

Fishing for Trouble:

LOOPHOLES PUT ILLEGALLY CAUGHT SEAFOOD ON AMERICANS' PLATES



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Executive Summary

o one wants the seafood they eat to be associated with crime, environmental destruction, or human rights abuses. But despite recent improvements, oversight of the seafood supply chain in the United States falls short, and American dollars continue to drive illegal fishing, forced labor, and threats to livelihoods across the globe. American consumers want and deserve better.

Illegal, unreported, and unregulated (IUU) fishing includes ignoring catch limits, fishing in closed areas, using prohibited fishing gear, violating regulations and laws, and misreporting catch. IUU fishing can also include fishing for unmanaged species or in unmanaged places. IUU fishing devastates ocean health, threatens fishing communities around the world, and is being driven in part by demand here at home: the United States imported an estimated \$2.4 billion worth of seafood derived from IUU fishing in 2019 alone.¹

IUU fishing can be hidden through seafood fraud. Seafood fraud encompasses any activity that misrepresents the fish purchased, including species substitution and document falsification.² This deception can also hide human rights abuses, and can hurt Americans' health and their wallets.²

To address these threats, the National Oceanic and Atmospheric Administration (NOAA) established the Seafood Import Monitoring Program (SIMP) in 2016, which requires catch documentation and traceability for some seafood at risk of IUU fishing and seafood fraud. But the program only covers 13 species and species groups representing about 40% of U.S. seafood imports, and the traceability requirements only apply from the fishing vessel or farm to the first point of entry into U.S. commerce — the U.S. border.^{3,4}

IUU fishing **devastates**ocean health and threatens
fishing **communities**around the world.



Four Species Not Covered by SIMP

In this report, Oceana highlights four species not covered by the Seafood Import Monitoring Program (SIMP) that are impacted by the illegal seafood trade and are vital to communities around the world.



In Belize, the Caribbean **spiny lobster** fishery is threatened by illegal fishing due to a lack of enforcement. In 2019, the United States imported over half a million pounds, or about 53%, of Belize's total lobster exports.



In Mexico's Yucatán Peninsula, some fishers are pillaging **Maya octopus** and ignoring laws meant to protect the fishery. The United States is the third-largest consumer of Maya and common octopus from Mexico, importing almost 2,000 metric tons of octopus valued at over \$13 million in 2019 alone.



Blue swimming crab from the Philippines is entering the United States disguised as more expensive domestic varieties, and that demand is driving overfishing, which is devastating local economies. Swimming crabs comprised over one-quarter of the total IUU wild-caught products imported into the United States in 2019.



Many Peruvian **squid** fishers are fishing without permits and unloading their catch to third-party exporters. Squid was Peru's top exported seafood in 2018, with 30% of it going to the European Union and the United States.





In all these regions, illegal fishing is pushing these fisheries toward collapse, which would devastate local economies and the many families that depend on abundant, sustainable seafood for their livelihoods and sustenance. But the four species highlighted in this report are not the only ones escaping oversight. Nearly 60% of the imported seafood products landing on Americans' plates are not covered by SIMP, and demand for these products is driving economic and ecological losses around the world.

Gaps in SIMP allow the U.S. seafood demand to incentivize illegal activities across the globe. As the world's largest seafood importing country, the United States has both the purchasing power and the responsibility to combat IUU fishing, and can do so by expanding SIMP to all seafood.⁵ In addition to combating illegal fishing and seafood fraud, stronger regulations would prevent seafood sourced using

forced labor or other human rights abuses from entering the United States.

When SIMP was established in 2016, the intent was always to expand the program to all seafood.⁴ Now that five years have passed since NOAA issued the final regulations, it is time for the U.S. government to finish the job.

Gaps in SIMP allow the U.S. seafood demand to **incentivize illegal** activities across the globe.







We must ensure that all seafood imported into the United States is safe, legally caught, responsibly sourced, and honestly labeled.

