Action Plan for North America

Sustainable Trade in Sharks

Commission for Environmental Cooperation

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For more information:

Commission for Environmental Cooperation
393, rue St-Jacques Ouest, bureau 200
Montreal (Quebec)
H2Y 1N9 Canada
t 514.350.4300 f 514.350.4314
info@cec.org / www.cec.org

Action Plan for North America

Sustainable Trade in Sharks

Great white shark (*Carcharodon carcharias*)

George T. Probst

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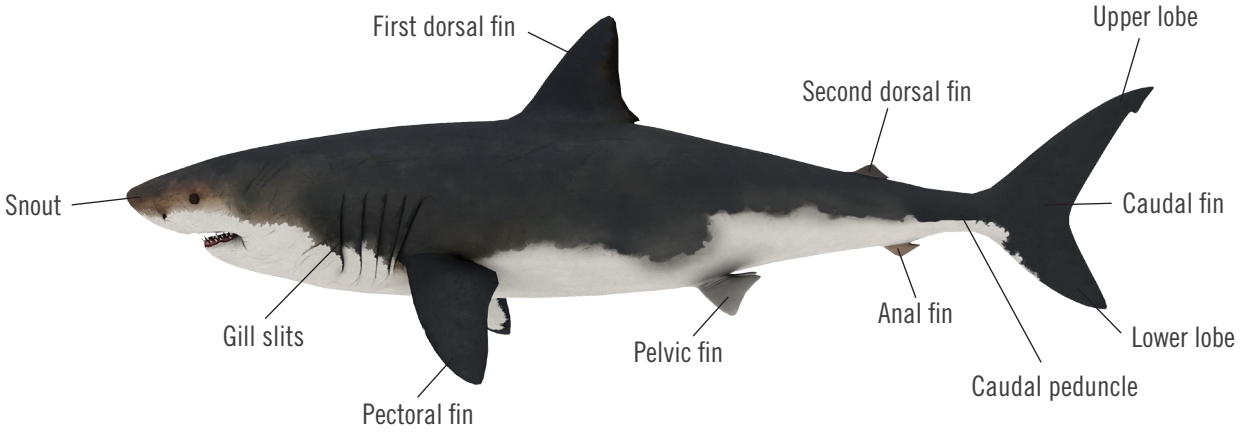
List of Abbreviations and Acronyms

CBSA	Canada Border Services Agency
CEC	Commission for Environmental Cooperation
CFIA	Canadian Food Inspection Agency
CICESE	*Centro de Investigación Científica y de Educación Superior de Ensenada* (Ensenada Center for Scientific Research and Higher Education; Mexico)
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNP	*Carta Nacional Pesquera* (National Fishing Chart; Mexico)
Conabio	*Comisión Nacional para el Conocimiento y Uso de la Biodiversidad* (National Commission for the Knowledge and Use of Biodiversity; Mexico)
Conanp	*Comisión Nacional de Áreas Naturales Protegidas* (National Commission of Natural Protected Areas; Mexico)
Conapesca	*Comisión Nacional de Pesca y Acuacultura* (National Commission of Fishing and Aquaculture; Mexico)
CoP	Conference of the Parties (CITES)
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CPCs	ICCAT Contracting Parties, Cooperating non-Contracting Parties, Entities or Fishing Entities
DGVS	*Dirección General de Vida Silvestre* (General Directorate for Wildlife; Mexico)
DNA	deoxyribonucleic acid
DPS	distinct population segment
ECCC	Environment and Climate Change Canada (formerly Environment Canada)
ESA	Endangered Species Act (United States)
FAO	Food and Agriculture Organization (of the United Nations)
FOC	Fisheries and Oceans Canada
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICES	International Council for the Exploration of the Sea
Inapesca	*Instituto Nacional de Pesca* (National Institute of Fishing; Mexico)
IPOA-Sharks	International Plan of Action for the Conservation and Management of Sharks (FAO)
IUCN	International Union for Conservation of Nature
LGPAS	*Ley General de Pesca y Acuacultura Sustentable* (General Law for Sustainable Fishing and Aquaculture; Mexico)
LGVS	*Ley General de Vida Silvestre* (General Wildlife Law; Mexico)
MSC	Marine Stewardship Council
mt	metric tons

NDF	non-detriment finding
NMFS	National Marine Fisheries Service (United States)
NOAA	National Oceanic and Atmospheric Administration (United States)
NOM	*Norma Oficiale Mexicana* (Official Mexican Standard)
NOM-059	Official Mexican Standard NOM059-SEMARNAT-2010 (Mexico)
NPOA	National Plan of Action (herein, for sharks)
NPOA-Sharks	National Plan of Action for Sharks (Canada)
PANMCT	*Plan de Acción Nacional para el Manejo y Conservación de Tiburones, Rayas y Especies Afines en México* (National Plan of Action for the Management and Conservation of Sharks, Rays and Related Species in Mexico)
PEP	*Program de Especies Prioritarias* (Priority Species Program; Mexico)
Profepa	*Procuraduría Federal de Protección al Ambiente* (Office of the Federal Attorney for Environmental Protection; Mexico)
RFMO	regional fisheries management organization
Sagarpa	*Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación* (Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food; Mexico)
SARA	Species at Risk Act (Canada)
Semarnat	*Secretaría de Medio Ambiente y Recursos Naturales* (Secretariat of Environment and Natural Resources, Mexico)
SFU	Simon Fraser University (Canada)
SUMA	*Sistema Nacional de Unidades de Manejo para la Conservación de la Vida Silvestre* (National System of Management Units for the Conservation of Wildlife; Mexico)
TAH	total allowable harvest
UMA	*Unidades de Manejo y Aprovechamiento Sustentable de Vida Silvestre* (Units for Management and Sustainable Exploitation of Wildlife; Mexico)
UNEP-WCMC	United Nations Environment Programme World Conservation Monitoring Centre
UNAM	*Universidad Nacional Autónoma de México* (National Autonomous University of Mexico)
US	United States
US NPOA	US National Plan of Action for Conservation and Management of Sharks
USFWS	United States Fish and Wildlife Service
WAPPRIITA	Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act (Canada)
WAPTR	Wild Animal and Plant Trade Regulations (Canada)
WCS	Wildlife Conservation Society
WED	Wildlife Enforcement Directorate (of Environment Canada)

Figure 1. **Basic anatomy of a shark**



Igor Filonenko

Note: Figure 1 shows a side (lateral) view of a *Carcharodon carcharias* (great white shark).

Abstract

This document is one of a set of five action plans that were prepared as part of a project by the Commission for Environmental Cooperation (CEC) to promote legal, sustainable and traceable trade in selected North American species that are listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The five action plans were produced under the guidance of the CITES Authorities of Canada, Mexico and the United States.

Eight shark species, from six different genera, were selected for this project and designated as "priority shark species." Information was compiled for the species as a group, including: the impact of trade on conservation and livelihoods; completion of CITES non-detriment findings (NDFs); and identification challenges for CITES enforcement. The eight species were also assessed as to their distribution, conservation status, trade and commercial pricing. A total of 17 recommended actions are proposed to improve cooperation among North American stakeholders, expand collection and analysis of shark fisheries and trade data, increase public awareness, update shark fisheries management in Mexico, and build enforcement capacity. These actions were developed based on the information compiled for this document and from consultation with stakeholders.

Executive Summary

This action plan presents 17 recommended actions for promoting sustainable trade in the priority shark species and provides an overview of the species' distribution, conservation status, and trade, and information relevant to their management. The actions focus on improving cooperation among North American stakeholders; capacity for monitoring and reporting by the fishing sector; public awareness of conservation and regulation; management of Mexican fisheries; and building enforcement capacity. The information found in this action plan was compiled via literature review, data analysis, and consultation with experts and stakeholders from Canada, Mexico and the United States. A stakeholder workshop was held in Mexico City on 17–18 January 2017.

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Priority Species

Eight priority shark taxa were selected for inclusion in this action plan: *Carcharhinus longimanus*, *Carcharodon carcharias*, *Cetorhinus maximus*, *Lamna nasus*, *Rhincodon typus*, *Sphyrna lewini*, *S. mokarran* and *S. zygaena*. Four species occur in Canadian waters, seven occur in Mexico and all of the species are found in the United States. The threat of overexploitation for international trade is the principal reason each of these species has been listed in Appendix II of CITES. They are all listed as either Vulnerable or Endangered on the International Union for Conservation of Nature (IUCN) Red List. Sharks are primarily traded as parts, pieces and derivatives—including meat, fins, teeth, jaws—and as ingredients in health supplements and pharmaceuticals. Fins are the most valuable product for international trade. The identification of shark fins is a challenge for border officers and a significant challenge to the implementation of CITES.

Management and Conservation Overview

In 1998, the Food and Agriculture Organization of the United Nations (FAO) developed an International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks). IPOA-Sharks calls on each member country to adopt a National Plan of Action (NPOA) for the conservation and management of sharks, and to cooperate through regional fisheries management organizations (RFMOs) to ensure the sustainability of shark stocks. Canada, Mexico and the United States have each developed NPOAs in accordance with the principles and provisions of IPOA-Sharks. All three countries are members of the International Commission for the Conservation of Atlantic Tunas (ICCAT) and the Inter-American Tropical Tuna Commission (IATTC). Both of these RFMOs have adopted conservation and management measures that are relevant to the conservation of priority sharks.

Trade Overview

In Canada, the only priority shark species for which there has been a fishery is *L. nasus*. In 2013, the directed fishery for the species was suspended. Bycatch of *L. nasus* still occurs in the Canadian tuna and swordfish longline fisheries, and the groundfish longline, gillnet, and bottom-trawl fisheries. In Mexico, *C. longimanus*, *S. lewini*, *S. mokarran* and *S. zygaena* are currently fished. The meat of these species is not considered palatable in Canada and the United States, but is consumed in Mexico. Exports mainly consist of fins. In the United States, *L. nasus* is fished primarily for its meat, while *C. longimanus*, *S. lewini*, *S. mokarran* and *S. zygaena* are fished primarily for their fins. The L. nasus fishery has been restricted via a strict quota, and the US fishery for *C. longimanus* has been reduced significantly in the past five years. Since 2013, the United States has been monitoring, by individual species, the landings of *S. lewini*, *S. mokarran* and *S. zygaena*—managing the three species under a single quota.

Recommended Actions

The following table provides a summary of the actions recommended for promoting the conservation of priority shark species in Mexico, and their legal, sustainable trade throughout North America. Completion of the recommended actions is subject to available funding.

No.	Goals	Actions
1	Ensure that progress on the recommendations in this action plan is reported and measurable.	**Measuring progress**: The governments of Canada, Mexico and the United States should develop and implement a process for tracking and reporting on efforts to fulfill the recommendations of this action plan, such as a dedicated website or other method.
2	Support collaborative North American efforts directed at promoting sustainable, traceable trade and conservation of priority CITES Appendix II species.	(a) **Trinational collaboration**: The governments of Canada, Mexico and the United States should support and monitor collaborative efforts to promote sustainable, traceable trade and conservation of native species deemed to be of priority concern—including CITES Appendix II sharks. (b) **Funding strategy**: The governments of Canada, Mexico and the United States (to the extent possible, and in consideration of domestic priorities) should develop a long-term strategy for funding this action plan, emphasizing realization of the high-priority actions. (c) **Staff exchanges**: The relevant authorities in Canada, Mexico and the United States should consider short-term exchanges of staff to share experiences, information and resources for meeting CITES requirements for trade in sharks. This could use existing programs or new initiatives, and could include management, scientific and/or enforcement personnel.
3	Build the capacity of the fishing sector to compile and report accurate shark fisheries data.	(a) **Capacity-building strategy**: The Mexican government should engage a consultant to develop a capacity-building strategy for improving species-specific identification and reporting by the fisheries sector. (b) **Capacity-building implementation**: The Mexican government should engage a consultant to develop a capacity-building strategy for improving species-specific identification and reporting by the fisheries sector.
4	Improve public awareness about shark conservation, management and the relevant laws and regulations that support sustainable harvest and trade of sharks in Mexico.	**Mexican national outreach strategy**: Mexican CITES and fisheries authorities, in collaboration with academia and nongovernmental organizations, should develop a national outreach strategy for increasing public awareness of relevant legal instruments, CITES, and shark conservation, to improve the engagement in sustainable management by the fisheries sector.

