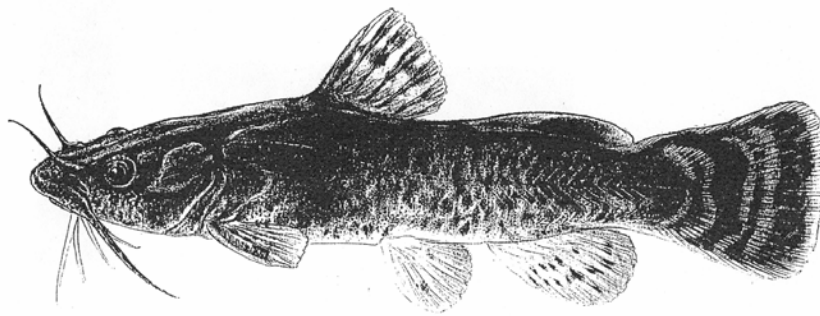


COSEWIC
Assessment and Update Status Report

on the

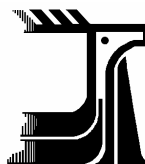
Northern Madtom
Noturus stigmosus

in Canada



ENDANGERED
2002

COSEWIC
COMMITTEE ON THE STATUS OF
ENDANGERED WILDLIFE IN
CANADA



COSEPAC
COMITÉ SUR LA SITUATION DES
ESPÈCES EN PÉRIL
AU CANADA

COSEWIC status reports are working documents used in assigning the status of wildlife species suspected of being at risk. This report may be cited as follows:

Please note: Persons wishing to cite data in the report should refer to the report (and cite the author(s)); persons wishing to cite the COSEWIC status will refer to the assessment (and cite COSEWIC). A production note will be provided if additional information on the status report history is required.

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.

Holm, E., and N.E. Mandrak. 1998. Update COSEWIC status report on the northern madtom *Noturus stigmosus* in COSEWIC assessment and update status report on the northern madtom *Noturus stigmosus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 1-15 pp.

Previous report:

Goodchild, C.D. 1993. COSEWIC status report on the northern madtom *Noturus stigmosus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 20 pp.

Production note:

The 1998 status report was never finalized. At a November 2002 meeting, the 1998 report was reassessed under the new COSEWIC criteria. An addendum prepared by Al Dextrase and Erling Holm was used for the reassessment.

For additional copies contact:

COSEWIC Secretariat
c/o Canadian Wildlife Service
Environment Canada
Ottawa, ON
K1A 0H3

Tel.: (819) 997-4991 / (819) 953-3215
Fax: (819) 994-3684
E-mail: COSEWIC/COSEPAC@ec.gc.ca
<http://www.cosewic.gc.ca>

Également disponible en français sous le titre Rapport du COSEPAC sur la situation du chat-fou du nord (*Noturus stigmosus*) au Canada – Mise à jour

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Northern madtom — © 1996 Joseph R. Tomelleri.

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COSEWIC Assessment Summary

Assessment Summary – November 2002

Common name

Northern madtom

Scientific name

Noturus stigmosus

Status

Endangered

Reason for designation

This species has a very restricted Canadian range (two extant locations), which is impacted by deterioration in water quality and potential negative interactions with an exotic species. One population (Sydenham River) has been lost since 1975.

Occurrence

Ontario

Status history

Examined in April 1993 and placed in the Data Deficient category. Re-examined in April 1998 and designated Special Concern. Status re-examined and uplisted to Endangered in November 2002. Last assessment was based on an existing status report with an addendum.



COSEWIC
Executive Summary

Northern Madtom
Noturus stigmosus

The Northern Madtom is one of 25 species in the genus *Noturus* of the bullhead catfish family Ictaluridae. Only one specimen was known from Canada at the time the original status report was written; therefore no status was assigned.

Distribution

The Northern Madtom is found in the Mississippi and western Lake Erie and Lake St. Clair basins.

In Canada, the Northern Madtom is known only from the Detroit River, Lake St. Clair, and a tributary of Lake St. Clair, the Thames River. The Northern Madtom has been known from the American side of the Detroit River since 1903. It was first recorded in Canada in Lake St. Clair near the origin of the Detroit River where a single specimen was collected in 1963.