To that end, Oceana makes the following recommendations:

Expand the catch documentation and traceability requirements of the Seafood Import Monitoring Program (SIMP) to all seafood.

Improve SIMP implementation by updating the key data elements and critical tracking events collected to better analyze the data and inform risk-based screening, audits, and enforcement.

Extend traceability from the boat or farm to the dinner plate and provide consumers with basic information about the seafood they purchase.

Build in mechanisms to address forced labor and other human rights abuses.





Introduction

llegal, unreported, and unregulated (IUU) fishing threatens the health of our oceans. IUU fishing includes ignoring catch limits, fishing in closed areas, using prohibited fishing gear, violating international regulations and laws, and misreporting catch. IUU fishing can also include fishing for unmanaged species or in unmanaged places. Illegal fishing devastates ecosystems, threatens fishing communities around the world, and is being driven in part by demand here at home: The United States imported an estimated \$2.4 billion worth of seafood derived from IUU fishing in 2019 alone.¹

U.S. dollars may also be supporting human rights abuses, including forced labor, human trafficking, withholding of wages, and restricting worker access to food and medical care.⁶ Fishing vessel captains have been known to use intimidation and debt bondage to keep migrant workers trapped in dangerous working conditions for months to years on end.⁶

The origins of some seafood products can be hidden through seafood fraud. Seafood fraud encompasses

any activity that misrepresents the fish purchased — including substituting seafood and falsifying documents.

Without adequate safeguards in place, U.S. consumers are unknowingly contributing to IUU fishing. The United States must ensure that only seafood that is safe, legally caught, responsibly sourced, and honestly labeled makes it onto Americans' dinner plates.

The **United States**imported an estimated **\$2.4 billion** worth of
seafood derived from **IUU fishing** in 2019.



SIMP: It's All or Nothing

he United States has taken some steps to fight IUU fishing and seafood fraud. In 2014, President Obama established the Presidential Task Force on Combating IUU Fishing and Seafood Fraud. The task force was comprised of federal agencies that developed recommendations and an action plan. This process included numerous public comment periods inviting stakeholder input. The action plan ultimately led to the National Oceanic and Atmospheric Administration (NOAA) establishing the Seafood Import Monitoring Program (SIMP), which requires catch documentation and traceability for some seafood at risk of IUU fishing and seafood fraud.

From the outset, the intent was to expand this program to all seafood. As of now, the program only applies to 13 species and species groups representing about 40% of seafood imports. The seafood products covered by SIMP are abalone, Atlantic cod, Atlantic blue crab, dolphinfish, grouper, king crab, Pacific cod, red snapper, sea cucumber, shark, shrimp, swordfish, and tuna. The program only requires recordkeeping from the fishing vessel

or farm to the first point of entry into U.S. commerce — the U.S. border.

Before SIMP, Oceana's seafood fraud investigations found that, on average, one-third of the samples tested nationwide were mislabeled as a different species.² Following the implementation of SIMP, Oceana tested seafood not covered by the program and found 21% of the samples tested across the country were still mislabeled.⁹ As SIMP only requires traceability from the boat to the U.S. border, seafood substitution within the U.S. supply chain can continue undetected.

As of now, SIMP only applies to **13 species** and species groups representing **about 40%** of seafood imports.

More than 85% of the seafood consumed in the United States is imported. Dut without catch documentation and traceability requirements for all seafood, the United States is continuing to allow IUU-derived and fraudulently labeled products into its market. As the world's largest seafood importing country, the United States has both the purchasing power and the responsibility to combat IUU fishing by expanding SIMP to all seafood.

