



ENDANGERED SHARKS IN YOUR BOWL

FINDINGS FROM

“DNA-BASED SPECIES IDENTIFICATION OF
SHARK FINS TRADED IN THAI MARKETS”

ช่วยสัตว์ป่า
WILDAID

ABOUT WILDAID

WildAid inspires change and empowers the world to protect wildlife and vital habitats from critical threats including illegal wildlife trafficking, climate change, and illegal fishing. WildAid delivers impact at scale in two distinct ways: 1) creating innovative communications campaigns that inspire millions of people in China, South East Asia, Africa, and the U.S. to protect endangered wildlife and reduce climate impacts, and 2) strengthening effective ocean enforcement of priority marine areas including marine protected areas, coastal fisheries, coral reefs, and blue carbon habitats with government, NGO, and community partners in 16 countries around the globe.

www.wildaid.org

Contact Information

WILDAID

220 Montgomery Street, Suite 1200
San Francisco, CA 94104
Telephone: +1 (415) 834-3174

Nuthatai Chotechuang
nuthatai@wildaid.org

Patranan Suphanganan
patranan@wildaid.org

PHOTOGRAPHERS

Sirachai Arunrugstichai
Nat Sumanatemeya
Pimpakarn Laongdee

COVER PHOTO

Sirachai Arunrugstichai

INFOGRAPHIC DESIGNER

Wizchayuth Limungkoon

LAYOUT DESIGNER

Arwika Mateekul

COVER PHOTO CAPTION

Dried shark fins seen stacked in a refrigerator at a shark fin restaurant in the Chinatown of Bangkok, Thailand. A recent study found several endangered shark species from foreign waters in Thai markets, which highlights the unsustainability of the industry and the role of Thailand in the international fin trade.

ABOUT THE REPORT

This report is based on the research findings from “**DNA-based species identification of shark fins traded in Thai markets.**”

Klangnurak, W., Arunrugstichai, S., Manopawitr, P. *et al.* DNA-based species identification of shark fins traded in Thai markets. *Conserv Genet* 24, 537–546 (2023)

AUTHORS' INFORMATION

Wanlada Klangnurak (Ph.D.)
*Lecturer, Department of Animal Production Technology and Fishery,
Faculty of Agricultural Technology, King Mongkut's Institute of Technology Ladkrabang*

Sirachai Arunrugstichai
Marine Scientist, Photojournalist, Aow Thai Marine Ecology Center

Petch Manopawitr (Ph.D.)
Conservation Scientist, Thailand Program Advisor, WildAid

Tassapon Krajangdara
Fishery Science, Senior Professional Level, Phuket Marine Fisheries Research and Development Center, Department of Fisheries, Thailand

AUTHOR CONTRIBUTIONS

Wanlada Klangnurak and Sirachai Arunrugstichai contributed to the study's conception and design. WK collected samples, conducted the molecular work and analyses, designed all figures and tables, and wrote the first draft of the report. All authors commented on and edited subsequent versions of the report.

This work was funded by WildAid.

CONTENTS

EXECUTIVE SUMMARY	5
THREATS TO SHARKS	7
ENDANGERED SHARKS IN YOUR BOWL: FINDINGS FROM “DNA-BASED SPECIES IDENTIFICATION OF SHARK FINS TRADED IN THAI MARKETS”	16
CONCLUSIONS	26
RECOMMENDATIONS	27
REFERENCES	30



EXECUTIVE SUMMARY

Overfishing and the demand for shark and ray products have driven one-third of global shark and ray species toward extinction.¹ A recent global study found overfishing is driving reef sharks towards extinction with the five most common species experiencing a decline of up to 73%.² Shark fins are one of the most valuable fish products and their demand is a major driver for shark fisheries where it was estimated that between 26 to 73 million sharks were killed annually during 2000-2010 for the global fin trade.³ According to FAO, the decline in volume of fins traded globally from the peak of the trade in 2003 suggests the trade for this shark product is unstable and has contributed to the decline of shark populations in many parts of the world.⁴

Thailand plays a key role in the shark fin trade as one of the top exporters of “low value” shark fin⁵ - referring to those that are cheaper, smaller, and otherwise considered lower quality. Between 2012-2016, Thailand exported over 22,466 tonnes of shark fin and processed shark fin products, ranking as the world’s number one exporter of shark fin during that period.⁶ In recent years, local demand for sharks has further contributed to Thailand becoming one of the most significant markets for the trade. However, WildAid’s 2023 online survey, independently conducted by Rapid Asia, found that demand for shark fin in Thailand has declined.

A total of 1,007 urban Thais, 25 years or older, in the central, northeast, north, and south regions were interviewed. Of these, 21% had consumed shark fin in the past 12 months, compared to 29% in the previous 2017⁷ survey. Based on population statistics, it is estimated that the number of shark fin consumers has dropped from around 6.6 million to around 5.3 million. Slightly fewer respondents (56%) want to try shark fin soup in the future, compared to 61% in the 2017 survey. Despite these positive trends, the latest findings show that Thailand remains an active market for shark fin consumption.

The shark population in Thailand has undergone a severe decline. Thailand’s fisheries statistics of shark landings from the last 10 years reveal shark catches from all types of fishing gear in commercial fisheries dramatically dropped from 2,873 tonnes in 2012 to 628 tonnes in 2016,⁸ and continued to decline to 545 tonnes in 2020.⁹ Previous studies of shark landings in Thailand’s Andaman Sea confirm that shark catches have become noticeably scarcer over the decade between 2005-2015, especially for the larger shark species. The loss of more than 60% of diversity from shark landings in little more than a decade, with massive shifts in the composition of the catch, suggest that shark populations in Thailand’s Andaman Sea may be perilously close to collapse.¹⁰

This study is the first DNA-based species identification of shark fin products in Thailand and aims to better understand the species composition of shark fin products in Thailand and their conservation statuses.¹¹ In 2020, a team of researchers from King Mongkut's Institute of Technology Ladkrabang (KMITL), in partnership with Thailand's Department of Fisheries (DoF), collected a total of 206 shark fin samples from retail markets, restaurants, warehouses, seaports, and fishing ports in four locations around Thailand. A total of 166 of 206 samples, or 80.58%, were identified. The research found fins from at least 15 unique shark species in Thailand's markets. Sixty-two percent of the identifiable species were assessed under the threatened categories of IUCN's Red List of Threatened Species. The spottail shark (*Carcharhinus sorrah*) and the night shark (*Carcharhinus signatus*) were the two dominant species identified in this study. Spottail sharks, the most dominant species, are categorized as Near Threatened (NT) under the IUCN Red List, but are Vulnerable (VU) in the 2020 Thailand Red Data, which is a status assessment of the biological resources in Thailand, by the Office of Natural Resources and Environmental Policy and Planning (ONEP), Thailand, using the IUCN Red List Categories as a guiding document.

The two species of hammerheads found in this study, the scalloped hammerhead (*Sphyrna lewini*) and great hammerhead (*Sphyrna mokarran*), were listed as Critically Endangered (CR) in both the IUCN Red List and Thailand Red Data and are globally regulated by the Convention on International Trade of Endangered Species (CITES) through inclusion in its Appendix II listing category.