Protection

No specific legal protection exists for the Northern Madtom in Canada. The Northern Madtom is listed as Special Concern in the United States and is legally protected in Michigan and Ohio and as Special Concern in Kentucky, Mississippi and West Virginia. It is listed as Special Concern in Tennessee. Global Rank: G3; National Ranks: US: N3, Canada: N1; Regional Ranks: IL (SH-historic), IN(S1), KY (S1), MI (S1), MS (S3?), OH (S1S2), PA (S1, TN (S3), WV (S1), ON(S1).

Population Size and Trends

No studies examining population size and trends have been conducted on the Canadian populations of the Northern Madtom. Recent collections of the species in Canada (37 specimens from 14 sites) and observations of males guarding larvae indicate that sustainable reproducing populations are established in the Detroit River, Lake St. Clair and the Thames River.

Habitat

The preferred habitat of the Northern Madtom is clear to turbid water of large creeks to big rivers with moderate to swift current. It occurs on bottoms of sand, gravel and rocks occasionally with silt, detritus, and accumulated debris, and is sometimes associated with macrophytes.

Biology

Nests are made under large rocks and in anthropogenic debris such as large submerged cans, milk bottles, and boxes with clutch sizes ranging from 61 to 141 eggs. Gravid females and recently spawned eggs were observed on 24 July 1996. Larvae and juveniles about 9 mm total length were observed being guarded by males on 13 August. The temperature during this period was 23°C.

Diet

There is no published information on the diet of the Northern Madtom, but it is assumed to be similar to that of other related species. The Northern Madtom is likely an opportunistic feeder.

Species Movement

There is no published information on the movements or migration of the Northern Madtom.

Behaviour/Adaptability

The Northern Madtom probably feeds and spawns during the night. During diving transects in the Detroit River and Lake St. Clair, a few Northern Madtoms were observed off Peche Island at night, but none were seen during the day.

Limiting Factors

The apparent absence of the Northern Madtom on the more polluted Canadian side of the St. Clair River as well as the more polluted American side of the Detroit River suggests that it avoids the poorer water quality of these rivers. Its northward dispersal may be limited by temperatures which are warm enough (e.g. 23°C) for spawning to occur. Global warming may allow the species to spread farther north.

Special Significance

Noturus species exhibit cryptic behaviour and possess poison glands associated with the pectoral spines that are unique to the Canadian fish fauna.

Evaluation

The Northern Madtom is at the northern limit of its range in Canada. It has been found recently only in the Detroit River, Lake St. Clair and a tributary of Lake St. Clair, the lower Thames River. Reproducing populations are established in the Detroit River, Lake St. Clair and the Thames River. These populations should persist if its habitat is not significantly altered.



COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) determines the national status of wild species, subspecies, varieties, and nationally significant populations that are considered to be at risk in Canada. Designations are made on all native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fish, lepidopterans, molluscs, vascular plants, lichens, and mosses.

COSEWIC MEMBERSHIP

COSEWIC comprises representatives from each provincial and territorial government wildlife agency, four federal agencies (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biosystematic Partnership), three nonjurisdictional members and the co-chairs of the species specialist groups. The committee meets to consider status reports on candidate species.

DEFINITIONS

Species	Any indigenous species, subspecies, variety, or geographically defined population of wild fauna and flora.
Extinct (X)	A species that no longer exists.
Extirpated (XT)	A species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A species facing imminent extirpation or extinction.
Threatened (T)	A species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.
Not at Risk (NAR)**	A species that has been evaluated and found to be not at risk.
Data Deficient (DD)***	A species for which there is insufficient scientific information to support status designation.

* Formerly described as “Vulnerable” from 1990 to 1999, or “Rare” prior to 1990.

** Formerly described as “Not In Any Category”, or “No Designation Required.”

*** Formerly described as “Indeterminate” from 1994 to 1999 or “ISIBD” (insufficient scientific information on which to base a designation) prior to 1994.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list.



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The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.

