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# SHARKS IN CRISIS

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EVIDENCE OF POSITIVE  
BEHAVIORAL CHANGE IN CHINA  
AS NEW THREATS EMERGE

**WILDAID**

## ABOUT WILDAID

WildAid's mission is to end the illegal wildlife trade in our lifetimes by reducing demand through public awareness campaigns and providing comprehensive marine protection.

The illegal wildlife trade is estimated to be worth over \$10 billion per year and has drastically reduced many wildlife populations around the world. Just like the drug trade, law and enforcement efforts have not been able to resolve the problem. Every year, hundreds of millions of dollars are spent protecting animals in the wild, yet virtually nothing is spent on stemming the demand for wildlife parts and products.

WildAid is the only organization with a mission focused on reducing the demand for these products, with the strong and simple message: *When the buying stops, the killing can too.* WildAid works with hundreds of Asian and Western celebrities, business leaders, sports and political figures, including the Duke of Cambridge, Yao Ming, Jackie Chan, Li Bingbing, Tony Jaa and Sir Richard Branson, to dissuade people from purchasing endangered wildlife products. These public service messages and educational initiatives reach hundreds of millions of people per week in Asia through donated media space

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Left: Shop selling hammerhead shark fin and totoaba bladder ©Alex Hofford, WildAid

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# EXECUTIVE SUMMARY

An estimated 100 million sharks are killed every year, the majority for their fins, with parts from up to 73 million ending up in soup, depleting sharks from our oceans at an alarming rate. According to the International Union for Conservation of Nature's (IUCN) Red List of Threatened Species, over one-quarter of the world's shark and ray species are threatened with extinction. New and continuing markets for shark meat and liver oil also drive illegal and unsustainable harvest while millions more die as bycatch on longlines and purse seine nets targeting commercial species such as tuna and swordfish.

In recent years, conservationists have applauded declining shark fin trends in mainland China, with most recent government statistics revealing an 80 percent reduction in consumption, as well as 81 percent declines in the country's shark fin imports and sales in Beijing, Shanghai and Guangzhou between 2010 and 2014.<sup>1</sup> These changes came on the heels of years-long public awareness campaigns educating people about the need to conserve sharks and a government banquet ban on the consumption of shark fin soup.

Yet, the significant decline in demand for fins in China is offset by expanding and emerging markets outside of the mainland, including in Hong Kong, Macau and Thailand. Consumption in the latter is widespread and has the potential to become a major market: A 2017 survey found that an astonishing 57 percent of urban Thais have already consumed shark fin, while 61 percent plan to consume it in the future.<sup>2</sup> Though trade in many species is legal, protected species often end up in the market: Researchers at the University of Guelph used DNA barcoding to determine that 71 fin samples purchased in Canada, China and Sri Lanka represented 20 shark species, 12 of which are considered "Endangered" or "Vulnerable" on the IUCN's Red List of Threatened Species, and seven of which are "at-risk", listed on Appendix II of the Convention on International Trade in Endangered Species (CITES).<sup>3</sup>

Meanwhile, markets for shark meat are rapidly growing, with a 42 percent increase in global imports between 2000 and 2011.<sup>4</sup> Brazil has emerged as one of the largest of these markets, selling the meat under a less recognizable name – cação instead of tubarão, the common word for shark – ostensibly because it sounds more enticing to consumers. Knowledge of the origins of the meat are limited: A 2014 survey discovered that 61 percent of respondents claimed to eat cação, but not sharks.<sup>5</sup>

Shark liver oil remains a desirable ingredient in a range of cosmetics, including makeup, moisturizers and serums, as well as health supplements for an alleged ability to boost the immune system and promote healthy aging. More recently, the oil has been touted as a cancer cure, supposedly minimizing the side effects of radiation and inhibiting the growth of tumors.<sup>6</sup>

In reality, the dangers of consuming shark fin, meat and oil outweigh the purported benefits. As predators at the top of the food chain, over their lifetimes sharks accumulate the highest concentrations of toxic substances such as mercury, methylmercury, cadmium and arsenic, long-term exposure to which can cause cancer, skin lesions, cardiovascular disease and neurological impacts in humans. Researchers have even found beta-Methylamino-L-alanine (BMAA) in shark fin and muscle tissue samples, suggesting consumers are at risk for developing neurological diseases such as Alzheimer's disease and Amyotrophic Lateral Sclerosis (ALS).<sup>7</sup>

Bycatch from the tuna and swordfish fisheries also kills millions of sharks and other wildlife every year. While most tuna supplied to the US is caught by purse seiners, albacore tuna is predominantly caught by longliners which catch about 10 times more sharks than purse seiners. Sharks can make up 25-32 percent of the total catch on longliners targeting tuna and billfish. Survival rates for sharks caught in longlines are slim: up to 59 percent die before being brought aboard, a further 30 percent of those surviving haulback might die during handling and of the few remaining individuals that survive till this point, up to 19 percent die after release.<sup>8</sup>

The blue shark is particularly vulnerable to longline bycatch. This species dominates the shark fin trade and fishing catches have nearly tripled since 2000, reaching 20 million per year, yet no international catch limits exist to manage their populations. Blue sharks may, at the moment, be more abundant than many other targeted shark species, but Regional Fisheries Management Organizations (RFMO), and the governments that make them up, have ignored the need for management, despite best advice from their scientists to set catch limits. There is currently no evidence of sustainably managed blue shark fisheries. A CITES Appendix II listing will be needed if blue shark fisheries and trade are to be genuinely made sustainable.

Many of the planet's vulnerable shark species face extreme population pressures due to overfishing, putting the health of our oceans and fisheries at risk. As keystone species, sharks help keep other fish populations healthy, feeding on the weak, sick, slower fish, and thus preventing the spread of disease while strengthening the gene pool. Sharks even influence the behavior of prey species, keeping their populations in check and preventing overgrazing or overconsumption by those species: studies have shown that when unchecked by sharks, cownose ray populations have surged, which in turn has decimated bay scallop populations, the rays' main food source. Without sharks, the entire ocean ecosystem can collapse, and humans are sure to witness the consequences, as food sources we depend on disappear. In order to save our oceans, we must urgently address the multitude causes of shark species' declines.

Right: Blacktip reef shark. ©Kydd Pollock/Marine Photobank





# CHANGING TIDES IN CHINA

When WildAid began its shark fin campaign in 2006, awareness levels were low: 75 percent of Chinese people were unaware that shark fin soup was made from sharks (the dish translates to “fish wing soup” in Mandarin), and nearly 1 in 5 believed that shark fins grew back. After two years of campaigning to raise awareness about the threats to sharks, and persuade the public not to consume their products, which included a big push during the 2008 Beijing Olympics, a survey of Beijing residents found that 55 percent of people remembered WildAid’s shark fin campaign and 82 percent said they would reduce or stop their consumption as a result.<sup>9</sup>

After expanding the campaign since the Beijing Olympics, China’s CITES Management Authority announced in October 2016 that shark fin consumption in China had fallen by more than 80 percent, citing a recent publication from the China Seafood Logistic and Processing Association,<sup>10</sup> which states that shark fin imports into China had decreased by 81 percent from 2011 to 2014, and estimated wholesale shark fin sales in Beijing, Shanghai and Guangzhou had declined by 81 percent from 2010 to 2014. This corroborates findings from WildAid’s 2013 market survey where shark fin vendors in Guangzhou, China reported an 82 percent decline in sales and a roughly 50 percent decline in prices from one to two years prior.<sup>11</sup>

The Chinese government’s promising statement also fits with more recent survey findings: In August 2016, WildAid commissioned iResearch to conduct an online survey of 1,551 residents in Beijing, Shanghai, Guangzhou and Chengdu, and found that 93 percent of respondents had not consumed shark fin in the previous 6 years (a combination of those who had previously eaten it and those who never had). Not including those who had never eaten shark fin, 73.7 percent of shark fin consumers had stopped eating shark fin in the previous six years. The top three reasons given for ceasing consumption included awareness campaigns, the cruel way sharks are killed, and a desire to protect sharks. Nearly 80 percent of respondents had seen WildAid’s shark public service announcements (PSAs) and 98.8 percent agreed that the messages had raised their awareness about shark protection and the need to reject shark fin consumption.

Left: Yao Ming pushes away a bowl of shark fin soup in a WildAid PSA.

## AIRLINES AND SHIPPING COMPANIES SHUN SHARK FIN

In April 2017, China’s biggest airline, China Southern, joined at least 43 other carriers, including Air China, Cathay Pacific, American Airlines and Emirates, in banning shark fin shipments due to sustainability concerns as well as potential legal risks and damage to their corporate brands. Some of the largest container shipping lines have also signed onto a no-shark-fin carriage ban, including the world’s largest, China COSCO Shipping Limited. Globally, 17 of the 19 largest container shipping lines have banned shark fin from cargo, “impacting 71 percent of the global market.”<sup>12</sup> Couriers UPS and DHL have also taken action within the past three years to ban shark fin shipments;<sup>13</sup> however, FedEx has still not banned shark fin from its cargo operations.

## HOTELS, RESTAURANTS AND OTHER CORPORATE PLEDGES

Building on the momentum of prominent hotel companies such as the Ritz Carlton, ShangriLa, Peninsula, Hilton, InterContinental, Anantara, and other top hotels, the corporate sector can take the lead in saying no to shark fin by adopting policies not to serve shark fin and not to allow their employees to consume it. These hotels taking shark fin off of their menus for event and wedding catering as well as in their restaurants also helps tremendously in changing attitudes on making shark fin unacceptable. Securing pledges and commitments from other prestigious restaurants can help in reducing the availability, while reinforcing the social norm that shark fin is not acceptable fare.



# DEMAND OUTSIDE OF MAINLAND CHINA

Though imports to mainland China have fallen, rising imports in neighboring territories and countries suggest that trade routes have shifted, possibly reflecting an increase in demand for shark fin and meat in other markets.

## HONG KONG

Census data released by the Hong Kong government in February 2018 revealed that the total annual amount of shark fin imported into Hong Kong since 2011 dropped by 52 percent from 10,292 tonnes to 4,980 tonnes in 2017.<sup>14</sup> During 2014 to 2016, annual decline slowed to one percent, but dropped a further 12 percent in 2017.<sup>15</sup> Noting that some importers are now mislabeling shark fin as other marine products, the reality is that the volume of imports are still quite high.