Thirty-four percent of identifiable fins were from sharks that have not been recorded in or near Thai waters, indicating that fins traded in Thai markets rely

heavily on sources from outside the country and may be imported to satisfy local demand or for re-export. According to Thailand's Customs Department website¹² and Food Intelligence Center website,¹³ Hong Kong, Taiwan, and Singapore are a few of the top places that Thailand exported shark fin to between 2012-2020. Findings also revealed that many of the Critically Endangered (CR), Endangered (EN), and Vulnerable (VU) species found were identified through small-size fins, including the scalloped hammerhead (*Sphyrna lewini*), suggesting a high prevalence of immature sharks are being caught and traded.

The findings demonstrate the need for a traceability system to be established both in Thailand and internationally to increase law enforcement and trade monitoring to comply with the existing and new CITES Appendix II listing of 54 requiem shark species, which will come into effect at the end of 2023. As a result of this listing, almost all internationally traded species of sharks will now be subject to CITES regulations. Thailand has requested a reservation on the inclusion of requiem sharks (Carcharhinidae) valid for a period of six years or until November 2028 to set up systems for monitoring shark landings and trade.¹⁴

In 2018, WildAid launched the "Celebrate with #NoSharkFin" ("Chalong Mai Chalarm") campaign to reduce demand for sharks in Thailand through behavior change interventions to address consumption patterns, particularly around the celebratory occasions when Thais consume shark fin the most, thereby protecting sharks, fisheries, and ocean health. Given these latest findings, we will continue to expand our efforts to inform consumers about how consumption of sharks is detrimental to the ocean's ecosystem and will work with policymakers to strengthen appropriate measures to protect these keystone species.

THREATS TO SHARKS

Overfishing and the demand for shark and ray products have driven one-third of all shark and ray species toward extinction globally, according to the International Union for Conservation of Nature (IUCN).¹⁵ Sharks and rays are intrinsically susceptible to fishing pressure due to slow growth rates, late sexual maturity, low fecundity, long interbirth intervals, and long gestation periods.¹⁶

Shark fins are among the most valuable fish products and demand for them is a major driver for shark fisheries, which are responsible for killing an estimated 26 to 73 million sharks annually for the global fin trade.¹⁷ According to FAO, the decline in volume of fins traded globally from the

peak of the trade in 2003 suggests the trade for this shark product is unstable and has contributed to the decline of shark populations in many parts of the world.¹⁸

Although sharks are not the main species targeted by fisheries,¹⁹ the shark population in Thailand has undergone a severe decline. According to Thailand's national fisheries statistics of shark landings in Thailand, reported by the Department of Fisheries, 2,873 tonnes of sharks were caught from all fishing gear in commercial fisheries in 2012. This number dropped dramatically to 628 tonnes in 2016²⁰ and continued to decline to 545 tonnes in 2020,²¹ indicating fewer sharks in Thai waters.



According to Thailand's Department of Fisheries, there are no known types of fishing gear deployed solely to catch sharks in Thailand.²² However, sharks continue to be caught as bycatch or incidental catch by a variety of fishing gear. The large majority of sharks are caught by the otter board trawl (>85%), pair trawl (>11%), and the rest are caught by other fishing gear, such as longlines, purse seines, Indo-Pacific mackerel gill nets, mackerel gill nets, etc.

Between 2002-2014, shark catches by both commercial and small-scale fisheries only contributed to ~0.72% of the total marine fishery production. However, catch reports are often underestimations since sharks are categorized as bycatch in commercial fisheries, with limited monitoring capacity.

Previous studies of shark landings in Thailand's Andaman Sea confirmed that shark catches have become noticeably scarcer over the decade between 2005-2015, especially for the larger shark species. The loss of more than 60% of diversity from shark landings in little more than a decade, with massive shifts in the composition of the catch suggest that shark populations in the Andaman Sea may be perilously close to collapse.²³

Shark commodities are utilized in several ways. Shark meat is sold fresh or processed as "salted fish", "sweetened fish" and "fish balls" by both local and industrial-scale processors. Shark liver oil is utilized in the cosmetic industry. Other shark by-products are utilized as raw materials for animal feeds. And of course, shark fin is dried and used as the defining ingredient in shark fin soup.²⁴



Opposite page, top: Workers slice off the caudal fin of a bull shark (*Carcharhinus leucas*) in a shark processing factory in Ranong, Thailand. As the Thai public is increasingly concerned about the conservation of these vulnerable marine predators, sharks are now rarely displayed at landing sites and instead sent directly to processing factories. © Sirachai Arunrugstichai; bottom: Immature scalloped hammerheads (*Sphyrna lewini*) are piled up in tubs prior to being transported to a shark processing factory in Songkhla, Thailand. The species is assessed as Critically Endangered by the IUCN shark specialist group, and they are also one of the shark species that have suffered the most severe population declines in Thai waters. © Sirachai Arunrugstichai

Above: A large pile of spottail sharks (*Carcharhinus sorrah*) caught in the Andaman Sea by commercial longline fisheries are laid in buckets, waiting to be transported to a shark processing factory in Phuket, Thailand. The species makes up a large percentage of the total landings of sharks caught in Thai commercial fisheries. © Sirachai Arunrugstichai

THAILAND'S ROLE IN THE SHARK FIN TRADE

According to the 2015 Food and Agriculture Organization of the United Nations (FAO) report, *State of the global market for shark products*,²⁵ Thailand occupies a significant position in the global market for shark fins as the world's second-largest exporting country by quantity. Thailand also plays a primary role in the world market as the major exporter of low-value, processed shark fins.

Between 2012 and 2016, Thailand exported over 22,466 tonnes of shark fin and processed shark fin products, according to Food Intelligence Centre Thailand.²⁶ This data ranked Thailand as the world's number one exporter of shark fin during the 5-year period.²⁷ The geographical origin of shark fins in Thailand's market is hard to trace due to the obscure nature of this lucrative and occasionally illegal trade. Fins imported to Thailand could be a re-export from another country, because according to FAO, many countries do not report exports separately from re-exports.²⁸ The revision of commodity coding of each category of shark fins by Thailand's Customs Department has made monitoring of the trade difficult over time.

