

Ontario Species at Risk Evaluation Report for
Gravel Chub
Gravelier
(Erimystax x-punctatus)

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

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Assessed by COSSARO as Extirpated

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Gravelier (*Erimystax x-punctatus*)

Le gravelier est un petit cyprinidé rivicole. Cette espèce est disparue du Canada, les dernières observations du gravelier dans la nature remontant à 1958. Malgré d'importants échantillonnages ciblés réalisés au cours des six dernières décennies, aucun individu n'a été capturé.

Les enregistrements de prises de la population de gravelier se limitaient à la rivière Thames, au sud-ouest de l'Ontario, où se trouvait la seule population connue du bassin versant des Grands Lacs. Le gravelier a des besoins stricts en matière d'habitat. Il se rencontre uniquement dans des eaux à faible turbidité dont le courant est assez fort pour empêcher le dépôt de limon au fond. Ces conditions limitent l'occurrence de l'espèce. De plus, les eaux de retenues des zones de rapides sont menaçantes pour le gravelier. Une turbidité et un envasement accrus auraient, selon ce que l'on croit, mené à la disparition du gravelier.

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Executive summary

Gravel Chub (*Erimystax x-punctatus*) is a small stream-dwelling cyprinid. This species is extirpated in Canada, with the last observations of Gravel Chub in the wild being in 1958. Despite substantial targeted sampling over the past six decades, no additional captures have been made.

The Gravel Chub population capture records were limited to the Thames River in Southwestern Ontario and was the only population identified within the Great Lakes watershed.

The Gravel Chub has specific habitat needs. It is only found in waters of low turbidity with enough current to keep the bottom silt-free. These conditions limit the species' occurrence. In addition, impoundment of riffle areas is a threat to the gravel chub. It is thought that increased turbidity and siltation may have led to the extirpation of the Gravel Chub.

1. Eligibility for Ontario status assessment

1.1. Eligibility conditions

1.1.1. Taxonomic distinctness

Gravel Chub is a distinct and valid species. The Gravel Chub is a recognized species (Nelson et al. 2004) that was formerly considered to be native to Canada, but has been absent from Canadian waters since 1958.

1.1.2. Designatable units

Not applicable. However, if the Gravel Chub was extant in the Great Lakes it would be separated from the population in the Ohio and Mississippi River watershed and may be considered a separate designatable unit.

1.1.3. Native status

Gravel Chub is considered native to the Thames River watershed within the Great Lakes Drainage basin. No other populations have been identified within the Great Lake watershed.

1.1.4. Occurrence

Gravel Chub is extirpated from Ontario. It was known from only two sites in the Thames River in southwestern Ontario (Figure 1). It was last observed 60 years ago and, despite extensive survey efforts every decade since then, no Gravel Chub has been captured. Gravel Chub is a searchable species in the Ontario Natural Heritage Information Centre database of the Ontario Ministry of Natural Resources and Forestry, in which there are no records since 1958.

1.2. Eligibility results

Gravel Chub (*Erimystax x-punctatus*) is eligible for status assessment in Ontario.

2. Background information

2.1. Current designations

- GRANK: G4 (NatureServe 2011)
- IUCN: Least Concern (2013)
- NRANK Canada: NX
- COSEWIC: Extirpated (May 2019), Endangered in 1985, Extirpated in 1987, May 2000 and April 2008

- SARA: Extirpated (Schedule 1)
- ESA 2007: Extirpated (2008)