	Goals	Actions
5	Support sustainable trade of sharks in North America through improved collection and analysis of fisheries and trade data.	(a) **Data compilation and analysis workshop**: The Mexican government, in collaboration with academia and nongovernmental organizations and with participation from Canada and the United States, should hold a workshop to explore and identify alternative methodologies for data compilation and analysis and assessing data-poor shark fisheries, for formulating non-detrimental findings and in accordance with national legislation. (b) **Compiling species-specific shark data**: Mexican fisheries authorities, CITES authorities and fishing communities should establish a collaborative program for collecting, compiling and reporting comprehensive species-specific data on catch and fishing effort, with emphasis on CITES-listed shark species. (c) **Trade-chain analysis**: Canada, Mexico, and the United States should compile comprehensive information on trade chains (from harvest to market) for CITES-listed shark species sourced in North America, to inform management and enforcement processes. (d) **Shark species–specific HS codes**: Canada, Mexico, and the United States should collaborate to support the work by FAO to institute shark species–specific Harmonized System (HS) codes under the World Customs Organization and support national efforts to collect species-specific harvest and trade data.
6	Provide enforcement officers with the information and resources necessary to identify shark specimens and enforce the laws that regulate shark trade.	(a) **Trinational training workshop**: Canada, Mexico and the United States should host a multi-agency trinational training workshop for enforcement officers, on: recognizing different shark products in trade; fundamentals of the international shark fin trade; trade law enforcement scenarios in North America; recognizing shark fins at different stages of processing; identifying fins of adults and juveniles of CITES species; addressing high-volume shipments; and selecting samples for forensic analysis. (b) **National enforcement training**: Canadian, Mexican and US CITES law enforcement authorities should provide officer training on shark fin identification relevant to national enforcement needs and forensic resources.
7	Support sustainable trade of sharks in North America by updating and improving the management of Mexican shark fisheries.	(a) **PANMCT review and update**: Conapesca, in collaboration with Inapesca, CITES authorities, academia, fisheries sectors, and nongovernmental organizations, should hold a workshop to review and update PANMCT to take into consideration changes that have taken place since the plan was published in 2004. These changes include additional CITES listings of elasmobranch species, and measures instituted by IATTC and ICATT to conserve sharks. (b) **Fisheries management techniques**: Mexican fisheries authorities should evaluate the effectiveness of, and possibly modify, the current fishing seasons, and evaluate other fisheries management techniques (such as quotas and/or size limits, and consideration of closing fisheries in areas of essential habitat) that could promote sustainable management of CITES-listed shark fisheries, in accordance with CITES requirements. (c) ***Carta Nacional Pesquera* (National Fishing Chart) update**: Inaspesca should add the genus *Sphyrna* to the CNP as a separate group. (d) **Mexican management plans**: The government of Mexico should prioritize completion of the Pacific and Gulf of Mexico Caribbean management plans for elasmobranch fisheries.

Whale shark (*Rhincodon typus*)

Background

In 2015, the governments of Canada, Mexico and the United States initiated a collaborative project through the Commission for Environmental Cooperation (CEC) to strengthen the conservation and sustainable trade of 56 North American taxa that are included in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The project, aligned with the CEC strategic priority on sustainable consumption and production, aims to provide guidance in the form of five action plans for reducing illegal and/or unsustainable harvest and trade; improving biological knowledge to allow science-based management decisions; and promoting traceability, species conservation, and livelihoods of stakeholders, throughout trade.

CITES came into force in 1975 and calls on the cooperation of the signatory countries to ensure that international trade does not threaten vulnerable specimens of wild animals and plants with extinction, and that trade is regulated and maintained at sustainable levels. To implement CITES, each Party to the Convention must designate one or more Management Authorities in charge of administering the permitting system, and one or more Scientific Authorities to advise them on the effects of trade on the conservation of species. Appendix II of CITES includes more than 34,000 species for which international trade is regulated to avoid over-exploitation and ensure their survival.

Process for Developing this Action Plan

The initial step in developing this action plan was a review of North American species listed in Appendix II of CITES, by the CEC project's Steering Committee, comprising CITES Authorities of Canada, Mexico and the United States. In total, 55 species and one genus were selected as "priority species" for the project. These species were selected because they are all native to North America and traded by more than one of the three North America countries. Furthermore, the Steering Committee determined that regional information exchange and collaboration would facilitate species conservation, CITES implementation, and trade legality, traceability and sustainability. These 56 taxa were organized into five groups: parrots, sharks, tarantulas, timber species (specific cacti and tropical hardwoods), and turtles and tortoises.

Then, a comprehensive review of the 56 taxa was developed to compile information on each species' conservation status, trade dynamics and commercial value. In addition, sustainable-use practices were documented, as was the impact of the species' trade on conservation, and the information needed for making CITES non-detriment findings (NDFs).[1] Species-identification challenges for CITES enforcement were reviewed and opportunities for promoting sustainable trade and conservation were discussed.

On 17–18 January 2017, a stakeholder consultation was held in Mexico City to gather information and recommendations for actions to promote sustainable trade and conservation of the priority shark species. This document draws on the information from the comprehensive review, at the stakeholder consultation, and consultations with CITES Authorities of Canada, Mexico and the United States.

This action plan includes information on eight priority shark species. The information was compiled for the species as a group, and included: the impact of trade on conservation and livelihoods; completion of NDFs; and identification challenges for CITES enforcement. Information on the distribution, conservation status, trade and commercial pricing of the eight species was also collected. A total of 17 recommended actions are proposed, to improve cooperation among North American stakeholders, expand collection and analysis of shark fisheries and trade data, increase public awareness, update shark fisheries management in Mexico, and build enforcement capacity. These actions were developed based on the information compiled for this document and from consultation with stakeholders.

1. Articles III and IV of the Convention text state that export permits for species listed in Appendices I and II may only be issued after the Scientific Authority of the exporting country has concluded that the export will not be detrimental to the survival of the species. Such a result from the evaluation process is known as a "non-detriment finding." Resolution Conference 10.3 outlines the role of the Scientific Authority, and Resolution Conference 16.7 provides recommendations for the process of making non-detriment findings (CITES 1973, 1997, 2013f).

Overview of the Priority Shark Species

Eight priority shark taxa were selected for this review: *Carcharhinus longimanus*, *Carcharodon carcharias*, *Cetorhinus maximus*, *Lamna nasus*, *Rhincodon typus*, *Sphyrna lewini*, *S. mokarran* and *S. zygaena*. All of these species are currently listed in Appendix II of CITES (CITES 2016a). Detailed species accounts, which include information on appearance, distribution, conservation status and trade, are provided in the *Priority Shark Species* section.

Carcharodon carcharias, *C. maximus*, *L. nasus* and *S. zygaena* occur in Canadian waters. However, *C. carcharias* occurs only sporadically, and *S. zygaena* is rare. (Canada 2010; COSEWIC 2006). Live specimens of *C. carcharias* are periodically observed in Atlantic Canada, but all records of *C. carcharias* on the Pacific coast of Canada consist of beached specimens on the shores of Haida Gwaii (Queen Charlotte Islands) (COSEWIC 2006; Hart 1980).

Each of the priority shark species occurs in Mexico except *L. nasus*. However, *C. maximus* is exceedingly rare in Mexican waters (Sandoval-Castillo et al. 2008). All of the priority shark species are found in the United States. Only three species (*C. carcharias*, *C. maximus* and *S. zygaena*) have ever been found in the waters of all three countries.

North American Government Authorities and Legislation

This section provides a short overview of the national laws and regulations that are specifically referenced in this document, along with a review of the government agencies or departments that are charged with their implementation.

Canada

Under Canada's Constitution, the provinces and territories have jurisdiction over wildlife within their borders. The federal government has jurisdiction over coastal and inland fisheries, wildlife on federal land, and migratory birds. The federal government also has jurisdiction over international and interprovincial trade (Canada 1867). Hence, both the management and conservation of shark species and the implementation of CITES are the responsibility of the federal government.

Environment and Climate Change Canada (ECCC) is the lead federal department for implementing CITES in Canada—including issuing permits, making non-detriment (and other) findings, and enforcement.

Border enforcement of CITES is the responsibility of the Wildlife Enforcement Directorate (WED) of ECCC, under the authority of the Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act (WAPPRIITA) and the Wild Animal and Plant Trade Regulations (WAPTR). WED works in collaboration with the Canada Border Services Agency (CBSA).

The purpose of WAPPRIITA is to protect species of animals and plants by implementing CITES and regulating the species' international and interprovincial trade, responsibilities which include the following (Canada 1992):

Andrea Izzotti

Great white shark (*Carcharodon carcharias*)

- Prohibition of the import and export of CITES specimens except with a permit or where permitted by the regulations.
- Prohibition of the importation of an animal or plant that was taken in contravention of any foreign law.
- Prohibition of the possession of specimens which have been imported in contravention of the legislation.

WAPTR provides specific definitions, interpretations and exceptions that are necessary for implementing WAPPRIITA (Environment Canada 2003). The species of animals and plants that are listed in the Appendices of CITES are compiled in Schedule 1 of WAPTR (Canada 1996). Schedule 1 must be amended after any change to the CITES Appendices in order for the provisions of WAPPRIITA to apply to the change.

Marine fisheries (including sharks) are regulated via the Fisheries Act, which is implemented and enforced by Fisheries and Oceans Canada (FOC) (Canada 1985b).

Imports into Canada of shark products for human consumption are regulated under the Fish Inspection Act and Regulations and, in the case of pharmaceuticals and health products, the Food and Drugs Act and Regulations (Canada 1985a, c, 2015a, 2016b). The purpose of the Fish Inspection Act is to ensure that imported fish and seafood products meet required standards of quality, safety and identity. The Food and Drugs Act establishes standards for the safety and nutritional quality of all foods sold in Canada. These Acts and Regulations are enforced by the Canadian Food Inspection Agency (CFIA).

Species of sharks that occur in Canadian waters may be afforded additional protection via the Species at Risk Act (SARA). The purpose of SARA is to conserve Canadian wildlife species and to facilitate the recovery of threatened, endangered or extirpated species (EC 2013). The status of species of concern is based on assessments provided by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). COSEWIC is a committee of experts that determines the Canadian national status of native wildlife that may be at risk of extinction or extirpation. COSEWIC assessments incorporate science and Aboriginal and community knowledge. The Committee meets on an annual basis (COSEWIC 2009a).

COSEWIC's wildlife species assessments are taken into consideration by the Government of Canada when establishing the Legal List of Species at Risk. The species that are subject to the provisions of SARA are listed on Schedule I of the Act. If a shark species is listed under SARA as "Extirpated," "Endangered" or "Threatened," then ECCC must prepare a strategy for its recovery.[2] If a species is listed as "Special Concern," ECCC must prepare a management plan containing measures for the conservation of the species and its habitat (Canada 2002; Ecojustice 2012).

2. A recovery strategy identifies the broad policies and approaches needed to reverse the population decline of a species (Fisheries and Oceans Canada 2011).

Mexico

Mexico is a federal presidential constitutional republic and its structure is based in its Constitution. The Mexican Constitution, in Article 27, establishes that: "The Nation has full ownership over all natural resources of the continental shelf and the seabed and subsoil of the submarine areas of the islands." In order to fulfill this responsibility, the federal government works through the Secretariat of Environment and Natural Resources (*Secretaría de Medio Ambiente y Recursos Naturales*—Semarnat) and the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food (*Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación*—Sagarpa).

Semarnat is responsible for protecting, restoring, and conserving the ecosystems, natural resources and assets of Mexico; it is also responsible for promoting sustainable development. Semarnat is ultimately responsible for conserving native species and for implementing CITES (Reuter, in litt.; Semarnat 2017).