In the lead-up to the 2017 Lunar New Year, the Hong Kong Shark Foundation (HKSF) and City University conducted an informal survey of 411 people leaving 30 evening wedding banquets to gauge their interest in shark fin. They found that while just 5 percent of guests actually like eating shark fin soup at banquets (20 percent dislike or “really dislike” it, while 75 percent were “neutral”), 9 out of 10 guests would eat the dish if served to “avoid food waste” or to “show respect for their host.”<sup>16</sup> Despite the low appreciation for the dish, an earlier 2016 survey by HKSF found that 98 percent of the 375 restaurants surveyed in Hong Kong still offered shark fin on their menus,<sup>17</sup> either by default or in the continued pursuit of profit.

Hong Kong’s Customs and Excise Department seized around 1,280 kg of dried shark fins — suspected to be from hammerheads and oceanic whitetips — in the first two months of 2017 from four containers originating in India, Egypt, Kenya and Peru.<sup>18</sup> The shipments lacked relevant permits necessary for trade.

In a May 2017 meeting between WildAid and a senior management team of Maxim’s Caterers Limited, and referring to their senior customer demographic, Maxim’s Marketing Director Catherine Lee stated that “60 percent of our customers still request shark fin.” The company has so far refused to remove blue shark fin from all of their menus.

Right: ©Samantha Whitcraft, WildAid

## MACAU

In 2016, for the first time ever, Macau topped mainland China for the highest volume of shark fin re-exports from Hong Kong, seeing a 62 percent rise from 88,029 kg in 2015 to 143,396 kg one year later.<sup>19</sup> This import figure has been on the rise since 2004,<sup>20</sup> correlating with the rapid growth seen during this time period in the territory’s hospitality industry and associated tourism sector.

Since 2002, when the government opened up the gambling industry to foreign operators, Macau’s hotel and “casino-hotel” industry has more than doubled.<sup>21, 22</sup> Visitors coming to stay at these high-end hotels with a reputation for extravagance expect upscale cuisine, with one such delicacy being shark fin. In 2013, after some 30 new hotels had been built, BLOOM Association Hong Kong conducted a survey of the availability of shark fin at the 33 casino-hotels that existed at that time. The survey found that just two of the 33 casino-hotels did not serve any shark fin-related dishes, though another 17 provided shark fin alternatives.<sup>23</sup>

Locals are consuming shark fin at restaurants, where it is regularly served, as well as at traditional banquets: an estimated 70 percent of wedding banquets in Macau include shark fin.<sup>24</sup> The 30.95 million tourists visiting Macau in 2016 (28 million of those coming from the Chinese mainland, Hong Kong and Taiwan<sup>25</sup>) — up from 11.5 million in 2002<sup>26</sup> — are also a main target: Countless tourism websites promote popular eateries famous for their shark fin soup,<sup>27, 28</sup> encouraging tourists to try the delicacy.

## SINGAPORE

Well-recognized as one of the most important trading hubs in Asia, Singapore has played a significant yet under-examined role in the international shark commodities trade. Acknowledging that country-specific analysis was outdated, TRAFFIC and World Wildlife Fund published a report in May 2017, titled, “The Shark and Ray Trade in Singapore,” with updated findings. Their assessment examines the shark product trade in Singapore from 2005–2014 and also analyzes the regulatory systems. Based on Food and Agriculture Organization of the United Nations (FAO) data, the report reveals that Singapore is the second largest importer and exporter of shark fin (in terms of value) in the world, and also cites a lack of transparency in Singapore’s trade information.

- In 2012–2013, Singapore exported \$40 million worth of shark fins, closely following Hong Kong's \$45 million. Singapore also imported \$51.4 million worth of fins, compared to Hong Kong's \$170 million.
- More than 72 percent of Singapore's shark fin exports went to Hong Kong, mainland China and Japan in 2012–2013.
- Spain, Namibia and Uruguay were Singapore's top three sources of shark fins during this period, accounting for more than 66 percent of Singapore's imports.<sup>29</sup>

Problematically, Singapore was reported to trade five of the 30 species of shark listed on CITES' Appendices, according to the CITES trade database. Though Singapore has minimal domestic shark production and all shark products are the result of imports,<sup>30</sup> Singapore is the world's second largest trader in shark products. The lack of transparency and access to clear data highlights a need for better reporting and access to trade information.

In summary of the report, many species of shark and ray are traded in excess of what could be sustainably sourced. The demand for shark and ray products in Singapore is being met with either unsustainable or unknown sources, based on inadequately traceable systems with a lack of appropriate trading and recording data,

as well as the use of shark and ray fisheries, which are not truly sustainable. Singapore's involvement in the global trade necessitates increased government accountability, as well as transparency and thoroughness of reporting.

## TAIWAN

Taiwan is the fourth largest shark producer and fifth largest importer and exporter in terms of volume worldwide, making it a highly important, albeit highly complex, market for shark fin due to a combination of production, trade, and high domestic consumption.<sup>31</sup> During 2005–2014, Taiwan's shark fin imports came from 60 different countries/territories, with Spain, mainland China and Indonesia as the top suppliers. Taiwan is also one of the top five shark catchers globally and between 2005–2014, 70 percent (5,268 tonnes) of its shark fin was exported to Hong Kong followed by 16 percent (1,208 tonnes) exported to mainland China.<sup>32</sup>

From a 2016 TRAFFIC report, Taiwan's shark fin exports to mainland China have shown a decreasing trend in recent years, including a 70 percent decrease between 2009 and 2010; however, import figures are reported at higher volumes than export figures between mainland China and Taiwan, regardless of the direction of the trade.



Taiwan's decreasing export numbers of frozen shark fin could be the result of reduced consumer demand in the key export markets of Hong Kong and mainland China. It is not clear whether Taiwan's own consumption has played an important role in increased imports and decreased exports of shark fin, however Taiwan's market is unlikely to have caused the changes, as decreased market demand and prices were reported in 2012.<sup>33</sup> It is also unclear whether stricter inspections on both sides of the trade for mainland China and Taiwan have impacted import numbers, just as it is uncertain whether underreporting of exports has been an issue.

## INDONESIA

Indonesia is the world's largest producer of shark fins, as well as the third largest exporter, according to the FAO 2015 technical paper, "State of the Global Markets for Shark Products." However, how much of the domestic production is consumed in the local market is largely unknown. In November 2017, a WildAid investigator visited three Indonesian cities — Jakarta, Bandung and Medan — to conduct field research and determine any local consumption trends. While possible to assess the market anecdotally, determining local consumption behaviors and patterns proved challenging. In addition to visiting and calling 17 restaurants, five wedding venues, and

12 hotels, the investigator conducted interviews with approximately 50 Chinese-Indonesians ranging from 25 to 75 years of age in the three cities visited, both through an extended network and via street interviews in Chinese neighborhoods.

The investigator found that shark fin soup was both more common and cheaper in Medan than in Bandung and Jakarta, where it was available for as low as 35K IDR (>\$3 USD). Reasons for this possibly include that Medan has a higher proportion of Chinese residents, is located near the province of Aceh (a major source of shark fins) and is a major trading port with Singapore and Malaysia. In each city, shark fin could be found in Chinese restaurants at several high- and mid-end hotels, and in every Chinese restaurant visited. Shark fin was also offered for sale in the main Chinese markets. During the in-person interviews, price was the main factor mentioned among lower- and middle-class Chinese-Indonesians in Jakarta, Bandung and Medan as to why they had not tried, or had rarely tried, shark fin soup. Consumption of shark fin, however, is only found within the Chinese community; other Indonesians, regardless of religion, were unaware about shark fin soup's existence in the country and showed little desire to try it.

Right Page: A hammerhead on the floor of a processing center in Nangfangau, Taiwan.

Below: Clockwise from top right: Great hammerhead caught on longline, Brazil, ©Animal Stock/Alamy Stock Photo; Blue shark caught on longline, Brazil, ©Animal Stock/Alamy Stock Photo; Off-loading sharks in Japan, ©Shawn Heinrichs.





In general, awareness of shark finning and shark sustainability was very low. Moreover, the three people interviewed who did know about these issues had all traveled or lived abroad and knew about it from exposure to a foreign environment. An informal analysis found that media coverage of shark finning and shark fin soup is relatively limited. Many posts on Indonesian-language social media platforms, including Facebook, Twitter and Instagram showing people consuming shark fin soup garnered almost no critical or negative comments. This suggests an opportunity for increased awareness campaigning. There seems to be little stigma about shark fin soup in the country, and low awareness of finning or other environmental issues related to the shark fin trade. Thus, despite the small size of the Chinese-Indonesian community, there is potentially a high risk that if shark fin soup prices drop, or the Indonesian economy grows, demand could rise and have a negative impact on the global effort to save sharks.

## VIETNAM

As re-exports of shark fin from Hong Kong to mainland China began decreasing in 2005, some neighboring countries began increasing their own trade.<sup>34</sup> In 2010, 2013 and 2014, Vietnam was the largest importer of shark fins from Hong Kong,<sup>35</sup> with slightly lessened trade continuing today. It is unclear, however, just how many of these fins remain within the country for domestic consumption (and processing) versus those that are re-exported to mainland China (as indicated by seizures) or elsewhere, with Vietnam functioning more as a transit country. Ostensibly there is some of both, given that domestic demand for shark fin soup exists.

In December 2017, WildAid commissioned Asia Plus to survey 1,463 urban Vietnamese residents in Hanoi, Ho Chi Minh City and Da Nang to gauge awareness about sharks and understand consumption trends for both shark fin and shark meat. The survey found that just 14 percent had tried shark products: 11 percent had consumed shark fin soup, 1 percent had consumed shark meat, and 2 percent had eaten both. Of the shark fin consumers, 67 percent had eaten the dish within the last two years, and the same percentage cited its [supposed] nutritional value as a reason to consume it. Business functions were the main occasions where both products were consumed.

