

COSSARO Candidate Species at Risk Evaluation
for
Pugnose Minnow (*Opsopoeodus emiliae*)

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

Assessed by COSSARO as Threatened

May 2012

Final

Le **Petit-bec** (*Opsopoeodus emiliae*) est un petit poisson (64 mm maximum) de la famille des cyprinidés (méné émeraude, chevaine, vandoise, méné). Les activités de parade et d'accouplement comprennent des déplacements en figure de huit, l'abaissement et le relèvement de la nageoire dorsale et le dépôt des œufs sous une pierre plate. Avec sa petite bouche tournée vers le haut, il se nourrit d'algues et de petits organismes (insectes, crustacés, larves et œufs de poissons) à la surface ou dans la colonne d'eau. Il habite les eaux peu profondes et lentes le long des terres humides et le long des rives des lacs et des rivières. L'espèce est commune dans le monde, avec un centre d'abondance dans le bassin versant du Mississippi aux États-Unis. L'espèce n'est pas menacée dans la plus grande partie de son aire de répartition, mais en raison d'une abondance réduite dans le nord, elle est considérée menacée ou rare dans 54 p. 100 de ses territoires du nord-est de l'Amérique du Nord. Les données indiquent que l'espèce a toujours été rare en Ontario, à la limite nord de son aire de répartition, où elle n'est connue que dans neuf sites dans l'extrême sud-ouest de la province. Les principales menaces pour l'espèce sont la charge de nutriments et de sédiments, la détérioration de la qualité de l'eau et la perte d'habitat résultant du dragage et de la modification des rives. L'espèce est protégée en vertu de la *Loi sur les pêches* fédérale et son utilisation comme poisson-appât est illégale en Ontario. En raison de sa rareté en Ontario et dans les territoires adjacents, le Petit-bec est classé **menacé** en Ontario.

Cette publication hautement spécialisée, COSSARO Evaluation for Pugnose Minnow n'est disponible qu'en anglais en vertu du Règlement 671/92 qui en exempte l'application de la Loi sur les services en français. Pour obtenir de l'aide en français, veuillez contacter le secrétariat de COSSARO par courrier électronique à l'adresse COSSAROsecretariat@ontario.ca.

PART 1: Current status and distribution

Current designations:

GRANK – G5 (Assessed 25/09/1996) (NatureServe, accessed 14/05/2012)

NRANK Canada – N2 (Assessed 09/09/2011) (NatureServe, accessed 14/05/2012)

COSEWIC – Threatened (COSEWIC, 2012)

SARA – Special Concern (Schedule 1) (Environment Canada, 2012)

ESA 2007 – Special Concern (Ministry of Natural Resources, 2012)

SRANK – S2 (NHIC, accessed 5/06/2012)

Distribution in Ontario:

The Pugnose Minnow is limited to extreme southwestern Ontario where it is found in Lake St. Clair and its smaller tributaries, the Detroit River, and the Sydenham River. It is believed to be extirpated from the Thames River system (COSEWIC 2012). Scott and Crossman (1973) suggest the species has always been rare in Ontario.

Distribution and status outside Ontario:

The Pugnose Minnow is common and widespread through most of the Mississippi River watershed from southeastern Wisconsin south. It also is found on the coastal plain from South Carolina to Florida and west to Texas.

PART 2: Eligibility for Ontario status assessment

2.1 Application of eligibility criteria

Taxonomic distinctness

Yes. The Pugnose Minnow (*Opsopoeodus emiliae*) is recognized as a distinct species, with no subspecies noted in Ontario. It is the only species in its genus.

Designatable Units

No. There is no known differentiation within the species that would merit consideration of more than one designatable unit in Ontario. It is restricted to a small geographic area in southwestern Ontario.

Native status

Yes. Records for this species date back to 1935 in Ontario (Edwards and Staton 2009).

Presence/absence

Present. The species is known to occur at 9 sites in southwestern Ontario. COSEWIC (2012) indicates that recent surveys confirming its presence were conducted at various times at the 9 sites (2004, 2005, 2010, 2011).

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 G5. Not in any category.

The Pugnose Minnow is globally secure and is considered to be common, widespread, and abundant through much of its range. It occurs only in North America.

