

**COSSARO Candidate Species at Risk Evaluation**  
**for**  
**Northern Madtom (*Noturus stigmosus*)**

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

Assessed by COSSARO as ENDANGERED

May 2012

**Final**

Le **Chat-fou du Nord** (*Noturus stigmosus*) est un membre de petite taille de la famille des barbués de rivière qui se nourrit principalement la nuit. De couleur tachetée, elle porte quatre paires de barbillons sur la tête et des épines pectorales et dorsales munies de glandes à venin. L'espèce semble en déclin dans la plus grande partie de son aire de répartition mondiale. Aux États-Unis, on a observé le Chat-fou du Nord dans la rivière Ohio, dans la partie ouest du lac Érié et dans le lac St. Clair. Au Canada, l'espèce a été observée uniquement dans les rivières Detroit, St. Clair et Thames, ainsi que dans le lac St. Clair. Elle est probablement disparue de la rivière Sydenham, où elle a été observée pour la dernière fois en 1975. Malgré sa rareté et son aire de répartition limitée, l'espèce occupe un grand éventail d'habitats, depuis les petits ruisseaux jusqu'aux rives des Grands Lacs. La longévité maximum de l'espèce est de trois ans. Les plus grandes menaces pour le Chat-fou du Nord sont l'envasement de son habitat, la turbidité et la charge en nutriments excessives, les espèces exotiques, les composés toxiques et la perte ou la dégradation de l'habitat. La plupart de ces menaces sont associées aux usages agricoles et urbains des terres qui dominent l'aire de répartition de l'espèce. Le Chat-fou du Nord est classé **en voie de disparition** en Ontario et en péril ou gravement en péril dans la plus grande partie de son aire de répartition aux États-Unis.

*Cette publication hautement spécialisée, COSSARO Evaluation for Northern Madtom 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](mailto:COSSAROsecretariat@ontario.ca).*

## **PART 1 - Current status and distribution**

### **Current designations:**

GRANK – G3 (NatureServe, 2012)

NRANK Canada – N1N2 (NatureServe, 2012)

COSEWIC – Endangered (COSEWIC, 2012b), assessed 2002

SARA – Endangered (Schedule 1) (Environment Canada, 2012)

ESA 2007 – Endangered (Ministry of Natural Resources, 2012)

SRANK – S1 (NHIC, 2012)

### **Distribution in Ontario:**

Restricted to southwestern Ontario (Lake St. Clair, St. Clair River, Detroit River, and Thames River in Lambton, Essex, Middlesex and Elgin Counties) which is near the northern limit of the species' range (COSEWIC, 2012a).

### **Distribution and status outside Ontario:**

Northern Madtom is endemic to eastern North America and is ranked by NatureServe (2012) as G3 (vulnerable). In Canada, it occurs only in southwestern Ontario. In the US, it occurs sporadically from Illinois, Michigan, and Pennsylvania, south to Kentucky and West Virginia (COSEWIC, 2012a).

## **PART 2 - Eligibility for Ontario status assessment**

### **2.1 Application of eligibility criteria**

#### **Taxonomic distinctness**

Yes. Northern Madtom is considered a valid species in almost all recent taxonomic works. This species is closely related to the Frecklebelly Madtom (*Noturus munitus*) which occurs only in the United States (COSEWIC, 2012a).

#### **Designatable units**

No subspecies or varieties have been described for Northern Madtom. The species is known in Ontario only from a small part of the southwest with no significant range disjunctions. Only a single designatable unit is recognized based on its restricted range in southwestern Ontario. No genetic information is available on the Ontario populations.

#### **Native status**

Yes. Considered to be a native fish in southwestern Ontario since it was first reported in the province in Lake St. Clair in 1963 (COSEWIC, 2012a).

#### **Presence/absence**

Present. Four Ontario populations considered extant were confirmed between 2007 and 2010 (COSEWIC, 2012a).

### **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. G3 (NatureServe, 2012)

#### **2. Global decline**

Not in any category. No evidence of a major global decline and some evidence of increases on the US side of the Detroit River (NatureServe, 2012; COSEWIC, 2012a).

#### **3. Northeastern North America ranks**

Endangered. The species is ranked in 8 of the 8 jurisdictions where it occurs (100%). Northern Madtom is highly ranked (S1, S2, SH, or SX) in 7 of 8 jurisdictions (88%) (NatureServe, 2012).

#### **4. Northeastern North America decline**

The northeastern North American range of the species is largely the same as its global range (COSEWIC, 2012a) and therefore no classification provided.