Fourteen percent of urban Vietnamese plan to consume shark fin in the future, the majority out of curiosity or for alleged nutritional benefit. Of the 86 percent who don't intend to eat the dish, the main reason (45 percent) is because shark fin is too expensive. Almost half of those surveyed are unaware of both the impact of the fin and meat trade on shark populations, and the important role sharks play in maintaining the balance of marine ecosystems. Slightly over half of all respondents agree that "sharks deserve to exist on earth." The results suggest significant opportunity for awareness campaigns to change public perception toward shark conservation and meat/fin consumption, and stress the importance of tamping down demand before it has the ability to expand, particularly if it becomes more affordable to a wider demographic.

Above: Shark fins drying on a rooftop in Hong Kong. ©Paul Hilton.  
Right: Shark fin on display and for sale at a Chinese food counter in a famous Bangkok, Thailand shopping center.





# EMERGING AND EXPANDING THREATS

## EMERGING MARKET: THAILAND

In January 2017, WildAid commissioned Rapid Asia to survey 866 urban residents in Thailand to gauge levels of awareness about sharks and the fin trade to better understand Thailand’s shark fin consumers, and to inform strategies to deter consumption. Survey results showed that the consumption of shark fin in Thailand is already widespread and has the potential to become a significant market for the trade: 57 percent of urban Thais have consumed shark fin at some point and 29 percent had eaten it within the previous 12 months.<sup>36</sup> Seventy-two percent of these more recent consumers (those who consumed it within the previous 12 months; 21 percent of the total) reported eating shark fin 2 to 5 times per year and 14 percent consumed the dish even more frequently. Shark fin is most often consumed at weddings (72 percent), family meals at restaurants (61 percent) and business meetings (47 percent). WildAid’s preliminary market research recorded at least 100 restaurants serving shark fin in Bangkok. Alarming, 61 percent of those individuals surveyed said that they will consume shark fin in the future, citing curiosity and hearing from others that it tastes good — even though shark fin itself has no flavor; the flavor comes from the broth that it is cooked in and added ingredients. Yet, 55 percent of these intenders said they wouldn’t consume the product if it was illegal.

For those not planning to consume shark fin in the future, the main reason keeping them from doing so was their feeling that it is “wrong,” considering that sharks are killed in a cruel way. The high cost of the dish was a second reason for not consuming shark fin, followed by the concern that sharks are endangered, and finally, a desire to protect the animals. At least half of all respondents lack adequate awareness of the consequences of the fin trade on shark populations worldwide. Respondents were unaware that sharks are often killed just for their fins and that some shark populations have already declined by 98 percent.

Thailand’s role in the shark fin trade goes beyond its growing domestic market. According to the Food and Intelligence Center Thailand, the country exported 22,467 tonnes of shark fin (and processed fin products) between 2012 and 2016.<sup>37</sup> Thailand has now surpassed Hong Kong as the world’s largest exporter of shark fin.<sup>38</sup>

Left: Sharks lined up on the floor of a processing facility in Nangfangau, Taiwan.

## MORE THAN FINS

In many countries, it isn’t just fins that are on the menu. Sharkstomach, liver, heart, eggs, skin and fermented meat are served in the Solomon Islands, Maldives, Taiwan, Japan and Iceland.<sup>39</sup> Shark meat has long been consumed elsewhere including Mexico’s Sea of Cortez<sup>40</sup> and as the fish in “fish and chips” in Europe, Australia and New Zealand.<sup>41</sup> Sharks commonly consumed include shortfin mako, a species currently listed as “Vulnerable” on the IUCN’s Red List of Threatened Species, and whose Atlantic population has declined 40 to 99 percent.<sup>42</sup> The number of shortfin mako caught continues to increase: In 2012, American fishermen reported catching more than 389,000 pounds of the fish, compared to 220,000 pounds in 2006.<sup>43</sup>





Shark meat for sale in São Paulo, Brazil. ©Leo Francini/Alamy Stock Photo.

## SHARK MEAT

Growing markets for shark meat pose a new threat to the predators. The biggest of these markets are found in South America (Brazil and Uruguay) and Europe (United Kingdom, Italy and Spain<sup>44</sup>). According to the United Nations' FAO, global imports of shark meat (this includes shark, skate, ray and chimaera) increased by 42 percent between 2000 and 2011, with a noted eight-fold increase in imports by Brazil during this time period.<sup>45</sup> FAO statistics show that 121,641 tonnes of shark meat were traded internationally in 2011, as well as 17,154 tonnes of shark fins.<sup>46</sup>

As more finning bans based on a "fin-attached" regulation come into effect, some fishermen are bringing entire carcasses back to shore to harvest the fins for Asia and find separate outlets for the meat, perhaps incidentally helping markets for the latter expand. The major shark fin producers like Spain and Taiwan are now supplementing their fin industry with shipments of meat to growing markets in Brazil and Italy<sup>47</sup> — with growth likely driven by a need to meet increasing global demand for seafood/protein sources among a rapidly expanding population. Brazil currently ranks as the world's eleventh producer and number one importer of shark meat.<sup>48</sup> There, shark meat is not sold as "tubarão" ("shark"), but marketed as "caçãõ," an inexpensive meat selling for about \$2.50/

kg, often as fillets in coastal states or as frozen slices of carcasses in non-coastal cities and supermarket chains.<sup>49</sup> In some regions, shark meat is mislabeled as a more expensive seafood like grouper or swordfish to earn a larger profit:<sup>50</sup> surveys in São Paulo and Rio de Janeiro found that 62 percent of fish sold as grouper turned out to be shark.<sup>51</sup> A 2014 survey in Curitiba, the largest city in southern Brazil, found that most grocery store shoppers weren't aware that they were even eating sharks: Over half of those surveyed didn't know caçãõ referred to sharks, and 61 percent claimed they ate caçãõ but not sharks.<sup>52</sup> The blue shark is the most frequently caught species in Brazil, accounting for up to 86 percent of fish caught with pelagic longlines, and its meat is more in demand in Brazil than in any other country.<sup>53</sup>

Prior to the rise of Brazil as a top market, the European Union (EU) was responsible for 56 percent of shark meat imports and 32 percent of exports in 2005.<sup>54</sup> The following year, the EU imported more than 40,000 tons of shark meat.<sup>55</sup> Topping the list, Italy accounts for over 30 percent of EU imports.<sup>56</sup> There, blue shark steaks are sold alongside swordfish, the former offered as an alternative to the more expensive fish.<sup>57</sup> Poland has also developed a demand for shark steaks, with increasing imports from Spain.<sup>58</sup> The United States is responsible for catching a significant volume of sharks and rays and is among the top three exporters of these fish by volume and value.<sup>59</sup> The majority of US shark meat is destined for France, Germany and Canada.<sup>60</sup>



©BSIP SA/Alamy Stock Photo

## HEALTH AND COSMETICS

Shark liver oil is widely sought-after for use in cosmetic products — creams, serums and makeup — often in the form of squalene, as well as in medicinal products and health supplements. An estimated 3 million sharks are caught annually to meet demand for oil, with up to 2,200 tons of liver oil harvested in 2012, 90 percent of which was used in cosmetic products.<sup>61</sup> A FAO report recognizes some 60 species fished for their oil, including 50 that are listed on the IUCN’s Red List<sup>62</sup> — three as “Critically Endangered,” six as “Endangered,” 26 as “Vulnerable” and 15 as “Near Threatened.” Oceana reports that targeted fisheries have already depleted deep-sea species such as the Portuguese dogfish and leafscale gulper sharks.<sup>63</sup> A WildLifeRisk investigation in 2014 found up to 600 whale sharks a year being processed in a single factory in the town of PuQi in China’s Zhejiang Province to supply the Italian market with raw materials for its cosmetics industry, as well as Omega-3 health supplements.<sup>64</sup>

Some tout shark liver oil for an alleged ability to boost the immune system and promote healthy aging, improve cardiovascular health,<sup>65</sup> and, according to Life Extension Magazine, fight cancer by minimizing the side effects of radiation and inhibiting the growth of tumors.<sup>66</sup> Yet, studies warn that consuming this oil may

come with consequences: A 2015 study that looked at tissue samples from dusky, sandbar and white sharks in Australian waters found that concentrations of mercury, iron, cadmium and arsenic in the liver tissue exceeded the Food Standards Australia New Zealand (FSANZ) maximum limit or upper level intake for adults.<sup>67</sup>

The myriad uses of this product are posing a considerable threat to sharks. Some organizations have now reported a new practice of “livering” — similar to the cruel and wasteful method of finning — whereby fishermen harvest only a shark’s liver before throwing the carcass back into the water.<sup>68</sup>

# A TOXIC MEAL

When mercury occurring naturally (or from anthropogenic sources) from the environment enters our rivers, lakes and oceans, it is converted by micro-organisms to its organic form, methylmercury, a known neurotoxin considered by the World Health Organization (WHO) to be the most toxic of all mercury compounds.

Methylmercury is toxic to the central and peripheral nervous system, potentially causing memory loss, insomnia, motor and cognitive dysfunction, and known to impair neurological development in utero.<sup>69</sup> This substance bioaccumulates and biomagnifies in fish and shellfish at each successive level of consumption as you move up the food chain. Over their lifetimes, longer-lived, larger fish including tuna, swordfish and sharks accumulate the highest concentrations of methylmercury as they reside at (or near) the top of the food chain. Such top level predatory fish can acquire methylmercury concentrations up to 10 million times greater than surrounding waters.<sup>70</sup>

Humans are exposed to methylmercury when they eat contaminated fish, and the dosage increases at each trophic level. Often apex predators, sharks are near the top of this food chain and common commercial species like shortfin mako and blue sharks who have had a long time to accumulate such toxins due to age and diet, contain some of the highest levels of methylmercury.<sup>71</sup> Thus, eating shark meat (and other large, predatory aquatic species) can be particularly harmful to humans. A 2015 study of dusky, sandbar and white shark tissue samples taken from Australian waters found that 75 percent of dusky shark and 58 percent of sandbar shark samples exceeded the maximum mercury limits set by the FSANZ: Just two 120-gram servings of these species' muscle tissue could exceed the provisional tolerable weekly dietary intake.<sup>72</sup> The study also found [extremely high] concentrations of arsenic beyond acceptable limits in all muscle, liver and fin fiber samples from the three species.<sup>73</sup> Additional studies have found shark fins with levels of arsenic exceeding by 13 to 32 times China's national guidelines.<sup>74-75</sup> In November 2017, the Center for Food Safety (CFS) of the Food and Environmental Hygiene Department cautioned the Hong Kong public to avoid a batch of prepackaged shark's tail skin after a routine test of a sample purchased in a Causeway Bay supermarket found that the product contained a level of mercury eight times the permissible limit - 4.16 parts per million vs the 0.5ppm legal limit.<sup>76</sup>