SIMP requires importers to supply catch documentation for products covered by the program to demonstrate the seafood was caught legally. Information about who caught the fish; where, when, and how it was caught; and what specific species was caught, must be provided to NOAA at the time of entry. NOAA also requires importers to keep traceability information for the product and supply that information when requested. 10

Expanding SIMP's requirements would not be without precedent. The European Union (EU) already requires all seafood to be accompanied by catch documentation, which reports details like who caught the fish, and where, how, and when it was caught, demonstrating the fish originated in a legal fishery.¹² Since the implementation of the EU's IUU fishing regulation, seafood fraud rates in the EU have decreased, and products coming from fisheries tied to illegal fishing have been blocked from entry. 12,13 Compared to the United States, the EU also provides consumers with more information about the seafood they purchase. 14 The EU's success shows that catch documentation, traceability, and accurate labeling are feasible and effective at combating seafood fraud and illegal fishing. 15 If the United States were to follow the EU's lead, that would mean two of the world's largest seafood markets would be closed to IUU-derived products.

TRACEABILITY AND TRANSPARENCY REQUIREMENTS	EUROPEAN UNION	UNITED STATES
Key information follows seafood products through the supply chain from boat to plate		Only 13 types of imported seafood can be traced from boat to border.
Catch documentation is required for all domestic and imported seafood		Domestic seafood: Traced species: Other imported seafood: X
Robust information is required on labels: scientific species name, wild-caught or farmed, area, and method of catch		×
Information must be entered electronically		Catch documentation for traced species: Other species: Traceability: X
Publicly trackable	The European Union requires its fishing vessels over 15 meters, or about 49 feet long, to be publicly trackable.	The United States requires its fishing vessels over 65 feet long, or about 20 meters, to be publicly trackable.





Key Species Not Covered by SIMP

ish and other seafood not covered by SIMP are slipping through the gaps in U.S. oversight of the seafood supply chain. 16,17 Oceana identified four species not covered by SIMP that are impacted by illegal fishing and are vital to communities around the world: Caribbean spiny lobster, Maya octopus, jumbo squid, and blue swimming crab. These case studies highlight only part of the problem. Nearly 60% of the seafood products landing on Americans' plates are not covered by SIMP, and demand for these products is driving economic and ecological losses around the world.

Nearly 60% of the imported seafood products landing on Americans' plates are not covered by SIMP.



Sarteneja Village, Belize's Spiny Lobster Fishery

The Caribbean spiny lobster (*Panulirus argus*) is found in waters from North Carolina's coast through the Caribbean and down to Brazil. ¹⁸ Spiny lobsters are a major source of income for fishing communities throughout South and Central America, including the northern village of Sarteneja, Belize, where the fishery has both economic and cultural importance. ^{18,19} In 2019, Belize exported nearly 454 metric tons of lobster valued at \$13.4 million. ¹⁹ The spiny lobster fishery is the most lucrative in Belize, making up 64% of the country's total seafood exports. ¹⁹ The United States is a major importer of Belize's spiny lobsters. In 2019, the

United States imported over half a million pounds, or about 53%, of Belize's total lobster exports. 19,20 Their prized, thick tails often sell for more than \$30 a piece in U.S. supermarkets. 21

Spiny lobsters in Belize are in decline.²² The most recent country-level assessment shows that landed lobsters are both smaller and fewer than in previous years.²² Small-scale Belizean fishers have also noted a decrease in lobster size and catch.^{23,24} The decline of this fishery threatens local fishers and communities who depend on spiny lobsters for their livelihoods.²⁵

Illegal Fishing

In a 2016 survey of fishers from across the country, 87% of respondents identified instances of illegal fishing and highlighted concerns over the lack of regulations and poor enforcement that allow illegal fishing to continue.²³ The fishers contend that enforcement is particularly deficient at night, and during the closed season from February to June.²³ Illegal fishing during those months may prevent the lobster population from being able to recover its numbers, as the closed season overlaps with the spawning season.²⁶

Illegal fishing in Belize could even affect the U.S. spiny lobster fishery.^{23,27} Because newly hatched larval lobsters travel on ocean currents, much of the lucrative U.S. spiny lobster fishery depends on spawning females in the Caribbean, including Belize.²⁷ In 2019, the United States landed 4.1 million pounds of spiny lobster in the Gulf of Mexico and south Atlantic Ocean, worth \$32 million.²⁷