**Update
COSEWIC Status Report**

on the

Northern Madtom
Noturus stigmosus

in Canada

Erling Holm¹
Nicholas E. Mandrak²

1998

¹Royal Ontario Museum
100 Queen's Park
Toronto, ON
M5S 2C6

²Trent University
Peterborough, ON
K9J 6X5

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ABSTRACT

The Northern Madtom, *Noturus stigmosus*, is a small member of the family Ictaluridae. It is disjunctly distributed in the Mississippi River and western Lake Erie drainage basins and has only recently been collected in Canada. There was insufficient information to assign a status in the original status report on the Northern Madtom. Recent collections indicate that reproducing populations are present in the Canadian waters of Lake St. Clair, the Detroit River and the Thames River. However, the stability, size and range of the populations are unknown; therefore, it is recommended that the Northern Madtom be classified as Vulnerable in Canada.

The Northern Madtom, *Noturus stigmosus* Taylor 1969, (Figure 1) is one of 25 species in the genus *Noturus* of the bullhead catfish family Ictaluridae (Robins et al. 1991). Only one specimen was known from Canada at the time the original status report was written (Goodchild 1993); therefore no status was assigned.

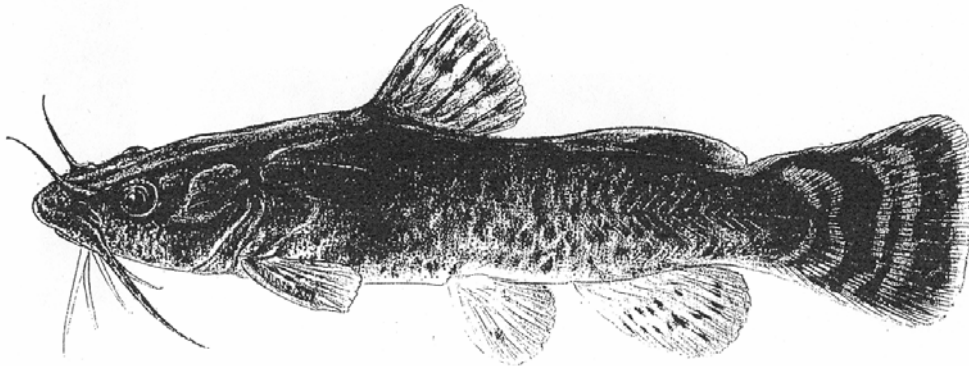


Figure 1. Northern Madtom, *Noturus stigmosus* Taylor, 1969, 77 mm TL, Detroit River.
© 1996 Joseph R. Tomelleri.

Species in the genus *Noturus* can be distinguished from other genera in Ictaluridae by an adipose fin that is a long, low, ridge-like extension of the caudal fin (Scott and Crossman 1973, Page and Burr 1991). However, in the Northern Madtom, the adipose fin appears to be almost completely separated from the caudal fin by a deep notch.

The Northern Madtom has an overall colour pattern that is mottled with three irregular dark saddles on the back located at the front of the dorsal fin, behind the dorsal fin and at the adipose fin. Unlike the Brindled Madtom, *Noturus miurus*, the dorsal and adipose fins have pale distal margins. There are three or four irregular crescent-shaped bars on the caudal fin; the middle bar usually extending across the upper and lower caudal rays and touching the caudal peduncle. Two pale spots about three-quarters the diameter of the eye are usually present just anterior to the dorsal fin. Maximum total length is 132 mm. In spawning males, the head flattens, dark pigment diffuses and conspicuous swellings develop behind the eyes, on the nape, and on the lips and cheeks. This description is a compilation of diagnostic characters based on observations of ROM specimens and on those given by Page and Burr (1991), Etnier and Starnes (1993), and Trautman (1981).

Only five species of *Noturus* have been collected in Canadian waters (Coad 1995). One of these, the Margined Madtom (*Noturus insignis*), is likely not native to Canada (Mandrak and Crossman 1992) although some (McAllister and Coad 1974, Goodchild 1993) have suggested that it may be indigenous. *Noturus miurus* and *Noturus stigmosus* differ from *Noturus insignis*, *Noturus flavus*, and *Noturus gyrinus*, in having a mottled pattern with saddles on the back instead of a more uniform brown or gray colour. The two mottled madtoms also differ from the plain-coloured madtoms in having the posterior edge of the pectoral spine strongly serrated instead of weakly serrated. Scott and Crossman (1973) indicated that specimens of *Noturus stigmosus* are very similar to *Noturus miurus* and should be watched for in collections from southwestern Ontario. The characters above distinguish *Noturus stigmosus* from *Noturus miurus* which has a dark blotch at the tip of the dorsal fin and a dark bar which extends to the extreme upper edge of the adipose fin. All specimens labelled *Noturus miurus* (40) in the fish collection of the Royal Ontario Museum (ROM) were examined and none were *Noturus stigmosus*. None of the *Noturus miurus* specimens in the Canadian Museum of Nature appear to be *Noturus stigmosus* (Goodchild 1993).