2.2. Distribution in Ontario

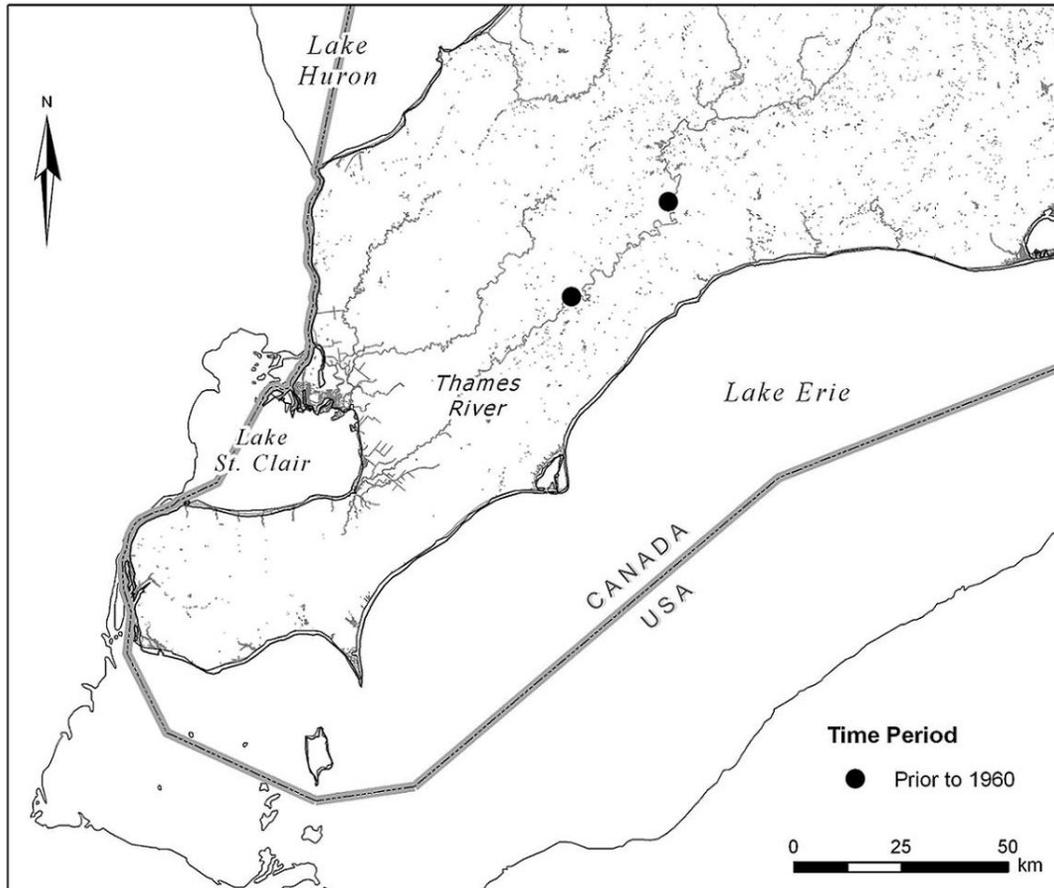


Figure 1. All Gravel Chub records for Ontario (COSEWIC, 2008).

2.3. Distribution, status and the broader biologically relevant geographic range outside Ontario

The Gravel Chub is found in east-central North America where it has a disjunct distribution (Figure 2), occurring from south-central Arkansas north to southern Minnesota and east to southern Ontario and western New York. The subspecies *E. x. trautmani* is limited to the Ohio River basin in Illinois, Indiana, Ohio, New York, Pennsylvania and Kentucky, and the Thames River, Ontario.



Figure 2. Global distribution of Gravel Chub (COSEWIC, 2008).

Table 1. Condition of the Species in Adjacent Jurisdictions and Broader Biologically Relevant Geographic Range

Adjacent Jurisdictions	Biologically Relevant to Ontario (n/a, yes, no)	Condition	Notes & Sources
Quebec			
Manitoba			
Michigan		NSR	NatureServe (2020)
Minnesota		S2	NatureServe (2020)
Nunavut			
New York	Yes	Threaten	DEC (2020)
Ohio	Yes	S4	NatureServe (2020)
Pennsylvania	Yes	SX	NatureServe (2020)
Wisconsin		S1	NatureServe (2020)
<i>Other Relevant Jurisdiction</i>			