In a study published in August 2016, scientists from the University of Miami looked at fin and muscle tissue samples from 10 shark species found in the Atlantic and Pacific Oceans. The researchers found dangerous levels of two toxins, mercury and beta-Methyl-amino-L-alanine (BMAA), present in all tested species, suggesting consumers of shark meat and fin are at risk for developing neurological diseases such as Alzheimer's disease and Amyotrophic Lateral Sclerosis (ALS); BMAA has recently been linked to both.<sup>77</sup>

In November 2016, WildAid tested 20 dry, raw shark fin samples — 10 obtained from shops in Sheung Wan, Hong Kong and 10 from shops along Dihua Street, Taipei City, Taiwan — for the presence of 23 heavy metals and other chemical elements. Based on China's Food Safety National Standard for Maximum Levels of Contaminants in Foods (GB 2762-2017),<sup>78</sup> all 20 samples were between 0.4 and 2.98 ppm above the permissible amounts for arsenic. According to the WHO, long-term exposure to arsenic can cause cancer (skin, bladder and lung) and skin lesions, is associated with cardiovascular disease and diabetes, and is linked to negative impacts on cognitive development in utero and early childhood exposures.<sup>79</sup> Eleven of the samples also exceeded the limit for cadmium, three exceeded limits for lead and one for mercury. Cadmium, a known carcinogen, affects the renal, skeletal and respiratory systems,<sup>80</sup> while lead, another toxic metal affects the neurologic, hematologic, gastrointestinal, cardiovascular and renal systems.<sup>81</sup>

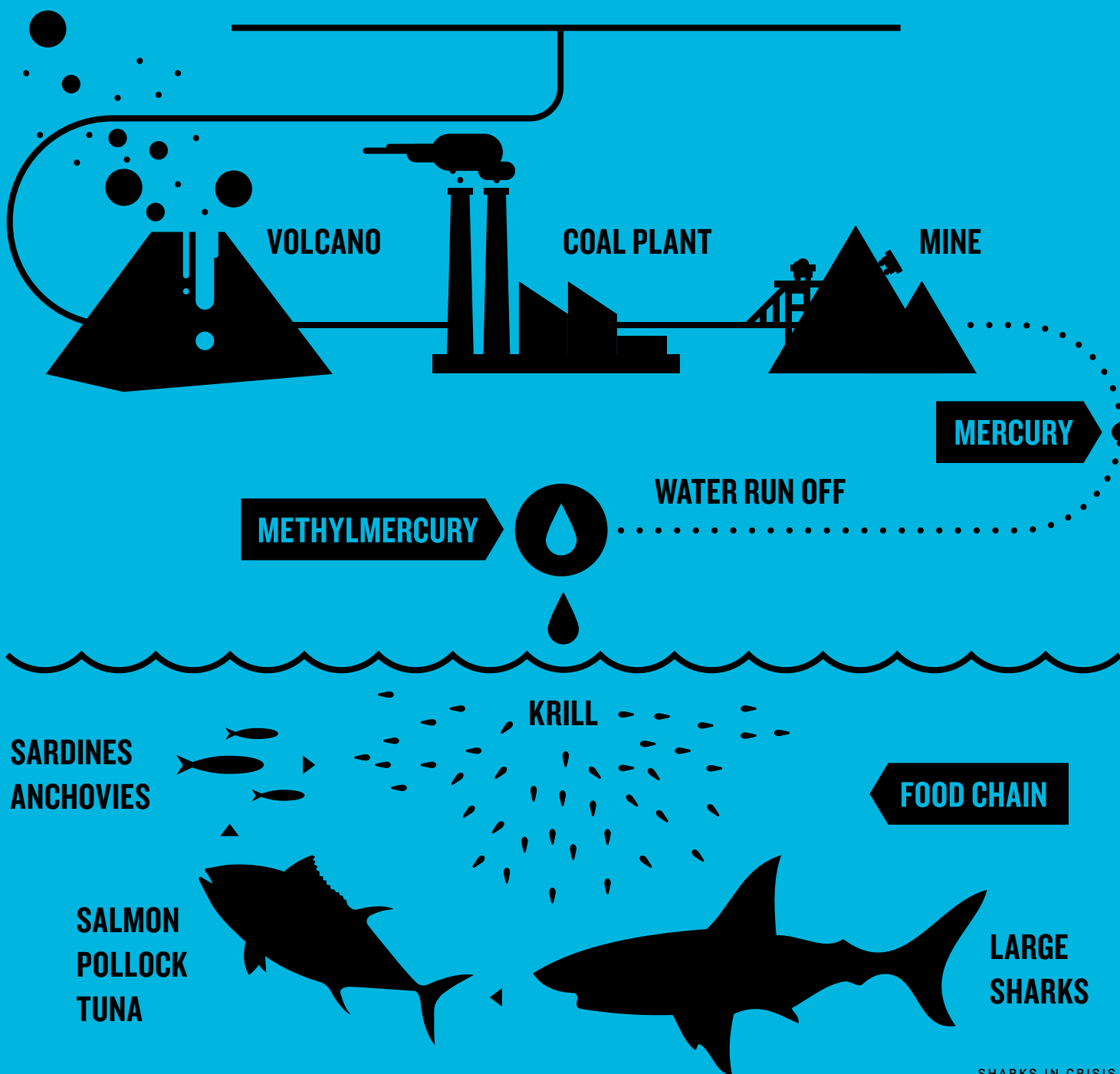
A 2007 analysis done by Hong Kong Baptist University and WildAid found that a quarter of the more than 70 uncooked shark fins found in Asian markets contained mercury concentrations that exceeded WHO standard guidelines; the fin with the highest concentration, at nearly three times the WHO guideline, was purchased in Shanghai.<sup>82</sup> High levels of methylmercury were also found: a fin bought at a Wenzhou market contained levels 36 percent higher than the FAO/WHO guideline.<sup>83</sup> Disturbingly, the concentration of methylmercury in foods can be made worse by their preparation: studies have shown that the traditional Cantonese style of cooking shark fin soup increases the methylmercury concentration on average by 27.6 percent<sup>84</sup> (water and soluble substances are lost in the process, while CH<sub>3</sub>Hg remains).

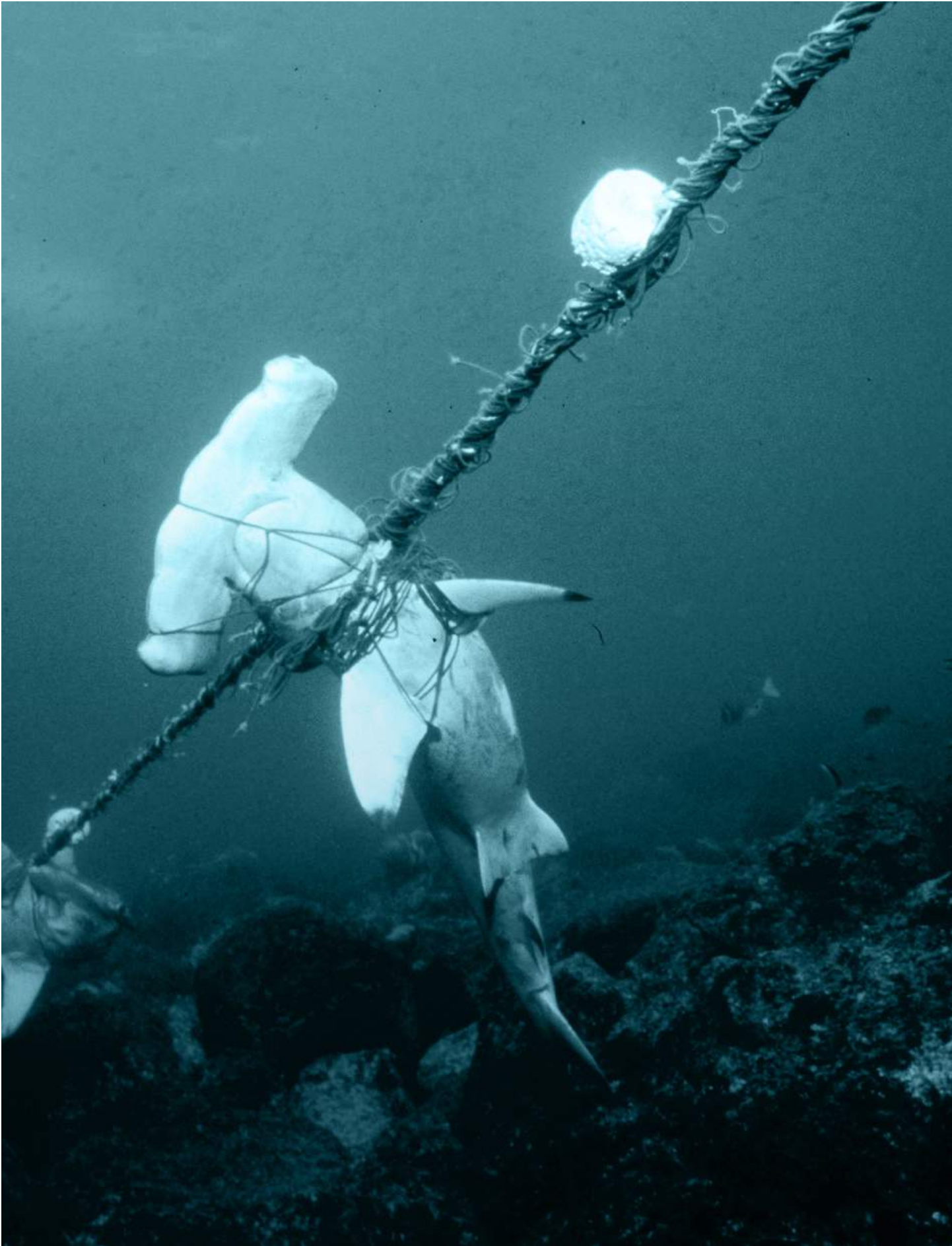
Some countries are less cautious about heavy metal risks, putting their populations at risk through less rigorous regulations. Brazil's restrictions in regard to heavy metals in seafood are less stringent than those of the EU, North America and Asia, allowing products containing high levels of these toxins that would not be marketable elsewhere to be legally sold in the country.<sup>85</sup> Fifty-four percent of shark meat samples tested in São Paulo contained mercury concentrations exceeding WHO acceptable levels, while a study looking at just blue sharks found 70 percent of samples had mercury concentrations above recommended limits.<sup>86</sup>

# MERCURY

## IN THE FOOD CHAIN

HUMANS ARE EXPOSED TO METHYLMERCURY WHEN THEY EAT CONTAMINATED FISH, AND THE DOSAGE INCREASES AT EACH TROPHIC LEVEL.





