

**Ontario Species at Risk Evaluation Report  
for  
Grass Pickerel (*Esox americanus vermiculatus*)**

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

Assessed by COSSARO as SPECIAL CONCERN

May 2015

FINAL

## Brochet vermiculé (*Esox americanus vermiculatus*)

Le brochet vermiculé (*Esox americanus vermiculatus*) est une sous-espèce reconnue du brochet d'Amérique (*Esox americanus*). Le statut taxinomique de la sous-espèce (brochet vermiculé) est justifié par des distinctions génétiques et morphologiques. Le brochet vermiculé est une petite forme de cette espèce, qui ne fait généralement que 30 cm de longueur. Au Canada, il est confiné au sud de l'Ontario et il compte quelques populations dans le sud-ouest du Québec. Il habite dans des cours d'eau chauds et peu profonds à débit lent ainsi que dans des enfoncements tranquilles. Il a besoin d'une végétation aquatique partiellement submergée et émergée dense où il se nourrit de macro-invertébrés, de poissons, d'écrevisses et de larves d'insectes.

Les tendances des populations de brochets vermiculés en Ontario ne sont pas connues. Bien que l'espèce semble être en diminution dans plusieurs sous-populations, l'ampleur de ces diminutions n'a pas été quantifiée. Les déclin peuvent être attribuables à un certain nombre de menaces, en particulier à la dégradation et à la perte d'habitat provoquées par le dragage et la canalisation, l'aménagement de chalets et la présence d'espèces envahissantes. Le brochet vermiculé est évalué comme une espèce préoccupante.

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## Executive summary

The Grass Pickerel (*Esox americanus vermiculatus*) is a recognized subspecies of the Redfin Pickerel (*Esox americanus*). The taxonomic status of the subspecies (Grass Pickerel) is supported by genetic and morphometric differences. Grass Pickerel is a small form of this species, usually only 30 cm long. In Canada, it is limited to southern Ontario and a few populations in southwestern Quebec. It inhabits shallow, warm, slow-moving streams, and quiet embayments. It requires dense submergent and emergent aquatic vegetation, where it preys upon macroinvertebrates, fishes, crayfishes, and larval insects.

The Ontario population trends of Grass Pickerel are unknown. Although the species appears to be declining at several sub-populations, the magnitudes of these declines have not been quantified. Declines may be due to a number of threats, especially degradation and loss of habitat due to dredging and channelization, cottage development, and invasive species. This species is assessed as Special Concern.

# 1. Background information

## 1.1. Current designations

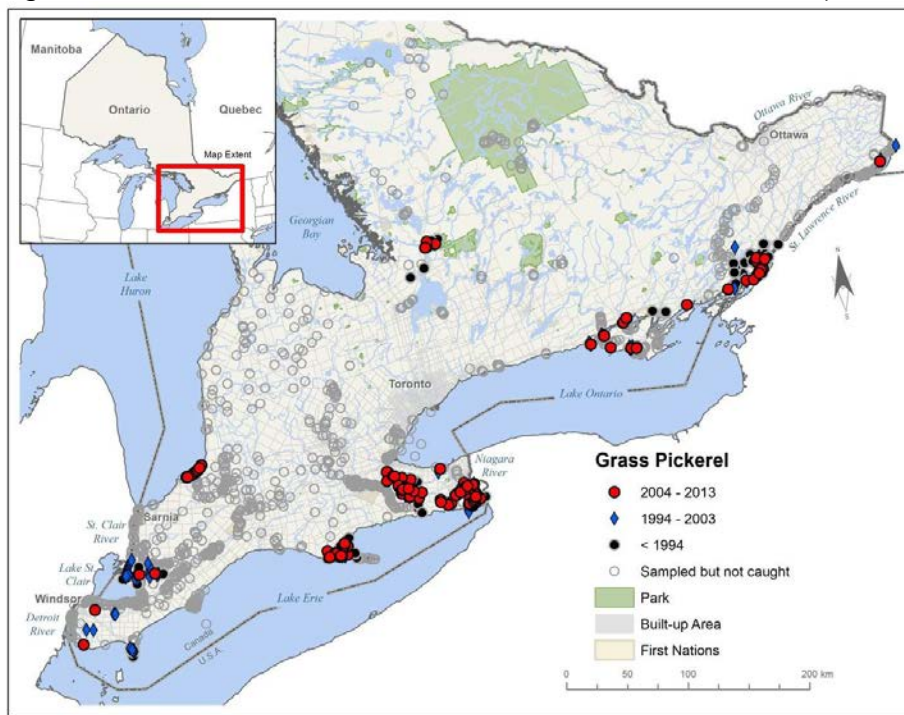
- GRANK: G5T5 (NatureServe 2015)
- NRANK Canada: N3
- COSEWIC: Special Concern (2014)
- SARA: Special Concern (Schedule 1)
- ESA 2007: Special Concern (2007)
- SRANK: S3