In 2003, Belize issued new lobster fishing regulations that prohibited fishing during the closed season, fishing without a license, and landing juvenile or undersized lobsters and egg-carrying females. ^{28,29} Despite these rules, illegal and unsustainable fishing has continued. In 2016, the Belize Department of Fisheries caught fishers landing undersized lobster, as well as fishers in possession of lobster during the closed season. ³⁰ These enforcement events only represent the illegal activities that were caught; according to the 2016 survey, Belizean fishers suspect much more illegal activity is occurring in the spiny lobster fishery. ²³

Because the United States is a major importer of spiny lobster, import requirements can help ensure

that only legally sourced spiny lobster enters the U.S. seafood market, thus reducing incentives for illegal fishing. Because spiny lobsters are not covered under SIMP, importers are not required to share information about the origins of the lobsters or demonstrate that they were caught legally. The lack of catch documentation and traceability requirements means that U.S. demand for this delicacy may be driving the illegal catch of spiny lobsters. By expanding SIMP to all species, the United States can ensure that U.S. dollars are not funding illegal and destructive fishing practices, and help safeguard the future of fishing communities like Sarteneja. In turn, the United States can protect its own spiny lobster fishery that depends on healthy populations throughout the Caribbean.



Yucatán Peninsula, Mexico's Maya Octopus Fishery

Mexico has the third-largest octopus fishery in the world, catching between 9,000 and 21,700 metric tons per year in the Yucatán Peninsula alone.³¹ The fishery consists of two popular species, the Maya octopus (*Octopus maya*) and the common octopus (*Octopus vulgaris*). The non-migratory Maya octopus lives exclusively on the seafloor off the coastal states of Yucatán, Quintana Roo, and Campeche, so all Maya octopus sold in the world comes from this fishery.^{32,33} In 2018, Mexico exported more than 11,700 metric tons of octopus, worth \$94 million.³⁴ The United States is the third-largest consumer of Maya and common octopus from Mexico, behind Italy and Spain, importing 1,951 metric tons of octopus valued at \$13.4 million in 2019.²⁰

Maya octopus are considered juveniles for most of their lives, until they reach a length of more than 43.3 inches.³⁵ Their short 1- to 1.5-year lifespan contributes to their vulnerability, as fishers in the Peninsula have been known to illegally keep the juveniles they land.³⁶ The season for the Maya octopus extends from August to December and only allows the landing of mature animals longer

HERMAN SPOTLIGHT: Carlos Puga, Yuca



In a 2021 interview with the news source Inforural, Carlos Puga, a Yucatán fishing cooperative leader, said, "[The level of] poaching is terrible; that's the reality. ... There are no longer any fish."

Puga, who directs a cooperative of nearly 200 fishers, has noticed a serious decline in octopus landings in the past few years and worries for his fellow fishers and their families. He believes that fishers from Campeche and other states that fish illegally in the Peninsula are causing the out-of-control overexploitation.

"We can patrol at day, but how can we at night? ... It's terrible, and now there's not just a few [illegal fishermen]; there's excessive poaching, and now they're attacking us from two sides. They come here from the west [Campeche], and they're starting to arrive from the east [Quintana Roo]," he said.⁴⁵



than 43.3 inches.³⁷ The fishery is closed from mid-December to the end of July.³⁸ During the closed season, female octopus lay their eggs and guard them until they hatch, at which point the mothers die.³⁹

The Yucatán Peninsula

Around 90% of the fishers in the states of Yucatán and Campeche — about 15,000 in total — fish for Maya octopus.³⁷ Fishers in Quintana Roo also target the Maya octopus, though to a lesser extent than in Yucatán and Campeche.³⁶ Fishers in the Peninsula bring in between 8,100 and 21,700 metric tons of Maya octopus each year.³¹ A total of 3,225 small-scale vessels and 344 large vessels are permitted to fish for octopus in these three states.⁴⁰ Warehouses, ice factories, and dedicated octopus processing facilities support the fishery and provide many jobs beyond fishing.³⁷