2.4. Ontario conservation responsibility

In Ontario's conservation responsibility for the species based on historic global range is less than one percent. With no individuals capture in the past 60 years, Ontario has minimal responsibility as no identified population exist and attempts are increase population distribution in other jurisdiction have been unsuccessful

2.5. Direct threats

Turbidity and sedimentation as a result of watershed land uses, primarily agriculture, are suspected to have been the greatest threat to Gravel Chub. Restoration and environmental stewardship activities are underway and have improved habitat, particularly water quality. Protection has been given to species at risk in baitfish fisheries. Education programs have been initiated to help limit the accidental capture of species at risk during baitfish harvest (DFO 2016).

2.6. Specialized life history or habitat use characteristics

Little is known about the Gravel Chub's general biology. Adult specimens from Canada were 52-57 mm in length and spawning occurs in Kansas sites in early spring. The main food is probably insects attached to the bottom. The Gravel Chub is also thought to probe under rocks and into crevices with its sensitive snout.

In North America, the species was only known to occur in clear to moderately turbid streams with permanent flow. The streams typically have well-defined sand, gravel or rocky riffles, and their currents keep the bottom free of unconsolidated silts and clays. The species tends to avoid areas with macrophytes, larger algae species and aquatic moss species. In Ontario, the species once inhabited sections of the Thames River. These river sections have constant flow and are 1-3 m deep; the bottom is composed of sand, rock and stone with areas of soft organics and silt. The water is turbid here, and there is very little vegetation along the riverbanks.

3. Ontario status assessment

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

Not Applicable – no individuals seen since 1958 (COSWIC 2019)

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

Not Applicable – no individuals seen since 1958 (COSWIC 2019).

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

Not Applicable – no individuals seen since 1958 (COSWIC 2019).

3.1.4. Criterion D – Very small or restricted total population

Not Applicable – no individuals seen since 1958 (COSWIC 2019).

3.1.5. Criterion E – Quantitative analysis

Not Applicable – no data (COSEWIC 2019).

3.2. Application of Special Concern in Ontario

Not Applicable

3.3. Status category modifiers

3.3.1. Ontario's conservation responsibility

Less than 1% of the historic range has been identified in Ontario, with no other sites identified in Canada. Although minimal responsibility exists with Ontario, the Canadian Federal Government has proposing and implementing a multi species recover plan for the Thames River, which includes the Gravel Chub as one of the objectives (TRRT, 2005).

3.3.2. Status modification based on rescue effect or level of risk in broader biologically relevant geographic range

Not applicable.

3.4. Other status categories

3.4.1. Data deficient

Not Applicable

3.4.2. Extinct or extirpated

Gravel Chub have not been observed in Ontario waters since 1958 despite extensive sampling (completed by the federal Department of Fisheries and Oceans) and being a large distinctive fish that is easily recognizable. It is considered XT - Extirpated from Ontario.

3.4.3. Not at risk

Not Applicable

4. Summary of Ontario status

Gravel Chub (*Erimystax x-punctatus*) is classified as XT - Extirpated in Ontario based on meeting identified criterion with the last record for this species was in 1958 despite extensive, repeated sampling at known sites and other areas of suitable habitat over the last 60 years. Ecosystem restoration of this watershed is underway; however, natural recolonization by the species is not possible because there are no adjacent populations in the Great Lakes watershed

Extirpated status of this species is consistent with the definition of status under the Endangered Species Act, 2007.

5. Information sources

COSEWIC. 2019. COSEWIC Rapid Review of Classification on the Gravel Chub *Erimystax x-punctatus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi pp. (<https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>)

COSEWIC. 2008. COSEWIC assessment and update status report on the Gravel Chub *Erimystax x-punctatus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 21 pp. (https://www.sararegistry.gc.ca/virtual_sara/files/cosewic/sr_gravel_chub_0808_e.pdf)

DEC, 2020. Department of Environmental Conservation, New York State, Gravel Chub Fact Sheet. <https://ec.ny.gov/animals/26038.html>, [website accessed November 22, 2020].