## 1.2. Distribution in Ontario

In Ontario, the Grass Pickerel is distributed in tributaries and shallow embayments of the southern Great Lakes and St. Lawrence River. The main extant populations are concentrated in the Upper St. Lawrence River (Brockville to Gananoque), Eastern Lake Ontario (Bay of Quinte), north shore tributaries of Lake Erie, tributaries of the Upper Niagara and Welland Rivers, Long Point Bay, Lake St. Clair, Old Ausable Channel, and Severn River drainage.

Of the 15 locations recognized in the 2014 COSEWIC status appraisal summary, 14 are found in Ontario (Appendix 1).

Figure 1. Current distribution of Grass Pickerel in Canada (COSEWIC 2014).



## 1.3. Distribution and status outside Ontario

Within Canada, Grass Pickerel occurs in the St. Lawrence River in western Quebec, where it may be in decline. One subpopulation is historical (Lac St. Louis), and its detection at the other (Lake St. Francis) is sporadic (COSEWIC 2014). The natural distribution of the Grass Pickerel is found west of the Appalachian Mountains, in the Great Lakes and Mississippi River systems (Crossman 1980 cited in COSEWIC 2005).

Despite this relatively wide range, the Grass Pickerel is ranked by NatureServe only in New Jersey (SNR) and West Virginia (S1S2). Other state ranks and trends in US jurisdictions are not available, since there is confounding information on the distribution and status of the Grass Pickerel and the Redfin Pickerel (*Esox americanus americanus*).

#### 1.4. Ontario conservation responsibility

The percentage of the global range occurring in Ontario is estimated at less than 10% (based on COSEWIC 2005, Figure 2).

#### 1.5. Direct threats

The primary historical threat to the Grass Pickerel is probably the destruction and degradation of wetland habitat, especially in southwestern Ontario (COSEWIC 2005). In addition to urbanization, cottage development is also now considered a threat in some drainages, especially when it results in the removal of aquatic and riparian vegetation (COSEWIC 2014; Beauchamp et al. 2012).

Municipal drainage and drain maintenance are primary threats to the species. Sediment loading threatens the Grass Pickerel, which is a visual predator and is moderately intolerant of turbidity (Trebitz et al. 2007). High levels of nutrients resulting from agricultural and sewage inputs may cause eutrophication and alter the shallow aquatic habitat of the Grass Pickerel. The effects of contaminants (e.g. pesticides and herbicides) are not well understood, but it is possible that they may alter reproduction and decrease available suitable habitat (i.e., aquatic vegetation). Water-level fluctuations and low water levels caused by extractions may also negatively affect Grass Pickerel populations.

There is increasing concern about the effect of two new invasive species on the Grass Pickerel. The Chain Pickerel, native to Quebec, is expanding into eastern Ontario and the effects on the Grass Pickerel are unknown. The non-native subspecies of Common Reed, *Phragmites australis*, may also reduce available shallow aquatic habitat at some locations.

Other threats of low or unknown impact include disease, fishing pressure, interspecific interactions, and climate change (Beauchamp et al. 2012). A threats calculator has not been completed for this species.

#### 1.6. Specialized life history or habitat use characteristics

The Grass Pickerel does not appear to have any specialized life history traits or require

rare or special habitats. Where it occurs, it is often a top predator and may control populations of smaller fishes.

## 2. Eligibility for Ontario status assessment

### 2.1. Eligibility conditions

#### 2.1.1. Taxonomic distinctness

Yes. The Grass Pickerel (*Esox americanus vermiculatus*) has been known as an entity since at least 1846 (Crossman 1966). It is recognized as a subspecies of the Redfin Pickerel (*Esox americanus*) in the Fifth Edition of the American Fisheries Society's list of Common and Scientific Names of Fishes from the United States and Canada (Robins et al. 1991). The subspecies is recognized as morphologically and genetically distinct (Grande et al. 2004). In the sixth edition (Nelson et al. 2004), it was decided not to list subspecies, but the subspecies is still considered valid, and the Grass Pickerel been assessed as a subspecies in Canada (COSEWIC 2005, 2014).

