COSEWIC
Status Appraisal Summary

on the

Basking Shark
Cetorhinus maximus

Pacific population

in Canada

ENDANGERED
2018

COSEWIC
Committee on the Status
of Endangered Wildlife
in Canada

COSEPAC
Comité sur la situation
des espèces en péril
au Canada

COSEWIC status appraisal summaries 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:

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COSEWIC
Assessment Summary

Assessment Summary – April 2018

Common name
Basking Shark - Pacific population

Scientific name
Cetorhinus maximus

Status
Endangered

Reason for designation
In Canada, the species was once subject to directed fisheries and control programs. While such activities have long ceased, they reduced abundance to very low levels. The species is especially vulnerable to incidental fishing mortality because of its low intrinsic productivity. This species continues to suffer from human-induced mortality, primarily through entanglement with gear. Fisheries and Oceans Canada has engaged in research and monitoring to better understand the current status and the habitat requirements. There has also been increased public awareness. Despite the increase in overall attention to this species, there is no evidence of recovery and the designation of Endangered is still supported by the limited new information available since the last assessment.

Occurrence
British Columbia, Pacific Ocean

Status history
Designated Endangered in April 2007. Status re-examined and confirmed in April 2018.

COSEWIC
Status Appraisal Summary

Basking Shark (Pacific population)

Pèlerin (population du Pacifique)

Cetorhinus maximus

Range of occurrence in Canada (province/territory/ocean): Pacific Ocean, British Columbia

Status History:

COSEWIC: Designated Endangered in April 2007. Status re-examined and confirmed in April 2018.

Evidence (indicate as applicable):

Wildlife species:

Change in eligibility, taxonomy or designatable units: yes ☐ no ☒

Explanation: The 2007 COSEWIC assessment defined the designatable unit for Basking Shark as "Canadian Pacific waters".

Understanding the general movement patterns of Basking Shark in the Northeast Pacific continues to be hampered by limited number of tagged individuals. Since the last assessment, there has only been one Basking Shark in the Northeast Pacific that has been successfully tracked using a satellite transmitter. This particular shark was tagged off the coast of Southern California and travelled across the open ocean and resurfaced near Hawaii eight months later (NOAA 2015). Although only one shark has been tagged, it has provided evidence contrary to the long-held view that Basking Sharks are primarily confined to the continental shelf and migrate north and south on a seasonal basis. While this evidence from this single observation suggests that the current DU definition found in the 2007 COSEWIC report may require revision, the available data are not yet sufficient to support a change. Numerous satellite tags have been deployed in the North Atlantic and have demonstrated that Basking Sharks in the North Atlantic are capable of transoceanic and transequatorial migrations (Gore *et al*. 2008; Skomal *et al*. 2009).

Range:

Change in Extent of Occurrence (EOO): yes ☐ no ☒ unk ☐

Change in Index of Area of Occupancy (IAO) : yes ☐ no ☒ unk ☒

Change in number of known or inferred current locations[1]: yes ☐ no ☒ unk ☐

Significant new survey information yes ☒ no ☐

Explanation:

Measures of the distribution of this species have not changed. The extent of occurrence (EOO) in the previous status report was based on the concept of a Canadian DU. The EOO was defined as the Canadian continental shelf at depths less than 200m. All Canadian sightings since 2007 have occurred within this distribution. The concept of locations does not apply to this species.

1 Use the IUCN definition of "location"

Population Information:

Change in number of mature individuals: yes ☐ no ☒ unk☐

Change in population trend: yes ☐ no ☒ unk☐

Change in severity of population fragmentation: yes ☐ no ☐ unk☒

Change in trend in area and/or quality of habitat: yes ☐ no ☐ unk ☒

Significant new survey information yes ☒ no ☐

Explanation:

Generation time is estimated to between 22 and 33 years. There are no estimates or indices to better quantify the size or current trajectory of the population of Basking Shark in Canada or elsewhere in its likely range (DFO 2011). However, between 1996 and 2015, there have been only 33 confirmed sightings in Canadian waters (DFO 2016). Since the 2007 assessment, there has been a concerted effort to obtain sightings through aerial surveys and public reporting (DFO 2016). Despite this effort, annual sightings have ranged between one and six per year.

Threats:

Change in nature and/or severity of threats: yes ☒ no ☐ unk ☐

Explanation:

Entanglement with fishing and aquaculture was identified in the Recovery Strategy to be the most likely threat to result in accidental mortality (McFarlane *et al*. 2009; DFO 2011). A confirmed 2014 record of a Basking Shark temporarily entangled in a gillnet is indication that the primary threat remains.

Microplastics in the marine environment are a newly identified threat, but the magnitude of the threats on large filter-feeders is unclear at present (Germanov *et al*. 2018).

Protection:

Change in effective protection: yes ☐ no ☐ unk ☒

Explanation:

Basking Shark was added to Schedule 1 of the *Species at Risk Act* in 2010 and a Recovery Strategy was completed in 2011 based on a Recovery Potential Assessment (DFO 2009; DFO 2011). In 2010, the U.S. National Marine Fisheries Service under the National Oceanographic and Atmospheric Administration (NOAA) identified the Pacific population of Basking Shark as a “species of concern” (NOAA 2010). Basking Shark is listed under Appendix II of CITES (CITES 2009). While these listings have occurred, it is not yet known if effective protection has been implemented.

Rescue Effect:

Change in evidence of rescue effect: yes ☐ no ☒

Explanation:

There is no further information to better understand the movement patterns into Canada from the United States or into the Northeast Pacific from international waters.