#### **5. Ontario occurrences**

Endangered. There are four extant locations (confirmed between 2007 and 2010) and a fifth that is rated as extirpated (COSEWIC, 2012a). Capture rates at most sites are low (COSEWIC, 2012a).

At the location that is regarded as extirpated (the Sydenham River), Northern Madtom was recorded only once in 1975. An earlier fish specimen (taken in 1929) from the Sydenham River may be a Northern Madtom but its identity is uncertain (COSEWIC, 2012a). Extensive surveys were conducted at many sites along the river between 1997 and 2010 but no Northern Madtom were found (COSEWIC, 2012a). This location may not have had a self-sustaining population but the single collection may have been from an accidental introduction—possibly by a fisherman (Edwards et al., 2012).

The Lake St. Clair population (where Northern Madtom was first discovered in Canada) is known from observations of only one to a few individuals in 1963, 1996, 1999, and 2007 (COSEWIC, 2012a). None was found during surveys at eight sites in 2010.

Sampling in the Detroit River between 1994 and 2010 found Northern Madtom at several sites where up to 69 individuals were captured (COSEWIC, 2012a).

Northern Madtom were collected in small numbers at several sites along the St. Clair River in 2003 and 2010, which is a new location since the 2002 COSEWIC Status Report (COSEWIC, 2002).

At several sites along the Thames River, Northern Madtom has been collected in very small numbers between 1991 and 2010 (COSEWIC, 2012a).

## **6. Ontario decline**

Insufficient information. Sampling effort and methodology have been too variable and inconsistent to allow Northern Madtom population trends to be identified (COSEWIC, 2012a). One new location (St. Clair River) and additional subpopulations at two of the known locations (Detroit River and Thames River) have been found since the 2002 COSEWIC Status Report (COSEWIC, 2002). This apparent expansion is likely due to increased and targeted sampling effort (COSEWIC, 2012a). Recent targeted surveys at some of the known sites in the lower Thames River and in Lake St. Clair have failed to find any Northern Madtom (COSEWIC, 2012a).

## **7. Ontario's conservation responsibility**

Not in any category. Ontario makes up <10% of the species global range (COSEWIC, 2012a).

### **3.2 Application of secondary criteria (threats and vulnerability)**

## **8. Population sustainability**

Insufficient information. No population viability analyses have been conducted for the species (COSEWIC, 2012a).

## **9. Lack of regulatory protection for exploited wild populations**

Not in any category. Fish habitat is protected under the *Fisheries Act*, which gives the Northern Madtom some protection. Other protective legislation in Ontario includes the *Endangered Species Act, 2007* and the *Species at Risk Act* (MNR, 2012). The species is not known to be exploited in the province.

## **10. Direct threats**

Threatened. The primary threats identified for Northern Madtom include siltation, water turbidity, excessive nutrient loading, exotic species, toxic compounds, and habitat loss/degradation (COSEWIC, 2012a). For each of the four extant populations, most of these factors are considered widespread, continuous, and of medium or high concern (COSEWIC, 2012a). Remedial steps have been undertaken in the Detroit River to improve water quality and increase the amount of fish habitat (COSEWIC, 2012a). These include shoreline rehabilitation, the installation of artificial spawning reefs, and the removal of contaminated sediments. Steps have also been taken in the St. Clair River to reduce the inflow of untreated sewage (COSEWIC, 2012a).

## **11. Specialized life history or habitat-use characteristics**

Not in any category. Northern Madtom may have narrow but undescribed habitat tolerances considering its limited range and extent in Ontario (COSEWIC, 2012a);

Dextrase, 1997). Its short lifespan and reduced fecundity may place some populations at long-term risk (Edwards et al., 2012).

### **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 – 1/1

Special Concern – 0/0

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

Endangered – 1

Threatened – 1

Special Concern – 0

#### **2. Data deficiency**

No. Two criteria are assessed as "insufficient information", however, there is enough information in the other categories to assess status.

#### **3. Status based on COSSARO evaluation criteria**

The application of COSSARO evaluation criteria suggests that Northern Madtom is Endangered 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. Number of mature individuals in Ontario is unknown (COSEWIC, 2012a).

##### **Criterion B – Small distribution range and decline or fluctuation**

Endangered. Meets B1ab(iii) and B2ab(iii) Extent of Occurrence is <5,000 km<sup>2</sup> (3330 km<sup>2</sup>) and Area of Occupancy is <500 km<sup>2</sup> (180 km<sup>2</sup> based on 2 km x 2 km grid and 107 km<sup>2</sup> based on 1 km x 1 km grid). The Northern Madtom is known from <5 sites and there is an inferred decline in habitat quality (COSEWIC, 2012a).