TAXONOMY

Class: Actinopterygii (ray-finned fishes)
Order: Siluriformes (catfishes)
Family: Ictaluridae (Bullhead catfishes)
Scientific Name: *Noturus stigmosus* Taylor, 1969
English Common Name: northern madtom
French Common Name: chat-fou du nord
OMNR¹ Species Code: 244

Prior to 1969 the Northern Madtom was considered a synonym of the Carolina Madtom, *Noturus furiosus*. Taylor (1969) described *Noturus stigmosus* as a distinct species and included it in the subgenus *Rabida* in the "*furiosus*-group" which included three other species of *Noturus* (*Noturus munitus*, *Noturus furiosus*, and *Noturus placidus*). He suggested that it was most closely related to *Noturus munitus*. Recent analysis of morphological, allozymic, and chromosomal data corroborates a monophyletic relationship among members of an expanded "*furiosus*-group" consisting of seven species (*Noturus furiosus*, *Noturus munitus*, *Noturus placidus*, *Noturus stigmosus*, *Noturus eleutherus*, *Noturus flavater*, and *Noturus flavipinnis*). Relationships within the "*furiosus*-group" are not clear and depend on the characters analyzed and the method of analysis (Grady and Legrande 1992). No subspecies of *Noturus stigmosus* have been recognized, but Mayden et al. (1992) indicated that it might be polytypic which may warrant its division into several species.

¹Ontario Ministry of Natural Resources

DISTRIBUTION

The Northern Madtom is found in the Mississippi and western Lake Erie and Lake St. Clair basins (Figure 2). In the Mississippi drainage, it is found in several tributaries in Mississippi and Tennessee, in the main stem between Arkansas and Tennessee and throughout most of the Ohio River basin in Kentucky, Indiana, Ohio and restricted areas of Illinois, Pennsylvania and West Virginia. It is found in several western Lake Erie tributaries in Indiana, Michigan and Ohio, and in the St. Clair River, Lake St. Clair and the Detroit River which form the border between Michigan and Ontario (Rohde 1980, Stauffer et al. 1982, Cincotta et al. 1986).



Figure 2. The North American distribution of Northern Madtom. Adapted from Rohda (1980) and Page and Burr (1991).

In Canada, the Northern Madtom is known only from the Detroit River, Lake St. Clair, and a tributary of Lake St. Clair, the Thames River (Figure 3). The Northern Madtom has been known from the American side of the Detroit River since 1903 (University of Michigan Museum of Zoology; UMMZ 132009). It was first recorded in Canada in Lake St. Clair near the origin of the Detroit River where a single specimen was collected in 1963 (Trautman 1981). Another specimen was collected in 1994 near the first capture site on the Canadian side of the Detroit River (ROM 68328). In 1996, approximately 50 specimens were either captured or observed in the area around Peche Island. Also, in 1996, three juveniles were seined at night in Lake St. Clair at the mouth of Belle River approximately 19 kilometres east of the Detroit River.

The lack of Canadian records in the Detroit River and Lake St. Clair between 1963 and 1994 is likely the result of limited trawling and night seining, and incorrect field identification. Specimens captured in 1963 and in 1996 were collected primarily by trawling, a collecting method not commonly used on the Canadian side of Lake St. Clair and the Detroit River (Don MacLennan, OMNR, Lake St. Clair Fisheries Management Unit, personal communication). If previously collected, specimens might have been incorrectly identified since the Northern Madtom is not included in taxonomic keys commonly used in Canada (e.g. Scott and Crossman 1973).

In July 1991, an adult specimen was captured by the ROM in the Thames River near Wardsville. A juvenile specimen, captured in August 1997 at the site of capture of the adult, indicates that Northern Madtoms are established in the Thames River. Both specimens were captured by seining in the daytime in the direction of the current during periods when the water level was low enough to wade across the river. These records are approximately 90 kilometers from the nearest Lake St. Clair record at Belle River. There are no apparent barriers such as dams to prevent its dispersal from Lake St. Clair to the Thames River at Wardsville.