#### 2.1.2. Designatable units

No. Although natural and man-made barriers exist between populations in Ontario, there is currently no genetic or other evidence to suggest that populations are reproductively isolated (COSEWIC 2005; 2014).

#### 2.1.3. Native status

Yes. Crossman (1966) considers several longstanding populations of Grass Pickerel native to Ontario, and both the species and subspecies are considered native by NatureServe (2015).

#### 2.1.4. Occurrence

Yes. The Grass Pickerel was sampled in Ontario in 2014.

### 2.2. Eligibility results

The Grass Pickerel (*Esox americanus vermiculatus*) is eligible for status assessment in Ontario.

## 3. Ontario status assessment

### 3.1. Application of endangered/threatened status in Ontario

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

Insufficient information. The number of mature individuals is unknown.

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

Not applicable. The EO within Ontario was not calculated. However, based on a visual estimate of available mapping, it is likely that >95% of the EO is in Ontario, and could be estimated around 82,500 km<sup>2</sup>, which is well above either threshold for B1.

B2 is met for Endangered since the IAO for Ontario populations. The total Canadian IAO of 427 km<sup>2</sup> was calculated for the entire Canadian range, and the Ontario IAO would be lower than this, perhaps by 5-10%. In any case, the IAO for Ontario meets the threshold for Endangered (<500 km<sup>2</sup>).

However, there are 14 locations in Ontario, which exceeds the threshold (10) for Threatened. There is also no evidence of continuing decline in EO, IAO, area, extent or quality of habitat. Although declines have been observed in the number of mature individuals at a few sub-populations (Beaver Creek, Jones Creek, Twenty Mile Creek), the magnitude of this decline is not known, and other sub-populations appear more stable. There is no evidence that this represents a continuing decline.

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

Insufficient information. The number of mature individuals is unknown.

### 3.1.4. Criterion D – Very small or restricted total population

Insufficient information. The number of mature individuals is unknown.

### 3.1.5. Criterion E – Quantitative analysis

Insufficient information. Population Viability Analysis has not been completed.

## 3.2. Application of Special Concern in Ontario

The Grass Pickerel is designated as Special Concern since it is near to qualifying as Endangered under B2 due to a small IAO (less than 427 km<sup>2</sup> for Ontario). However, the number of Ontario locations (14) exceeds the thresholds for the Grass Pickerel to be considered Threatened or Endangered.

Nonetheless, there appear to be declines at some locations, and although the magnitude of the declines is not known, preliminary data suggest that populations may be significantly reduced at three locations (i.e., thousands of individuals in 2009 to hundreds in 2013). The 14 Ontario locations are also relatively fragmented based on the limited movements of this species.

It is possible that without monitoring and mitigation of threats such as drain construction and maintenance, cottage development and the spread of invasive species, the Grass Pickerel may become Threatened in future. There was no Threats Calculator available for the Grass Pickerel. Therefore, a designation of Special Concern is considered to apply to the Grass Pickerel. Rescue effect is considered possible, although not likely

(see below).

### 3.3. Status category modifiers

#### 3.3.1. Ontario's conservation responsibility

Does not apply. Global rank is G5T5, and <10% of the global range, and probably global population, is found in Ontario.

#### 3.3.2. Rescue effect

Unlikely. Rescue of Ontario Grass Pickerel populations from outside jurisdictions is considered possible, but unlikely. The status of this taxon (*E. americanus vermiculatus*) in adjacent US states is difficult to assess, since *E. americanus* has been ranked only at the species level in many US states (NatureServe 2015). Immigration from the US is only considered possible in the Upper St. Lawrence River populations (i.e. 4 of the 14 Ontario locations). Although the species is known from the US side of Lakes Erie and Ontario, it is not likely that individuals would travel long distances (COSEWIC 2014). Immigration to Ontario from Quebec, where there is only one small extant population, is possible but unlikely because population sizes are likely quite small.

### 3.4. Other status categories

#### 3.4.1. Data deficient

Not applicable.

#### 3.4.2. Extinct or extirpated

Not applicable.

#### 3.4.3. Not at risk

Not applicable.

## 4. Summary of Ontario status

Grass Pickerel (*Esox americanus vermiculatus*) is classified as Special Concern in Ontario.

