. There is some evidence for limited population viability based on quantitative analyses of minimum area required for population viability; however, there are no data on actual population size or reproduction failure (or success). Given the highly fragmented nature of the Pugnose Shiner’s distribution in Ontario, individual location populations may be at elevated risk.

3. Status Based on COSSARO Evaluation Criteria

The application of COSSARO evaluation criteria suggests that **Pugnose Shiner** is **Threatened** in Ontario.

PART 4

ONTARIO STATUS BASED ON COSEWIC EVALUATION CRITERIA

4.1 APPLICATION OF COSEWIC CRITERIA

Regional (Ontario) COSEWIC Criteria Assessment

Criterion A – Decline in Total Number of Mature Individuals

Not in any category There is no evidence for any decline in the number of mature individuals in Ontario (COSEWIC 2013).

Criterion B – Small Distribution Range and Decline or Fluctuation

Threatened The Index of Area of Occupancy is $< 500 \text{ km}^2$ (308 km^2) and the population is severely fragmented, but there is no evidence of a continuing decline or extreme fluctuations (COSEWIC 2013). Although Pugnose Shiner does not meet Criterion B, Ontario locations are isolated and half are estimated to have suitable habitat below the threshold for population viability (COSEWIC 2013). A designation of Threatened is assigned because of a small area of occupancy, declining habitat quality, and concerns that many subpopulations may not be viable.

Criterion C – Small and Declining Number of Mature Individuals

Not in any category The number of mature individuals is not known, but is not believed to be small nor declining in Ontario (COSEWIC 2013).

Criterion D – Very Small or Restricted Total Population

Not in any category The Pugnose Shiner has a patchy but widespread distribution in Ontario; it occurs in 14 locations and numbers in some locations were judged “high” due to high catch rates (N/ Mandrak DFO, pers. comm.; COSEWIC 2013).

Criterion E – Quantitative Analysis

Insufficient information No PVA has been performed.

Rescue Effect

No. Although immigration from New York in the St. Lawrence region of the Pugnose Shiner’s range is possible, it is highly unlikely given the small size and poor swimming capabilities of these fish coupled with their critically imperiled (S1) status in New York. (COSEWIC 2013).

Special Concern Status

No.

4.2 COSEWIC EVALUATION RESULTS

1. Criteria satisfied in each status category

Indicate whether or not a criterion is satisfied in each of the status categories.

ENDANGERED – [no]

THREATENED – [yes]

SPECIAL CONCERN – [no]

2. Data Deficiency

No Although one criterion was judged as having insufficient information.

3. Status Based on COSEWIC Evaluation Criteria

The application of COSEWIC evaluation criteria suggests that **Pugnose Shiner** is **Threatened** in Ontario.

PART 5

ONTARIO STATUS DETERMINATION

5.1 APPLICATION OF COSSARO AND COSEWIC CRITERIA

COSSARO and COSEWIC criteria give the same result. Yes

5.2 SUMMARY OF STATUS EVALUATION

Pugnose Shiner is classified as **Threatened** in Ontario.

The Pugnose Shiner, *Notropis anogenus*, is native to central North America in the upper Mississippi River and Great Lakes watersheds plus the Red River drainage in Minnesota and North Dakota. The Pugnose Shiner is a small fish that prefers slow-moving and standing clear water with sand and silt substrate with aquatic vegetation. The Pugnose Shiner occurs in Canada only in Ontario as a single DU in a highly fragmented range including Lakes Huron, St. Clair, Erie and Ontario drainages, and the St. Lawrence River. Globally, the Pugnose Shiner has been declining; however, there are no data pertaining to declines for Ontario populations. Direct threats of particular concern include habitat modifications and nutrient and sediment loading. Pugnose Shiner is classified as **Threatened**. The down listing from Endangered to Threatened was driven by an increase in the number of new locations of capture resulting from additional targeted sampling since it was last assessed in 2002 coupled with evidence for healthy populations in the St. Lawrence River.