DFO. 2016. Report on the progress of recovery strategy implementation for the Gravel Chub (*Erimystax x-punctatus*) in Canada for the period 2008-2015. Species at Risk Act Recovery Strategy Report Series. Fisheries and Oceans Canada, Ottawa. ii + 9 pp.

Nelson, J.S., E.J. Crossman, H. Espinosa-Perez, L.T. Findley, C.R. Gilbert, R.N. Lea and J.D. Williams. 2004. Common and Scientific Names of Fishes from the United States, Canada, and Mexico. 6th Edition. American Fisheries Society Special Publication 29. Bethesda, Maryland. 386 pp.

TRRT (Thames River Recovery Team). 2005. The Thames River Aquatic Ecosystem Recovery Strategy [draft]: 2004-2009.

Appendix 1: Technical summary for Ontario

Species: Gravel Chub (*Erimystax x-punctatus*)

Demographic information

Demographic attribute	Value
Generation time. Based on average age of breeding adult: age at first breeding = X year; average life span = Y years.	2-3 years
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	Not Applicable
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.	Not Applicable
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations.	Not Applicable
Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations.	Not Applicable
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.	Not Applicable
Are the causes of the decline (a) clearly reversible, and (b) understood, and (c) ceased?	a. Unknown b. No 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 (EOO). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i>	0 km ²
Index of area of occupancy (IAO). <i>If value in COSEWIC status report is not applicable, then use geocat.kew.org. State source of estimate.</i>	0 km ²
Is the total population severely fragmented? i.e., is >50% of its total area of occupancy in habitat patches that are: (a) smaller than would be required to support a viable population, and	a. Not Applicable b. Not Applicable

Extent and occupancy attributes	Value
(b) separated from other habitat patches by a distance larger than the species can be expected to disperse?	
Number of locations. <i>See Definitions and Abbreviations on COSEWIC and IUCN websites for more information on the term "location". Use plausible range to reflect uncertainty if appropriate.</i>	0
Number of NHIC Element Occurrences <i>Request data from MNRF.</i>	
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 sub-populations or EOs?	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?	No
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 (or total population)	Number of mature individuals
<i>Not Applicable</i>	0

Quantitative analysis (population viability analysis conducted)

Probability of extinction in the wild is at least [20% within 20 years or 5 generations, or 10% within 100 years]: Not applicable.

Threats

Threats to this species include:

1. high levels of turbidity and siltation resulting from urban and agricultural land use practices
2. nutrient loading resulting from agricultural and urban land use practices.

Rescue effect

Rescue effect attribute	Value
Does the broader biologically relevant geographic range for this species extend beyond Ontario?	Yes
Status of outside population(s) most likely to provide immigrants to Ontario	Ohio (S4 ranking)
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Unknown
Would immigrants be adapted to survive in Ontario?	Unknown
Is there sufficient suitable habitat for immigrants in Ontario?	No
Are conditions deteriorating in Ontario?	Probably
Is the species of conservation concern in bordering jurisdictions?	Yes
Is the Ontario population considered to be a sink?	No
Is rescue from outside populations likely?	No

Sensitive species

No

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
EO: Element occurrence (as defined by NHIC)
EOO: extent of occurrence
GRANK: global conservation status assessments
IAO: index of area of occupancy
IUCN: International Union for Conservation of Nature and Natural Resources
MNRF: Ministry of Natural Resources and Forestry
NHIC: Natural Heritage Information Centre
NNR: Unranked
NRANK: National conservation status assessment
SARA: Species at Risk Act
SNR: unranked
SRANK: subnational conservation status assessment
S1: Critically Imperiled
S2: Imperiled
S3: Vulnerable
S4: Apparently Secure
S5: Secure
IUCN: International Union for Conservation of Nature and Natural Resources
CDSEPO: Le Comité de détermination du statut des espèces en péril en Ontario