2. Global decline – Not in any category.

The NatureServe database (accessed June 2012) suggests the Pugnose Minnow occurs, or occurred, in more than 350 watersheds in the USA, which accounts for more than 95% of its global range. The species is recorded as extant (still present) in the majority of these watersheds. For some states, NatureServe data are detailed enough to enable the change in the number of occupied counties to be estimated. These data suggest the species has been extirpated in 10 of the 74 counties (13.5%) in the USA for which there are natural heritage records. This does not meet the minimum threshold for threatened status under this criterion (non-cyclical decline in at least 30% of the global range).

3. Northeastern North America ranks – Threatened.

Ranks are provided by jurisdiction for the Pugnose Minnow in Appendix 1. Ranking is available for all the jurisdictions in the NE where the species occurs. It is ranked as S2 in Ontario, and S1, S2, SH, or SX in 5 of the 10 other jurisdictions in northeastern North America where it occurs (total = 6/11 or 54.5%).

4. Northeastern North America decline – Not in any category.

The northeastern North American range of the species is not the same as its global range, which includes several states in the southern US as far west as Texas, where it is common (COSEWIC 2012). To assess decline, we used NatureServe reports (accessed May 14, 2012) on the counties in each state in which the species is still found, and those in which it has been extirpated. The results (Appendix 1) suggest the species has been extirpated from 1 entire state (West Virginia) and in 6/62 or 10% of the counties in the remaining 6 northeastern states for which information is available (Appendix 1). As the overall change in range for the northeast (including West Virginia) is probably less than 30% in total, the species does not qualify as at risk under this criterion.

5. Ontario occurrences – Threatened

There are currently only 9 locations in Ontario where the species is known (COSEWIC 2012; Table 1). As this is more than 5 but less than 20 locations, the Pugnose Minnow qualifies as threatened under this criterion.

Table 1. Summary of data from COSEWIC (2012) and Edwards and Staton (2009) on the Pugnose Minnow in Ontario.

COSEWIC (2012) data on occurrences of the Pugnose Minnow in Ontario

	1970-1999	1970-1999	1970-1999	2000-2010	2000-2010	2000-2010	Notes**
Drainage	No. of Sites sampled*	No. of Sites Occupied	No. of Fish	No. of Sites sampled* 2000-2011	No. of Sites Occupied	No. of Fish	
N Sydenham River	6	4	8	17	1	1	Recent occupancy confirmed. Possible large decline
Sydenham River E Branch	4	4	22	129	7	25	Recent occupancy confirmed. Similar number of fish with much more sampling.
East Otter Cr.	unkno wn	unkno wn	unkno wn	2	1	1	Recent occupancy confirmed. Trend unknown.
Maxwell Cr	unkno wn	2	3	7	2	3	Recent occupancy confirmed. Possibly no change.
Little Bear Cr	unkno wn	2	2	8	4	18	Recent occupancy confirmed. Possible increase.
Whitebread Drain	unkno wn	unkno wn	unkno wn	3	1	18	Recent occupancy confirmed. Captured for the first time here in 2003. Trend unknown.
McDougall Drain	unkno wn	1	2	2	0	0	Appears to be extirpated.
Chenal Ecarte	not availab le	1	1	5	2	4	Recent occupancy confirmed. Trend unknown.
Lake St. Clair	unkno wn (at least 87)	1	4	at least 20	1	1	Historically sparse in Lake St. Clair. Only 4 fish caught 1935-1979.
Thames R	1+	1	7	120	0	0	Appears to be extirpated.
Detroit R	unkno wn	4	63	90	1	1	Recent occupancy confirmed. Possible large decline
Total	Mostly unkno wn	20	112	403+	19	71	

*Unknown how many different sites were sampled in the two sampling periods. There may be double counting.

**Without knowing the number of sites sampled historically, it is not possible to determine population trend.

6. Ontario decline – Insufficient information

Table 1 summarizes data from COSEWIC (2012) and Edwards and Staton (2009) on the occurrence of Pugnose Minnows in 2 periods (up to 1999, and 2000-2010) in the drainages where the species was recorded.