Information Sources

1. Literature Cited

Bouvier, L.D., A.L. Boyko and N.E. Mandrak. 2010. Information in support of a recovery potential assessment of Pugnose Shiner (*Notropis anogenus*) in Canada. DFO Canadian Science Advisory Secretariat Science Research Document 2010/009. vi + 23 pp.

COSEWIC. 2013. COSEWIC Status Report on Pugnose Shiner *Notropis anogenus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa.

Dextrase, A.J. 2002. COSSARO Candidate V, T, E Species Evaluation Form for Pugnose Shiner (*Notropis anogenus*). Ontario Ministry of Natural Resources, Peterborough. 7 pp.

Latta, W.C. 2005. Status of Michigan's Endangered, Threatened, Special-876 Concern, and other fishes, 1993–2001. Michigan Department of Natural Resources, Fisheries Research Report 2079, Ann Arbor, Michigan. 42 pp.

NatureServe 2013. NatureServe Explorer: An online encyclopedia of life. Web site: http://www.natureserve.org/explorer/servlet/NatureServe?post_processes=PostReset&loadTemplate=nameSearchSpecies.wmt&Type=Reset [Accessed May 2013].

Page, L.M., and B.M. Burr. 2011. Peterson field guide to freshwater fishes of North America north of Mexico. Houghton Mifflin Harcourt Publishing Company, New York, New York. xix + 663 pp.

Schonhuth, S. and I. Doadrio. 2003. Phylogenetic relationships of Mexican minnows of the genus *Notropis* (Actinopterygii, Cyprinidae). Biological Journal of the Linnean Society 80: 323–337.

Venturelli, P.A., L.A. Vélez-Espino and M.A. Koops. 2010. Recovery potential modelling of Pugnose Shiner (*Notropis anogenus*) in Canada. DFO Canadian Science Advisory Secretariat Science Research Document 2010/007. iv + 22 pp.

2. Community and Aboriginal Traditional Knowledge Sources

NONE

3. Acknowledgements

Dr. N. Mandrak (DFO) provided valuable input for this report.

APPENDIX 1

NORTHEASTERN NORTH AMERICA STATUS RANK AND DECLINE

	Subnational Rank	Sources	Decline
CT	Not Present	NatureServe 2013	No data
DE	Not Present	NatureServe 2013	No data
IL	S1	NatureServe 2013	No data
IN	S1	NatureServe 2013	No data
IA	Not Present	NatureServe 2013	No data
LB	Not Present	NatureServe 2013	No data
KY	Not Present	NatureServe 2013	No data
MA	Not Present	NatureServe 2013	No data
MB	Not Present	NatureServe 2013	No data
MD	Not Present	NatureServe 2013	No data
ME	Not Present	NatureServe 2013	No data
MI	S3	NatureServe 2013	No data
MN	S3	NatureServe 2013	No data
NB	Not Present	NatureServe 2013	No data
NF	Not Present	NatureServe 2013	No data
NH	Not Present	NatureServe 2013	No data
NJ	Not Present	NatureServe 2013	No data
NS	Not Present	NatureServe 2013	No data
NY	S1	NatureServe 2013	No data
OH	SX	NatureServe 2013	No data
ON	S2	NatureServe 2013	No data
PA	Not Present	NatureServe 2013	No data
PE	Not Present	NatureServe 2013	No data
QC	Not Present	NatureServe 2013	No data
RI	Not Present	NatureServe 2013	No data
VA	Not Present	NatureServe 2013	No data
VT	Not Present	NatureServe 2013	No data
WI	S2	NatureServe 2013	No data
WV	Not Present	NatureServe 2013	No data

Occurs as a native species in 8 of 29 northeastern jurisdictions
 Srank or equivalent information available for 8 of 8 jurisdictions = 100%
 S1, S2, SH, or SX in 6 of 8 = 75%