Semarnat meets its mandate through the activities of a number of subentities within the Secretariat, including the following (Reuter, in litt.):

- The General Directorate for Wildlife (*Dirección General de Vida Silvestre*—DGVS).
- The National Commission for the Knowledge and Use of Biodiversity (*Comisión Nacional para el Conocimiento y Uso de la Biodiversidad*—Conabio).
- The Office of the Federal Attorney for Environmental Protection (*La Procuraduría Federal de Protección al Ambiente*—Profepa).
- The National Commission of Natural Protected Areas (*Comisión Nacional de* Áreas *Naturales Protegidas*—Conanp).

DGVS is responsible for the management of wildlife in the country and the implementation of the General Wildlife Law (*Ley General de Vida Silvestre*—LGVS). In addition, DGVS acts as the CITES Management Authority in Mexico and is responsible for issuing permits, keeping records and liaising with the CITES Secretariat. DGVS also manages the National System of Management Units for the Conservation of Wildlife (*Sistema Nacional de Unidades de Manejo para la Conservación de la Vida Silvestre*—SUMA), which includes the approval of plans for the Units for Management and Sustainable Exploitation of Wildlife (*Unidades de Manejo y Aprovechamiento Sustentable de Vida Silvestre*—UMA). The purposes of UMA are the restoration, protection, maintenance, recovery, reproduction, repopulation, reintroduction, and rehabilitation of wildlife; its sustainable use, recreational use and exhibition; and environmental education of the public (DOF 2000). Furthermore, DGVS can authorize the release of wildlife back into the wild, when appropriate. (Camarena Osorno; Reuter, in litt.).

Conabio is responsible for promoting, coordinating, supporting and implementing activities to improve the knowledge of biological diversity, its conservation and its sustainable use. Conabio serves as the CITES Scientific Authority in Mexico and is responsible for making non-detriment findings (NDFs) (Camarena Osorno; Reuter, in litt.).

Profepa is a decentralized administrative body of Semarnat that has technical and operational autonomy. Profepa was created to respond to and control environmental deterioration. One of its primary tasks is to enforce compliance with environmental regulations. It is also responsible for enforcing CITES in Mexico, under the authority of the LGVS (Camarena Osorno; Reuter, in litt.).

Conanp is responsible for conserving species considered at risk under its Priority Species Program (*Program de Especies Prioritarias*—PEP) (Reuter, in litt.), and for managing 176 federally protected natural areas—including national parks, biosphere reserves, nature sanctuaries and natural monuments (Semarnat 2012).

Alexander Vasenin

Oceanic whitetip (*Carcharhinus longimanus*)

The LGVS regulates the sustainable use, conservation and management of native wild animals and plants. It regulates the protection of species or populations that are at risk, including both terrestrial and aquatic species (DOF 2000; Linder and Kaplan 1952; Mexico 2016). The LGVS establishes the national policy for wildlife protection and sustainable use, via the SUMA program and the Official Mexican Standard NOM059-SEMARNAT-2010 (NOM-059) on Mexican species at risk (see below). In addition, the LGVS regulates the creation of UMAs.

Article 55 of the LGVS implements CITES in Mexico. The LGVS also includes some provisions that are stricter than is required by the Convention.

Article 60 Bis 1 of the LGVS specifically protects the *Carcharodon carcharias* (great white shark), *Cetorhinus maximus* (basking shark) and *Rhincodon typus* (whale shark). These species may not be taken for subsistence or commercial purposes. Their capture can only be authorized for restoration, repopulation or reintroduction activities in their natural habitat.

The Regulations of the LGVS (*Reglamento de la Ley General de Vida Silvestre*—RLGVS) enable and implement the LGVS and provide the essential requirements for the integration of SUMA and the inclusion, establishment, management and operation of the UMAs (DOF 2014c).

In 1992, the Mexican federal government established the Official Mexican Standards (*Normas Oficiales Mexicanas*—NOMs). The NOMs are legally-binding, technical regulations that control a diverse range of production processes, including in sectors such as manufacturing and fisheries.

NOM-059 is the "reference instrument" of the LGVS. It defines the criteria that must be met for a species to be considered "at risk," provides the criteria for reviewing the conservation status of native Mexican terrestrial and aquatic species of animals and plants, and categorizes those species that require special protection (DOF 2010). The exploitation of NOM-059 species is allowed only under a UMA framework and hence a management plan approved by DGVS (Camarena Osorno, in litt.).

NOM-059 establishes four risk categories: Probably Extinct (in the wild), Endangered, Threatened, and Subject to Special Protection (DOF 2010). These categories are defined in Appendix A of this report.

In 2007, the NOM-029-PESCA-2006 was published; it provides a suite of specific regulations for the shark and rays fisheries in Mexican waters (DOF 2007b). In addition, since 2012 the fishing of sharks and rays has been closed between 1 May and 31 July (DOF 2012). In February 2014, fishing for C. carcharodon was prohibited (DOF 2014). This prohibition includes the mandatory release of incidental catches of the species.

Marine (including shark) fisheries are regulated by the General Law for Sustainable Fishing and Aquaculture (*Ley General de Pesca y Acuacultura Sustentable*—LGPAS), which was enacted in 2007 (DOF 2007a). The LGPAS is implemented by the National Commission of Fishing and Aquaculture (*Comisión Nacional de Pesca y Acuacultura*—Conapesca).

The United States

The US Fish and Wildlife Service (USFWS) is responsible for implementing the provisions of CITES—including permit issuance, completing NDFs and other findings, and enforcement. The United States implements CITES via section 8A of the Endangered Species Act of 1973 (ESA) (USA 1973).

The goal of the ESA is to conserve endangered or threatened species throughout all (or a significant portion) of their range. This includes the conservation of the ecosystems on which these species depend (NOAA 2015b). Under the ESA, species listed as Endangered (with limited exceptions) may not be imported or exported, possessed, sold or transported. They may not be taken within the United States or on the high seas (USA 1973). Generally, these same prohibitions and exceptions also apply to species listed as Threatened. However, for some species designated as Threatened, a special rule may be implemented which provides prohibitions and exceptions that are tailored to the conservation needs of the particular species (USA 1971). Not all CITES-listed species are also ESA-listed, and not all ESA-listed species are afforded protection under CITES.

All fish or wildlife that are imported into or exported from the United States must be declared to USFWS via a special form (USFWS FORM 3-177).[3] In addition, wildlife may normally only be imported or exported through specifically designated ports (USFWS 2016). Failure to comply with these requirements is a violation of the ESA and its implementing regulations.

In addition to the ESA, the Lacey Act makes it illegal to import, export, transport, sell, receive, acquire or purchase, in interstate or foreign commerce, any fish or wildlife that was taken, possessed, transported, or sold in violation of any foreign law. The Lacey Act also prohibits the import, export, transport, sale, receipt, acquisition or purchase, in interstate or foreign commerce, of any plant taken, possessed, transported or sold in violation of any foreign law that protects plants or that regulates certain activities associated with those plants (Cornell 2017). Importing sharks into the United States that were taken or exported in violation of a foreign national law would be a violation of the Lacey Act (USA 1900, 1981; USFWS 2015).

Shark fisheries in the United States are managed under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). The goals of the Magnuson-Stevens Act include conserving and managing fishery resources, supporting and encouraging implementation and enforcement of international fishery agreements for the conservation of highly migratory species (such as sharks), and promoting domestic commercial and recreational fishing under sound conservation and management principles. These goals are implemented, in part, by preventing overfishing while achieving the optimum yield from each fishery, rebuilding stocks as needed, minimizing adverse economic impacts and providing for the sustained participation of fishing communities, minimizing (to the extent practicable) bycatch and the mortality of such bycatch, and promoting the safety of human life at sea (NOAA 2016b; USA 1976). The National Marine Fisheries Service (NMFS) of the National Oceanic Atmospheric Administration (NOAA) is responsible for implementation of the Magnuson-Stevens Act, including enforcement of the regulations resulting from this implementation.

In 2010, the Magnuson-Stevens Act was amended by the Shark Conservation Act of 2010, which requires that all shark species (with one exception[4]) must be landed in the United States with their fins naturally attached to the body (NOAA 2016e).

3. "Fish or wildlife" is defined in section 3 of the ESA as any member of the animal kingdom, including any parts, products, eggs, or offspring, and including dead bodies or parts (USA 1973).
4. The one possible exception is commercially fished Mustelus canis (smooth dogfish) (NOAA 2016a).

Trade in Priority Sharks

This section provides an overview of the impact of trade in priority shark species on conservation and livelihoods.

Trade and Conservation

The consensus among fisheries scientists today is that because of their life-history characteristics (i.e., extreme longevity, slow growth, late maturity, long gestation period and low fecundity) most shark species are extremely vulnerable to over-exploitation. For many shark species, a lack of reliable catch data, from directed and/or non-directed fishing, and limited biological data constrain the use of traditional stock assessment models to determine stock status or develop rational management plans (McFarlane, in litt.).

All the priority shark species that are the focus of this report are taken in fisheries somewhere in the world either as directly targeted species or as non-directed bycatch. Three of these species (*C. carcharias*, *C. maximus* and *R. typus*) are protected in North American waters, but may be taken as non-directed bycatch. In addition, these species may migrate outside of North America and outside of the protection provided in North American marine jurisdictions.

Historic overexploitation has reduced the global populations of each of the priority shark species. As a result, they are all listed as either Vulnerable or Endangered on the International Union for Conservation of Nature (IUCN) Red List (Baum et al. 2007; Baum et al. 2015; Casper et al. 2005; Denham et al. 2007; Fergusson et al. 2009; Fowler 2005, 2009; Norman 2005). The threat of overexploitation for international trade is the principal reason each of these species has been listed in CITES Appendix II (CITES 2002a, b, 2013a, b, c, d).

In 1998, the Food and Agriculture Organization of the United Nations (FAO) developed an International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks) (FAO 2000). IPOA-Sharks states that, due to the population dynamics of sharks, the precautionary approach is especially applicable to management of these species.[5,6] IPOA-Sharks calls on each member country to adopt a National Plan of Action (NPOA) for the conservation and management of sharks, and to cooperate through regional fisheries management organizations (RFMOs) to ensure the sustainability of shark stocks (FAO 1999). IPOA-Sharks notes that countries should carry out a regular assessment of the status of shark stocks. To support the implementation of IPOA-Sharks, the FAO published a set of guidelines stipulating that when fisheries data are insufficient or unreliable, shark exploitation should occur only at a minimal level, in order to avoid overfishing (FAO 2000).

Canada, Mexico and the United States have each developed NPOAs in accordance with the principles and provisions of IPOA-Sharks. In 2001, the United States developed the US National Plan of Action for the Conservation and Management of Sharks (US NPOA) (NOAA 2001). A report on the implementation of the US NPOA was published in 2014 (NOAA 2014b). In 2004, Mexico published the National Action Plan for the Management and Conservation of Sharks, Rays and Related Species in Mexico (*Plan de Acción Nacional para el Manejo y Conservación de Tiburones, Rayas y Especies Afines en México*—PANMCT) (Conapesca-INP 2004). In 2007, Canada developed the National Plan of Action for Sharks (NPOA-Sharks) (FOC 2007).

Each of these action plans was developed to meet the objectives of IPOA-Sharks, as follows:

- Ensure that catches of sharks are sustainable.
- Assess the threats to shark populations.
- Identify and protect critical habitat for sharks.
- Identify and protect particularly vulnerable or threatened species or stocks.

5. The basic concept of the precautionary approach (or precautionary principle) is that if a human activity is potentially harmful to the environment, then actions must be taken to avoid or diminish that harm, even if there is no scientific consensus that the activity is harmful. In other words, the activity must be prevented or otherwise mitigated unless there is proof that it is not harmful, rather than the other way around (CELA 2012; Cooney 2004; UNESCO 2005). The precautionary approach has also been highlighted in the 1995 United Nations Agreement on Straddling and Highly Migratory Fish Stocks (United Nations 1995) and the 1995 FAO Code of Conduct for Responsible Fisheries (FAO 1995).
6. The population dynamics of sharks includes low productivity of stocks (some species having especially low productivity), small populations, and/or rarity of some species.