## BYCATCH IN THE TUNA FISHERY

Bycatch remains a major threat to sharks and other marine species around the world, killing millions of animals each year. Bycatch is a term used to denote catches of species that are not the main target of a fishery, and can include individuals of the target species that are considered too small or damaged, other fish species, marine mammals, sea birds, sea turtles and elasmobranchs such as sharks and rays. While some researchers define bycatch as any non-target species whether retained or not, others restrict the definition to include only discarded catch. Still others restrict it to non-target catch that is unmanaged, even where the target species itself is subject to some kind of regulatory regime. In the case of sharks in particular, the line between targeted catch and bycatch became very blurred during the late 1980s because of the escalation in the value of shark fins.

The tuna industry is among the worst offenders in terms of bycatch. National observer coverage of tuna fisheries is poor, although coverage for purse seiners is considerably higher than for longliners (vessels using one long, main fishing line with many baited hooks attached at intervals). Worldwide, 40 nations are engaged in longline fishing, but only 15 have observer programs.<sup>87</sup> In 2013, about 72 percent of the tuna in the Western and Central Pacific was caught by purse seiners<sup>88</sup> (the International Seafood Sustainability Foundation [ISSF] estimates that these vessels account for 62 percent of global tuna catch each year<sup>89</sup>), 9 percent by longliners and 8 percent by pole and line fisheries. While less than 10 percent is caught by longliners, these vessels are estimated to catch 10 times more sharks,<sup>90</sup> so their impact is disproportionately significant.

Any estimate of shark bycatch is limited by the scarcity of data across all regions and all gear types. Even where reporting of shark bycatch is carried out, it is often only the retained catch that is reported; discards frequently go unreported. Throughout the 1990s, an estimated 12 million sharks and rays were caught each year as bycatch.<sup>91</sup> Species frequently at risk include the oceanic whitetip, silky shark, blue shark, dusky shark and scalloped hammerhead, some of whose populations have declined by up to 90 percent as a result of overfishing.<sup>92</sup> For some, such as the scalloped hammerhead, it is its unique shape that makes the species more prone to getting caught in the gear.<sup>93</sup> The main species caught by tropical purse seine fisheries is the silky shark, accounting for 90 percent of the sharks caught.<sup>94</sup> A study of shark bycatch rates in 12 pelagic longline fisheries noted that, in some non-shark fisheries, sharks comprise a large proportion of the total catch. For example, sharks comprise over 25 percent of the total catch in the Australian longline tuna and billfish fishery and the Fiji longline tuna fishery:<sup>95</sup> Longlines have been found to catch sharks instead of the intended target 20 to 50 percent of the time in Atlantic and Hawaiian fisheries:<sup>96</sup> Sharks comprised 50 percent of the catch of the Hawaii-based longline swordfish fishery prior to a prohibition on the use of squid for bait, where sharks now comprise 32 percent of the catch.<sup>97</sup>

Survival rates for sharks caught in longlines are slim: up to 59 percent die before being brought aboard, a further 30 percent of those surviving haulback might die during handling and of the few remaining individuals that survive till this point, up to 19 percent die after release.<sup>98</sup> Even in circumstances where catch prohibitions exist and protocol is followed to release sharks with “minimal harm,” studies have shown that 81 to 84 percent of sharks entangled in purse-seine gear don’t survive.<sup>99</sup>

Ideal solutions for addressing bycatch are currently lacking, with existing efforts causing either or often both economic losses and operational difficulties, while potentially not doing enough to alleviate the overall threat. There is a great deal of literature on bycatch mitigation, but there is little consensus on methods that are effective across all shark species, let alone other sea life. For example, while circle hooks (as opposed to J-hooks) are generally agreed to reduce mortality in sea turtles and seabirds, there are significant gaps in current knowledge on shark mortality rates. Other methods include prohibiting or modifying fish aggregating devices (FADs), prohibiting shark lines on longliners, changing wire leaders to monofilament, using fish as bait instead of squid, changing the way sharks are handled on deck to reduce post-release mortality and using shark deterrents.



# THE CASE FOR PROTECTING BLUE SHARKS

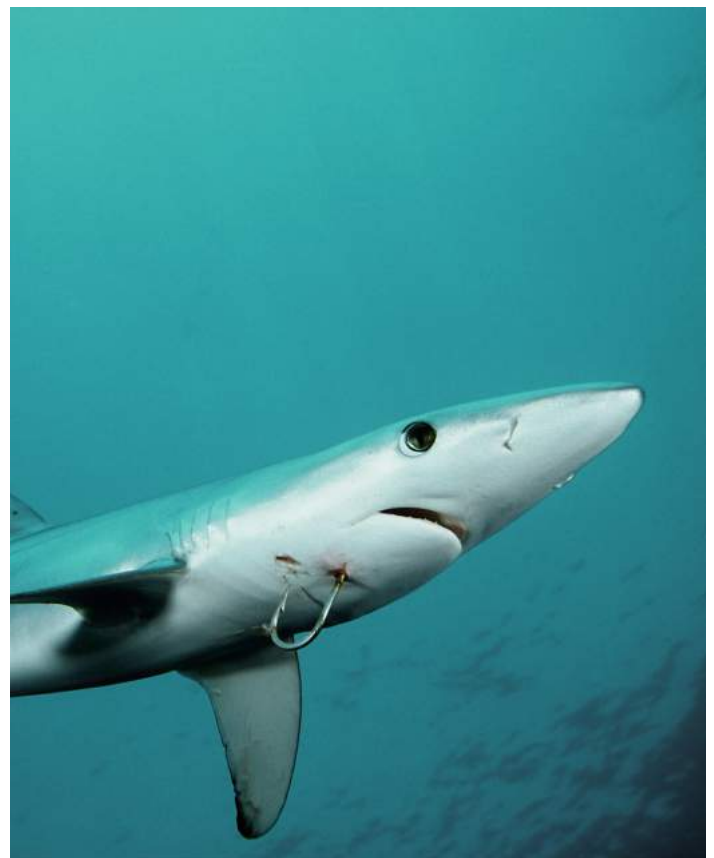
There is currently no evidence of sustainably managed blue shark fisheries. The blue shark (*Prionace glauca*) dominates the shark fin trade and fishing catches have nearly tripled since 2000, reaching 20 million per year, yet no international catch limits exist to manage their populations.<sup>100</sup> The species is especially vulnerable to the pelagic longlines used in tuna and swordfish fisheries:<sup>101</sup> Portuguese longline swordfish fisheries in the Atlantic claim blue sharks are one of the two main [shark] species caught.<sup>102</sup> The number of unreported blue sharks caught as bycatch in the Canadian Atlantic was estimated to be 100 times that of reported catch.<sup>103</sup> Though sometimes discarded, blue sharks are commonly targeted bycatch, valuable in supplying the fin and meat trade, with meat going to Spain and Brazil and fins primarily going to Hong Kong. As the world's third major shark catching country, Spain<sup>104</sup> exports much of its shark fin to Hong Kong — the majority sourced from blue shark bycatch in its swordfish fisheries.

A recent Pew-funded DNA study conducted by Bloom Association, Kadoorie Farm and Botanical Garden (KFBG), Stony Brook University and Florida International University, concluded that 34.1 percent to 64.2 percent of all shark fin traded in Hong Kong in 2015 was derived from blue sharks.<sup>105</sup> Further, according to Ricky Leung Lak-kee, chairman of the Hong Kong Marine Products Association, blue sharks make up 60 percent to 80 percent of fins consumed in Hong Kong.<sup>106</sup> This number by far outstrips the second most popular shark species in the Hong Kong shark fin trade, the CITES-Appendix-II-listed silky shark (10 percent). It is clear that the Hong Kong shark fin trade presents a clear danger to threatened blue shark populations and is putting the species on a trajectory towards extinction. Action now can help the blue shark to avoid the fate of other shark species most favored by the Hong Kong shark fin trade such as the oceanic whitetip shark (*Carcharhinus longimanus*) and three species of hammerhead shark (*Sphyrnidae*), which were listed on CITES Appendix II for their protection in 2013.

Stock assessments for sharks, in general, come with a high degree of uncertainty and may significantly underestimate mortality rates, as Michael E. Byrne of the Guy Harvey Research Institute, along with other researchers, found with shortfin mako sharks

in the North Atlantic. Their report suggests that species assessed at or near sustainable levels, such as blue sharks, may in fact already be overexploited.<sup>107</sup> The last IUCN blue shark population stock assessment was conducted 13 years ago in 2005, when they were classified as “Near Threatened” globally<sup>108</sup> (though considered “Critically Endangered” in the Mediterranean<sup>109</sup>). The IUCN website currently notes that this assessment needs to be updated, especially considering that the most recent publications referenced in it are dated 1999. Yet, Hong Kong restaurant groups such as its largest, Maxim’s Caterers Limited, are using IUCN’s outdated population stock assessment as a green light to continue buying large amounts of blue shark fin and selling it in their 50 or more restaurants under the pretext that sustainability concerns are not valid.

But in fact, the following declines in blue shark populations — which are not referenced in the IUCN assessment — have been



Left: Thousands of shark carcasses off-loaded in Japan, ©Shawn Heinrichs.