In addition to bringing in revenue, the Maya octopus is also a highly valued food for locals. ⁴¹ During the open season, octopus is incorporated into the menus of local restaurants. ⁴² Common dishes include octopus ceviche, fried octopus, octopus in garlic, and octopus in pickled onions. ⁴² Octopus in ink, or "pulpo en su tinta a la campechana," is a traditional dish in Campeche, where it is enjoyed in homes when octopus is in season. ⁴²

Illegal Fishing

Despite the economic and cultural importance of Maya octopus, fishers do not always play by the rules. Fishers in the state of Yucatán have complained that Campeche fishers illegally enter their octopus fishery and poach the species to the point of overexploitation; however, illegal fishing occurs throughout the Yucatán Peninsula.⁴³ According to news reports, fishers from the state of Yucatán described a decline in octopus catch, barely landing enough to cover boat expenses and provide for their families.⁴³

The Mexican government requires fishing licenses to access the Maya octopus fishery. It also sets catch limits each open season, prohibits landing juvenile octopus under 43.3 inches, bans fishing gear that can target egg-bearing females, and prohibits fishing during the closed season.^{37,46} Some fishers are not complying with these regulations.^{47,48}

In August 2021, Yucatán police arrested two fishers for allegedly transporting 1,587 pounds of octopus during the closed season.⁴⁵ Closedseason fishing especially harms the Maya octopus when reproductive females are caught during the most important time of the year for them to rebuild their population.⁴⁸ According to Mexico's government, every female landed is a loss of another 800 potential octopuses that will never enter the population, since these females will not be able to reproduce.⁴⁸ Fishers who illegally land octopus during the off-season sell their catch for a high price to wholesalers, who ship the product to major Mexican cities and foreign markets.⁴⁸ Illegal fishers are threatening the future of the species, the livelihoods of honest fishers, and the communities that depend on their catch. Since catch documentation and traceability are not required, illegally caught octopus are exported and likely making their way to the United States.



Concepcion, the Philippines' Blue Swimming Crab Fishery

The Philippines is one of the top 15 fishing countries in the world, exporting a variety of products, including tuna, shrimp, and crab. ^{49,50} Around 1.6 million Filipinos depend on the seafood industry for their livelihoods, and fishery exports from the Philippines totaled over 226,821 metric tons, with 24% of that going to the United States. ⁵¹

The Philippines is the third-largest crab exporter globally, and the second-largest crab exporter to the United States. ⁵² The blue swimming crab is the main species fished, comprising over 90% of the crabs landed in the country. ⁴⁹ Ninety-five percent of the crabs are landed by artisanal fishers rather than the commercial fleet. ⁵³

Blue swimming crabs get their name from the flat pair of legs they use to paddle through the ocean.⁵⁴

The species *Portunus pelagicus* resides in the Indo-Pacific region and is one of 51 species of swimming crabs found worldwide.⁵⁵ Blue swimming crabs can be found in waters off three continents, from East Africa to the Philippines to Australia.⁵⁶ In the Philippines, blue swimming crabs are caught using pots, gillnets, and entangling nets. Global commercial fishing of blue swimming crabs rapidly grew in the 1990s when the Chesapeake Bay blue crab (*Callinectes sapidus*) fishery crashed.⁵⁷ Imports began to replace Chesapeake blue crabs to satisfy the U.S. demand when domestic landings in the bay dropped by nearly half in 1992.⁵⁷

Because of its ability to pass as other crabs, substitutions of blue swimming crab for higher-value crab occur to this day throughout the global market, often without the knowledge of consumers. ⁵⁴ In 2015, Oceana tested crab cakes from Maryland and Washington, D.C. that purportedly contained only locally sourced blue crab. Forty-eight percent of the crab cakes tested contained crab from the Indo-Pacific region, with the most common substitute being blue swimming crab. ⁵⁴ Seafood fraud is common with the blue swimming crab because crab imported into the United States typically costs less than the domestic catch. ⁵⁴