##### **Criterion C – Small and declining number of mature individuals**

Insufficient information. Number of mature individuals and population trend is unknown (COSEWIC, 2012a).

##### **Criterion D – Very small or restricted total population**

Threatened. Meets D2. There are five or fewer locations (COSEWIC, 2012a).

##### **Criterion E – Quantitative analysis**

Insufficient information. No population viability analyses have been conducted for the species in Ontario.

##### **Rescue effect**

Yes. Possible but unlikely. Imperiled or Critically Imperiled in three of the four closest states (Michigan: S1, Ohio: S1, and Pennsylvania: S2) and does not occur in New York (NatureServe, 2012). Mark-recapture studies in the Detroit River in 2009-2011 showed that adult Northern Madtom had crossed the river from the US to the Canadian side (Manny et al., 2012).



## **4.2 COSEWIC evaluation results**

### **1. Criteria satisfied in each status category**

Endangered – Yes

Threatened – Yes

Special Concern – No

### **2. Data deficiency**

No. Data regarding population size and trends (on which many of the COSEWIC criteria are based) are lacking, however, there is enough information on range and habitat quality to allow a status determination.

### **3. Status based on COSEWIC evaluation criteria**

The application of COSEWIC evaluation criteria suggests that Northern Madtom is Endangered 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**

Northern Madtom is classified as Endangered in Ontario.

The Northern Madtom (*Noturus stigmosus*) is a small member of the catfish family that forages mostly at night. It has a mottled colour pattern, four pairs of barbels on the head, and venomous spines in dorsal and pectoral fins. This fish appears to be declining in much of its global range. In the United States, the Northern Madtom is found in the Ohio River, western Lake Erie, and the Lake St. Clair basins. In Canada, it is known only from the Detroit River, St. Clair River, Lake St. Clair, and the Thames River. It is likely extirpated from the Sydenham River where it was last recorded in 1975. Despite its rarity and limited range, the species occupies a wide range of habitats from small creeks to the shores of the Great Lake. The maximum age for the species is three years. Potential threats to Northern Madtom include siltation of its habitat, excessive turbidity and nutrient loading, exotic species, toxic compounds, and habitat loss or degradation. Most of these threats relate to agricultural and urban land uses that dominate the species range. The Northern Madtom is considered endangered in Ontario and imperiled or critically imperiled in most of its US range.

## Information sources

### 1. Literature cited

COSEWIC. 2002. COSEWIC Assessment and Update Status Report on the northern madtom, *Noturus stigmosus*, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 15 pp.

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<https://www.ontario.ca/page/natural-heritage-information-centre>

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### 2. Community and Aboriginal traditional knowledge sources

No community knowledge or traditional Aboriginal knowledge was available.

### 3. Acknowledgements

Scott Gibson from the OMNR COSSARO Secretariat located important information.

## Appendix 1: Northeastern North America status rank and decline

	Subnational Rank	Sources	Decline	Sources
<b>CT</b>	Not present	NatureServe 2012		
<b>DE</b>	Not present	NatureServe 2012		
<b>IL</b>	S1	NatureServe 2012		
<b>IN</b>	S	NatureServe 2012		
<b>IA</b>	Not present	NatureServe 2012		
<b>LB</b>	Not present	NatureServe 2012		
<b>KY</b>	S2S3	NatureServe 2012		
<b>MA</b>	Not present	NatureServe 2012		
<b>MB</b>	Not present	NatureServe 2012		
<b>MD</b>	Not present	NatureServe 2012		
<b>ME</b>	Not present	NatureServe 2012		
<b>MI</b>	S1	NatureServe 2012		
<b>MN</b>	Not present	NatureServe 2012		
<b>NB</b>	Not present	NatureServe 2012		
<b>NF</b>	Not present	NatureServe 2012		
<b>NH</b>	Not present	NatureServe 2012		
<b>NJ</b>	Not present	NatureServe 2012		
<b>NS</b>	Not present	NatureServe 2012		
<b>NY</b>	Not present	NatureServe 2012		
<b>OH</b>	S1	NatureServe 2012		
<b>ON</b>	S1	NatureServe 2012		
<b>PA</b>	S2	NatureServe 2012		
<b>PE</b>	Not present	NatureServe 2012		
<b>QC</b>	Not present	NatureServe 2012		
<b>RI</b>	Not present	NatureServe 2012		
<b>VA</b>	Not present	NatureServe 2012		
<b>VT</b>	Not present	NatureServe 2012		
<b>WI</b>	Not present	NatureServe 2012		
<b>WV</b>	S1	NatureServe 2012		

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 7 of 8 = 88%