Quantitative Analysis:

Change in estimated probability of extirpation: yes ☐ no ☐ unk ☒

Details: No quantitative analysis has been undertaken.

Summary and Additional Considerations: [e.g., recovery efforts]

Since the previous COSEWIC report in 2007, Fisheries and Oceans Canada has developed a Recovery Strategy and has engaged in research and monitoring to better understand the current status and the habitat requirements. There has also been increased public awareness. Despite the increase in overall attention to this species, there are few sightings and no indication from anywhere in the known distribution to suggest that the population is recovering.

Acknowledgements and authorities contacted:

The report writer was in contact with Heidi Dewar from NOAA to get an update on sightings and tagging information from California waters.

Information sources:

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TECHNICAL SUMMARY

Cetorhinus maximus

Basking Shark, Pacific population

Pèlerin, Population du Pacifique

Range of occurrence in Canada (province/territory/ocean): British Columbia, Pacific Ocean

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)	22-33 years (based on two estimates provided in COSEWIC 2007, one followed IUCN guidelines, the other unknown)
Is there an [observed, inferred, or projected] continuing decline in number of mature individuals?	Yes (inferred)
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].	decline >90% (inferred)
[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] period, over a time period including both the past and the future.	decline >90% (inferred)
Are the causes of the decline a.clearly reversible and b.understood and c. ceased?	a.Yes b.Yes c. No
Are there extreme fluctuations in number of mature individuals?	No

Extent and Occupancy Information

Estimated extent of occurrence (EOO)	2007 report was limited to Canadian waters at 80,000 km^2. However, given uncertainties in the DU, EOO could be considered unknown, but likely greater than 20,000 km^2.
10.Index of area of occupancy (IAO) (Always report 2x2 grid value).	Unknown.
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. Unknown, unlikely b. Unknown, unlikely.

Number of “locations”* (use plausible range to reflect uncertainty if appropriate)	N/A, the concept of locations does not apply for this species
Is there an [observed, inferred, or projected] decline in extent of occurrence?	Unknown, unlikely
Is there an [observed, inferred, or projected] decline in index of area of occupancy?	Unknown
Is there an [observed, inferred, or projected] decline in number of subpopulations?	Unknown
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?	Unknown, but unlikely
Are there extreme fluctuations in number of subpopulations?	Unknown, but unlikely
Are there extreme fluctuations in number of “locations”∗?	N/A
Are there extreme fluctuations in extent of occurrence?	Unknown, but unlikely
Are there extreme fluctuations in index of area of occupancy?	Unknown, but unlikely

Number of Mature Individuals (in each subpopulation)

Subpopulations (give plausible ranges)	**N Mature Individuals**
Unknown	COSEWIC (2007) reported that the minimum historical population was at least 750 individuals. With a decline rate of >90%, it appears likely that less than 250 individuals remain. Also, McFarlane *et al*. (2009) estimate that some proportion of the full range-wide population (321-535) individuals utilize Canadian waters.
Total	

Quantitative Analysis

Is the probability of extinction in the wild at least [20% within 20 years or 5 generations, or 10% within 100 years]?	Unknown. No quantitative analysis available for probability of extinction, although McFarlane *et al*. (2009) provide rebuilding time-frames under various scenarios.

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

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

Was a threats calculator completed for this species? No. i. Entanglement/bycatch What additional limiting factors are relevant? Microplastics, but severity of the threat is unknown at present.

Rescue Effect (immigration from outside Canada)

Status of outside population(s) most likely to provide immigrants to Canada.	Depleted (NOAA 2010)
Is immigration known or possible?	Unlikely
Would immigrants be adapted to survive in Canada?	Yes
Is there sufficient habitat for immigrants in Canada?	Unknown
Are conditions deteriorating in Canada?[+]	Unknown
Are conditions for the source population deteriorating?[+]	Unknown
Is the Canadian population considered to be a sink?[+]	Unknown
Is rescue from outside populations likely?	Unlikely

Data Sensitive Species

Is this a data sensitive species? No

Status History

COSEWIC: Designated Endangered in April 2007. Status re-examined and confirmed in April 2018.

Status and Reasons for Designation:

Status:	**Alpha-numeric codes:**
Endangered.	A2ad; C2a(i); D1
Reasons for designation: In Canada, the species was once subject to directed fisheries and control programs. While such activities have long ceased, they reduced abundance to very low levels. The species is especially vulnerable to incidental fishing mortality because of its low intrinsic productivity. This species continues to suffer from human-induced mortality, primarily through entanglement with gear. Fisheries and Oceans Canada has engaged in research and monitoring to better understand the current status and the habitat requirements. There has also been increased public awareness. Despite the increase in overall attention to this species, there is no evidence of recovery and the designation of Endangered is still supported by the limited new information available since the last assessment.	

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

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Meets Endangered, A2ad (population decline >50% over the past three generations), based on direct observations and actual or potential human-induced mortality.
Criterion B (Small Distribution Range and Decline or Fluctuation): Not applicable.
Criterion C (Small and Declining Number of Mature Individuals): Meets Endangered, C2a(i), with an inferred number of mature individuals < 250 and an estimated continuing decline rate of at least 20% in two generations. The last full assessment considered the remaining population to be “virtually nil”. Between 1996 and 2015, there have been only 33 confirmed sightings in Canadian Pacific waters (DFO 2016), in spite of increased survey and public awareness efforts being devoted to this species.
Criterion D (Very Small or Restricted Population): Meets Endangered, D1, because the remaining population is suspected to be less than 250 individuals.
Criterion E (Quantitative Analysis): Not done

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 (2018)

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
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