Concepcion

Iloilo Province is one of four provinces on Panay Island surrounded by the Visayan Sea and is one

of the top producers of blue swimming crab in the Philippines. ⁵⁶ From 2010 to 2019, the province generated the most domestic revenue out of all blue swimming crab fisheries in the nation. ⁵⁶

Concepcion is a rural municipality in the northern region of Iloilo Province that depends almost entirely on fishing and agriculture. Concepcion is composed of 25 barangays, or villages, 14 of which are on the mainland of Panay; the rest are on islands.⁵⁸ As of 2020, 44,000 people lived in Concepcion, with 10% of the population working in the fishery.⁵⁹ As it has one of just two crab picking and processing plants in northern Iloilo, the municipality is home to one of the province's most vital blue swimming crab fisheries.⁶⁰

On the mainland of Concepcion, blue swimming crab is an important food source. ⁵⁶ What they do not eat at home, fishers sell mostly in local markets, but also to the capital where seafood can be shipped abroad. ⁶¹

Island barangays are especially economically dependent on fishing, since suitable land for farming and raising livestock is limited.⁵⁶ Most blue swimming crab caught by artisanal island fishers is exported instead of being kept for domestic consumption.⁵⁶

Dr. Ildefonso Toledo, head of Iloilo's Provincial Agriculture Office that oversees fisheries, is alarmed



Oceana Finds a Bait-and-Switch in 'Local' Crab Cakes

In 2015, Oceana **tested** crab cakes in Washington, D.C. and Maryland to see if they contained only the local blue crab species, as labeled. **Forty-eight percent** of the crab cakes tested contained crab from the **Indo-Pacific region**, with the most common substitute being blue swimming crab.⁵⁴ **Seafood fraud is common** with the blue swimming crab because crab imported to the United States typically costs less than domestic catch.⁵⁴

by the decline of the crab population and its impact on local crab processing plants in Concepcion.⁶² In an interview with the Philippine News Agency, he recalled the 2000s, when the plants processed 18 metric tons of crab daily, versus today, when they can barely get 1 metric ton each day: "That is a remarkable decrease in the population of blue swimming crab," he said.⁶²

Illegal Fishing

Foreign demand for blue swimming crab seriously impacts the health of the fishery.⁵³ Fishers overexploited the species to the point where landings in 2008 and 2009 were 75% lower than landings 20 years before.⁵³ Panay News reported that the Philippines' Bureau of Fisheries and Aquatic Resources (BFAR) pins the decline on the exhaustion of the crabs' breeding population.⁶³

In Iloilo Province it is illegal to land, possess, sell, and transport egg-carrying females and crabs smaller than 4.33 inches. ⁵⁶ Concepcion's rules go further, by limiting access to the fishery only to locals from the municipality in an effort to combat overexploitation by outsiders. ⁵⁸ The fishery's size and the number of local fishers have made the requirements difficult to enforce, and commercial fishers from elsewhere in the province regularly fish illegally in Concepcion's waters. ⁵⁸

Illegal fishing is a notorious problem in Northern Iloilo. BFAR referred to the region as an illegal fishing "hotspot," after recording 470 instances of illegal fishing there between 2016 and 2018.⁶⁴ This only reflects official complaints recorded by the government, and illegal fishing may be even more rampant. Concepcion is one of the municipalities in the region with continuously high levels of illegal fishing.^{65,66} News coverage from 2017 to 2018 reveals multiple alleged incidents of illegal fishing gear use, fishing without permits, and commercial vessels illegally entering municipal fisheries.^{65,66}

The U.S. International Trade Commission estimated that swimming crabs comprised over one-quarter of the total IUU wild-caught products imported into the United States in 2019.¹ SIMP already covers Atlantic blue crab and king crab, but not blue swimming crab. Illegal activity in Concepcion is contributing to overexploitation of blue swimming crab, which threatens the livelihood

and food security of Filipinos who depend on the fishery. ^{65,66} Expanding SIMP to all seafood would protect the future of crab fishers in places like Concepcion by closing the U.S. market to illegally caught crabs, allowing only imports of legally sourced seafood.