Dried shark fins are seen stacked in a refrigerator at a shark fin restaurant in Bangkok's Chinatown. Based on a 2023 WildAid survey of urban Thais, there has been a general decrease in shark fin consumption in the past six years. However, the number of consumers is still estimated to be 5.3 million people, indicating that Thailand is still an active market for shark fin consumption. © Sirachai Arunrugstichai



Small-size, ready to cook shark fins are on display at the front of a restaurant in Bangkok's Chinatown. © WildAid



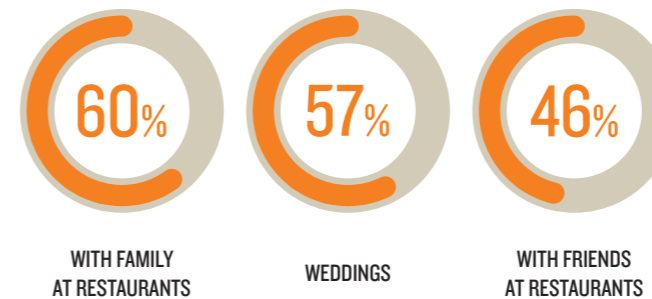
Small-size, ready to cook shark fins are on display at the front of a restaurant in Bangkok's Chinatown. Thailand remains an active market for shark fin consumption, according to WildAid's 2023 consumer survey of urban Thais. © WildAid

SHARK FIN DEMAND IN THAILAND

WildAid's 2023 online survey, independently carried out by Rapid Asia, found that demand for shark fin in Thailand has declined over the past six years. A total of 1,007 urban Thais, 25 years or older, in the central, northeast, north, and south regions were interviewed. Of these, 21% had consumed shark fin in the past 12 months, compared to 29% in the previous 2017 survey.²⁹ Based on population statistics, it is estimated that the number of shark fin consumers has dropped from around 6.6 million to around 5.3 million. In addition, the frequency of consumption also declined: In 2017, regular and occasional consumers represented 86% of consumers (around 5.7 million), but in 2023 this group shrunk to 60% (around 3.2 million). Despite this decline, the latest findings show that Thailand remains an active market for shark fin consumption.

The 2023 survey found evidence to suggest that demand reduction initiatives are likely to have contributed to the reduction in demand. The behavioral change model, KAP Score,³⁰ was used as part of the survey to examine the overall mindset of consumers in terms of their knowledge, attitude, and behavior towards shark fin consumption. The KAP Score model's lead indicator, the KAP Index suggests an incremental but significant improvement. That is, consumers have become more aware of the negative consequences of shark fin consumption and are beginning to question the killing of tens of millions of sharks for their fins and meat. The result is consistent with the decline seen in occasional consumption, shifting from 2-5 times per year to one time per year or less.

Preliminary research in 2023 showed there are over 150 restaurants, including stand-alone, chain, and hotel restaurants, recorded serving shark fin in Bangkok. Although a few shops have closed down since the 2017 survey took place, it is expected that the number of restaurants serving shark fin then was underestimated. The price of a bowl of shark fin soup ranges from as low as 200 Baht (6 USD) on the streets to as high as 6,000 Baht (172 USD) in a downtown Bangkok restaurant for a dish containing an extra-large fin.



Respondents from the latest survey said they consume shark fin most often with family at restaurants (60%), followed by weddings (57%), and with friends at restaurants (46%). This result was consistent with that of 2017, and social gatherings remain the main consumption occasions for shark fin. However, the impact of the COVID-19 pandemic may well have contributed to the overall decline as there were fewer weddings taking place and fewer people going out to restaurants. The 2023 survey revealed an increasing trend of consumers eating shark fin in the comfort of their own homes, acquired via online delivery platforms or takeaway from restaurants.



A chef pours shark fin soup into a clay pot at a restaurant in Bangkok's Chinatown. A bowl of shark fin soup in downtown Bangkok ranges from 200 Baht (6 USD) to as high as 6,000 Baht (172 USD). © Wildaid



PROTECTION

At the 19th Conference of the Parties (CoP19) of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in November 2022, Parties agreed to list all 54 species of the requiem shark family and the six remaining species from the hammerhead family not yet listed to Appendix II of the CITES convention. Requiem sharks include blue sharks, tiger sharks, bull sharks, blacktip sharks, and others that are heavily targeted for their fins. Around 70% of the species in this family are already threatened with extinction. A CITES Appendix II designation gives listed species greater protections at an international level, in that trade must be regulated and controlled in order to avoid utilization incompatible with their survival. Thailand has requested a reservation on the inclusion of requiem sharks (Carcharhinidae) in Appendix II valid for a period of six years or until November 2028 in order to set up systems for monitoring of shark landings and trade.³¹ This request is unique among shark fin trading countries and may put Thailand in a challenging position as the sole trading country with exception to comply with the new CITES resolution.

Thailand has enforced a number of laws, which either directly or indirectly affect fisheries resource management and conservation of sharks and rays with the objective of sustainable utilization of aquatic animals. The whale shark is the

only species currently declared as a Conserved Wild Animal, which warrants the highest protection status. Any attempt to hunt, kill, or sell carcasses of these species can result in the penalty of imprisonment up to 15 years and fines of 300,000-1,500,000 Baht (8,500 USD - 42,400 USD). In 2021, four species of hammerhead sharks including the winghead shark (*Eusphyrna blochii*), scalloped hammerhead (*Sphyrna lewini*), great hammerhead (*Sphyrna mokarran*), and smooth hammerhead (*Sphyrna zygaena*) received approval to be listed as Protected Wild Animal in Thailand. The penalty for violating laws regarding Protected Species includes imprisonment of up to 10 years and fines of up to 1,000,000 Baht (28,000 USD).

Thailand established the *National Plan of Action for the Conservation and Management of Sharks (NPOA-Sharks) Plan 1, 2020-2024* in 2019, led by the Department of Fisheries and relevant agencies outlining five key actions necessary to improving and ensuring sustainable management and conservation of sharks and rays in Thai waters.³² The NPOA-sharks is commendable but still lacks a clear coordination mechanism and implementation timeline. Actions in NPOA should be prioritized for all relevant agencies, especially DoF, DMCR, and DNP. The updating process for NPOA should consider the obstacles and barriers for effective implementation and how to overcome them.

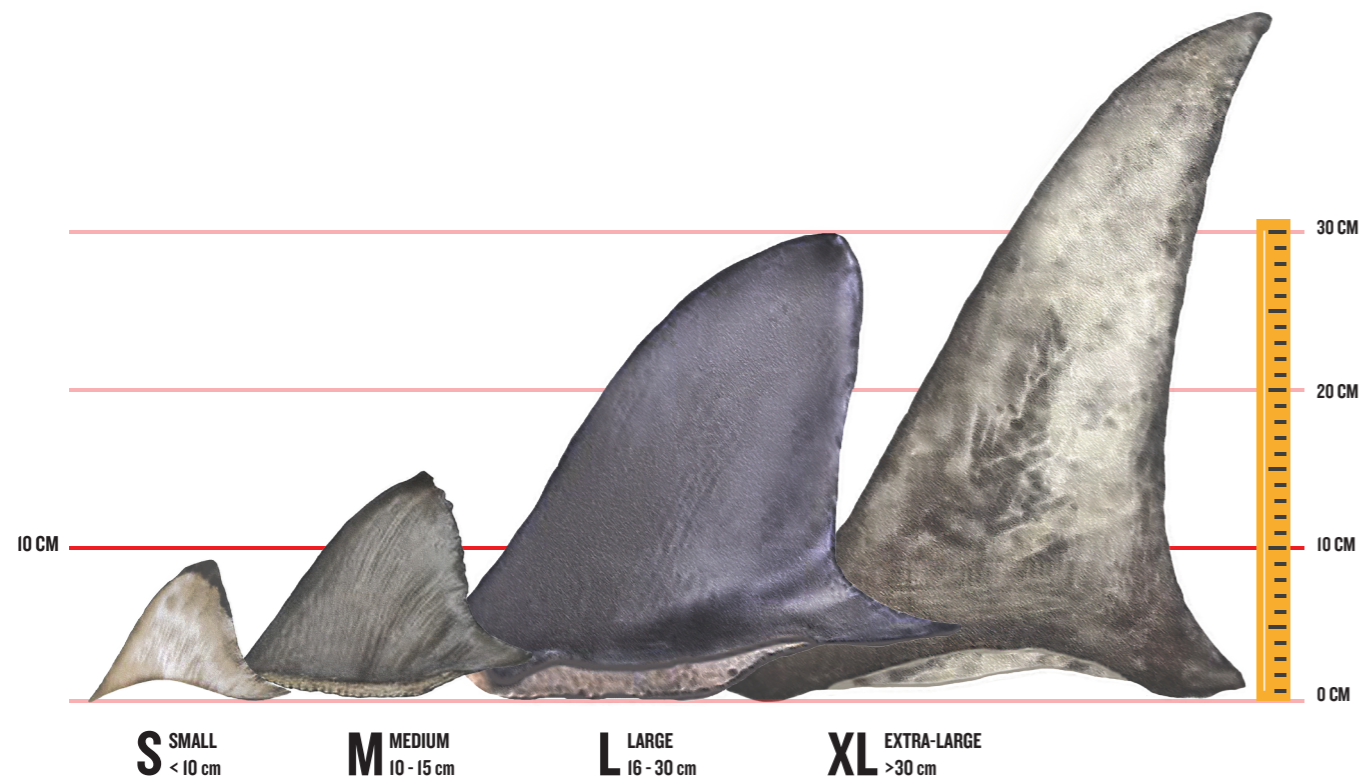
Opposite page, Buckets of immature spottail sharks (*Carcharhinus sorrah*) are seen loaded onto a motorcycle trailer, to be processed at a shark processing factory in Ranong, Thailand. Most sharks produce a very low number of offspring and take many years before reaching reproductive maturity compared to other fishes; therefore, it can take a very long time for a population to recover once fished out. © Sirachai Arunrugstichai