It has been recently recorded and is apparently established on the Michigan side of the lower St. Clair River at Algonac State Park (see Figure 3) (D. Jude, University of Michigan, personal communication). It is likely that this population dispersed there from the Detroit River via Lake St. Clair. Sampling by the ROM in 1996 (day and night trawls in 2-10 metres, and day and night seining in 0.1-1.3 metres) failed to capture it on the Canadian side of the St. Clair River.

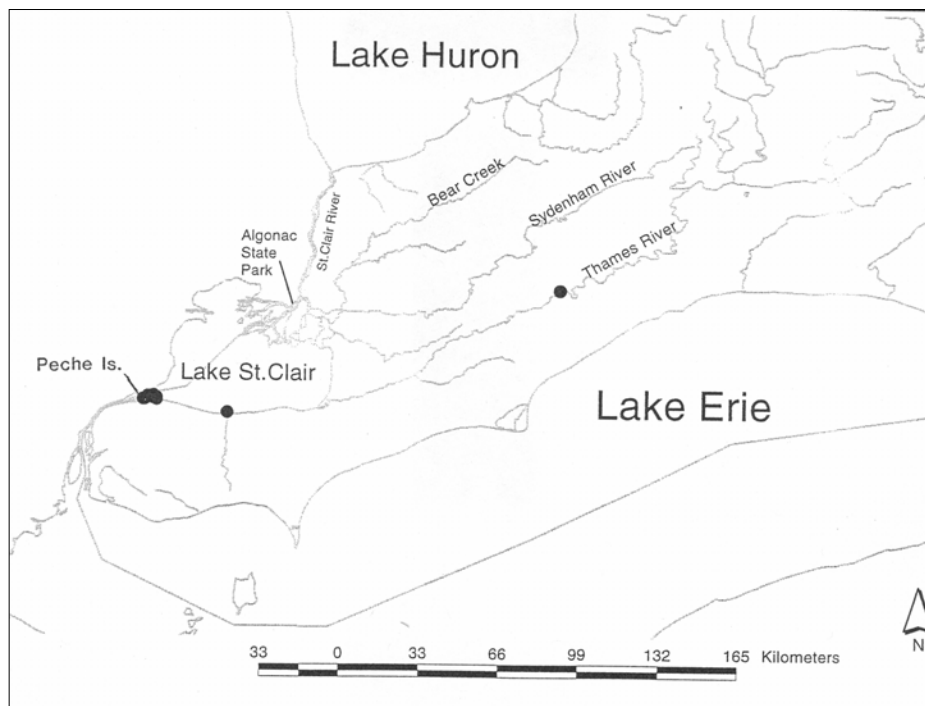


Figure 3. Canadian Distribution of the Northern Madtom 1963-1997.

PROTECTION

No specific legal protection exists for the Northern Madtom in Canada. The original COSEWIC report on the Northern Madtom concluded that insufficient scientific information was available to assign a status designation (Goodchild 1993).

The species and/or its habitat may be protected by the Canada Environmental Assessment Act, Canada Environmental Protection Act, Canada Fisheries Act, Canada Water Act, Canada Wildlife Act, Ontario Environmental Protection Act, Ontario Environmental Assessment Act, Ontario Game and Fish Act, Ontario Planning Act and Ontario Water Resources Act. A recent Natural Heritage Policy Statement, 2.3, of the Ontario Planning Act reduces protection for species classified as Vulnerable. Only habitats of Threatened and Endangered species are protected against development and site alteration (Ian Buchanan, Ministry of Natural Resources, personal communication).

The population of Northern Madtom in the Detroit River is in one of 43 "Areas of Concern". The Detroit River has been identified by the United States and Canada as having several beneficial uses which have become impaired. These include degraded fish and wildlife populations and loss of fish and wildlife habitats (Hartig et al. 1996). A Remedial Action Plan has been initiated and, if fully implemented, is likely to improve water quality, increase amount of fish habitat, and improve prospects for the survival of the Northern Madtom.

The Northern Madtom is listed as Special Concern in the United States by Mayden et al. (1992). Johnson (1987) listed it as legally protected in Michigan and Ohio and as Special Concern in Kentucky, Mississippi and West Virginia. It is listed as of Special Concern in Tennessee by Etnier and Starnes (1993). It was listed as Threatened in Kentucky by the Kentucky Nature Protection Commission, but Burr and Warren (1986) recommended downlisting it to Special Concern.