La Tortuga and La Islilla, Peru's Jumbo Squid Fishery

Fishers in Peru catch nearly 390,100 metric tons of jumbo squid (*Dosidicus gigas*) every year, almost half of the global annual catch. ^{67,68} From 2015 to 2019, Peru exported approximately \$502 million worth of jumbo squid every year. ⁶⁷ Squid was Peru's top exported seafood in 2018, with 30% of it going to the EU and the United States. ^{69,70} The abundant squid off Peru's coast draws fishing fleets from China that also sell their catch to the United States. ⁷¹ The Peruvian fishery is comprised entirely of artisanal fishers within Peru's waters; and in terms of employment and export levels, it is the most important artisanal fishery for the country. ⁶⁸ The nearly 3,000-vessel artisanal fleet employs 11,000 fishers. ^{72,73}

Jumbo squid, also referred to as Humboldt squid and jumbo flying squid, are found in the Eastern Pacific Ocean from Chile to Alaska. Peru's coastal waters serve as one of the squid's primary breeding grounds. Each female can lay up to 20 million eggs in her lifetime and can reproduce anytime throughout the year. Many commercial fish species and important predators — such as tuna, sharks, and billfish — rely on the jumbo squid, or on other fish that eat the squid, as a significant part of their diets. Depleted squid populations could potentially lead to a decline in other fisheries and disruptions in the marine ecosystem, leading to losses of fishing jobs in local communities.

La Tortuga and La Islilla

La Tortuga and La Islilla are fishing towns with fewer than 10,000 people, in the Sechura and Paita provinces, respectively, on the northern coast of Peru. ⁸⁰ Paita has the region's major fishing port, and the 500 vessels from La Islilla and La Tortuga capture around 20% of Peru's total catch of jumbo squid. ^{80,81}

The people of La Islilla and La Tortuga are largely dependent on jumbo squid fishing for their livelihoods. Other employment options include dangerous high-seas fishing or working in local mines, but because these alternatives are riskier, most residents choose to fish for squid instead.⁸⁰ The squid fishery is more than just income for artisanal fishers — its revenue also funds public services like electricity, clean water, and schools.⁸⁰

Illegal Fishing

Illegal fishing for jumbo squid within Peru's coastal waters, where licenses are required, is found among the Peruvian artisanal fleet and distant-water fleets from other countries. More than 60% of Peruvian artisanal vessels lack valid permits. Many of them sell their illegal squid catch to third parties who then falsely label it as if it was caught with valid permits so it can be sold internationally. 83,84

The distant-water fleets that exploit the jumbo squid fishery near Peru are predominantly composed of

Chinese vessels, which bring in around 317,500 metric tons of squid per year. ^{85,86} Peruvian fishers and international organizations are concerned that the fleet is also fishing illegally within Peru's exclusive economic zone (EEZ — the waters within 200 miles of the country's coast). ^{82,85} As jumbo squid often migrate back and forth from the EEZ into international waters, overfishing outside of the EEZ impacts the jumbo squid population inside. ⁸⁷

The problems with the jumbo squid fishery highlight the need for better documentation and traceability to ensure only legally caught squid are entering the United States. The EU already requires catch documentation, so the United States following suit could incentivize changes in Peru. With added pressure from the United States, fishers could be pushed to obtain proper licensing, thereby protecting the fishery from overfishing, and international consumers from buying falsely labeled seafood. Also, the Peruvian government should ensure the permitting process is fair and accessible to allow these fishermen to legally export their catch.

Expanding SIMP to include all seafood, including the jumbo squid, would help squid-dependent towns like La Islilla and La Tortuga. Only allowing legally sourced squid to be sold in the United States would improve the long-term sustainability of the fishery, which would benefit food security and economic stability in Peru.



The Chinese fleet has a history of unsustainable fishing practices in South American waters.