ENDANGERED SHARKS IN YOUR BOWL

FINDINGS FROM “DNA-BASED SPECIES IDENTIFICATION OF SHARK FINS TRADED IN THAI MARKETS”

This is the first DNA-based species identification study of shark fin products in Thailand aiming to better understand the species composition of shark fin products in Thailand, calling attention to their conservation statuses.³³ In 2020, a team of researchers from King Mongkut’s Institute of Technology Ladkrabang (KMITL), in partnership with Thailand’s Department of Fisheries (DoF), randomly collected a total of 206 shark fin samples from retail markets, restaurants, warehouses, seaports, and fishing

ports from four locations around Thailand. Fin samples were classified into four types, including frozen, dried, dried processed, and wet processed fins. Length of fins was measured from the fin baseline to the tip of the fin in a perpendicular line. Size of fins was categorized as small (S: <10 cm), medium (M: 10-15 cm), large (L: 16-30 cm), and extra-large (XL: >30 cm). Each fin tissue sample was clipped for DNA extraction.



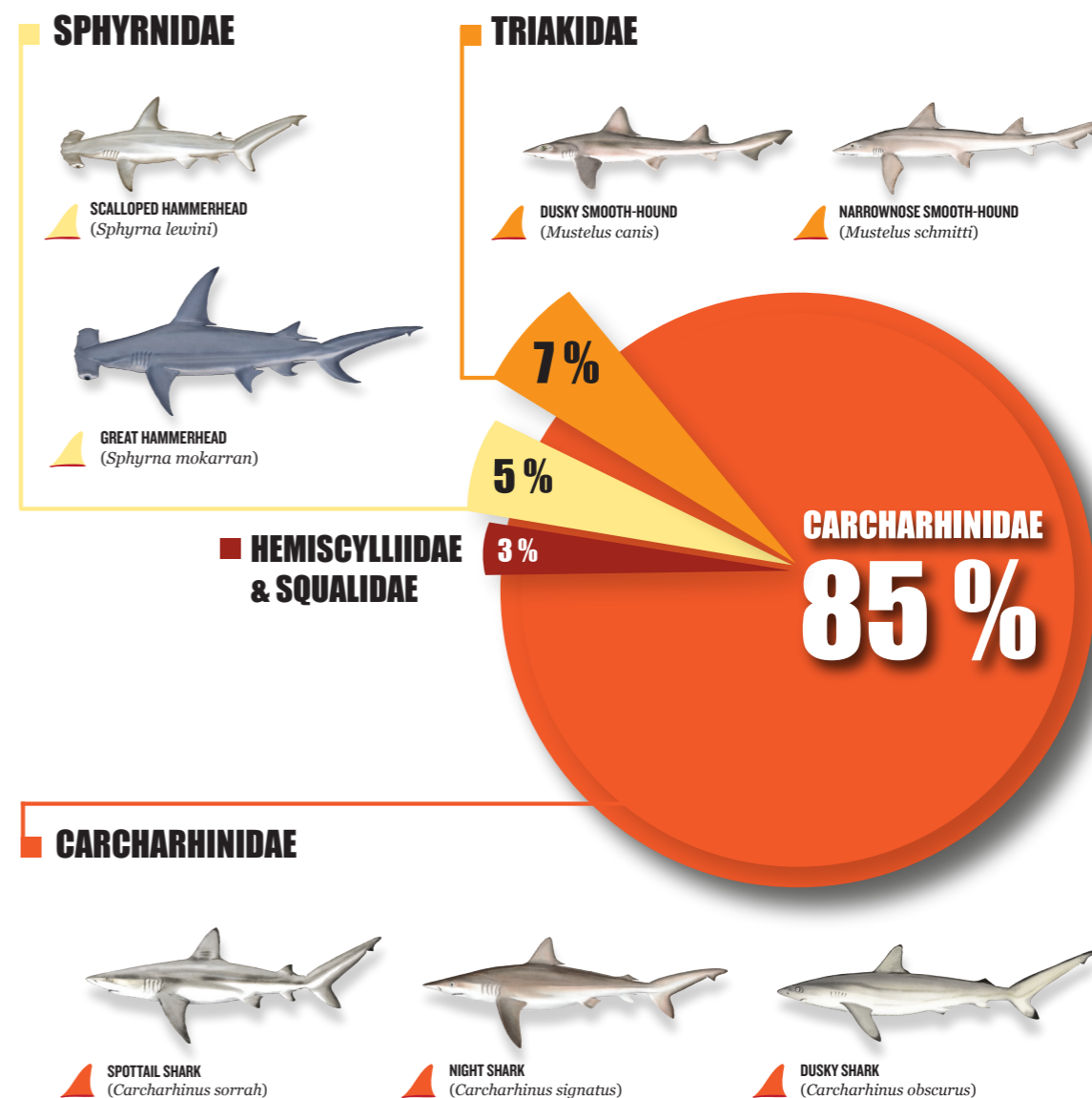
Examples of small-size dried shark fins and dried processed fins collected from four locations around Thailand. © Pimpakarn Laongdee for WildAid.



A researcher clips a tissue sample from a dried processed shark fin for DNA extraction. © Pimpakarn Laongdee for WildAid.



PROPORTION OF EACH SHARK FAMILY IDENTIFIED FROM FIN SAMPLES COLLECTED IN THIS STUDY



A total of 166 of 206 fin samples (80.58%) were successfully identified. The research found fins from at least 15 different shark species present in Thailand's markets (Table 1). The sharks found

belong to the Carcharhinidae [Requiem] (85%), Triakidae (7%), Sphyrnidae (5%), and other (3%) families.