## 5. Information sources

Beauchamp, J., A.L. Boyko, S. Dunn, D. Hardy, P.L. Jarvis, and S.K. Staton. 2012. Management plan for the Grass Pickerel (*Esox americanus vermiculatus*) in Canada. *Species at Risk Act Management Plan Series*. Fisheries and Oceans Canada, Ottawa. vii + 47 pp.



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## Appendix 1: Technical summary for Ontario

Species: Grass Pickerel

### 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.	3-4 years
Is there an observed, inferred, or projected continuing decline in number of mature individuals?	Maybe
Estimated percent of continuing decline in total number of mature individuals within 5 years or 2 generations.	Unknown
Observed, estimated, inferred, or suspected percent reduction or increase in total number of mature individuals over the last 10 years or 3 generations. There have likely been declines in at least some Ontario locations in the last 10 years (Beaver Creek, Twenty Mile Creek, Jones Creek).	Unknown (Observed or inferred for some populations)
Projected or suspected percent reduction or increase in total number of mature individuals over the next 10 years or 3 generations.	Unknown
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.	Unknown
Are the causes of the decline a. clearly reversible and b. understood and c. ceased?	N/A. No conclusive evidence of recent decline across Ontario range.
Are there extreme fluctuations in number of mature individuals? Limited sampling precludes a definitive answer, but two Ontario studies with targeted sampling over multiple years show no evidence of extreme fluctuation in abundance.	Unknown, but unlikely

### Extent and occupancy information in Ontario

Extent and occupancy attributes	Value
Estimated extent of occurrence. (Request value from MNR or use <a href="http://geocat.kew.org/">http://geocat.kew.org/</a> )	~82,500 km <sup>2</sup> (estimate)

Index of area of occupancy (IAO). (Request value from MNR or use <a href="http://geocat.kew.org/">http://geocat.kew.org/</a> )	Less than 427 km <sup>2</sup> (COSEWIC 2014), Ontario only
Is the total population severely fragmented? (i.e. is >50% of its total area of occupancy is in habitat patches that are (a) smaller than would be required to support a viable population, and (b) separated from other habitat patches by a distance larger than the species can be expected to disperse?)	a. No b. No
Number of locations (as defined by COSEWIC). Severn River Drainage Grass Lake Old Ausable Channel Lower Grand River Lake St. Clair area; Walpole Island, Little Bear Creek Lake Erie Western Basin, including Point Pelee, Holiday Beach Long Point Upper Niagara River Drainage Lower Niagara River main stem Twenty Mile Creek Upper Welland River Eastern Lake Ontario Upper St. Lawrence River (above fall line) - Jones Creek and upper Gananoque River Upper St. Lawrence River (below fall line; urbanization, agriculture)	14
Number of NHIC Element Occurrences	N/A
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 populations?	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?	Probably
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

Rescue effect

<b>Rescue effect attribute</b>	<b>Likelihood</b>
Is immigration of individuals and/or propagules between Ontario and outside populations known or possible?	Possible but unlikely
Would immigrants be adapted to survive in Ontario?	Yes
Is there sufficient suitable habitat for immigrants in Ontario?	Probably
Is the species of conservation concern in bordering jurisdictions?	No
Is rescue from outside populations reliant upon continued intensive recovery efforts?	No

## Appendix 2: Adjoining jurisdiction status rank and decline Information regarding status rank and decline for Grass Pickerel

Jurisdiction	Subnational rank	Population trend	Sources
Ontario	S3	Probable decline	NatureServe 2015
Quebec	S1	Possible decline	NatureServe 2015
Manitoba	Not present	n/a	n/a
Michigan	S5	Unknown	COSEWIC 2014 Note that S-ranks cited in COSEWIC 2014 appear to be for the species level, <i>Esox americanus</i> . This subspecies, <i>E. americanus vermiculatus</i> has been ranked by NatureServe (2015) in only 4 jurisdictions (ON, QC, NJ, WV).
Minnesota	Unknown	n/a	n/a
Nunavut	Not present	n/a	n/a
New York	S4	Unknown	COSEWIC 2014
Ohio	S5	Unknown	COSEWIC 2014
Pennsylvania	S4	Unknown	COSEWIC 2014
Wisconsin	Unknown	n/a	n/a

### 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

GRANK: global conservation status assessments

IAO: index of area of occupancy

MNRF: Ministry of Natural Resources and Forestry

NHIC: Natural Heritage Information Centre

NRANK: National conservation status assessment

SARA: Species at Risk Act

SRANK: subnational conservation status assessment

S1: Critically imperiled

S3: Vulnerable

S4: Apparently Secure

S5: Secure