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Oceanic whitetip (*Carcharhinus longimanus*)

- Identify and consult with stakeholders regarding research, management and education.
- Minimize bycatch and discards, and encourage the full use of dead sharks.
- Protect biodiversity and ecosystem functioning.
- Compile biological information on shark and ray species.
- Improve the collection of catch and landings data, and facilitate reporting of biological and trade data.

All three action plans establish frameworks for instituting or maintaining sustainable shark fisheries. However, PANMCT also notes that current levels of government funding are insufficient, and includes a recommendation that additional sources of funding, both domestic and international, should be identified to develop, implement and maintain PANMCT.

Canada, Mexico and the United States are members of two RFMOs that have adopted conservation and management measures that are relevant to the conservation of priority sharks: The International Commission for the Conservation of Atlantic Tunas (ICCAT) and the Inter-American Tropical Tuna Commission (IATTC). ICCAT is responsible for the conservation of tunas and tuna-like species in the Atlantic Ocean and its adjacent seas. IATTC is responsible for the conservation and management of tuna and tuna-like species in the eastern Pacific Ocean.[7]

Both organizations compile fisheries statistics from their members and from all entities fishing for tuna in their respective Convention areas. They coordinate research (including stock assessments), develop science-based management advice and provide a mechanism for the Contracting Parties to agree on management measures (IATTC 2016a; ICCAT 2016).

ICCAT has several binding recommendations regarding sharks. In 2004, ICCAT required Contracting Parties, Cooperating Non-Contracting Parties, and Entities or Fishing Entities (CPCs) to fully utilize the sharks that are caught in association with ICCAT fisheries. ICCAT also requires that the fins onboard a vessel not weigh more than 5% of the total weight of sharks at first landing (ICCAT 2004).

In 2009, ICCAT, in collaboration with the International Council for the Exploration of the Sea (ICES), published a stock assessment of *L. nasus*. For the Northwest Atlantic stock, the ICCAT scientific group used and updated the *L. nasus* stock analysis carried out by FOC (ICCAT 2009). In 2015, ICCAT adopted a measure requiring CPCs to release any incidental catches of *L. nasus* that are alive when brought alongside the vessels. ICCAT also agreed to consider additional measures if catches of *L. nasus* increase beyond 2014 levels (ICCAT 2015).

In 2010, ICCAT adopted measures for *Carcharhinus longimanus* and for *Sphyrna* species (all but one species, *S. tiburo*, of these sharks) that prohibit the retention,

7. This includes tuna-like species and species in the same ecosystem that are affected by fishing for fish stocks encompassed by the IATTC, or are dependent on or associated with them.

transshipping, landing, storing, selling, or offering for sale of any part of these species caught in association with fisheries managed by this RFMO. Developing coastal members may still catch these sharks for consumption, but must comply with reporting requirements and should not increase their catches (ICCAT 2010a). ICCAT also adopted a similar measure to prohibit the retention of any part of *C. longimanus* sharks (ICCAT 2010b).

In 2005, IATTC adopted Resolution C-05-03, which placed controls on shark-finning by applying a five percent fin-to-carcass weight ratio requirement. This Resolution also included non-binding language that Members and Cooperating Non-Members establish and implement national plans of action for the conservation and management of shark stocks, in accordance with IPOA-Sharks. The Resolution further resolved that (in 2006) IATTC would cooperate with relevant scientists to provide preliminary advice on the status of key shark stocks and propose a research plan for a comprehensive assessment of those stocks (IATTC 2005).

In 2011, IATTC adopted Resolution C-11-10, which prohibits retaining onboard, transshipping, landing, storing, selling, or offering for sale any part or whole carcass of oceanic whitetip sharks in the fisheries covered by IATTC (IATTC 2011).

In 2015, IATTC adopted Resolution C-15-03, which prohibits the intentional setting of purse seine nets for whale sharks (IATTC 2015).

In 2016, IATTC adopted Resolution C-16-05, which requires IATTC scientific staff to develop a workplan and timeline for completing stock assessments for hammerhead sharks, including *S. lewini*, *S. zygaena* and *S. mokarran*. The workplan is to be prepared in advance of the Scientific Advisory Committee meeting in 2017 (IATTC 2016c). Also in 2016, IATTC amended Resolution C-05-03 (on the conservation of sharks caught in association with fisheries in the eastern Pacific Ocean) through Resolution C-16-04, and called for its Parties, where possible, in cooperation with the IATTC scientific staff, to undertake research on improving the selectivity of fishing gear and improving the knowledge of key biological and ecological parameters of sharks (including their life-histories, behavioral traits, and migration patterns). The amendment also highlighted the need for the Parties to identify key shark-mating, pupping, and nursery areas, and to improve handling practices for live sharks in order to maximize their post-release survival (IATTC 2016b).

In addition to developing the PANMCT, Mexico has established annual closures of shark fisheries on both coasts. In the Pacific, the fishing of sharks is prohibited from 1 May to 31 July (DOF 2013), and from 1 May to 30 June in the Gulf of Mexico and Caribbean Sea (DOF 2014b). Shark fishing is also prohibited in Tabasco, Campeche and Yucatán during 1–29 August.

In Mexico, landings of *Sphyrna* are not reported under the individual species. *Sphyrna* are also not included as a separate group in the National Fishing Chart (*Carta Nacional Pesquera*—CNP). The CNP is a binding instrument for the fisheries authorities' decision-making process, in Mexico.

Good management can be augmented by several different third-party certification programs that have been developed to support sustainable fisheries. Perhaps the best known is the Marine Stewardship Council (MSC), which is also the only certification program that meets the United Nations' best practice guidelines for ecolabeling and certification. The MSC compares a fishery's performance to internationally established, science-based standards so as to provide sustainability assurances for the target stocks/species and other affected taxa. Assessments are conducted by an independent team consisting of a certifier and relevant scientists. External stakeholders also can provide input on an assessment. In addition, the MSC has implemented a chain-of-custody program that allows buyers to trace the entire supply chain for certified seafood products (MSC 2016). Currently, however, the only existing MSC-certified shark fishery is one for *Squalus acanthias*. There are no MSC-certified fisheries for any of the priority shark species, and there are no certified fisheries that have significant catches of any of those species (Nunn, in litt.).

Great hammerhead (*Sphyrna mokarran*)

Trade and Livelihoods

Canada

In Canada, the only priority species for which there has been a directed fishery is *L. nasus*. Commercial fishing of *L. nasus* was started in the 1960s by Norwegian vessels, which were eventually joined by Faroese vessels. After the stock collapsed (around 1970), fishing continued at a reduced level. In 1992, Faroese vessels increased their catch efforts for *L. nasus*, and Canadian vessels joined the fishery. After 1994, the fishery was confined to Canadian vessels (Campana et al. 2008). By 2009 there were only three Canadian vessels fishing for *L. nasus*, and in 2013 the directed fishery for the species was suspended (COSEWIC 2014).

Bycatch of *L. nasus* still occurs in the Canadian tuna and swordfish longline fisheries, and the groundfish longline, gillnet, and bottom-trawl fisheries.[8] All non-targeted, retained catch is reported and subject to 100% dockside monitoring. The total of discard mortalities has averaged 110 metric tons (mt) annually since 2010, but had dropped to 72 mt in 2014. Under the current rate of mortality, the Northwest Atlantic population of *L. nasus* could recover by around 2042 (FOC 2015).

Prior to 1961, landings of *L. nasus* amounted to less than 2,000 tons annually, but rose to approximately 9,000 metric tons in 1964. By 1970, after the stock collapsed, landings dropped to less 1,000 mt annually. Landings continued at less than 500 mt until 1989, when the fishery effort increased, hitting a high of approximately 2,000 mt in 1992 (Campana et al. 2008). Quotas for landings of *L. nasus* were instituted in 1998 (COSEWIC 2014). Currently, the total allowable harvest (TAH) for the Northwest Canada population is 185 mt (per year). However, landings have dropped in recent years from 33 mt in 2012, to 4 mt in 2015 (Shaw, in litt.).

Mexico

Mexico occupies sixth place among the principal countries that catch elasmobranchs (sharks, rays and chimaeras) in the world, with an average of 33,815 mt landed between 2000 and 2011 (Dent and Clarke 2015). The different Mexican fisheries that take sharks, either as directed catch or as bycatch, are well described by Conapesca-INP (2004).

Historically, the individual shark species landed in Mexico were not recorded. Instead, shark landings were reported under two categories: "tiburon," which included sharks greater than 150 centimeters (cm) in total length (TL); and "cazon," for sharks less than 150 cm TL (Saldaña-Ruiz et al., in review). Since 2006, the catches of individual species are reported, although data for *Sphyrna* species are pooled.

Seven of the priority shark species are found in Mexican waters, but only *C. longimanus*, *S. lewini*, *S. mokarran* and *S. zygaena* are currently fished. Approximately 20 mt of *C. longimanus* are landed per year by the mid-size vessel fleet based in Manzanillo. According to FAO data, approximately 30 mt of *Sphyrna* sharks are landed by fisheries in the Atlantic, and approximately 100 mt in the Pacific (FAO 2016a). However, Saldaña-Ruiz et al. (in review) do not agree with these data. The authors conducted a literature review and estimated that during 2009–2014, landings increased from approximately 1,000 to 2,000 mt per year, just for the Gulf of California. Unfortunately, the amounts of the individual species that are landed is not known.

The meat of *C. longimanus*, *S. lewini*, *S. mokarran* and *S. zygaena* is not considered palatable in Canada and the United States, but in Mexico, this shark meat is readily consumed. The meat of these four species is cheaper than that of other more desirable species, such as the silky shark (*Carcharhinus falciformis*), thresher (*Alopias* species) or mako (*Isurus* species).

8. Groundfish are economically important fish that live on or near the ocean bottom.

Fishermen who are members of a cooperative will take their catch to the cooperative landings office, and the cooperative will sell the meat either to a wholesaler, to an intermediary who will re-sell to a wholesaler, or directly to fish markets. Fins are sold to a fin wholesaler. Other fishermen, who work for a permit-holder (*patrón*), will deliver their catch to the *patrón*, who will then sell the sharks in the same way as a cooperative. If the fisherman has his own permit, he will usually sell directly to a wholesaler (Sosa, pers. obs.).

The incidental catch of *C. carcharias* has been reported from the waters surrounding Baja California, including the Gulf of California (Galván-Magaña et al. 2010; Oñate-González et al., in review; Santana-Morales et al. 2012). The take of *C. carcharias* has been prohibited since 2007, and the ban was reinforced in 2014 (DOF 2007b, 2014a). No parts of the species may be legally landed. Conapesca-INP (2004) notes that more than 90% of the Mexican landings of sharks and rays are used as food—either fresh, frozen or dry-salted. Exports mainly consist of fins and skins (no records of skins from priority species were recorded in the CITES Trade Database of the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC). Between 2000 and 2011, Mexico exported an average of 248 mt per year of dried fins from several shark species, mainly to Hong Kong (Dent and Clarke 2015).[9]

Shark meat from domestic fisheries is supplemented by imported shark meat. Mexico has become the sixth-largest importer of shark meat, with an average volume of 5,650 mt per year imported between 2000 and 2011 (Dent and Clarke 2015).

United States

All eight of the priority shark species are found in US waters, five of which are currently fished and potentially exported: *C. longimanus*, *L. nasus, S. lewini*, *S. mokarran* and *S. zygaena*. These species appear to be only taken in the Atlantic, as no landings were recorded for any of these species in the Pacific in 2015, according to the current Pacific Stock Assessment and Fishery Evaluation (SAFE) report (PFMC 2016).

