COSEWIC
Rapid Review of Classification

on the

Paddlefish
Polyodon spathula

in Canada

EXTIRPATED
2019

COSEWIC
Committee on the Status
of Endangered Wildlife
in Canada

COSEPAC
Comité sur la situation
des espèces en péril
au Canada

The Rapid Review of Classification process is used by COSEWIC for Wildlife Species that have not changed status since the previous COSEWIC assessment. Readily available information from the previous status report or status appraisal summary, recovery documents, recovery teams, jurisdictions, conservation data centres, and species experts was initially reviewed by the relevant Species Specialist Subcommittees before being reviewed by COSEWIC. The following is a summary of the relevant information.

COSEWIC Rapid Review of Classification are working documents used in assigning the status of wildlife species suspected of being at risk in Canada. This document may be cited as follows:

COSEWIC. 2019. COSEWIC Rapid Review of Classification on the Paddlefish *Polyodon spathula* 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).

Production note:
COSEWIC acknowledges Pete Cott for writing the rapid review of classification on the Paddlefish, *Polyodon spathula*, in Canada, prepared under contract with Environment and Climate Change Canada. This rapid review of classification was overseen and edited by Nicholas Mandrak, Co-chair of the COSEWIC Freshwater Fishes Specialist Subcommittee.

For additional copies contact:

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

Tel.: 819-938-4125
Fax: 819-938-3984
E-mail: ec.cosepac-cosewic.ec@canada.ca
https://www.canada.ca/en/environment-climate-change/services/committee-status-endangered-wildlife.html

Également disponible en français sous le titre Examen rapide de la classification du COSEPAC sur le Spatulaire (*Polyodon spathula*) au Canada.

Catalogue No. CW69-18/3-2019E-PDF
ISBN 978-0-660-32449-4

COSEWIC
Assessment Summary

Assessment Summary – May 2019

Common name
Paddlefish

Scientific name
Polyodon spathula

Status
Extirpated

Reason for designation
This fish, once found in the Great Lakes, was never common in the Canadian portion of its range. The species has not been observed in Canadian waters since the early 1900s despite extensive sampling and being a large distinctive fish that is easily recognizable.

Occurrence
Ontario

Status history
Disappeared from Canada in approximately 1913. Designated Extirpated in April 1987. Status re–examined and confirmed in May 2000, April 2008 and May 2019.

COSEWIC
Rapid Review of Classification

PREVIEW

Paddlefish (*Polyodon spathula*) is a large filter-feeding fish with a distinctive paddle-shaped nose. This species is extirpated in Canada, with the last observations of wild Paddlefish being made prior to 1913 (Halkett 1913).

Paddlefish is extirpated from the Great Lakes basin (Roseman *et al*. 2009). The EOO and IAO are both zero as indicated in the 2008 assessment. No new observations of Paddlefish have been made in Canada since at least 1913. Note: Halkett (1913) summarized the historical records of Paddlefish in Canada, Parker (1988) reiterated this summary citing Halkett (1913). The date of 1917 as the last time Paddlefish were observed in Canada appears to be an error first occurring in Parker (1988) and subsequently repeated. The 1917 date is not connected to an observation, location, reference or any other form of substantiation. The last known observations of Paddlefish in Canada should therefore be referred to as prior to 1913.

There has been no change in effective protection for Paddlefish. This species was listed as “Schedule 1 – Extirpated” under the *Species at Risk Act* (SARA) in 2003, with a recovery strategy accepted February 2008. No changes to the effective protection of Paddlefish under SARA has occurred since the last assessment. The federal recovery strategy concluded that the recovery of this species in Canada would not be technically or biologically feasible and, as such, no further recovery action is currently recommended (Reid *et al*. 2007). The *Fisheries Act* was revised in 2012, with a change from protecting fishes and fish habitat for all fishes, to just those fishes supporting Aboriginal, commercial, and recreational fisheries. Sport and commercial fishing is conducted in some jurisdictions in the core of this species’ range; however, Canada has always been on the periphery of the Paddlefish range and thus Paddlefish has never been the target of any Canadian fishery.

Although substantial commercial, subsistence, recreational, and scientific fishing using gear suitable for Paddlefish is ongoing in the Great Lakes, there have been no new records of Paddlefish in Canada, or in the Great Lakes basin, since 1913. The United States Geological Survey, Great Lakes database was queried for Paddlefish in the past 60+ years and produced no returns (Owen 2018). Paddlefish does not occur as a searchable species in the Ontario Ministry of Natural Resources and Forestry, Ontario Natural Heritage Information Centre database, nor was any new information available from Fisheries and Oceans Canada.

Updated map: □ Required x Not required

Explanation / updated map provided:

Not required.