Opposite page, PCR microtubes containing DNA from shark fin samples are prepared for the PCR (Polymerase Chain reaction) process to increase the amount of DNA. This is an important step before DNA sequencing for species identification. © Pimpakarn Laongdee for WildAid.

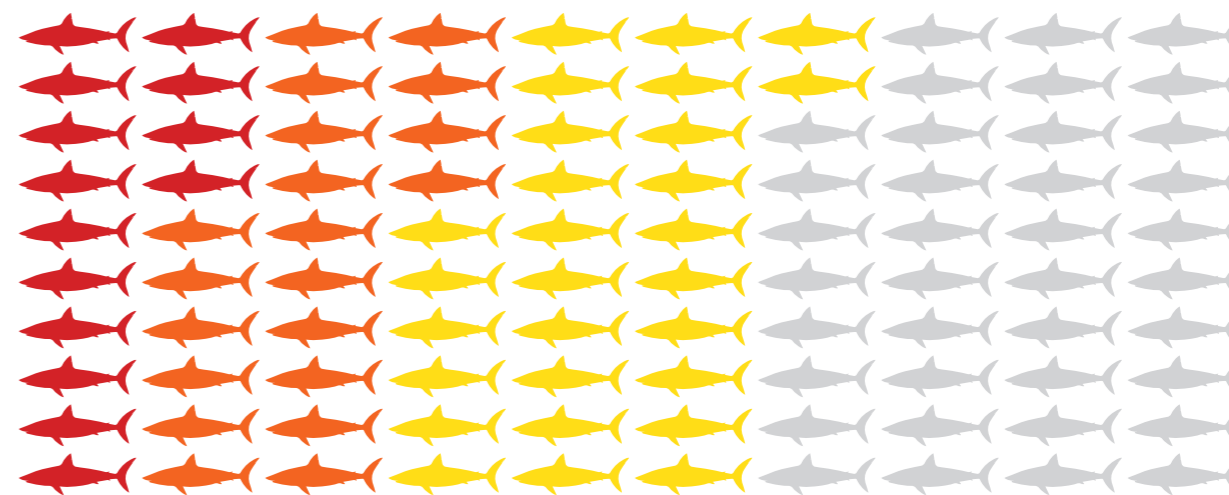
TABLE 1: PROPORTION OF IDENTIFIED SPECIES AND THEIR CORRESPONDING IUCN RED LIST STATUS, THAILAND RED DATA STATUS, AND CITES LISTING

No.	Scientific name	Common name	Portion in identifiable species (%)	IUCN Red list status	Thailand Red Data (2021)	CITES listing
1	<i>Carcharhinus sorrah</i>	Spottail shark	29%	NT (2020)	VU	Appendix II (effective Nov 2023)*
2	<i>Carcharhinus signatus</i>	Night shark	26%	EN (2019)	N/A	Appendix II (effective Nov 2023)*
3	<i>Carcharhinus amboinensis</i>	Pigeye shark	5%	VU (2020)	VU	Appendix II (effective Nov 2023)*
4	<i>Carcharhinus brevipinna</i>	Spinner shark	4%	VU (2020)	VU	Appendix II (effective Nov 2023)*
5	<i>Rhizoprionodon acutus</i>	Milk shark	3%	VU (2020)	NT	Appendix II (effective Nov 2023)*
6	<i>Sphyrna lewini</i>	Scalloped hammerhead	3%	CR (2018)	CR	Appendix II
7	<i>Carcharhinus amblyrhynchoides</i>	Graceful shark	2%	VU (2020)	EN	Appendix II (effective Nov 2023)*
8	<i>Carcharhinus limbatus</i>	Blacktip shark	2%	VU (2020)	VU	Appendix II (effective Nov 2023)*
9	<i>Mustelus schmitti</i>	Narrownose smooth-hound	2%	CR (2019)	N/A	-
10	<i>Chiloscyllium punctatum</i>	Brownbanded bambooshark	2%	NT (2015)	VU	-
11	<i>Carcharhinus leiodon</i>	Smooth tooth blacktip shark	1%	EN (2017)	N/A	Appendix II (effective Nov 2023)*
12	<i>Carcharhinus obscurus</i>	Dusky shark	1%	EN (2018)	EN	Appendix II (effective Nov 2023)*
13	<i>Carcharhinus plumbeus</i>	Sandbar shark	1%	EN (2020)	VU	Appendix II (effective Nov 2023)*
14	<i>Loxodon macrorhinus</i>	Sliteye shark	1%	NT (2021)	NT	Appendix II (effective Nov 2023)*
15	<i>Trienodon obesus</i>	Whitetip reef shark	1%	VU (2020)	VU	Appendix II (effective Nov 2023)*
16	<i>Sphyrna mokarran</i>	Great hammerhead	1%	CR (2018)	CR	Appendix II
17	<i>Mustelus canis</i>	Dusky smooth-hound	1%	NT (2019)	N/A	-

NT - Near Threatened VU - Vulnerable EN - Endangered CR - Critically Endangered

Thailand Red Data is a status assessment of threatened species in Thailand by Thailand's Office of Natural Resources and Environmental Policy and Planning (ONEP) using the IUCN Red List Categories as a guiding document.

* Thailand has requested a reservation on the inclusion of requiem sharks (Carcharhinidae) valid for a period of six years or until November 2028.



62% OF THE FINS SAMPLED BELONGED TO SHARK SPECIES THAT WERE ASSESSED UNDER THREATENED CATEGORIES OF THE IUCN RED LIST

14% CRITICALLY ENDANGERED (CR) 20% ENDANGERED (EN) 28% VULNERABLE (VU) 38% NEAR THREATENED (NT)

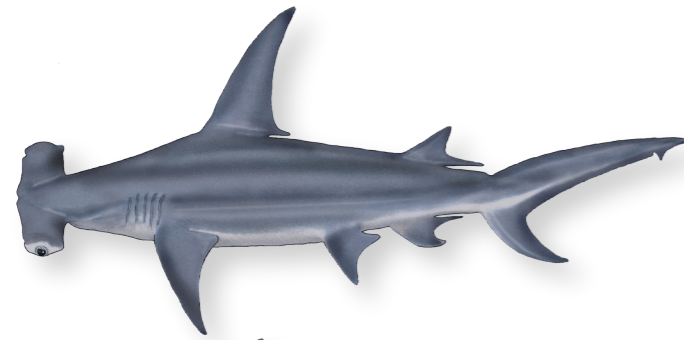
Most of the species identified (62%) were assessed under the threatened categories of the IUCN Red List. Fourteen percent of fins belonged to Critically Endangered (CR) species, 20% from Endangered (EN) species, and 28% were from Vulnerable (VU) species.

The spottail shark (*Carcharhinus sorrah*) and the night shark (*Carcharhinus signatus*) were the two species found most frequently. This implies that a large volume of these species are being exploited to support Thailand's market. Spottail sharks are

Near Threatened (NT) on IUCN's Red List, but are Vulnerable (VU) in the 2020 Thailand Red Data assessment.