In the Atlantic, as of 2015, the commercial hammerhead shark (*Sphyrna*) fisheries are managed in three distinct sub-regions: Eastern Gulf of Mexico, Western Gulf of Mexico and the Atlantic. There are separate quotas issued to fisheries for the take of *Sphyrna* species in the Eastern Gulf of Mexico (the total take allowed for the number of quotas [n] = 13.4 mt), Western Gulf of Mexico (total for n = 11.9 mt) and Atlantic (total for n = 27.1 mt), but there are no quotas for individual *Sphyrna* species. The other priority shark species do not have regional commercial quotas. Instead, there is one overall quota for all regions (NMFS, in litt.). The commercial quota for pelagic sharks other than *L. nasus* or *Prionace glauca* (total for n = 488.0 mt) includes the take of *C. longimanus*. The only quota specific to a priority shark species is for *L. nasus* (total for n = 1.7 mt) (NOAA 2016c). As of July 2016, the USFWS had not received applications for permits to export *L. nasus* since the CITES listing of the species became effective. It has, however, completed NDFs for the quota amount as approved by NMFS (Gnam, in litt.).

Since 2011, the United States has prohibited the take of *C. longimanus*, *S. lewini*, *S. mokarran* and *S. zygaena* caught in association with International Commission for the Conservation of Atlantic Tunas (ICCAT) longline fisheries, as per ICCAT recommendations (NOAA 2015a). Landings of *C. longimanus* dropped from a high of 1.10 mt in 2011 to only 0.01 mt by 2014.

In the years 2009–2014, the United States landed 6,256.56 mt of (dressed) sharks other than *Squalus acanthias* or *Mustelus* spp., of which 279.76 mt were priority shark species. The *Sphyrna* species that were landed in 2009–2012 were all priority species, although the specific species were not recorded. In 2013 and 2014, the data for landings of *Sphyrna* were recorded according to individual species. Based on this information, it appears that the total number of landed priority *Sphyrna* decreased substantially between 2009 and 2014. However, the number of landed *S. mokarran* rose sharply after 2012, while the numbers of *S. lewini* and *S. zygaena* dropped. In part, these numbers are the result of changes in reporting systems, which no longer allowed for dealers to report unclassified sharks (unclassified hammerhead sharks went from a high of 28.5 mt in 2009 to 0 mt in 2013 and 2014).

9. Dent and Clarke (2015) converted the weights of frozen fins to that of dried fins, using a specified conversion factor. These weights were then combined with the reported weight for dried fins in order to estimate the total dried weight.

Approximately 2.0 mt of *L. nasus* were landed in each year during 2009–2012. In 2013, landings of *L. nasus* dropped to only 0.02 mt, and then increased to 2.91 mt in 2014. In 2015, the *L. nasus* fishery was closed because the 2014 fishery exceeded the available quota (NOAA 2014a).

In 2013 and 2014, priority shark species accounted for 3% and 4%, respectively, of all sharks landed.

Prior to 2013, commercial landings of shark fins were not recorded according to individual species. In 2013, there were 113 kilograms (kg) of shark fins (dry weight) landed. In 2014, the weight landed increased to 414 kg. The fins landed in 2013 included three different priority shark species: *L. nasus*, *S. lewini* and S. *mokarran.* No *L. nasus* fins were landed in 2014. In both years, S. *mokarran* fins comprised 95% of the fins landed from priority species. In 2013, the fins from all the priority species together accounted for less than 1% of all the fins commercially landed. In 2014, the fins from priority species accounted for 2%.

NOAA (2015a) reported that in 2014, the United States exported 18 mt of dried shark fins (worth US$0.98 million); 217 mt of fresh shark (worth US$0.57 million); and 827 mt of frozen shark (worth US$5.31 million). The volumes and values of individual species were not recorded. However, the value of the dried fins exported in 2014 calculates out to US$54.44 per kilogram. The 414 kg of fins from priority species landed in 2014 would, therefore, have been worth roughly US$22,540.

Challenges to CITES Implementation

Non-detriment findings

Guidance for making NDFs for CITES-listed species has been built on the foundations established at the International Expert Workshop on CITES NDFs, held in Cancun, Mexico in 2008 (CITES 2010). Guidance for completion of non-detriment findings for sharks has been discussed in documents submitted by Spain, Germany and Japan at the 24th, 27th, and 28th meetings, respectively, of the CITES Animals Committee (CITES 2009, 2014a, b, 2015).

Guidance specific to sharks was analyzed and tested at an international workshop hosted by the German government in 2014. The *CITES Non-detriment Findings Guidance for Shark Species* (2nd revised version) was completed and made available to the Parties in 2014 (Mundy-Taylor et al. 2014). The document provides guidance to CITES Authorities for the different scenarios that may be encountered when developing findings for sharks—including species caught in targeted fisheries as secondary catch and from stocks that are fished by more than one country. The authors also provide guidance for responding to situations where the data are poor.

Mundy-Taylor et al. (2014) provide guidance in the form of six steps; four of these steps are specifically directed to Scientific Authorities, and the other two are primarily the concern of the Management Authorities. Each step provides detailed instructions as to the information that is required, and the factors to be considered. The final step directs Authorities to consider actions that would implement or improve monitoring, management and/or other measures.

In addition to step-by-step guidance, Mundy-Taylor et al. (2014) incorporate a series of valuable annexes, including species-specific biological data for each shark species that was listed by CITES as of 2014 (which includes each of the priority shark species that are the subject of this report).

In 2015, in Mexico, Conabio, in collaboration with the National Institute of Fishing (*Instituto Nacional de Pesca—Inapesca*) and the Ensenada Center for Scientific Research

and Higher Education (*Centro de Investigación Científica y de Educación Superior de Ensenada*—CICESE), held a workshop on the productivity, susceptibility and management of Mexican sharks listed in CITES Appendix II (Benítez et al. 2015; Conabio 2016). The participants of this workshop produced approximately 30 recommendations for actions to improve the sustainability of fishing for priority shark species in Mexico (Benítez et al. 2015). Mexico uses the results and conclusions of this workshop as additional guidelines for completing NDFs (López Segurajáuregui, in litt.).

The United States has posted its NDFs for *L. nasus* and *Sphyrna* species on the CITES shark website (CITES 2016c), which offers guidance on making NDFs based on fisheries management (with conditions).

Enforcement

Each of the priority shark species is distinctive enough that whole specimens can readily be identified to species. However, sharks are primarily traded as parts, or pieces—such as meat, fins, teeth, jaws—and derivatives, including ingredients in health supplements and pharmaceuticals. This poses a problem for border enforcement. Authorities in exporting countries have an advantage in that they can monitor shark fishing, landings and processing to ensure that the products exported are accurately identified. However, countries typically put more emphasis on inspecting imports, both to keep out contraband and to collect duties and taxes. CITES enforcement is no exception (Cooper, pers. obs).

Meat

There is no easy way for border enforcement authorities to visually identify shark meat to species. Identification of meat would require DNA analysis by qualified laboratories. This would also be true for other internal parts or derivatives, such as shark cartilage.

Teeth

Shark teeth are traded as collector items and as pendants, earrings and other jewelry. In most cases, this means that the teeth need to be recognizable by a layperson as shark teeth. Most of the shark teeth traded internationally are fossils. However, recent teeth of *C. carcharias*, *C. longimanus* and *Sphyrna* species are readily found in trade (Cooper, pers. obs.).

Most of the shark teeth in trade are byproducts of fisheries that take sharks for their meat and/or fins. The exception to this rule is *C. carcharias*, which has historically been specifically targeted for its highly valuable jaws and teeth, in addition to its fins (CITES 2013a).

The teeth of *C. carcharias* are triangular, heavily serrated, and are distinctive enough to be readily identified (Florida Museum of Natural History 2016). *C. longimanus* and *Sphyrna* are requiem sharks (family Carcharhinidae), and their teeth are morphologically similar to other species in the family. Further, carcharhinid teeth from the upper jaw look different from those of the lower jaw. Therefore, *C. longimanus* and *Sphyrna* teeth are not as easy to identify as are those of *C. carcharias*. Identifying a single tooth from a specimen of the genus *Carcharhinus* requires a series of measurements and analysis, and it may not be possible to identify it to species. Similarly, it may be possible to identify teeth as being from the genus *Sphyrna*, but it may not be possible to identify them to species (Florida Museum of Natural History 2016; Naylor and Marcus 1994).

There are popular guides to shark teeth identification, such as Cocke (2002), that are available to enforcement officers, but their taxonomic accuracy is not certain. There are useful Internet sites, including the online tooth identification guide hosted by the University of Florida (Florida Museum of Natural History 2016), as well as various academic journal publications. However, no resources for identifying shark teeth have been developed specifically for enforcement officers. One Senior Wildlife Inspector noted that US Wildlife Inspectors could use training on shark tooth identification, as there are many shark teeth being sold in shops, and many may be imported and not declared (Iacomini, in litt.).

Fins

For many species of sharks, their fins are the most valuable product for international trade. Concern over the unsustainable fishing of sharks for the fin trade was a major driver for the listing of *C. longimanus*, *S. lewini*, *S. mokarran* and *S. zygaena* in CITES Appendix II.

The identification of shark fins was recognized as a significant challenge to the implementation of CITES early in the CITES listing process, and much work has been done on the topic. Several different groups have organized workshops on shark fin identification in different countries. In addition, regional guides to the identification of sharks have been produced. The Internet website for the CITES Secretariat has a page dedicated to identification materials on sharks (CITES 2016b).

At least three guides to the identification of shark fins have been published (Abercrombie and Chapman n.d.; Abercrombie et al. 2013; Marshall and Barone 2016). Of these three, Marshall and Barone (2016) is the most comprehensive and informative. In addition, the FAO has developed and distributed free software for shark fin identification. The first version of the software, called iSharkFin, can identify dorsal fins from 35 species, and pectoral fins from seven species (FAO 2016b). The list of 16 species that can be identified by the first release of iSharkFin and its accompanying guide can be found at the CITES website (CITES 2016d). An Internet search could find no reviews of the software and its functionality.

One weakness of the available shark fin identification materials is that they all focus on fresh or unprocessed dried fins. The fins that are imported from Asia for consumption in Canada and the United States are typically dried, processed and skinned, leaving only the cartilage. For Canadian and US enforcement authorities, this makes identification extremely difficult. DNA analysis can be used to identify processed fins, but that is not a feasible option for routine inspections.

Wildlife enforcement staff in the United States and Mexico have received training on shark fin identification (Iacomimi, and López Segurajáuregui, in litt.). US Wildlife Inspectors have requested additional shark fin identification training, with more samples and a focus on large volumes in transit (Iacomini, in litt.). No trinational workshops on shark fin trade and identification have been held to date.

Priority Shark Species

This section provides description, distribution, conservation status, and trade overview of each priority species. The morphological terms used for the different species in the following descriptions are explained in Figure 1.

The IUCN Red List Categories, and categories for species at risk in Canada, Mexico and the United States referenced in this section are defined in Appendix A.

Willi Sattler

Carcharhinus longimanus (Poey, 1861)

Common names

Oceanic whitetip shark (English)
Requin longimane, Requin océanique (French)
Tiburón oceánico, tiburón de puntas blancas (Spanish)

Description

Carcharhinus longimanus is a large, stocky shark. The species is distinguished by its large, rounded first dorsal fin and very long, wide paddle-shaped pectoral fins. The snout is short and bluntly rounded. The first dorsal fin originates just anterior to the rear edge of the pectoral fins. The second dorsal fin originates above the anal fin. Specimens of *C. longimanus* may reach 3.5–4 meters (m) in length, but most are less than 3 m. The maximum recorded weight for *C. longimanus* is 167.4 kilograms (kg). Females reach greater maximum lengths than males (Bester 2017a).

In color, specimens of *C. longimanus* are grayish bronze to brown, and the tips of the first dorsal, pectoral and caudal fins have white markings.

The teeth of the upper jaw are broad, triangular and serrated; the teeth of the lower jaw are pointed, and serrated only near the tip (Bester 2017a).

Distribution

Historically, *C. longimanus* was one of the most widespread shark species, and was distributed throughout tropical and subtropical offshore waters between latitudes 30°N and 35°S (Baum et al. 2015). In the 1950s, *C. longimanus* was the most common species of shark in the Gulf of Mexico. By 2004 the stock was estimated to have declined by over 99% (Baum and Myers 2004).