As suggested by Edwards and Staton (2009), and confirmed in Table 1, the available data are not detailed enough to determine population trends in most cases. Some recent sampling (since 2000) has been well documented (COSEWIC 2012), but information on the number of sites sampled is missing for most drainages where the species occurred historically, and there is no information on historical sampling intensity that would facilitate unbiased estimates of change based on catch per unit of effort. Differences in the type of sampling gear used could also explain some of the differences in number of fish caught between periods. For example, COSEWIC (2012) described trends in the Detroit River as 5 Pugnose Minnows captured in 1940-41, 138 in 1994-96, and only 1 in 2004, but they cautioned that the results were likely strongly influenced by the type of sampling gear used.

Owing to the gaps in information and variation attributable to sampling intensity and type of gear, it is impossible to comment on precise trends in population for Ontario. With this in mind, Edwards and Staton (2009, p. 11) concluded that "overall Pugnose Minnow populations in Canada are believed to be stable". However, the recent COSEWIC status report (2012) which included data from targeted sampling surveys for Pugnose Minnow in 2010 suggest there might have been declines in some drainages. If the available data (Table 1) are taken at face value, they indicate that 20 sites were occupied some time during 1970-1999, and 19 in 2000-2010 (no major change). In terms of trends at each site, in the second period there were 2 new occupied sites discovered, and the number of fish present was stable or increasing at 4 other sites. The species is believed to be extirpated at 2 sites and has declined at 3 others. This suggests neutral or positive trends at 6 sites and declining trends at 5 sites. Two new locations were found in the 2000 to 2010 surveys (East Otter Creek and Whitebread Drain; Table 1). However, since one of the historical sites (Thames River near London, Ontario) where the species may be extirpated was ~80 km from the others, the estimated decline in extent of occurrence is 87% (from 9303 km² to 1254 km²; COSEWIC 2012). This single location in Thames River exaggerates the true decline since all other sites (both current and historical) are clustered closer together. Because of the loss of the historical site near London, COSEWIC (2012) also considered the area of occupancy to have declined by 70% (from 275 km² to 84 km²).

7. Ontario's conservation responsibility – Not in any category

Ontario accounts for less than 5% of the species global range (COSEWIC 2012). Therefore, the species does not qualify as at risk under this criterion.

3.2 Application of secondary criteria (threats and vulnerability)

8. Population sustainability – Insufficient information

As noted above, there is too little information available to determine overall population trend and population size, or to determine the sustainability of the Ontario population. Although sampling has never revealed large numbers of the Pugnose Minnow in Ontario (Table 1), the species has persisted at most sites since first recorded. Recruitment failure has occurred in the 2 drainages where the Pugnose Minnow has been extirpated, but relatively large numbers have been found recently (2010) in 2 drainages (22 fish at Sydenham River east branch, and 15 at Little Bear Creek).

9. Lack of regulatory protection for exploited wild populations – Not in any category

The Pugnose Minnow is not a legal baitfish in Ontario, according to MNR's Fishing Regulations¹. The species and its habitat are protected under the federal *Fisheries Act*.

10. Direct threats – Special Concern

There is no known directed poaching or taking of the Pugnose Minnow, which is sparsely distributed in Ontario. However, COSEWIC states that incidental harvesting associated with the legal harvest of other baitfish species likely occurs.

There is uncertainty about the requirements and the ecological tolerances of the Pugnose Minnow. The species has been caught in Ontario and elsewhere in clear and in turbid waters, and where there is abundant or minimal aquatic vegetation. In the United States where the species is most common, it inhabits:

- lowlands in clear to turbid, sluggish, often weedy waters of lakes, reservoirs, sloughs, swamps, and streams of all sizes²;
- sluggish water habitats including low-gradient streams, natural lakes, bayous, sloughs, ditches, borrow pits, oxbows, harbors, bays and human-made canals that are clear or tannin-stained with dense aquatic vegetation and bottoms of fine mud, sand, or organic debris³;
- clear, glacial lakes and streams with an abundance of submerged vegetation, and low velocity habitats over sand, mud, or gravel substrates, commonly with pondweed (*Potamogeton* spp.), water milfoil (*Myriophyllum* spp.), elodea (*Elodea* spp.), eelgrass (*Verbasicum blattaria*), coontail (*Ceratophyllum* spp.), bulrush (*Scirpus* spp.), muskgrass (*Chara* spp.), and filamentous algae⁴; and

¹ MNR [Fishing Regulations](#)

² [NatureServe](#)

³ [Iowa Fish Atlas](#)

⁴ [Minnesota Department of Natural Resources](#)

- glacial lakes in and around Ohio and in the marshes and bays of Lake Erie⁵

COSEWIC (2012) noted that one of the sites inhabited by the Pugnose Minnow in Ontario is a man-made channel running between the St. Clair River and Lake St. Clair.