Right: A blue shark swimming with a hook lodged in its underside, ©David Fleetham/Alamy Stock Photo.



documented in multiple peer-reviewed publications since 2005:

- There was a greater than 50 percent decline in the North Pacific from 1996 to 2009 (5 percent per year).<sup>110</sup>
- There was a greater than 50 percent decline in the North Pacific from 1996 to 2009 (5 percent per year).
- There was an 80 percent decline in male sharks in the North Atlantic from the mid-1980s to early 1990s.<sup>111</sup>
- There was an 87 percent decline in the Central Pacific from the 1950s to the 1990s (5 to 6 percent decline per year).<sup>112</sup>
- There was a 60 percent decline in the Northwest Atlantic from 1986 to 2000.<sup>113</sup>
- Fishery scientists from the IUCN Shark Specialist Group estimate that only 4 percent of shark and ray fisheries are sustainably managed and none of these are blue shark fisheries. Those considered to be sustainably managed are mainly for some rays, chimaeras and small sharks that are not preferred for shark fin soup.<sup>114</sup>
- Finning (dumping the bodies at sea) of blue sharks still happens, even in monitored fisheries.<sup>115</sup>
- Blue sharks spend up to 92 percent of their time on the high seas in the Northwest Atlantic with minimal monitoring, and are often caught as bycatch by swordfish and tuna fishing fleets. Inaccurate reporting of both landings and discards, as well as high discard mortality rates, threaten the population and hinder effective population monitoring.<sup>116</sup>
- In Peru — one of the top 12 suppliers of blue shark fins to Hong Kong — 74.7 percent of blue sharks caught were deemed sexually immature and under the legal minimum landing size.<sup>117</sup>
- Global shark chondrichthyes (shark, ray, skate and chimaera) landings peaked in 2003 and declined by almost 20 percent over the next decade. Declines were mainly attributed to fishing pressure and current fisheries management measures did not have the strength or coverage to halt overfishing and avert population declines.<sup>118</sup>

Recognizing the threats posed to blue sharks by overfishing, and based on scientific advice, a successful inclusion on Appendix II of the United Nations' Convention on Migratory Species (CMS) was adopted in October 2017.<sup>119</sup> The successful listing indicates a high degree of concern amongst governments about the total lack of management of the species. Blue sharks may, at the moment, be more abundant than many other targeted shark species, but Regional Fisheries Management Organizations (RFMO), and the governments that make them up, have totally ignored the need for management, despite best advice from their scientists to set catch limits. CMS Appendix II listings are designed to stimulate better government-to-government coordination globally and show that measures such as setting catch limits and a CITES Appendix II listing will be needed if blue shark fisheries and trade are to be genuinely made sustainable, not just assumed to be with little evidence and no management or safeguards. Action must be taken to reduce supply from Spain amongst others, and demand in Hong Kong, including Maxim's, which is one of the city's major wholesale buyers of blue sharks (and that is rumored to also have procurement deals with suppliers in South Africa and Solomon Islands).

# RECOMMENDATIONS

The fate of sharks and the health of our oceans will depend on the actions we take in the immediate future. WildAid recommends the following actions be taken with urgency:

- Continue educational campaigns to reduce demand for shark fin and meat in key markets, including mainland China, Hong Kong and Taiwan. Assess these markets to determine current consumption trends on a biennial basis.
- Address and reduce demand for shark fin and meat through educational communication campaigns in emerging markets in Thailand and Vietnam before consumption grows.
- Conduct public awareness campaigns in Brazil to inform consumers about the seafood they're eating, educate the public about the need to protect sharks, and thereby reduce demand for shark meat.
- Encourage the hotel and catering sector in mainland China, Hong Kong, Macau, Taiwan, Thailand and Vietnam to ban all shark fin from all its menus.
- Now that the corporate sector is well on the road to mainstreaming the protection of sharks and the preservation of marine ecosystems through transportation bans, the timing is right for further pressure to other industries in the corporate world that are negatively impacting oceans. This includes FedEx, the last major carrier refusing to implement a ban on shark fin shipments, as well as Maxim's, Hong Kong's largest Chinese restaurant group.
- To reduce bycatch, we must push for better reporting procedures (counting all catch, not just target species), expanded observer coverage (particularly on tuna longliners), cleaner gear, transparency and traceability at the consumer end.
- Promote awareness among tuna consumers of the canned tuna industry's destructive impacts on shark populations, so that they may make more informed purchasing decisions. Encourage tuna companies to improve their fishing practices by putting the onus on the brands to show that they are sourcing their products responsibly.
- Increase the level of global protection for blue sharks by uplisting the species to CITES Appendix II at the United Nations' Conference of Parties 2018 (CoP18) in Sri Lanka in 2019.

Left: Hundreds of blue sharks piled on pallets in a warehouse in Spain, ©Paul Hilton.

Right: A campaign billboard featuring Yao Ming from 2011.

YAO MING  
姚明

JOIN ME, SAY NO TO 與我攜手  
向魚翅說“不” SHARK FIN SOUP.

73,000,000 sharks a year end up in shark fin soup.  
Many are “finned” wasting 95% of the animal.

WWW.WILDAID.ORG

WHEN THE BUYING STOPS, THE KILLING CAN TOO.