Carcharhinus longimanus is native to both coasts of Mexico and the United States (Baum et al. 2015).

In Mexico, the species ranges through the waters off the states of Baja California, Baja California Sur, Campeche, Chiapas, Colima, Guerrero, Jalisco, Michoacán, Nayarit, Oaxaca, Quintana Roo, Sinaloa, Sonora, Tabasco, Tamaulipas, Veracruz and Yucatán (Baum et al. 2015).

In the United States, *C. longimanus* is found in the waters off the states of Alabama, California, Connecticut, Delaware, Florida, Georgia, Hawaii, Louisiana, Maine, Maryland, Massachusetts, Mississippi, New Hampshire, New Jersey, New York, North Carolina, Rhode Island, South Carolina, Texas and Virginia, and the District of Columbia; and off two US Minor Outlying Islands: Johnston Island and Wake Island (Baum et al. 2015).

Conservation status

Carcharhinus longimanus is listed as Vulnerable on the IUCN Red List (Baum et al. 2015).

On 29 December 2016, NMFS completed a status review of *C. longimanus* under the ESA. NMFS determined that, as a result of the life-history characteristics of the species, the threats, and the ongoing abundance declines, *C. longimanus* is likely to become endangered within the foreseeable future and has a moderate risk of extinction throughout its global range within 30 years. NMFS concluded that *C. longimanus* warrants listing as a threatened species. At the time of writing, the comment period for the proposed rule to list the species under the ESA had not expired (NMFS 2016; USA 2016a).

Trade

Carcharhinus longimanus meat is consumed in some local markets, but it is the large fins of the species that are primarily utilized for international trade.

In the United States, *C. longimanus* meat has not historically been eaten, and the main value of the fishery for the species was the export of its fins. In Mexico, the meat of *C. longimanus* is consumed and the fins exported. Inapesca reported that in 2012, the average ex-vessel price of dressed sharks (which could include *C. longimanus*) at landing sites was US$0.35 per kilogram. Fresh fillets sold for US$0.62 per kilogram, and dried fillets for US$0.67 per kilogram (Luna Raya et al. 2016). The price of shark fins depends on their quality. In 2012, one kilogram of first-class dried fins (including those of *C. longimanus*) was worth US$17.10 when landed (Luna Raya et al. 2016).

Carcharhinus longimanus teeth and jaws are also traded. A review of shark teeth available for sale on eBay in September 2016 found *C. longimanus* teeth available as pendants and earrings for US$20–$40. Groups of mixed teeth, advertised as possibly including *C. longimanus*, were available for US$20–$120 (eBay 2016).

Data downloaded from the UNEP-WCMC CITES Trade Database found no records for trade in *C. longimanus* reported by Canada, Mexico or the United States during 2009–2015 (CITES 2016a). However, the listing of *C. longimanus* in Appendix II of CITES did not come into effect until September 2014 (CITES 2013e). These data, therefore, do not accurately or adequately reflect the levels of trade prior to September 2014.

Andrea Izzotti

Carcharodon carcharias (Linnaeus, 1758)

Common names

Great white shark, white pointer (English)
Grand Requin blanc (French)
Tiburón blanco (Spanish)

Description

Carcharodon carcharias is a very large, stocky shark. The species has a large, triangular dorsal fin and a crescent-shaped caudal fin with a single keel on the caudal peduncle. The first dorsal fin originates over the inner margins of the pectoral fins. The second dorsal fin is anterior to the origin of the anal fin. The snout is short and conical. Specimens of *C. carcharias* may reach 3.8–6 meters in length, and possibly longer. Mature females are larger than males (COSEWIC 2006; Martins and Knickle 2017a).

In color, the upper portions of *C. carcharias* are blue-grey to brown-bronze, while the underside is white. The margin between the dark dorsal and white ventral sides is distinct. Most specimens have a black blotch on the underside of the tip of the pectoral fin.

The teeth are large, triangular and distinctly serrated. The teeth of the upper jaw are broader than those in the lower jaw (COSEWIC 2006; Martins and Knickle 2017a).

Distribution

Carcharodon carcharias is found in most seas and oceans, from latitudes 60°N to 60°S, but tends to be most common in temperate coastal seas (COSEWIC 2006; Fergusson et al. 2009; Martins and Knickle 2017a). *Carcharodon carcharias* is native to Canada, Mexico and the United States, although it is rare in Canadian waters (COSEWIC 2006). On the Atlantic coast of North America, the species ranges from Newfoundland, Canada, south to the Gulf of Mexico. On the Pacific coast, *C. carcharias* has been recorded from Alaska, United States, and British Columbia, Canada. However, the species is very rare in northern waters and is most common off the coast of Oregon southwards to the Gulf of California (COSEWIC 2006; Fergusson et al. 2009; Martins and Knickle 2017a).

Conservation status

Carcharodon carcharias is listed as Vulnerable on the IUCN Red List (Baum et al. 2015).

In Canada, the Atlantic population of *C. carcharias* is considered Endangered, under SARA (Canada 2016a, g; COSEWIC 2006, 2007a). A strategy has not yet been completed for *C. carcharias* in Atlantic Canada (FOC 2016).

In Mexico, *C. carcharias* has been listed as Threatened since 2002 (FOC 2002, 2010). Fishing of this species is prohibited, and no part may be landed if the specimen is caught incidentally (DOF 2007c, 2014a).

In the US Atlantic, *C. carcharias* is a prohibited species under the NOAA Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks (NMFS 2003; NOAA 2015a). Prohibited species may not be fished for, retained, or sold. All the US states along the east coast and along the Gulf of Mexico have prohibited the retention of *C. carcharias* in state waters. In the eastern Pacific Ocean, *C. carcharias* is a prohibited species under the NOAA Pacific Highly Migratory Species Fishery Management Plan, but may be retained if incidentally caught and subsequently sold or donated to a recognized scientific or educational organization for research or display purposes. The species is further protected by the State of California (NOAA 2010, 2011).

Trade

Carcharodon carcharias may be utilized for its meat, fins, cartilage, liver oil, and hides. However, its jaws and teeth have particular value in international trade. A review of Internet auction sites in 2009 found more than 30 *C. carcharias* teeth available for sale from US dealers on any given day. At the time, prices for *C. carcharias* teeth ranged from under US$100 to more than US$1,000 for very large specimens (Cooper, unpublished data).

In Mexico, the take of *C. carcharias* has been prohibited since 2007, and the ban was reinforced in 2014 (DOF 2007c, 2014a). No parts of the species may be legally landed. However, some incidental catch of *C. carcharias* has been reported from the waters surrounding Baja California, including the Gulf of California (Galván-Magaña et al. 2010; Oñate-González et al., in review; Santana-Morales et al. 2012).

Data downloaded from the UNEP-WCMC CITES Trade Database found a variety of records for trade in *C. carcharias* parts reported by Canada, Mexico and the United States during 2009–2015. The majority were teeth or undescribed specimens traded for scientific or circus/travelling exhibition purposes. The only commercial trade in *C. carcharias* parts recorded consisted of one skin piece and one carving, imported into the United States in 2012 and 2014, respectively (CITES 2016a).

NOAA

Cetorhinus maximus (Gunnerus, 1765)

Common names

Basking shark (English)
Requin pèlerin (French)
Tiburón peregrino (Spanish)

Description

Cetorhinus maximus is the second-largest species of fish, with a maximum recorded length of 12.2 meters. The species has large, elongated gill slits that extend almost to the mid-point of the dorsal surface. The snout is pointed and somewhat bulbous. The first dorsal fin is triangular and located approximately half-way between the pectoral and pelvic fins. The caudal fin is crescent-shaped and the caudal peduncle has strong lateral keels. The mouth is very large (COSEWIC 2007, 2009b; Knickle et al. 2017).

In color, specimens of *C. maximus* are typically grayish-brown, grey or blue-grey dorsally, with a lighter underside. There may be white blotches on the underside of the head and/or abdomen (COSEWIC 2007, 2009b; Knickle et al. 2017).

The teeth are tiny and number in the hundreds. The teeth in the center of the jaws are triangular and the teeth on the sides are conical and slightly recurved (Knickle et al. 2017).

Distribution

Cetorhinus maximus is found in coastal temperate and arctic waters around the world. *Cetorhinus maximus* is native to the Atlantic and Pacific coasts of Canada and the United States. The species is exceedingly rare in Mexico—the first confirmed record was not until 2003 (Sandoval-Castillo et al. 2008). On the Atlantic coast of North America, the species ranges from Newfoundland, Canada, south to Florida, United States. On the Pacific coast, *C. maximus* ranges from the Gulf of Alaska to the Gulf of California.

Conservation status

The global population of *C. maximus*, including the Atlantic Canada and Atlantic US stocks, is listed as Vulnerable on the IUCN Red List. The North Pacific population, including the stocks found on the West coast of Canada and the United States, is listed as Endangered (Fowler 2005, 2009).

In Canada, the Pacific population of *C. maximus* is considered Endangered, under SARA (Canada 2016a, c; COSEWIC 2006, 2007). The Atlantic population of *C. maximus* is considered of Special Concern, by COSEWIC, and is under consideration for listing on SARA (Canada 2015b; COSEWIC 2009b). A recovery strategy has been drafted for *C. maximus* in the Pacific, as required by SARA (FOC 2011).

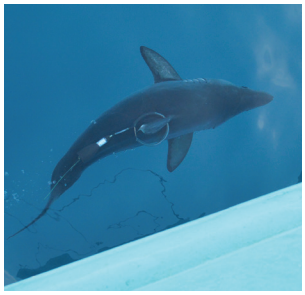
In Mexico, *C. maximus* has been listed as Threatened since 2002 (DOF 2002, 2010). Fishing of these species is prohibited, and no part may be landed if the specimen is caught incidentally (FOC 2007c, 2014a).

In the US Atlantic, *C. maximus* is a prohibited species under the NOAA Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks (NMFS 2003; NOAA 2015a). Prohibited species may not be fished for, retained, or sold. All the US states along the east coast and along the Gulf of Mexico have prohibited the retention of *C. maximus* in state waters. In the eastern Pacific, *C. maximus* is a prohibited species under the NOAA Highly Migratory Species Fishery Management Plan, but may be retained if incidentally caught and subsequently sold or donated to a recognized scientific or educational organization for research or display purposes. The species is further protected by the State of California (NOAA 2010, 2011).

Trade

Historically, *C. maximus* was fished primarily for the liver, which would be rendered for oil, mainly for industrial purposes. Currently, *C. maximus* are mainly taken for their meat, fins and cartilage (CITES 2002b).

Data downloaded from the UNEP-WCMC CITES Trade Database found no records for commercial trade in *C. maximus* reported by Canada, Mexico or the United States during 2009–2015. The only recorded trade was in 2014 and consisted of 35 grams of specimens exported to the United States from Canada for scientific purposes (CITES 2016a).



Sarah Hoffmann

Lamna nasus (Bonnaterre, 1788)

Common names

Porbeagle shark, mackerel shark (English)
Maraîche, Requin-taupe commun (French)
Marrajo sardinero, tiburón sardinero, tiburón cailón (Spanish)

Description

Lamna nasus superficially resembles *C. carcharias*. The species has a stout spindle-shaped body, a triangular first dorsal fin, large pectoral fins and a crescent-shaped caudal fin. The caudal peduncle is strongly keeled and there is a secondary keel on the lower half of the caudal fin. The snout is moderately long and conical. The first dorsal fin originates just anterior to the rear edge of the pectoral fins. The second dorsal fin originates above the anal fin. Both the second dorsal fin and the anal fin are small. Specimens of *L. nasus* may reach 3.6 meters in length, and 230 kilograms in weight (COSEWIC 2014; Roman 2017).

In color, the upper portions of *L. nasus* are dark blue to gray, while the underside is white. The first dorsal fin is mainly dark in color, with a distinctive white or gray trailing edge. Some specimens have dark blotches on the white underside (COSEWIC 2014; Roman 2017).