COSEWIC (2012) identifies several assumed threats to the Pugnose Minnow, such as nutrient loading in waters inhabited by the species, sediment loading, exotic species, altered coastal processes (dredging and shoreline alteration), climate change, and pumps that could act as potential barriers to movement. As noted above, direct effects of these potential threats on the Pugnose Minnow are not well understood. However, because the quality of waterways in southern Ontario in general remains a concern, the Pugnose Minnow is considered to merit special concern status under this criterion.

11. Specialized life history or habitat-use characteristics – Not in any category.

The Pugnose Minnow occupies a wide variety of habitat types throughout its range, and is not known to have specialized habitat requirements.

COSEWIC (2012) provided a detailed account of the courtship and spawning behaviour of the Pugnose Minnow. This minnow attaches its cluster of eggs to the underside of a flat surface such as a rock. It is unlikely that the supply of spawning sites could be limiting the species.

The species does not appear to be restricted to provincially rare habitats, and does not appear to have particularly narrow biological tolerances. Its courtship displays and spawning sites are unusual, but not likely to qualify the species for at risk status under this criterion.

3.3 COSSARO evaluation results

1. Criteria satisfied in each status category

Endangered – [0/0]
Threatened – [2/0]
Special concern – [0/1]

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

Endangered – [0]
Threatened – [1]
Special concern – [0]

⁵ [Ohio Department of Natural Resources](#)

2. Data deficiency

No. The number of criteria assessed as "insufficient information" is 2. There was sufficient information to assess the species under 9 COSSARO criteria. It was assessed as at risk under 3 of the criteria and not at risk under 5.

3. Status based on COSSARO evaluation criteria

The application of COSSARO evaluation criteria suggests that the Pugnose Minnow is Threatened in Ontario because of its very small range in the province and the number of locations where the species occurs, as well as the proportion of jurisdictions in northeastern North America where it is ranked as extirpated, S1 or S2. It seems to occur in small numbers where it is present 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 – Insufficient information

Table 1 suggests the available data are not detailed enough to determine trends in populations of the Pugnose Minnow in most cases. Owing to the gaps in information and variation attributable to sampling intensity and type of gear (see detailed discussion above), it is impossible to comment on precise trends in population for Ontario. The trend of the provincial population remains unclear. Edwards and Staton (2009, p. 11) concluded that "overall Pugnose Minnow populations in Canada [Ontario] are believed to be stable". However, COSEWIC (2012) suggests that recent survey work in 2010 imply there might have been declines in some drainages.

Criterion B – Small distribution range and decline or fluctuation - Threatened

The extent of occurrence of the Pugnose Minnow in Ontario is estimated to be 1,254 km². Currently, there are 9 known sites of occurrence in the province. COSEWIC (2012) reported that there is a continued decline in the extent of occurrence and area of occupancy. Because the extent of occurrence is much less than 5,000 km², there are ≤10 sites, and a continued decline is hypothesized, the species qualifies as threatened under this criterion.

Criterion C – Small and declining number of mature individuals - insufficient information

The number of mature individuals in Ontario is unknown (COSEWIC 2012).

Criterion D – Very small or restricted total population – insufficient information

The number of mature individuals in Ontario is unknown (COSEWIC 2012).

Criterion E – Quantitative analysis - insufficient information

No quantitative analysis that predicts the probability of extinction in the wild is available.

Rescue effect – No

COSEWIC (2012) notes that rescue is possible because of the presence of a nearby population in Michigan, but suggests it is unlikely because populations in the adjacent US states are fragmented and declining. The Pugnose Minnow is ranked as S1 in Michigan, where it is known from only 3 counties (Table 1).

Special Concern status – No

The species has been ranked under some of the criteria above. Therefore it does not qualify for special concern status.