Two species of hammerheads identified in this study, the scalloped hammerhead (*Sphyrna lewini*) and great hammerhead (*Sphyrna mokarran*), are listed as Critically Endangered (CR) in both the IUCN Red List and Thailand Red Data and are globally regulated by their CITES Appendix II listing status.

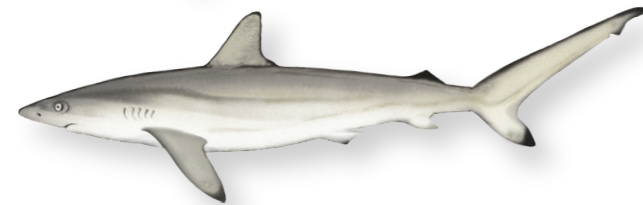
5 OF THE 15 SHARK SPECIES IDENTIFIED IN THIS STUDY AND THEIR CATEGORIZATION UNDER IUCN RED LIST AND THAILAND RED DATA



GREAT HAMMERHEAD (*Sphyrna mokarran*)
IUCN RED LIST STATUS: CRITICALLY ENDANGERED (2018)
THAILAND RED DATA STATUS: CRITICALLY ENDANGERED
CITES APPENDIX II



SCALLOPED HAMMERHEAD (*Sphyrna lewini*)
IUCN RED LIST STATUS: CRITICALLY ENDANGERED (2018)
THAILAND RED DATA STATUS: CRITICALLY ENDANGERED
CITES APPENDIX II



SPOTTAIL SHARK (*Carcharhinus sorrah*)
IUCN RED LIST STATUS: NEAR THREATENED (2020)
THAILAND RED DATA STATUS: VULNERABLE



BLACKTIP SHARK (*Carcharhinus limbatus*)
IUCN RED LIST STATUS: VULNERABLE (2020)
THAILAND RED DATA STATUS: VULNERABLE



SPINNER SHARK (*Carcharhinus brevipinna*)
IUCN RED LIST STATUS: VULNERABLE (2020)
THAILAND RED DATA STATUS: VULNERABLE



IUCN RED LIST - The World's most comprehensive information source on the global extinction risk status of animal, fungus and plant species.

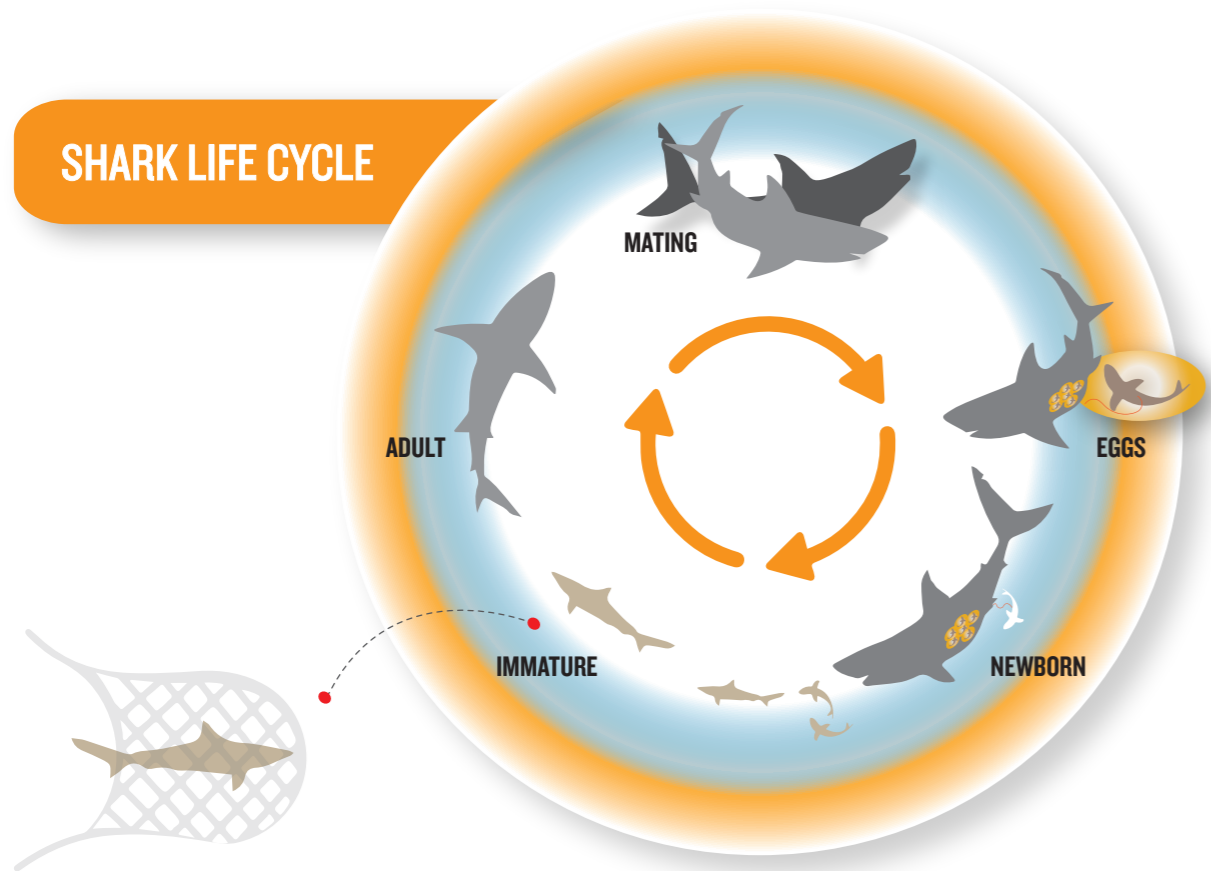
THAILAND RED DATA - An assessment of the status of the biological resources in Thailand by the office of Natural Resources and Environmental Policy and Planning (ONEP), using the IUCN Red List categories as a guiding document.



34% of the shark species identified are not found in Thai waters, indicating that fins traded in Thai markets rely heavily on sources outside the country

Most of the species identified can be found in Thai waters, however, it could not be determined if they were captured from Thai seas, since some of the species are widespread.³⁴ Meanwhile, 34% of the sharks identified are not found in Thai waters. This provides evidence that the fins traded in Thai markets rely heavily on sources from outside the country, imported to satisfy local demand and/

or for re-export, with Thailand acting as a trading hub. Species from all threatened categories were found in the samples collected from Bangkok and its vicinity, reflecting that it is the center of Thailand's shark fin market, procuring fins from all over, while markets outside of Bangkok probably obtain shark fin products from local sources or dealers in Bangkok and its vicinity.