Distribution

Lamna nasus is found in coastal temperate and cold-temperate waters around the world. The species is native to the Atlantic coast of Canada and the United States. In Canada, it occurs in the waters of Newfoundland and Nova Scotia. In the United States, it is found off Maine, Massachusetts, New Jersey, New York, Rhode Island and possibly South Carolina (COSEWIC 2014; Stevens et al. 2006).

The teeth are moderately large, narrow, sharp, not serrated and have sharp cusps on each side (COSEWIC 2014; Roman 2017).

Conservation status

The Northwest Atlantic subpopulation of *L. nasus*, including the stocks in Canada and the United States, is listed as Endangered on the IUCN Red List (Stevens et al. 2006).

In Atlantic Canada, *L. nasus* has been reassessed by COSEWIC as Endangered (COSEWIC 2014). The process of listing the species under SARA is underway (Merriman, in litt.).

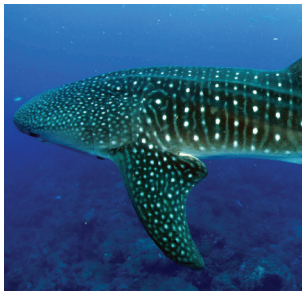
In the United States, NMFS reviewed the status of *L. nasus* to determine if listing under the ESA was warranted. On 1 August 2016, NMFS determined that listing the species was not warranted (USA 2016b).

Trade

Lamna nasus has been primarily fished for its meat and fins, both of which have been traded internationally. Canada's directed fishery for *L. nasus* was suspended in 2013 (COSEWIC 2014). A directed fishery continues in the United States, managed under a species-specific quota (NOAA 2016c).

Lamna nasus meat is available for retail sale in Atlantic Canada. In September 2016, large *L. nasus* steaks were available in Halifax, Nova Scotia, for about US$1.50/kilogram (Sampson, pers. obs.). Fishermen are paid between US$0.17–$0.34 per kilogram for whole sharks (Snow, pers. comm.).

Data downloaded from the UNEP-WCMC CITES Trade Database found no records for trade in *L. nasus* reported by Canada, Mexico or the United States during 2009–2015 (CITES 2016a). However, the listing of *L. nasus* in Appendix II of CITES did not come into effect until September 2014 (CITES 2013e). These data, therefore, do not accurately or adequately reflect the levels of trade prior to September 2014.



NOAA

Rhincodon typus (Smith, 1828)

Common names

Whale shark (English)
Requin-baleine (French)
Tiburón ballena (Spanish)

Description

Rhincodon typus is the largest species of fish, with a maximum length of up to 20 meters. The species has a long, streamlined body and a distinctly broad, and flattened head. The mouth is very large and spans the width of the head. The first dorsal fin is much larger than the second dorsal fin, and is positioned behind the midpoint of the body, above the pelvic fins. The upper lobe of the caudal fin is noticeably longer than the lower lobe (Martins and Knickle 2017b).

The coloration of *Rhincodon typus* is distinctive and consists of a pattern of cream-colored spots and stripes on a dark background. The background color is greyish, bluish or brownish. The underside is white above, with an upper surface pattern of creamy white spots between pale, vertical and horizontal stripes (Martins and Knickle 2017b).

The teeth are very tiny, hook-shaped, and arranged in approximately 300 rows in each jaw (Martins and Knickle 2017b).

Distribution

Rhincodon typus ranges in all tropical and warm temperate seas worldwide, except for the Mediterranean. In North America, the species occurs in the Atlantic from New York south through the Gulf of Mexico, and in the Pacific from Southern California southwards, including the Gulf of California. Specimens of *R. typus* aggregate annually in the waters off the Yucatán Peninsula of Mexico (de la Parra Venegas et al. 2011; Martins and Knickle 2017b; Norman 2005).

Conservation status

Rhincodon typus is listed as Vulnerable on the IUCN Red List (Norman 2005).

In Mexico, *R. typus* has been listed as Threatened since 2002 (DOF 2002, 2010). Fishing of this species is prohibited, and no part may be landed if the specimen is caught incidentally (DOF 2007c, 2014a).

In the United States, *R. typus* is a prohibited species under the NOAA Fishery Management Plan for Atlantic Tunas, Swordfish and Sharks (NMFS 2003; NOAA 2015a). Prohibited species may not be fished for, retained, or sold.

Trade

Historically, there have been both small and large-scale fisheries for *Rhincodon typus*, although not in North America. The species has been taken primarily for its meat, liver (for rendering to oil) and fins, with international trade in meat and fins (CITES 2002a; Norman 2005).

Data downloaded from the UNEP-WCMC CITES Trade Database found no records for commercial trade in *Rhincodon typus* reported by Canada, Mexico or the United States during 2009–2015. The only recorded trade consisted of specimens for scientific purposes. Specimens were exported by Mexico and imported by both Canada and the United States (CITES 2016a).

Kevin Lino

Sphyrna lewini (Griffith & Smith, 1834)

Common names

Scalloped hammerhead shark (English)
Requin marteau, Requin-marteau halicorne (French)
Cornuda común, *tiburón martillo común* (Spanish)

Description

Sphyrna lewini is a moderately large species of shark that exhibits the distinctive hammer-shaped head (cephalophoil) that is the source of its group common name (hammerhead sharks). The anterior edge of the cephalophoil has a prominent indentation at the midline that is unique to the species. The eyes are located on the ends of the cephalophoil. The body is slender, with a large, slightly curved first dorsal fin and low second dorsal fin. The posterior margins of the anal fins are deeply notched. The second dorsal fin has a long, pointed posterior margin, the tip of which almost reaches the caudal fin. The upper lobe of the caudal fin is much longer than the lower. Specimens of *S. lewini* may reach 3.7–4.3 meters in length and 150 kilograms in weight (Bester 2017b; NOAA 2016d).

The teeth are small, with lateral cusps that may be smooth or slightly serrated. The teeth in the upper jaw are narrow and triangular, becoming increasingly oblique towards the corners of the mouth. The lower teeth are not as wide as the upper teeth (Bester 2017b).

Distribution

Sphyrna lewini has a worldwide distribution in coastal warm temperate and tropical seas. In North America, the species is native to Mexico and the United States. On the Atlantic coast, *S. lewini* ranges from New Jersey south through the Gulf of Mexico. On the Pacific coast, *S. lewini* ranges from California south along the coast of Mexico, including the Gulf of California. The species is not native to Canada (Baum et al. 2007; CITES 2013c).

Conservation status

Sphyrna lewini is listed as Endangered on the IUCN Red List (Baum et al. 2007).

In the United States, four distinct population segments of *S. lewini* are currently listed under the ESA.[10] The Eastern Atlantic and Eastern Pacific segments are categorized as Endangered, and the Central Atlantic, South Atlantic and Indo-West Pacific are considered Threatened (NOAA 2016d).

10. NOAA Fisheries defines a distinct population segment (DPS) as "a vertebrate population or group of populations that is discrete from other populations of the species and significant in relation to the entire species" (NOAA 2014c).

Trade

Globally, *S. lewini* is primarily fished for meat and fins, but it is the fins that are utilized for international trade.

In the United States, *S. lewini* meat has not historically been eaten, and the main value of the fishery for the species is the export of their fins to Asian markets. In Mexico, the meat of *S. lewini* is consumed domestically and the fins are exported. See *C. longimanus* (above) for information on the value of shark meat and fins in Mexico.

Hammerhead shark teeth and jaws (presumably from *Sphyrna* specimens) are sometimes offered for sale. A review of shark teeth available for sale on eBay in September 2016, found hammerhead teeth available as pendants and earrings for US$20–$40. Groups of mixed teeth, advertised as possibly including hammerhead teeth, were available for US$20–$120 (eBay 2016).

Data downloaded from the UNEP-WCMC CITES Trade Database found that a total of 5303.14 kilograms of *S. lewini* fins were exported from Mexico to China and Hong Kong in 2015 for commercial purposes. The only other North American trade in *S. lewini* during 2009–2015 consisted of two specimens exported from the United States in 2014 for scientific purposes (CITES 2016a). However, the listing of *S. lewini* in Appendix II of CITES did not come into effect until September 2014 (CITES 2013e). These data, therefore, do not accurately or adequately reflect the levels of trade prior to September 2014.

Sphyrna mokarran (Rüppell, 1837)

Common names

Great hammerhead shark (English)
Grand Requin-marteau (French)
Tiburón cornuda gigante, pez martillo, tiburón martillo gigante (Spanish)

Description

Sphyrna mokarran is a large species of shark that exhibits the distinctive hammer-shaped head (cephalophoil) that is the source of its group common name (hammerhead sharks). The cephalophoil is almost rectangular, and the anterior edge is fairly straight, with a shallow notch in the center. The eyes are located on the ends of the cephalophoil. The body is stout, with a very large, pointed and curved first dorsal fin. The posterior margins of the pelvic fins are curved. The posterior edges of the anal fins are deeply notched. The upper lobe of the caudal fin is much longer than the lower. The heaviest specimen of *S. mokarran* recorded was 450 kilograms. The species reportedly can reach 6 meters in length (Bester 2017c).

The teeth in both jaws are triangular and strongly serrated, becoming increasingly oblique towards the corners of the mouth.

Distribution

Sphyrna mokarran has a worldwide distribution in coastal warm temperate and tropical seas from latitudes 40°N to 35°S. In North America, the species is native to Mexico and the United States. On the Atlantic coast, *S. mokarran* ranges from North Carolina south through the Gulf of Mexico. On the Pacific coast, *S. mokarran* ranges from Baja California, Mexico, south along the coast of Mexico, including the Gulf of California. The species is not native to Canada (Bester 2017c; Denham et al. 2007).

Conservation status

Sphyrna mokarran is listed as Endangered on the IUCN Red List (Denham et al. 2007).

Trade

Globally, *S. mokarran* is primarily fished for meat and fins, but it is the fins that are utilized for international trade.

In the United States, *S. mokarran* meat has not historically been eaten, and the main value of the fishery for the species is the export of the fins to Asian markets. In Mexico, the meat of *S. mokarran* is consumed domestically and the fins are exported. See *Carcharodon longimanus* (above) for information on the value of shark meat and fins in Mexico.

Hammerhead shark teeth and jaws are sometimes offered for sale. See *Sphyrna lewini* (above) for information on the value of hammerhead shark teeth.

Data downloaded from the UNEP-WCMC CITES Trade Database found that 250 kilograms (kg) and 8,898.35 kg of *S. mokarran* fins were exported from Mexico to China for commercial purposes in 2014 and 2015, respectively. There were no other records of North American trade in *S. mokarran* during 2009–2015 (CITES 2016a). However, the listing of *S. mokarran* in Appendix II of CITES did not come into effect until September 2014 (CITES 2013e). These data, therefore, do not accurately or adequately reflect the levels of trade prior to September 2014.

Alessandro De Maddalena

Sphyrna zygaena (Linnaeus, 1758)

Common names

Smooth hammerhead shark (English)
Requin-marteau commun, Requin-marteau lisse (French)
Cornuda prieta, tiburón martillo liso, tiburón martillo cruz (Spanish)

Description

Sphyrna zygaena is a large species of shark that exhibits the distinctive hammer-shaped head (cephalophoil) that is the source of its group common name (hammerhead sharks). The anterior edge of the cephalophoil is broadly curved and does not have an indentation at the center. The eyes are located on the ends of the cephalophoil. The body is slender, with a large, pointed and curved first dorsal fin. The second dorsal fin is shorter than the anal fin. The posterior margins of the pelvic fins are not curved. The posterior edges of the anal fins are deeply notched. The upper lobe of the caudal fin is much longer than the lower. Specimens of *S. zygaena* average 2.5–3.5 meters in length, but may reach up to 5 meters long, with a maximum weight of 400 kilograms (Bester 2017d).

The teeth in both jaws are triangular, and smooth or slightly serrated (Bester 2017d).