Paddlefish is extirpated with the last observations in Canada made over a century ago (Halkett 1913; Parker 1988; COSEWIC 2008). There are only five known historical records of Paddlefish in Canadian waters of the Great Lakes. All known observations in Canada were summarized by Halkett (1913), in which he described Paddlefish as “exceedingly rare” in Canada. Further, as mentioned in previous assessments (e.g., COSEWIC 2008), Paddlefish, being a unique and conspicuous animal, would be unlikely to escape attention if present in the wild. This is particularly so considering the amount of commercial, subsistence, recreational, and scientific fishing conducted throughout the Great Lakes.

TECHNICAL SUMMARY

Polyodon spathula

Paddlefish

Spatulaire

Range of occurrence in Canada (province/territory/ocean): Ontario

Demographic Information

Generation time (usually average age of parents in the population; indicate if another method of estimating generation time indicated in the IUCN guidelines(2011) is being used)	16 y for males 26 y for females
Is there an [observed, inferred, or projected] continuing decline in number of mature individuals?	n/a
Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations]	n/a
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over the last [10 years, or 3 generations].	n/a
[Projected or suspected] percent [reduction or increase] in total number of mature individuals over the next [10 years, or 3 generations].	n/a
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over any [10 years, or 3 generations] period, over a time period including both the past and the future.	n/a
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?	n/a, as there are no individuals.

Extent and Occupancy Information

Estimated extent of occurrence (EOO)	0 km²
Index of area of occupancy (IAO) (Always report 2x2 grid value).	0 km²
Is the 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 (b) separated from other habitat patches by a distance larger than the species can be expected to disperse?	a. n/a b. n/a

Number of "locations"* (use plausible range to reflect uncertainty if appropriate)	0
Is there an [observed, inferred, or projected] decline in extent of occurrence?	n/a
Is there an [observed, inferred, or projected] decline in index of area of occupancy?	n/a
Is there an [observed, inferred, or projected] decline in number of subpopulations?	n/a
Is there an [observed, inferred, or projected] decline in number of "locations"*?	n/a
Is there an [observed, inferred, or projected] decline in [area, extent and/or quality] of habitat?	Yes, decline in habitat. The introduction of dreissenid mussels into the Great Lakes has resulted in a decline in pelagic productivity.
Are there extreme fluctuations in number of subpopulations?	n/a
Are there extreme fluctuations in number of "locations"*?	n/a
Are there extreme fluctuations in extent of occurrence?	n/a
Are there extreme fluctuations in index of area of occupancy?	n/a

Number of Mature Individuals (in each subpopulation)

Subpopulations (give plausible ranges)	N Mature Individuals
	0
Total	0

Quantitative Analysis

Is the probability of extinction in the wild at least [20% within 20 years or 5 generations, or 10% within 100 years]?	n/a

Threats (direct, from highest impact to least, as per IUCN Threats Calculator)

Was a threats calculator completed for this species? No

It is not known what led to the demise of Paddlefish in Canada or the Great Lakes. Trautman (1981) suggested that its extirpation from Lake Erie could have been the result of blocking of upstream spawning migrations by dams on tributaries and/or destruction of the spawning habitat. As a pelagic planktivore, Paddlefish would be negatively impacted by the decline in the pelagic productivity of the Great Lakes following the introduction of dreissenid mussels.

* See Definitions and Abbreviations on COSEWIC website and IUCN (Feb 2014) for more information on this term

Rescue Effect (immigration from outside Canada)

Status of outside population(s) most likely to provide immigrants to Canada. Note that in the Great Lakes states in which it is not extirpated, it only occurs outside of the Great Lakes basin.	MN, OH, WI: S2 (imperiled) IL: S2S3 (imperiled-vulnerable) IN: S4 (apparently secure) MI, NY, PA: SX (presumably extirpated)
Is immigration known or possible?	no
Would immigrants be adapted to survive in Canada?	unknown
Is there sufficient habitat for immigrants in Canada?	unknown
Are conditions deteriorating in Canada?+	yes
Are conditions for the source (i.e., outside) population deteriorating?+	n/a
Is the Canadian population considered to be a sink?+	unknown
Is rescue from outside populations likely?	no

Data Sensitive Species

Is this a data sensitive species?	no

Status History

COSEWIC Status History: Disappeared from Canada in approximately 1913. Designated Extirpated in April 1987. Status re-examined and confirmed in May 2000, April 2008 and May 2019.

Status and Reasons for Designation:

Status: Extirpated	**Alpha-numeric codes:** Not applicable
Reasons for designation: This fish, once found in the Great Lakes, was never common in the Canadian portion of its range. The species has not been observed in Canadian waters since the early 1900s despite extensive sampling and being a large distinctive fish that is easily recognizable.	

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Not applicable.
Criterion B (Small Distribution Range and Decline or Fluctuation): Not applicable.
Criterion C (Small and Declining Number of Mature Individuals): Not applicable.
Criterion D (Very Small or Restricted Population): Not applicable.
Criterion E (Quantitative Analysis): Not applicable.