Harvesting immature sharks can severely impact shark populations and hinder the recovery potential of stocks from exploitation

According to FAO, fins commonly marketed and exported from Thailand are small, low-value fins,³⁵ which seems to be confirmed by the fact that small fins were the most prevalent fin size collected in this study. The research found that many identifiable species that are classified as Critically Endangered, Endangered, and Vulnerable were found in the small size class, including pigeye shark (*Carcharhinus amboinensis*), spinner shark (*Carcharhinus brevipinna*), blacktip shark (*Carcharhinus limbatus*), dusky shark (*Carcharhinus obscurus*), sandbar shark (*Carcharhinus plumbeus*), night shark (*Carcharhinus signatus*), milk shark (*Rhizo-*

prionodon acutus), whitetip reef shark (*Triaenodon obesus*), scalloped hammerhead (*Sphyrna lewini*), and narrownose smooth-hound shark (*Mustelus schmitti*). We concluded that, with the exception of smaller shark species, the samples categorized as small likely represent immature individuals. However, it is difficult to determine the maturity of sharks from fins alone, since there is limited information on the relationships between fin length and size at maturity of different shark species. Harvesting immature sharks can severely impact shark populations and hinder the recovery potential of stocks after exploitation.³⁶

CONCLUSION

The DNA analysis study of shark fin products sold in Thailand confirms that consumers might be eating endangered sharks without knowing. Concurrently, the 2023 survey of shark fin demand in Thailand highlights that Thailand remains an active market for shark fin consumption. These results demonstrate the need to continue demand reduction efforts rooted in social and behavior change communications, while simultaneously helping to inform the public and

government stakeholders about relevant research findings, raising awareness of the importance of sharks to ocean ecosystems, and working with government agencies to support implementation of the National Plan of Action for Conservation and Management of Sharks, Thailand (NPOA-Sharks) and protect important habitats for sharks. Execution of these activities, in combination, has significant potential to save vulnerable shark species around the world that are being impacted by trade.

KEY FINDINGS

- 62% of the fins belonged to shark species at risk of extinction, according to the IUCN Red List.
- A significant prevalence of Critically Endangered (CR), Endangered (EN), and Vulnerable (VU) shark species were found in small-sized fins, indicating the potential exploitation of threatened species of immature sharks in the trade.
- The spottail shark (*Carcharhinus sorrah*) was found to be the most prevalent shark species in the samples collected and is listed as Near Threatened (NT) on the IUCN Red List and Vulnerable (VU) to extinction in Thai waters according to Thailand Red Data List.
- 80% of the species found from the study will be listed in the CITES Appendix II, effective from November 2023, while Thailand has requested a reservation on the inclusion of requiem sharks (Carcharhinidae) valid for a period of six years or until November 2028.
- 34% of the identifiable fins were from sharks that have never been recorded in Thai waters. This provides evidence that the fins traded in Thai markets rely heavily on sources from outside the country, imported to satisfy local demand and/or for re-export, with Thailand acting as a trading hub.
- WildAid's 2023 survey of 1,007 urban Thais found 21% of respondents, or around 5.3 million people, based on population statistics, have consumed shark fin in the past 12 months, a decline from 29% or around 6.6 million consumers in 2017, while 56% of respondents plan to consume shark fin in the future, a slight decline from 61% in 2017.
- In 2017, regular and occasional consumers represented 86% of consumers (around 5.7 million), but in 2023 only 60% fell into this group (around 3.2 million).
- Shark fin is most often consumed with family at restaurants (60%), followed by weddings (57%), and with friends at restaurants (46%). This result was consistent with that of 2017, and social gatherings remain the main consumption occasions for shark fin. However, home consumption increased in 2023 and is likely to have been a result of the Covid-19 pandemic.

RECOMMENDATIONS

IMPROVE TRACEABILITY SYSTEM FOR SHARK FIN TRADE

Lack of traceability of globally threatened species in the shark fin trade is a barrier to understanding the supply chain and trade route of shark fins in Thailand. Given Thailand's important role in the international trade of shark fin, the country needs to rapidly strengthen its capability to trace the supply chain of shark fin. CITES-listed shark species should be receiving full attention and be properly monitored. Shark identification capability needs to be improved significantly among relevant government staff. A traceability system that allows access to information on shark products throughout the supply chain should be established both domestically and internationally. This could involve, for example, adopting SharkTrace³⁷, a tool

that uses technology to trace species from capture to consumption, or other similar tools. Robust execution of the landings monitoring is also needed to comply with new CITES listings and to understand how existing management measures are protecting sharks and what other efforts might be needed to ensure conservation of wild populations across species. The data should be analyzed and reported every year to monitor the status of the stock. Shark data should be collected during quarterly research using trawl method by the Department of Fisheries to update the shark distribution maps and annual catch rates, species composition, sex ratios and estimated biomass.

STOCK AND TRADE MONITORING OF DOMINANT AND THREATENED SPECIES

A large volume of the spottail shark (*Carcharhinus sorrah*) is being exploited to support Thailand's small, low-value shark fins market, evidenced by it being the most frequently identified species in this study. Its IUCN Red List status should be re-evaluated and likely revised given its prevalence in this marketplace. Spottail shark stocks should be assessed for all regions for better fisheries management, particularly because previous studies have also found its landings were dominated by immature size specimens in Southeast Asia.³⁸ Site-based management for shark conservation needs to be strengthened, especially at known shark hotspots. Mapping shark hotspots and highlighting them as Key Biodiversity Areas (KBAs) could be one way to expand marine protection coverage and support

the global goal of 30% protection of the world's oceans by 2030.

More than 80% of species found in this study will be added to CITES Appendix II, in which Thailand requested a reservation valid for a period of six years or until November 2028. Many of the species found are classified as Critically Endangered on the IUCN Red List. Law enforcement action and monitoring of these species should be prioritized globally, and through Thailand's National Plan of Action for Conservation and Management of Sharks. Thailand should aim to better understand sharks' conservation status, the sources of fins, and ensure that trade of these species complies with CITES Appendix II obligations.

CONDUCT RANDOM DNA TESTING

Given this study's high ratio of success, we recommend additional DNA-based identification methods to detect threatened species and CITES-listed species in the shark fin trade. Conducting regular random molecular tests of subsamples of shark products will also provide invaluable

information for future evaluations for the threatened and CITES-listed species, aid in better management for shark resources in this region, and help with enforcement on the trade of illegal shark species within Thailand.

FUTURE RESEARCH

Studies of relationships between fin length and mature size of sharks could help identify a recommended minimum fin size that should be required by sustainable fisheries targeting sharks. This

could help ensure that future catches are primarily composed of mature sized sharks, increasing the likelihood of maintaining healthy populations.



Researchers are categorizing samples of dried shark fins to differentiate their sizes. The size of each fin is measured from the fin base-line to the tip of the fin in a perpendicular line. © WildAid