Global and North American federal, state and provincial conservation status and ranks were obtained from the Eastern Regional Office of the Nature Conservancy, Boston, dated 9 June 1997. The ranks assigned to Northern Madtom indicate that it is rare to extremely rare throughout its range:

Global Rank: G3

National Ranks: US: N3, Canada: N1

Regional Ranks: IL (SH-historic), IN(S1), KY (S1), MI (S1), MS (S3?), OH (S1S2), PA (S1, TN (S3), WV (S1), ON(S1)

1=extremely rare, 2=very rare, 3=rare to uncommon, 4=common, 5=very common

POPULATION SIZE AND TRENDS

No studies examining population size and trends have been conducted on the Canadian populations of the Northern Madtom. Recent collections of the species in

Canada (37 specimens from 14 sites) and observations of males guarding larvae (MacInnis 1998) indicate that sustainable reproducing populations are established in the Detroit River, Lake St. Clair and the Thames River. The new records, including those from the St. Clair River on the American side, suggest that the species is undergoing a range expansion. However, these new records result from a more intensive sampling program of trawling and night seining specifically targeting the Northern Madtom. Therefore, it is uncertain that the population size is increasing.

HABITAT

The preferred habitat of the Northern Madtom is clear to turbid water of large creeks to big rivers with moderate to swift current. It occurs on bottoms of sand, gravel and rocks occasionally with silt, detritus, and accumulated debris, and is sometimes associated with macrophytes (Taylor 1969, Smith 1979, Trautman 1981, Cooper 1983, Burr and Warren 1986, Robison and Buchanan 1988). In Ontario, it was trawled in the Detroit River at depths of 1-3m on smooth, firm bottoms often covered by macrophytes such as *Chara*. The surface waters were not turbid, but a gradient of increasing turbidity with increasing depth is present in the Detroit River (B. Ray, University of Windsor, personal communication). The Northern Madtom has also been seined at night in Lake St. Clair near the outlet of the Detroit River and around Belle River on sandy substrate devoid of cover. Two specimens were seined in the highly turbid Thames River (secchi <0.2m) on a bottom consisting of sand, gravel and rubble from areas where the substrate was free from silt and clay. Current was moderate, maximum depth of capture was 1.2m, water temperature was 23-26°C, conductivity was 666 μ S, and pH was 7.9. In the St. Clair River, it has been collected in trawls at depths of 3-7 metres (D. Jude, University of Michigan, unpublished data).

BIOLOGY

Reproductive Capability

Nests are made under large rocks and in anthropogenic debris such as large submerged cans, milk bottles, and boxes. In Michigan, *Noturus stigmosus* reproduced slightly earlier than *Noturus miurus*, and clutch sizes were larger ranging from 61 to 141 eggs (Taylor 1969).

MacInnis (1998) observed and video-taped nesting of 21 adult Northern Madtoms in Lake St. Clair during the summer of 1996 while conducting research on the Round Goby, *Neogobius melanostomus*. Gravid females and recently spawned eggs were observed on 24 July 1996 in artificial goby nests set near Peche Island (see Figure 3). The nests were set in gentle current on a sandy bottom surrounded by a thick bed of aquatic macrophytes (primarily *Chara*). Eggs were approximately 3 mm in diameter and clutch size was conservatively estimated to range from 32 to 160. The male guarded both the eggs and newly hatched fry and, did not abandon the nest when disturbed. Larvae and juveniles

about 9 mm total length were observed being guarded by males on 13 August. The temperature during this period was 23°C. A male Brindled Madtom was also observed nesting during this period but, when disturbed, would abandon the nest.

Diet

There is no published information on the diet of the Northern Madtom, but Rohde (1980) assumed it was similar to that of other related species.