4.2 COSEWIC evaluation results

1. Criteria satisfied in each status category

Endangered – [No]

Threatened – [Yes]

Special concern – [No]

2. Data deficiency – No

Since COSEWIC requires only one criterion to be met for endangered or threatened status, and the species has been ranked under one of the criteria, there are sufficient data on which to base an assessment.

3. Status based on COSEWIC evaluation criteria

The application of COSEWIC evaluation criteria suggests that the Pugnose Minnow 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

The Pugnose Minnow (*Opsopoeodus emiliae*) is a small (64 mm maximum) fish in the family Cyprinidae (shiners, chubs, dace, minnows). Courtship and mating involves swimming in figure-eight patterns, raising and lowering the dorsal fin, and depositing the eggs under a flat rock. With its small, upturned mouth, it feeds on algae and small organisms (insects, crustaceans, larval fish and fish eggs) on the surface or in the water column. Habitat is shallow, slow-moving water near wetlands and other near-shore areas in lakes and rivers. The species is globally common, with a centre of abundance in the Mississippi drainage in the USA. It is not at risk in most of its range, but, owing to reduced abundance in the north, it is considered to be at risk or rare in 54% of the jurisdictions in northeastern North America. Data suggest it has always been rare in Ontario, at the northern edge of its range, where it is known from only 9 sites in the extreme southwest. The main threats to the species include nutrient and sediment loading, deterioration of water quality, and habitat loss due to dredging and shoreline alterations. The species is protected under the federal *Fisheries Act* and is not a legal baitfish in Ontario. Owing to its rarity in Ontario and adjacent jurisdictions, the Pugnose Minnow is classified as Threatened in Ontario.

Information sources

1. Literature cited

COSEWIC. 2012. COSEWIC status report on Pugnose Minnow *Opsopoeodus emiliae* in Canada. Two-month Interim Report, March 2012.

Edwards, A.L. and S.K. Staton. 2009. Management plan for the Blackstripe Topminnow, Pugnose Minnow, Spotted Sucker and Warmouth in Canada. *Species at Risk Act* Management Plan Series. Fisheries and Oceans Canada, Ottawa.

Scott, W. and E. Crossman. 1973. Freshwater fishes of Canada. Fisheries Research Board of Canada, Ottawa. Bulletin 184.

2. Community and Aboriginal traditional knowledge sources

No community knowledge or traditional Aboriginal knowledge was available.

3. Acknowledgements

COSSARO is grateful to all who provided information used in the development of this report.

Appendix 1: Northeastern North America status rank and decline

Northeastern North America status rank and decline	Subnational Rank*	Sources – NatureServe (June 2012) in all cases	Decline (expressed as % of counties in which the species is known or thought to be extirpated)	Sources – NatureServe (May 2012 in all cases but Ontario)
CT	---			
DE	---			
IL	S2/S3		Extirpated from 1 of 5 counties = 20%	
IN	S3		No information	
IA	S3		Extirpated from 1 of 7 counties = 14%	
LB	---			
KY	S4/S5		No information	
MA	---			
MB	---			
MD	---			
ME	---			
MI	S1		Present in 3 counties; extirpated in none = 0%	
MN	S4		Present in 7 counties; extirpated in none = 0%	
NB	---			
NF	---			
NH	---			
NJ	---			
NS	---			
NY	---			
OH	S1		Extirpated in 1 of 6 counties = 17%	
ON	S2		No change in the overall number of drainages = 0%, but thought to be	COSEWIC (2012)

* Note: --- means the species does not occur in the jurisdiction

Northeastern North America status rank and decline	Subnational Rank*	Sources – NatureServe (June 2012) in all cases	Decline (expressed as % of counties in which the species is known or thought to be extirpated)	Sources – NatureServe (May 2012 in all cases but Ontario)
			extirpated from the Thames River	
PA	S1		No information	
PE	---			
QC	---			
RI	---			
VA	---			
VT	---			
WI	S3		Extirpated in 3 of 34 counties = 9%	
WV	SX		Extirpated in the state = 100%	

Occurs (occurred) as a native species in 11 of 29 northeastern jurisdictions

Subnational rank or equivalent information is available for 11 of 11 jurisdictions = (100%)

S1, S2, SH, or SX in 6 of 11 = (54%)