WILDAID SHARK SAVERS OCEANA THE HUMANE SOCIETY OF THE UNITED STATES

## ENDNOTES

- 1 Xianlin, M., He, C., Xiaojie, D., Dezhen, L., Wang, J. et al. "An Overview of China's Shark Resource Utilization and the Current Monitoring Mechanism." China Seafood Logistic and Processing Association. China Agriculture Publishing House. October 2015.
- 2 *Shark Fin Demand in Thailand*. WildAid. July 2017. <http://www.wildaid.org/sites/default/files/resources/Shark%20Fin%20Demand%20in%20Thailand%202017.pdf>
- 3 Steinke, D., Bernard, A., Horn, R., Hilton, P. et al. *DNA analysis of traded shark fins and mobulid gill plates reveals a high proportion of species of conservation concern*. Scientific Reports 7, Article number: 9505. August 25, 2017. <https://www.nature.com/articles/s41598-017-10123-5>
- 4 Clarke, Shelley. *Re-examining the shark trade as a tool for conservation*. Report. Secretariat of the Pacific Community. 2015. [https://spccfpstore1.blob.core.windows.net/digitallibrary-docs/files/0a/0a48cab679585e518468bd63855b9a79.pdf?sv=2015-12-11&sr=b&sig=z8qWp27of%2FPeet4oxZxbx9d8UpA%2Byg%2BMJYQRfMw5b6k%3D&se=2018-07-30T17%3A36%3A20Z&sp=r&rscc=public%2C%20max-age%3D864000&rsct=application%2Fpdf&rscd=inline%3B%20filename%3D%22FishNews145\\_49\\_Clarke.pdf%22](https://spccfpstore1.blob.core.windows.net/digitallibrary-docs/files/0a/0a48cab679585e518468bd63855b9a79.pdf?sv=2015-12-11&sr=b&sig=z8qWp27of%2FPeet4oxZxbx9d8UpA%2Byg%2BMJYQRfMw5b6k%3D&se=2018-07-30T17%3A36%3A20Z&sp=r&rscc=public%2C%20max-age%3D864000&rsct=application%2Fpdf&rscd=inline%3B%20filename%3D%22FishNews145_49_Clarke.pdf%22)
- 5 Bornatowski, H., Braga, R., Kalinowski, C., Vitale, J.R.S. "Buying a Pig in a Poke: The Problem of Elasmobranch Meat Consumption in Southern Brazil." *Ethnobiology Letters*. 2015. 6(1):196-202. DOI: 10.14237/eb1.6.1.2015.451.
- 6 Kiefer, Dale. "Anti-Cancer Benefits of Shark Liver Oil." *Life Extension Magazine*. August 2005. [http://www.lifeextension.com/Magazine/2005/8/report\\_shark/Page-01](http://www.lifeextension.com/Magazine/2005/8/report_shark/Page-01)
- 7 "Study Finds Shark Fins & Meat Contain High Levels of Neurotoxins Linked to Alzheimer's Disease." Press release. University of Miami. August 29, 2016. <http://www.rsmas.miami.edu/news-events/press-releases/2016/study-finds-shark-fins-meat-contain-high-levels-of-neurotoxins-linked-to-al>
- 8 Clarke, Shelley. *Re-examining the shark trade as a tool for conservation*.
- 9 *Evidence of Declines in Shark Fin Demand China*. WildAid. August 17, 2014. [http://wildaid.org/sites/default/files/SharkReport\\_spread\\_final\\_08.07.14.pdf](http://wildaid.org/sites/default/files/SharkReport_spread_final_08.07.14.pdf)
- 10 Xianlin, M. et al. "An Overview of China's Shark Resource Utilization and the Current Monitoring Mechanism."
- 11 *Evidence of Declines in Shark Fin Demand China*. WildAid.
- 12 "China's biggest airline bans shark fin cargo." *South China Morning Post*. Last updated April 20, 2017. <http://www.scmp.com/news/hong-kong/economy/article/2089229/chinas-biggest-airline-bans-shark-fin-cargo>
- 13 "Air China bans shark fin cargo, reflecting dramatic shift in attitudes." *The Washington Post*. January 8, 2017. [https://www.washingtonpost.com/world/asia\\_pacific/air-china-bans-shark-fin-cargo-reflecting-dramatic-shift-in-attitudes/2017/01/08/754e0d56-0457-4667-8880-97775a0a97fd\\_story.html?utm\\_term=.924d02c1f7e3](https://www.washingtonpost.com/world/asia_pacific/air-china-bans-shark-fin-cargo-reflecting-dramatic-shift-in-attitudes/2017/01/08/754e0d56-0457-4667-8880-97775a0a97fd_story.html?utm_term=.924d02c1f7e3)
- 14 Hong Kong Government Census and Statistics Department. February 2018. [http://gia.info.gov.hk/general/201802/07/P2018020700663\\_277898\\_1\\_1517992160576.pdf](http://gia.info.gov.hk/general/201802/07/P2018020700663_277898_1_1517992160576.pdf)
- 15 Ibid.
- 16 "Only 5pc of Hong Kong wedding guests like shark fin soup even though most menus offer it as 'default' option, survey finds." *South China Morning Post*. Last updated December 21, 2016. <http://www.scmp.com/news/hong-kong/health-environment/article/2056086/only-5pc-hong-kong-wedding-guests-shark-fin-soup>
- 17 Ibid.
- 18 "Shipments of suspected scheduled dried shark fins seized by AFCD." Press release. The Government of the Hong Kong Special Administrative Region. March 6, 2017. <http://www.info.gov.hk/gia/general/201703/06/P2017030600602.htm>
- 19 "Macau shark fin imports from Hong Kong increased by 62% in 2016." *Macau News*. September 27, 2017. <https://macaunews.mo/macau-shark-fin-imports-hk-increases/>
- 20 *Dining on shark fins: a snapshot of shark fins offered by Macau's leading casino-hotels*. Report. BLOOM Association Hong Kong. December 2015. [http://admf.org/wp-content/uploads/2016/12/1-Resource\\_c\\_-A-Snapshot-of-Shark-Fin-offered-by-Macau-Leading-Casino-Hotels-Report-BLOOM-December-2015.pdf](http://admf.org/wp-content/uploads/2016/12/1-Resource_c_-A-Snapshot-of-Shark-Fin-offered-by-Macau-Leading-Casino-Hotels-Report-BLOOM-December-2015.pdf)
- 21 Ibid.
- 22 "Macau tourist arrivals in 2016 shows record-breaking numbers." *Travel and Tour World*. January 19, 2017. <http://www.travelandtourworld.com/news/article/macau-tourist-arrivals-in-2016-shows-record-breaking-numbers/>
- 23 *Dining on shark fins: a snapshot of shark fins offered by Macau's leading casino-hotels*. Report. BLOOM Association Hong Kong.
- 24 "Macau shark fin imports from Hong Kong increased by 62% in 2016." *Macau News*.
- 25 "Macau tourist arrivals in 2016 shows record-breaking numbers." *Travel and Tour World*.
- 26 Elaine Fong I M., Ken Lou T. M., Moses Ho K. I., Raynis Chou I. H., Raymond Fok H. M. "Develop Macau as a Sustainable Tourism Destination in terms of Hotel industry." *Macau University Research Project Competition*. 2009. <http://www.dsec.gov.mo/File/UStatContest/2009/SecondRunnerUp.aspx>
- 27 "Downtown Macau Restaurants: Where and What to Eat in Downtown Macau." *Macau by Hotels.com*. <http://www.china-macau.com/downtown/dining.htm>
- 28 G, Captain. "What and where to eat in Macau (like a local)?" *Triangle Trip*. January 19, 2015. <http://www.triangletrip.com/2015/01/19/what-and-where-to-eat-in-macau-like-a-local/>
- 29 Dasgupta, Shreya. "Singapore is world's second largest shark-fin trader: TRAFFIC." *Mongabay*. May 26, 2017. <https://news.mongabay.com/2017/05/singapore-is-worlds-second-largest-shark-fin-trader-traffic/>
- 30 Lack, M., and Sant, G. (2009). *Trends in Global Shark Catch and Recent Developments in Management*. TRAFFIC International, Cambridge, UK. As quoted in Pei Ya, Boon. *The Shark and Ray Trade in Singapore*. TRAFFIC Report. May 2017. [http://www.trafficj.org/publication/17\\_The\\_Shark\\_and\\_Ray\\_Trade\\_in\\_Singapore.pdf](http://www.trafficj.org/publication/17_The_Shark_and_Ray_Trade_in_Singapore.pdf)
- 31 Clarke, Shelley and Dent, Felix. *State of the global market for shark products*. Technical Paper. Food and Agriculture Organization of the United Nations. Page 49. 2015. <http://www.fao.org/3/a-i4795e.pdf>
- 32 Wu, Joyce. *Shark Fin and Mobulid Ray Gill Plate Trade*. TRAFFIC Report. June 2016. [http://www.trafficj.org/publication/16\\_Shark\\_Fin\\_and\\_Mobulid\\_Ray\\_Gill\\_Plate\\_Trade.pdf](http://www.trafficj.org/publication/16_Shark_Fin_and_Mobulid_Ray_Gill_Plate_Trade.pdf)
- 33 Lu, K.C. China ban shark fins – *Somalia pirates lost their jobs*. *Business Weekly*. Vol. 1304 (2012). <https://archive.businessweekly.com.tw/Article/Index?StrId=48471>. As quoted in Wu, Joyce. *Shark Fin and Mobulid Ray Gill Plate Trade*. TRAFFIC Report. June 2016. [http://www.trafficj.org/publication/16\\_Shark\\_Fin\\_and\\_Mobulid\\_Ray\\_Gill\\_Plate\\_Trade.pdf](http://www.trafficj.org/publication/16_Shark_Fin_and_Mobulid_Ray_Gill_Plate_Trade.pdf)
- 34 Wu, Joyce. *Shark Fin and Mobulid Ray Gill Plate Trade*. TRAFFIC Report.
- 35 Ibid.
- 36 *Shark Fin Demand in Thailand*. WildAid.
- 37 "Food Intelligence Center Thailand." National Food Institute Ministry of Industry, Food Intelligence Center Thailand. <http://fic.nfi.or.th/index.php>
- 38 Clarke, Shelley. *Re-examining the shark trade as a tool for conservation*. Report. Secretariat of the Pacific Community. 2015. [https://spccfpstore1.blob.core.windows.net/digitallibrary-docs/files/0a/0a48cab679585e518468bd63855b9a79.pdf?sv=2015-12-11&sr=b&sig=z8qWp27of%2FPeet4oxZxbx9d8UpA%2Byg%2BMJYQRfMw5b6k%3D&se=2018-07-30T17%3A36%3A20Z&sp=r&rscc=public%2C%20max-age%3D864000%2C%20max-stale%3D86400&rsct=application%2Fpdf&rscd=inline%3B%20filename%3D%22FishNews145\\_49\\_Clarke.pdf%22](https://spccfpstore1.blob.core.windows.net/digitallibrary-docs/files/0a/0a48cab679585e518468bd63855b9a79.pdf?sv=2015-12-11&sr=b&sig=z8qWp27of%2FPeet4oxZxbx9d8UpA%2Byg%2BMJYQRfMw5b6k%3D&se=2018-07-30T17%3A36%3A20Z&sp=r&rscc=public%2C%20max-age%3D864000%2C%20max-stale%3D86400&rsct=application%2Fpdf&rscd=inline%3B%20filename%3D%22FishNews145_49_Clarke.pdf%22)
- 39 "Shark Conservation." *Shark Trust*. [https://www.sharktrust.org/en/shark\\_conservation](https://www.sharktrust.org/en/shark_conservation)
- 40 "Why Shark Finning Bans Aren't Keeping Sharks Off The Plate (Yet)." *National Public Radio, Inc*. March 3, 2015. <https://www.npr.org/sections/thesalt/2015/03/03/39049252/why-shark-finning-bans-arent-keeping-sharks-off-the-plate-yet>
- 41 Clarke, Shelley. *Re-examining the shark trade as a tool for conservation*.
- 42 *Evidence of Declines in Shark Fin Demand China*. WildAid.
- 43 Mejia, Paula. "Shark Week, Shark Meat: Endangered Species for Dinner." *Newsweek*. August 14, 2014. <http://www.newsweek.com/shark-meat-its-whats-dinner-264646>
- 44 Towers, Lucy. "State of the global market for shark products." *The Fish Site*.
- 45 Clarke, Shelley. *Re-examining the shark trade as a tool for conservation*.
- 46 Towers, Lucy. "State of the global market for shark products." *The Fish Site*.
- 47 Ibid.
- 48 Barreto, R.R., Bornatowski, H., Motta, F.S., Santander-Neto, J., Vianna, G.M.S., Lessa, R. "Rethinking use and trade of pelagic sharks from Brazil." *Marine Policy*. Volume 85 (2017): Pages 114–122. <https://www.openchannels.org/literature/19961>
- 49 Ibid.
- 50 Ibid.
- 51 Estrella, F., Raposo, G., Pascoli, J., Gonzalez, J.G., Motta, F.S., de Moura, R.L. "Comercialização de pescado nas cidades de São Paulo e Rio de Janeiro." Technical Report. Fundação SOS Mata Atlântica. 2014.
- 52 Bornatowski, H. et al. "Buying a Pig in a Poke: The Problem of Elasmobranch Meat Consumption in Southern Brazil."
- 53 Barreto, R.R. et al. "Rethinking use and trade of pelagic sharks from Brazil."
- 54 *From head to tail: How European nations commercialise shark products*. Report. Oceana. November, 2008. [http://oceana.org/sites/default/files/reports/From\\_Head\\_To\\_Tail.pdf](http://oceana.org/sites/default/files/reports/From_Head_To_Tail.pdf)
- 55 Ibid.
- 56 Ibid.
- 57 Ibid.
- 58 Ibid.
- 59 Wilcox, Christie. "Shark fin ban masks growing appetite for its meat." *The Washington Post*. September 12, 2015. <https://www.theguardian.com/environment/2015/sep/12/shark-fin-ban-not-saving-species>
- 60 Ibid.