Recent unpublished analysis of gut contents indicates that the Northern Madtom has a varied diet and is likely an opportunistic feeder. The stomach contents of 11 specimens from the Detroit River and one specimen from the Thames River were identified. Diet of the Detroit River specimens consisted primarily of chironomids, fish (Mimic Shiners, *Notropis volucellus*), mayflies, particularly *Hexagenia bilineata* and possibly *H. limbata*, crustaceans (Malacostraca, an ostracod, and an amphipod). In addition they contained smaller amounts of nematodes, Lepidoptera, and caddisflies (such as *Triaenodes aba*, *Hydropsyche scalaris*, and probably *Polycentropus*). The Thames River specimen contained mostly caddisflies (primarily *Potamyia flava* but one *Hydropsyche scalaris*) and mayflies (*Ephemera* and probably *Stenonema*).

The gut contents of 25 adult Northern Madtoms (82-130 mm TL) captured in the St. Clair River were analyzed by G. Crawford, University of Michigan (D. Jude, University of Michigan, unpublished data²). These specimens were caught near Algonac State Park, Michigan in May and June of 1994. Their guts contained mostly mayflies (primarily *Baetisca* and occasionally *Hexagenia* and *Baetis*). Caddisflies (primarily represented by *Phryganea*, *Banksiola* and a few *Hydropsyche*) were also present in substantial numbers. Midges of the family Chironomidae and stoneflies (Plecoptera) were also represented to a lesser extent, and three small Round Gobies were found in the stomach of one specimen. The guts of juveniles (31-37 mm TL) collected at the same site contained mostly Diptera as well as substantial numbers of mayflies (Ephemeroptera).

Species Movement

There is no published information on the movements or migration of the Northern Madtom.

Behaviour/Adaptability

The Northern Madtom probably feeds (Goodchild 1993) and spawns (Coad 1995) during the night. During diving transects in the Detroit River and Lake St. Clair, a few Northern Madtoms were observed off Peche Island at night, but none were seen during the day (B. Ray, University of Windsor, personal communication).

²These data not to be published without permission from David Jude, University of Michigan.

LIMITING FACTORS

The restricted distribution and low numbers of the Northern Madtom suggest that it has specific ecological requirements (Goodchild 1993). The apparent persistence of populations of the Northern Madtom in the Detroit River, one of the most heavily polluted areas of the Great Lakes, suggests that it is relatively tolerant to human disturbance. However, the apparent absence of the Northern Madtom on the more polluted Canadian side of the St. Clair River (Griffiths et al. 1991) as well as the more polluted American side of the Detroit River (David Jude, personal communication) suggests that it avoids the poorer water quality of these rivers. Its northward dispersal may be limited by temperatures which are warm enough (e.g. 23°C) for spawning to occur. Global warming may allow the species to spread farther north. The rapidly expanding populations of Round Goby in Lake St. Clair and the Detroit River are threatening some native species such as the Mottled Sculpin, *Cottus bairdi* (Jude et al. 1996). Its impact on the Northern Madtom is not known.

SPECIAL SIGNIFICANCE

Noturus species exhibit cryptic behaviour and possess poison glands associated with the pectoral spines that are unique to the Canadian fish fauna (Scott and Crossman 1973). One of the four *Noturus* species native to Canada, the Brindled Madtom, is listed by COSEWIC as Vulnerable (Campbell 1995) and we recommend a Vulnerable status for the Northern Madtom. Therefore, the genetic diversity expressed by behaviour, ecology and morphology in the genus *Noturus* may be in jeopardy in Canada.

EVALUATION

The Northern Madtom is at the northern limit of its range in Canada. It has been found recently only in the Detroit River, Lake St. Clair and a tributary of Lake St. Clair, the lower Thames River. Although additional sampling is required to determine the stability, size and range of the species, it appears that reproducing populations are established in the Detroit River, Lake St. Clair and the Thames River. These populations should persist if its habitat is not significantly altered.

There is no evidence of any other reproducing populations in Canada. Therefore, it should be recognized that, if these populations were extirpated due to human activity, the only known established Canadian populations of Northern Madtom would be lost. It is recommended that *Noturus stigmosus* be classified as Vulnerable in Canada.