Distribution

Sphyrna zygaena has a worldwide distribution in coastal temperate and tropical seas. In North America, the species is native to Canada, Mexico and the United States, although it is rare in Canadian waters. On the Atlantic coast, *S. zygaena* ranges from Nova Scotia, Canada, south along the coast of the United States and through the Gulf of Mexico. On the Pacific coast, *S. zygaena* ranges from northern California, United States, south to the Mexican state of Jalisco, including the Gulf of California (Bester 2017d; Casper et al. 2005).

Conservation status

Sphyrna zygaena is listed as Vulnerable on the IUCN Red List (Casper et al. 2005).

Trade

Globally, *S. zygaena* is primarily fished for meat and fins, but it is the fins that are utilized for international trade.

In the United States, *S. zygaena* meat has not historically been eaten, and the main value of the fishery for the species is the export of its fins to Asian markets. In Mexico, the meat of *S. zygaena* is consumed domestically and the fins are exported. See *Carcharodon longimanus* (above) for information on the value of shark meat and fins in Mexico.

Hammerhead shark teeth and jaws are sometimes offered for sale. See *Sphyrna lewini* (above) for information on the value of hammerhead shark teeth.

Data downloaded from the UNEP-WCMC CITES Trade Database found that 11,121.28 kilograms of *S. zygaena* fins were exported from Mexico to China and Hong Kong for commercial purposes in 2015. There were no other records of North American trade in *S. zygaena* during 2009–2015 (CITES 2016a). However, the listing of *S. zygaena* in Appendix II of CITES did not come into effect until September 2014 (CITES 2013e). These data, therefore, do not accurately or adequately reflect the levels of trade prior to September 2014.

Recommended Actions

The following actions are recommended for promoting the conservation of priority shark species in Mexico, and their legal, sustainable trade throughout North America. Completion of the recommended actions is subject to available funding. If the cost of an action can reasonably be considered to be part of normal government spending, then the cost is listed as n/a. If the cost will likely require additional and possibly external funding, then a very rough estimate of the cost is provided.

Measuring, reporting and following up on the recommendations provided in this action plan will be the responsibility of the governments of Canada, Mexico and the United States, in collaboration with academic institutions, nongovernmental organizations and/or individual experts.

No.	Goals	Actions	Cost (US$)	Timeline	Priority
1	Ensure that progress on the recommendations in this action plan is reported and measurable.	**Measuring progress**: The governments of Canada, Mexico and the United States should develop and implement a process for tracking and reporting on efforts to fulfill the recommendations of this action plan, such as a dedicated website or other method.	n/a	2017 (ongoing)	High
2	Support collaborative North American efforts directed at promoting sustainable, traceable trade and conservation of priority CITES Appendix II species.	**(a) Trinational collaboration**: The governments of Canada, Mexico and the United States should support and monitor collaborative efforts to promote sustainable, traceable trade and conservation of native species deemed to be of priority concern—including CITES Appendix II sharks.	n/a	2017 (ongoing)	High
		(b) Funding strategy: The governments of Canada, Mexico and the United States (to the extent possible, and in consideration of domestic priorities) should develop a long-term strategy for funding this action plan, emphasizing realization of the high-priority actions.	n/a	2018	High
		(c) Staff exchanges: The relevant authorities in Canada, Mexico and the United States should consider short-term exchanges of staff to share experiences, information and resources for meeting CITES requirements for trade in sharks. This could use existing programs or new initiatives, and could include management, scientific and/or enforcement personnel.	n/a	2017 (ongoing)	Low
3	Build the capacity of the fishing sector to compile and report accurate shark fisheries data.	**(a) Capacity-building strategy**: The Mexican government should engage a consultant to develop a capacity-building strategy for improving species-specific identification and reporting by the fisheries sector.	20,000	2018	High
		(b) Capacity-building implementation: The Mexican government should implement the capacity-building strategy for improving species-specific identification and reporting by the fisheries sector.	TBD	2019–2020	High

No.	Goals	Actions	Cost (US$)	Timeline	Priority
4	Improve public awareness about shark conservation and management and the relevant laws and regulations that support sustainable harvest and trade of sharks in Mexico.	**Mexican national outreach strategy**: Mexican CITES and fisheries authorities, in collaboration with academia and nongovernmental organizations, should develop a national outreach strategy for increasing public awareness of relevant legal instruments, CITES, and shark conservation, to improve the engagement in sustainable management by the fisheries sector.	20,000	2018	High
5	Support sustainable trade of sharks in North America through improved collection and analysis of fisheries and trade data.	**a) Data compilation and analysis workshop**: The Mexican government, in collaboration with academia and nongovernmental organizations, and with participation from Canada and the United States, should hold a workshop to explore and identify alternative methodologies for data compilation and analysis and assessing data-poor shark fisheries, for formulating non-detrimental findings and in accordance with national legislation.	50,000	2018	High
		b) Compiling species-specific shark data: Mexican fisheries authorities, CITES authorities and fishing communities should establish a collaborative program for collecting, compiling and reporting comprehensive species-specific data on catch and fishing effort, with emphasis on CITES-listed shark species.	100,000 (per year)	2019	High
		c) Trade-chain analysis: Canada, Mexico, and the United States should compile comprehensive information on trade chains (from harvest to market) for CITES-listed shark species sourced in North America, to inform management and enforcement processes.	75,000	2019	High
		d) Shark species–specific HS codes: Canada, Mexico, and the United States should collaborate to support the work by FAO to institute shark species–specific Harmonized System (HS) codes under the World Customs Organization and support national efforts to collect species-specific harvest and trade data.	n/a	2019	Medium
6	Provide enforcement officers with the information and resources necessary to identify shark specimens and enforce the laws that regulate shark trade.	**a) Trinational training workshop**: Canada, Mexico and the United States should host a multi-agency trinational training workshop for enforcement officers on: recognizing different shark products in trade; fundamentals of the international shark fin trade; trade law enforcement scenarios in North America; recognizing shark fins at different stages of processing; identifying fins of adults and juveniles of CITES species; addressing high-volume shipments; and selecting samples for forensic analysis.	75,000	2018	High
		b) National enforcement training: Canadian, Mexican and US CITES law enforcement authorities should provide officer training on shark fin identification relevant to national enforcement needs and forensic resources.	10,000–25,000 (per year & per country, as needed)	2018 (ongoing)	High

No.	Goals	Actions	Cost (US$)	Timeline	Priority
7	Support sustainable trade of sharks in North America by updating and improving the management of Mexican shark fisheries.	(a) **PANMCT review and update**: Conapesca, in collaboration with Inapesca, CITES authorities, academia, fisheries sectors, and nongovernmental organizations, should hold a workshop to review and update the PANMCT to take into consideration changes that have taken place since the plan was published in 2004. These changes include additional CITES listings of elasmobranch species, and measures instituted by IATTC and ICATT to conserve sharks.	30,000	2018	High
		(b) **Fisheries management techniques**: Mexican fisheries authorities should evaluate the effectiveness of, and possibly modify, the current fishing seasons, and evaluate other fisheries management techniques (such as quotas and/or size limits, and consideration of closing fisheries in areas of essential habitat) that could promote sustainable management of CITES-listed shark fisheries, in accordance with CITES requirements.	n/a	2019	High
		(c) ***Carta Nacional Pesquera* update**: Inaspesca should add the genus *Sphyrna* to the CNP as a separate group.	n/a	Next update	High
		(d) **Mexican management plans**: The government of Mexico should prioritize completion of the Pacific and Gulf of Mexico Caribbean management plans for elasmobranch fisheries.	n/a	2017	High

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Brian Lester, Fisheries and Oceans Canada
Paola Mosig Reidl, Conabio
Jaqueline Jeniffer Noguez Lugo, Conabio
Luz Erandi Saldaña Ruiz, Cicese
Javier Tovar Ávila, Inapesca
Leonel Francisco Urbano Gutiérrez, Semarnat
Steven Wallace, David Suzuki Foundation

Steering Committee

Basile van Havre, Environment and Climate Change Canada
Carolina Caceres, Environment and Climate Change Canada
Gina Schalk, Environment and Climate Change Canada
Rosemarie Gnam, US Fish and Wildlife Service
Craig Hoover, US Fish and Wildlife Service
David W. Oliver, US Trade Representative
Hesiquio Benítez, Conabio
Gabriela López Segurajáuregui, Conabio
María Isabel Camarena Osorno, Conabio
Emmanuel Rivera Téllez, Conabio
Karla Isabel Acosta, Profepa
Francisco J. Navarrete Estrada, Profepa
Eliz Regina Martínez López, Profepa
Carolina Citlalli Carrillo Páez, Profepa

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Appendix A: **Categories of Risk**

Canada

The categories for species at risk in Canada, as used for species assessed under SARA, are summarized as follows (COSEWIC 2015):

- **Extinct (-)**: A wildlife species that no longer exists.
- **Extirpated (XT)**: A wildlife species that no longer exists in the wild in Canada, but exists elsewhere.
- **Endangered (E)**: A wildlife species facing imminent extirpation or extinction.
- **Threatened (T)**: A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
- **Special Concern (SC)**: A wildlife species that may become threatened or endangered 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 to resolve a species' eligibility for assessment or to permit an assessment of the wildlife species' risk of extinction.

Mexico

The legislated categories for species and populations at risk in Mexico, as summarized from the General Law of Wildlife of Mexico (*Ley General de Vida Silvestre*) (Mexico 2016), are as follows:

- **Probably Extinct (in the wild)**: Those species that no longer can be found in the wild and are only known to exist in captivity or outside Mexican territory.
- **Endangered (in danger of extinction)**: Those species whose ranges or population size have declined dramatically in Mexico, thereby threatening their survival, due to factors such as the destruction or drastic modification of habitat; unsustainable exploitation; disease; or predation.
- **Threatened**: Those species that could be in danger of extinction in the short or medium term, if the factors that threaten their survival continue unabated.
- **Subject to Special Protection**: Those species that could potentially be threatened by factors that threaten their survival, and for which efforts are required to promote their recovery and conservation.

United States

The categories for species at risk established by the United States, as defined in section 3 of the ESA, are as follows (USA 1973):

- **Endangered**: Any species which is in danger of extinction throughout all or a significant portion of its range. Species of insects may be exempt if they are deemed by the Secretary to be pests whose protection would present an overwhelming risk to man.

- **Threatened**: Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

IUCN Red List Categories

The Categories and Criteria of the IUCN Red List (IUCN 2012) are summarized as follows:

- **Extinct (EX)**: A taxon[11] of which no living individuals exist.

- **Extinct in the Wild (EW)**: A taxon that is known to survive only in cultivation, in captivity or as a naturalized population (or populations) well outside its past range.

- **Critically Endangered (CR)**: A taxon that meets any of five established criteria (A to E) and is facing an extremely high risk of extinction in the wild. The criteria for Critically Endangered are based on population size, geographic ranges and/or at least a 50% probability of extinction within 10 years or three generations.

- **Endangered (EN)**: A taxon that meets any of five established criteria (A to E) and is facing a very high risk of extinction in the wild. The criteria for Endangered are based on population size, geographic ranges and/or at least a 20% probability of extinction within 20 years or five generations.

- **Vulnerable (VU)**: A taxon that meets any of five established criteria (A to E) and is facing a high risk of extinction in the wild. The criteria for Vulnerable are based on population size, geographic ranges and/or at least a 10% probability of extinction within 100 years.

- **Near Threatened (NT)**: A taxon that has been evaluated against the criteria and does not qualify as Critically Endangered, Endangered or Vulnerable—but is close to qualifying for or is likely to qualify for the category Threatened in the near future.

- **Least Concern (LC)**: A taxon that has been evaluated against the criteria and does not qualify as Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa qualify for this category.

- **Data Deficient (DD)**: A taxon for which there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status.

- **Not Evaluated (NE)**: A taxon which has not yet been evaluated against the criteria.

11. The name applied to any taxonomic group in biological nomenclature (i.e., kingdom, phylum, class, order, family, genus, species, etc.) (Merriam-Webster 2016).

Commission for Environmental Cooperation
393, rue St-Jacques Ouest, bureau 200
Montreal (Quebec) H2Y 1N9 Canada
t 514.350.4300 f 514.350.4314
info@cec.org / www.cec.org