REFERENCES

- Dulvy, N.K., Pacoureau, N., Rigby, C.L., Pollom, R.A., Jabado, R.W., Ebert, D.A., Finucci, B., Pollock, C.M., Cheok, J., Derrick, D.H., Herman, K.B., Sherman, C.S., VanderWright, W.J., Lawson, J.M., Walls, R.H.L., Carlson, J.K., Charvet, P., Bineesh, K.K., Fernando, D., Ralph, G.M., Matsushiba, J.H., Hilton-Taylor, C., Fordham, S.V. and Simpfendorfer, C.A. 2021. Overfishing drives over one-third of all sharks and rays toward a global extinction crisis. *Current Biology* 31: 1-15 <https://doi.org/10.1016/j.cub.2021.08.06>
- Colin A. Simpfendorfer et al., Widespread diversity deficits of coral reef sharks and rays. *Science* 380, 1155-1160 (2023). DOI: 10.1126/science.ade4884
- Clarke SC, McAllister MK, Milner-Gulland EJ, Kirkwood GP, Michielsens CG, Agnew DJ, Pickett EK, Nakano H, Shivji MS (2006b) Global estimates of shark catches using trade records from commercial markets. *Ecol Lett* 9:1115-1126. <https://doi.org/10.1111/j.1461-0248.2006.00968.x>
- Dent F, Clarke S (2015) State of the global market for shark products. FAO, Rome, p 187
- Ibid.
- Shark Fin Demand in Thailand*. WildAid. July 2017. <http://www.wildaid.org/sites/default/files/resources/Shark%20Fin%20Demand%20in%20Thailand%202017.pdf>
- Ibid.
- Department of Fisheries (2014) The marine fisheries statistics 2012 based on the sample survey. Fishery Statistics Analysis and Research Group. Fisheries Development Policy and Strategy Division, p 1654; Department of Fisheries (2018) Fisheries statistics of Thailand 2016. Fisheries development policy and strategy division, department of fisheries, p 165
- Department of Fisheries (2020) Thailand National Plan of Action for the Conservation and Management of Sharks (NPOA-Sharks, Thailand: Plan 1, 2020-2024). Fisheries, Ministry of Agriculture and Cooperatives, Bangkok, Thailand, p 62
- Arunrugstichai S, True JD, White WT (2018) Catch composition and aspects of the biology of sharks caught by Thai commercial fisheries in the Andaman Sea. *J Fish Biol* 92:1487-1504. <https://doi.org/10.1111/jfb.13605>
- Klangnurak, W., Arunrugstichai, S., Manopawitr, P. et al. DNA-based species identification of shark fins traded in Thai markets. *Conserv Genet* 24, 537-546 (2023). <https://doi.org/10.1007/s10592-023-01519-0>
- http://www.customs.go.th/statistic_report.php?ini_content=statistics_report
- <https://fic.nfi.or.th/index.php>
- <https://cites.org/sites/default/files/notifications/E-Notif-2023-052.pdf>
- Dulvy, N.K., Pacoureau, N., Rigby, C.L., Pollom, R.A., Jabado, R.W., Ebert, D.A., Finucci, B., Pollock, C.M., Cheok, J., Derrick, D.H., Herman, K.B., Sherman, C.S., VanderWright, W.J., Lawson, J.M., Walls, R.H.L., Carlson, J.K., Charvet, P., Bineesh, K.K., Fernando, D., Ralph, G.M., Matsushiba, J.H., Hilton-Taylor, C., Fordham, S.V. and Simpfendorfer, C.A. 2021. Overfishing drives over one-third of all sharks and rays toward a global extinction crisis. *Current Biology* 31: 1-15 <https://doi.org/10.1016/j.cub.2021.08.06>.
- Hoenig JM, Gruber SH (1990) Life-history patterns in the elasmobranchs: implications for fisheries management. Department of Commerce, Washington, DC, p 16 Cortés E (2000) Life history patterns and correlations in Sharks. *Rev Fish Sci* 8:299-344. <https://doi.org/10.1080/10641260008951115>
- Clarke SC, McAllister MK, Milner-Gulland EJ, Kirkwood GP, Michielsens CG, Agnew DJ, Pickett EK, Nakano H, Shivji MS (2006b) Global estimates of shark catches using trade records from commercial markets. *Ecol Lett* 9:1115-1126. <https://doi.org/10.1111/j.1461-0248.2006.00968.x>
- Dent F, Clarke S (2015) State of the global market for shark products. FAO, Rome, p 187
- Department of Fisheries (2020) Thailand National Plan of Action for the Conservation and Management of Sharks (NPOA-Sharks, Thailand: Plan 1, 2020-2024). Fisheries, Ministry of Agriculture and Cooperatives, Bangkok, Thailand
- Department of Fisheries (2014) The marine fisheries statistics 2012 based on the sample survey. Fishery Statistics Analysis and Research Group. Fisheries Development Policy and Strategy Division, p 1654; Department of Fisheries (2018) Fisheries statistics of Thailand 2016. Fisheries Development Policy and Strategy Division, Department of Fisheries, p 165
- Department of Fisheries (2020) Thailand National Plan of Action for the Conservation and Management of Sharks (NPOA-Sharks, Thailand: Plan 1, 2020-2024). Fisheries, Ministry of Agriculture and Cooperatives, Bangkok, Thailand, p 62
- Ibid.
- Arunrugstichai S, True JD, White WT (2018) Catch composition and aspects of the biology of sharks caught by Thai commercial fisheries in the Andaman Sea. *J Fish Biol* 92:1487-1504. <https://doi.org/10.1111/jfb.13605>
- Department of Fisheries (2020) Thailand National Plan of Action for the Conservation and Management of Sharks (NPOA-Sharks, Thailand: Plan 1, 2020-2024). Fisheries, Ministry of Agriculture and Cooperatives, Bangkok, Thailand
- Dent F, Clarke S (2015) State of the global market for shark products. FAO, Rome, p 187
- <https://fic.nfi.or.th/>
- Shark Fin Demand in Thailand*. WildAid. July 2017. <http://www.wildaid.org/sites/default/files/resources/Shark%20Fin%20Demand%20in%20Thailand%202017.pdf>
- Dent F, Clarke S (2015) State of the global market for shark products. FAO, Rome, p 5
- Ibid.
- Rapid Asia <https://rapid-asia.com/services/kap-score/>
- <https://cites.org/sites/default/files/notifications/E-Ntif-2023-052.pdf>
- Department of Fisheries (2020) Thailand National Plan of Action for the Conservation and Management of Sharks (NPOA-Sharks, Thailand: Plan 1, 2020-2024). Fisheries, Ministry of Agriculture and Cooperatives, Bangkok, Thailand
- Klangnurak, W., Arunrugstichai, S., Manopawitr, P. et al. DNA-based species identification of shark fins traded in Thai markets. *Conserv Genet* 24, 537-546 (2023). <https://doi.org/10.1007/s10592-023-01519-0>
- Dulvy NK, Fowler SL, Musick JA, Cavanagh RD, Kyne PM, Harrison LR, Carlson JK, Davidson LN, Fordham SV, Francis MP et al (2014) Extinction risk and conservation of the world's sharks and rays. *Elife* 3:e00590. <https://doi.org/10.7554/eLife.00590>
- Dent F, Clarke S (2015) State of the global market for shark products. FAO, Rome
- Fahmi SK (2007) Size, sex and length at maturity of four common sharks caught from western Indonesia. *Mar Res Indonesia* 32:7-19
- <https://www.traffic.org/sharktrace/>
- Fahmi SK (2007) Size, sex and length at maturity of four common sharks caught from western Indonesia. *Mar Res Indonesia* 32:7-19; Moore AB, McCarthy ID, Carvalho GR, Peirce R (2012) Species, sex, size and male maturity composition of previously unreported elasmobranch landings in Kuwait, Qatar and Abu Dhabi Emirate. *J Fish Biol* 80:1619-1642. <https://doi.org/10.1111/j.1095-8649.2011.03210.x>

ช่วยสัตว์ป่า
WILDAID



This report is printed on 100% Recycled Paper