- 61 Clemens, Danny. "There's Shark in Your Lipstick: Everything You Need to Know about Shark Liver Oil." Discovery Channel website. July 3, 2015. <http://www.discovery.com/tv-shows/shark-week/shark-feed/theres-shark-in-your-lipstick-everything-you-need-to-know-about-shark-liver-oil/>.
- 62 "Appendix III: Non-Food Uses of Sharks by Hooi Kok Kuang." FAO Corporate Document Repository. <http://www.fao.org/docrep/005/x3690e/x3690e1d.htm>.
- 63 *From head to tail: How European nations commercialise shark products*. Oceana.
- 64 Lee, Jane J. "Slaughterhouse Said to Process 'Horrible' Number of Whale Sharks Annually." National Geographic. January 30, 2014. <https://news.nationalgeographic.com/news/2014/01/140129-whale-shark-endangered-cites-ocean-animals-conservation/>.
- 65 Dobberstein, Linda J. "Shark Liver Oil: Benefits More Than Just the Immune System." Wellness Resources. January 26, 2016. <https://www.wellnessresources.com/news/shark-liver-oil-benefits-more-than-just-the-immune-system>.
- 66 Kiefer, Dale. "Anti-Cancer Benefits of Shark Liver Oil."
- 67 Gilbert, J.M., et al. *Metal and metalloid concentrations in the tissues of dusky carcharhinus obscurus, sandbar c. plumbeus and white carcharodon carcharias sharks from south-eastern Australian waters, and the implications for human consumption*. Mar. Pollut. Bull. (2015): <http://dx.doi.org/10.1016/j.marpollbul.2014.12.037>.
- 68 Clemens, Danny. "There's Shark in Your Lipstick: Everything You Need to Know about Shark Liver Oil."
- 69 "Mercury and health." World Health Organization. <http://www.who.int/mediacentre/factsheets/fs361/en/>.
- 70 *Mercury update: Impact on Fish Advisories*. US EPA. 2001.
- 71 "Shark Conservation." Shark Trust. [https://www.sharktrust.org/en/shark\\_conservation](https://www.sharktrust.org/en/shark_conservation).
- 72 Gilbert, J.M., et al. *Metal and metalloid concentrations in the tissues of dusky carcharhinus obscurus, sandbar c. plumbeus and white carcharodon carcharias sharks from south-eastern Australian waters, and the implications for human consumption*.
- 73 Ibid
- 74 "Evaluation of Certain Food Additives." Technical Report Series: 928. World Health Organization. 2005.
- 75 "Hygienic Standard for Fresh and Frozen Marine Products of Animal Origin." Ministry of Public Health of the People's Republic of China and the China Standardization Administration National Standard of the People's Republic of China. 2004.
- 76 Press Release. Centre for Food Safety, The Government of the Hong Kong Special Administrative Region. November 2017. [http://www.cfs.gov.hk/english/press/20171110\\_6639.html](http://www.cfs.gov.hk/english/press/20171110_6639.html)
- 77 "Study Finds Shark Fins & Meat Contain High Levels of Neurotoxins Linked to Alzheimer's Disease." Press release. University of Miami. August 29, 2016. <http://www.rsmas.miami.edu/news-events/press-releases/2016/study-finds-shark-fins-meat-contain-high-levels-of-neurotoxins-linked-to-al>.
- 78 <http://www.cirs-group.com/uploads/soft/170425/2762-2017.pdf>.
- 79 "Arsenic." World Health Organization. <http://www.who.int/mediacentre/factsheets/fs372/en/>.
- 80 "Cadmium." World Health Organization. [http://www.who.int/ipcs/assessment/public\\_health/cadmium/en/](http://www.who.int/ipcs/assessment/public_health/cadmium/en/).
- 81 "Lead." World Health Organization. [http://www.who.int/ipcs/assessment/public\\_health/lead/en/](http://www.who.int/ipcs/assessment/public_health/lead/en/).
- 82 *In the soup, how mercury poisons the fish we eat*. WildAid. 2009. Page 7.
- 83 Ibid.
- 84 *Contaminants and health risk assessment of shark fins available in markets in five cities in China*. Croucher Institute for Environmental Sciences & Hong Kong Baptist University. March 7, 2007.
- 85 Barreto, R.R. et al. "Rethinking use and trade of pelagic sharks from Brazil."
- 86 Ibid
- 87 Gilman, Eric L. *Bycatch governance and best practice mitigation technology in global tuna fisheries*. *Marine Policy*. Volume 35, Issue 5 (September, 2011). Pages 590–609.
- 88 Harley, Shelton; Williams, Peter; Nicol, Simon; and Hampton, John. *The western and Central Pacific tuna fishery: 2013 overview and status of stocks*. Report. Tuna Fisheries Assessment Report No. 14.
- 89 "Purse Seine Fishing." International Seafood Sustainability Foundation. <http://iss-foundation.org/purse-seine/>.
- 90 Lawson, T. *Estimation of Catch Rates and Catches of Key Shark Species in Tuna Fisheries of the Western and Central Pacific Ocean Using Observer Data*. WCPFC Scientific Committee. August, 2011. Pohnpei, Federated States of Micronesia.
- 91 Shapiro, Alison. "What are Some of the Biggest Threats Facing Sharks?" Oceana. July 10, 2015. <http://ocean.org/blog/what-are-some-biggest-threats-facing-sharks>.
- 92 Gallagher, A.J.; Orbesen, E.S.; Hammerschlag, N.; Serafy, J.E. *Vulnerability of oceanic sharks as pelagic longline bycatch*. *Global Ecology and Conservation*. Volume 1 (August 2014): Pages 50–59. <https://www.sciencedirect.com/science/article/pii/S2351989414000055>.
- 93 Shapiro, Alison. "What are Some of the Biggest Threats Facing Sharks?"
- 94 *A Summary Of Bycatch Issues And ISSF Mitigation Initiatives To-Date In Purse Seine Fisheries, With Emphasis On FADs*. Report. International Seafood Sustainability Foundation. 2014.
- 95 Gilman et al. *Shark interactions in pelagic longline fisheries*. Report. *Marine Policy* 32 (2008) 1–18. <http://www.prodolphinus.org/pdf/2008%20Shark%20interactions%20in%20pelagic%20longline%20fisheries.pdf>.
- 96 Shapiro, Alison. "What are Some of the Biggest Threats Facing Sharks?"
- 97 Gilman et al. *Shark interactions in pelagic longline fisheries*.
- 98 Clarke, Shelley. *Re-examining the shark trade as a tool for conservation*.
- 99 Ibid.
- 100 "Quarter of northeast Atlantic sharks and rays threatened with extinction." International Union for Conservation of Nature. November 10, 2008. <https://www.iucn.org/content/quarter-northeast-atlantic-sharks-and-rays-threatened-extinction>.
- 101 Coelho, Rui et al. *Effects of Hook and Bait on Targeted and Bycatch Fishes in an Equatorial Atlantic Pelagic Longline Fishery*. *Bulletin of Marine Science*. Volume 88 (No. 3): Pages 449–467. 2012.
- 102 Stevens, J. "Prionace glauca assessment." IUCN Red List of Threatened Species. 2009. <http://www.iucnredlist.org/details/39381/0>.
- 103 Ibid.
- 104 "New study gets its teeth into shark trade regulations." TRAFFIC. <http://www.traffic.org/home/2013/7/30/new-study-gets-its-teeth-into-shark-trade-regulations.html>.
- 105 Fields, A. T., Fischer, G. A., Shea, S. K. H., Zhang, H., Abercrombie, D. L., Feldheim, K. A., Babcock, E. A. and Chapman, D. D. *Species composition of the international shark fin trade assessed through a retail-market survey in Hong Kong*. Accepted Author Manuscript. *Conservation Biology*. doi:10.1111/cobi.13043. <http://onlinelibrary.wiley.com/doi/10.1111/cobi.13043/abstract>.
- 106 Kao, Ernest. "Hong Kong shark fin traders 'will be hit hard' by proposal to protect blue sharks." South China Morning Post. August 28, 2017. <http://www.scmp.com/news/hong-kong/health-environment/article/2108502/hong-kong-shark-fin-traders-will-be-hit-hard>.
- 107 Byrne, Michael E. et al. *Satellite telemetry reveals higher fishing mortality rates than previously estimated, suggesting overfishing of an apex marine predator*. The Royal Society. August 2, 2017. doi: <https://doi.org/10.1098/rspb.2017.0658>.
- 108 The IUCN Red List of Threatened Species. <http://www.iucnredlist.org/details/39381/0>.
- 109 Sims, D., Fowler, S.L., Ferretti, F. & Stevens, J. 2016. *Prionace glauca*. The IUCN Red List of Threatened Species 2016: e.T39381A16553182.
- 110 Clarke, S., Harley, S., Hoyle, S., Rice, J. 2012. *Population trends in Pacific Oceanic Sharks and the Utility of Regulations on Shark Finning*. *Conservation Biology*, Contributed Paper: Pages 1–13.
- 111 Hueter, R.E. and Simpfendorfer, C.A. *Trends in blue shark abundance in the western North Atlantic as determined by a fishery-independent survey*. In *Sharks of the Open Ocean*, M Camhi and E.K. Pikitch, eds. Blackwell Scientific Publ., Fish and Aquatic Resources Series 13: Pages 236–241. 2008.
- 112 Ward, P. and Myers, R.A. *Shifts in open-ocean fish communities coinciding with the commencement of commercial fishing*. *Ecology* 86(4): Pages 835–847. 2005.
- 113 Baum, J. K., Myers, R.A., Kehler, D.G., Worm, B., Harley, S.J., and Doherty, P.A. *Collapse and conservation of shark populations in the northwest Atlantic*. *Science*, 299: Page 4. 2003.
- 114 Dulvy, N.K. and Simpfendorfer, C.A. *Bright spots of sustainable shark fishing*. *Current Biology Magazine*. Issue 27, R1–R3. 2017.
- 115 Clarke, S. et al. *Population trends in Pacific Oceanic Sharks and the Utility of Regulations on Shark Finning*.
- 116 Campana, S.E. *Transboundary movements, unmonitored fishing mortality, and ineffective international fisheries management pose risks for pelagic sharks in the Northwest Atlantic*. *Can. J. Fish. Aquat. Sci.* 73: Pages 1599–1607. doi: [dx.doi.org/10.1139/cjfas-2015-0502](http://dx.doi.org/10.1139/cjfas-2015-0502). 2016.
- 117 Doherty, P.D., Alfaro-Shigueto, J., Hodgson, D.J., Mangel, J.C., Witt, M.J., Godley, B.J. *Big catch, little sharks: Insight into Peruvian small-scale longline fisheries*. *Ecology and Evolution* 4(12): Pages 2375–2383. doi: 10.1002/ece3.1104. 2014.
- 118 Davidson, L.N.K., Krawchuk, M.A., Dulvy, N.K. *Why have global shark and ray landings declined: improved management or overfishing?* *Fish and Fisheries*: Page 21. doi: 10.1111/faf.12119. 2015.
- 119 "Proposal for the Inclusion of the Blue Shark (*Prionace glauca*) on Appendix II of the Convention." Convention on Migratory Species, 12th Meeting of the Conference of the Parties. October 2017. [http://www.cms.int/sites/default/files/document/cms\\_cop12\\_Doc%2025.1.22\\_Rev1\\_Listing-proposal-blue-shark-AppII-Samoa-Sri-lanka\\_o.pdf](http://www.cms.int/sites/default/files/document/cms_cop12_Doc%2025.1.22_Rev1_Listing-proposal-blue-shark-AppII-Samoa-Sri-lanka_o.pdf).

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