+ See Table 3 (Guidelines for modifying status assessment based on rescue effect)

ACKNOWLEDGEMENTS

The writer would like to thank all of the experts contacted for their willingness to share information, as well as Jenny Wu and Marie-France Noel of the COSEWIC Secretariat, and Nick Mandrak, the Freshwater Fishes Subcommittee Co-chair, for their advice and guidance with the development of this review of classification document.

AUTHORITIES CONTACTED

- Nick Mandrak, University of Toronto
- Scott Reid, Ontario Ministry of Natural Resources and Forestry, Species at Risk
- Andrew Muir, Great Lakes Fishery Commission
- Marty Stapanian, United States Geological Survey, Great Lakes Science Centre, Ohio
- Chuck Madenjian, United States Geological Survey, Great Lakes Science Centre, Michigan
- Chuck Owen, United States Geological Survey, Great Lakes Science Centre, Lake Superior Biological Station
- Patrick Kocovsky, United States Geological Survey, Great Lakes Science Centre, Lake Erie Biological Station
- Douglas Nelson, University of Michigan - Museum of Zoology
- Donald Sutherland, Ontario Ministry of Natural Resources and Forestry, Natural Heritage Information Centre
- Erling Holm, Royal Ontario Museum
- Doug Watkinson, Fisheries and Oceans Canada, Freshwater Institute
- Andrew Drake, Fisheries and Oceans Canada, Great Lakes Laboratory for Fisheries and Aquatic Sciences
- Craig Paukert, University of Missouri

INFORMATION SOURCES

COSEWIC. 2008. Update COSEWIC Status Report on the Paddlefish *Polyodon spathula* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 26 pp.

Halkett, A. 1913. Check list of the Fishes of the Dominion of Canada and Newfoundland. King’s Printer. Ottawa. 138 pp.

NatureServe. 2018. Website: www.explorer.natureserve.org [accessed 19 October 2018].

Owen, C. pers. comm. 2018. *Email correspondence to P. Cott*. United States Geological Survey Great Lakes Science Centre, Lake Superior Biological Station.

Parker B.J. 1988. Status of the paddlefish, *Polyodon spathula*, in Canada. Canadian Field-naturalist 102(2):291-5.

Pothoven, S.A., and C.P. Madjenian, 2008. Changes in consumption by alewives and lake whitefish after dreissenid mussel invasion of Lakes Michigan and Huron. North American Journal of Fisheries Management 28: 308-320.

Reid, S.M., A.L. Edwards, and B. Cudmore. 2007. Recovery Strategy for the Paddlefish (*Polyodon spathula*) in Canada. Species at Risk Act Recovery Strategy Series, Fisheries and Oceans Canada, Ottawa. iv+14 pp.

Riley, S.C., E.F. Roseman, S.J. Nichols, T.P. O'Brien, C.S. Kiley, and J.S. Schaeffer. 2008. Deepwater demersal fish community collapse in Lake Huron. Transactions of the American Fisheries Society 137:1879-1890.

Roseman, E.F., J.S. Schaeffer, and P.J. Steen. 2009. Review of fish diversity in the Lake Huron basin. Journal of Aquatic Ecosystem Health and Management 12:11–22.

Trautman, M.B. 1981. The fishes of Ohio with illustrated keys. Ohio State Univ. Press, Columbus, Ohio.

WRITER OF RROC

Pete Cott is a biologist based in Yellowknife NWT, and is a member of the Freshwater Fishes Specialist Subcommittee for COSEWIC. His PhD research focused on the reproductive ecology of Burbot.

COSEWIC HISTORY

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. On June 5, 2003, the *Species at Risk Act* (SARA) was proclaimed. SARA establishes COSEWIC as an advisory body ensuring that species will continue to be assessed under a rigorous and independent scientific process.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species, subspecies, varieties, or other designatable units that are considered to be at risk in Canada. Designations are made on native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fishes, arthropods, molluscs, vascular plants, mosses, and lichens.

COSEWIC MEMBERSHIP

COSEWIC comprises members from each provincial and territorial government wildlife agency, four federal entities (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biodiversity Information Partnership, chaired by the Canadian Museum of Nature), three non-government science members and the co-chairs of the species specialist subcommittees and the Aboriginal Traditional Knowledge subcommittee. The Committee meets to consider status reports on candidate species.

DEFINITIONS (2019)

Wildlife Species	A species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.
Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)**	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)***	A category that applies when the available information is insufficient (a) to resolve a species' eligibility for assessment or (b) to permit an assessment of the species' risk of extinction.

* 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. Definition of the (DD) category revised in 2006.

Environment and Climate Change Canada
Canadian Wildlife Service
Environnement et Changement climatique Canada
Service canadien de la faune
Canada

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