TECHNICAL SUMMARY

Noturus stigmosus

Northern Madtom

Chat-fou du Nord

Range of Occurrence Ontario

Extent and Area Information	
• Extent of occurrence	< 1600 km ²
• no discernable trends	
• Area of occupancy	< 700 km ²
• no discernable trends	
• Number of extant locations	2
• no discernable trends	
• Habitat trends	declining
Population Information	
• Generation time	2
• Number of mature individuals (capable of reproduction) in the Canadian population	Unknown, but probably in low thousands, or hundreds
• Population trend:	Unknown
• Is the population fragmented?	No
• number of extant sites	2
• number of historic sites from which species has been extirpated	1
• Does the species undergo fluctuations?	No
Rescue Potential	
• Does species exist outside Canada?	Yes
• Is immigration known or possible?	Possible, but unlikely due to state of neighboring populations
• Would immigrants survive in Canada?	Yes
• Is suitable habitat available for immigrants?	Yes, but range extensions are limited by water temperature and quality
Threats	
Deterioration of water quality and introductions of exotics	

ACKNOWLEDGEMENTS

Financial support for fieldwork and preparation of this report was provided by the Royal Ontario Museum, World Wildlife Fund (Canada), Canadian Wildlife Service, and Section 25 of Human Resources Development Canada. A. MacInnis and B. Ray, University of Windsor, provided invaluable field assistance, unpublished data and distribution records. W. Ramshaw and A. Salomon prepared the maps using ARC/VIEW GIS software provided by ESRI Canada. D. Boehm, K. Banks, S. Newton, M. Ciuk, K. Ditz, R. Guppy and W. Ramshaw assisted with fieldwork. P. MacCulloch identified invertebrate stomach contents. We are grateful to D. Jude, University of Michigan, for providing unpublished data on collections of Northern Madtom in the United States. The manuscript was improved by comments from the reviewers: E. Crossman, A. Dextrase, A. Peden, and J. Nelson.

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THE AUTHORS

Erling Holm is Assistant Curator at the Centre for Biodiversity and Conservation Biology of the Royal Ontario Museum where he manages a collection of preserved fishes consisting of around 1 000 000 specimens. He has a Bachelor of Science degree from the University of Toronto and worked for the Ministry of Natural Resources

prior to coming to the Museum in 1977. He has been involved in fieldwork in Ontario, Quebec, Peru and Guyana. His interests include the taxonomy and ecology of Canadian and South American freshwater fishes and Indo-Pacific marine fishes.

Nicholas Mandrak is a faculty member in the Department of Biology, Trent University in Peterborough, Ontario where he teaches courses in Biogeography, Conservation Biology and Ontario Fishes. His primary research interests are the biogeography, conservation biology and ecology of native and introduced freshwater fishes. He received his doctoral degree from the University of Toronto in 1994.

Addendum

Prepared by Alan Dextrase (OMNR) and Erling Holm (ROM), November 2002.

There are two new Canadian records of northern madtom (*Noturus stigmosus*) since its status was last evaluated by COSEWIC (Holm and Mandrak 1997). In 1999, a specimen was captured by a commercial fisherman in Lake St. Clair, off Walpole Island (ROM 72038). Although the northern madtom has been previously captured from the southern shore of Lake St. Clair, the 1999 record is approximately 20 km north of the other Lake St. Clair locations. So, this record does not indicate a range extension, but rather a new site within a previously known location. The second “new” record results from examination of a specimen that was taken from the Sydenham River near Florence in 1975 (NMC 75-1623). This specimen was originally identified as a brindled madtom (*Noturus miurus*), but was reexamined by Erling Holm in 1999 and determined to be a northern madtom. Despite repeated sampling at the same location (1989, 1991, 1997, 1999, 2001, 2002), no northern madtoms have been captured and it is possible that the species is extirpated from the Sydenham River. There is no new information available from the extant populations. The new records are included in the published version of the COSEWIC status report (Holm and Mandrak 2002).

Holm and Mandrak (1997) suggest that species may be tolerant of human disturbance, but may be intolerant of pollution based on the absence of the species from the Canadian side of the St. Clair River. Northern madtoms can withstand moderate turbidity, but no longer occur in the highly turbid Sydenham River. The population in the nearby Thames River occurs in an intensive agricultural landscape and is exposed to similar stresses (heavy sediment and nutrient loading) that may have contributed to the extirpation of the Sydenham River population.

Holm, E., and N.E. Mandrak. 1998. Updated status of the northern madtom, *Noturus stigmosus*, in Canada.

Holm, E., and N.E. Mandrak. 2002. Updated status of the northern madtom, *Noturus stigmosus*, in Canada. *Canadian Field-Naturalist* 115: 138-144.