For example, in March 2016, a Chinese trawler was sunk by the Argentinean Coast Guard after it was suspected of fishing illegally in Argentina's EEZ.⁸⁸ A 2021 Oceana report found that from January 2018 to April 2021, more than 70% of Chinese squid jiggers within 20 nautical miles of Argentina's EEZ had their public tracking systems "go dark." With these systems dark, it is difficult for authorities to know if the vessels are making illegal forays into Argentina's waters.

MAN SPOTLIGHT: David Fiestas, La Isli



David Fiestas is a fisherman from La Islilla. In an interview with Oceana, he shared concerns about overexploitation of the squid.

"We've always had conflict with the [foreign] industrial fishers; they're the reason our fish are disappearing," he said.⁸⁰

CALAMASUR, a jumbo squid conservation organization, has brought the concerns of artisanal fishers like Fiestas to international light. CALAMASUR's president, Alfonso Miranda, told the online publication ChinaDialogueOcean.net that an estimated 45,359 metric tons of jumbo squid are illegally caught by the Chinese fleet each year within Peru's EEZ, leading to an estimated \$85 million in annual revenue losses for the country.⁸²



Conclusion and Recommendations

hen SIMP was established in 2016, the intent was always to expand the program to all seafood.⁴ Now that five years have passed since NOAA issued the final regulations, it is time for the U.S. government to finish the job.

Without comprehensive catch documentation and traceability requirements for all imported species, illegally sourced seafood products will continue to enter the U.S. market. In addition to combating illegal fishing and seafood fraud, stronger regulations will prevent seafood sourced using forced labor or other human rights abuses from ending up on Americans' plates.

The **United States** can ensure that all imported seafood is safe, legally caught, responsibly sourced, and honestly labeled.

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To that end, Oceana has the following recommendations:

- **Expand** the catch documentation and traceability requirements of the Seafood Import Monitoring Program (SIMP) to all seafood.
- Improve SIMP implementation by updating the key data elements and critical tracking events collected to better analyze the data and inform risk-based screening, audits, and enforcement.
- Extend traceability from the boat or farm to the dinner plate and provide consumers with basic information about the seafood they purchase.
- **Build** in mechanisms to address forced labor and other human rights abuses.





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Photos courtesy of Shutterstock.



- ¹ United States International Trade Commission (2021) Seafood Obtained Via Illegal, Unreported, and Unregulated Fishing: U.S. Imports and Impact on U.S. Commercial Fisheries. 468p.
- ² Warner K, Timme W, Lowell B and Hirshfield M (2013) Oceana Study Reveals Seafood Fraud Nationwide. Oceana. 69p.
- ³ Freitas B (2021) Corruption in the Fisheries Sector: Import Controls, Transparency, and WWF Practice. WWF. 14p.
- ⁴ NOAA (2016) Seafood Import Monitoring Program, Docket NOAA NMFS-2015-0122-0111. Available: https://www.regulations.gov/document/NOAA-NMFS-2015-0122-0111. Accessed Nov 5, 2021.
- ^{5.} Food and Agricultural Organization (n.d.) USA Fisheries Statistics: Production, Consumption and Trade. Available: https://www.fao.org/in-action/globefish/countries/countries/usa/usa-trade/en/. Accessed Oct 1, 2021.
- ⁶ Murphy D (2018) Hidden Chains: Rights Abuses and Forced Labor in Thailand's Fishing Industry. New York: Human Rights Watch. 148p.
- ⁷ Presidential Task Force (2015) Presidential Task Force on Combating IUU Fishing and Seafood Fraud. 44p.
- ⁸ NOAA (n.d.) Seafood Import Monitoring Program. Available: https://www.fisheries.noaa.gov/international/seafood-import-monitoring-program. Accessed Oct 28, 2021.
- Warner K, Roberts W, Mustain P, Lowell B and Swain M (2019) Casting a Wider Net: More Action Needed to Stop Seafood Fraud in the United States. Oceana. 19p.
- ^{10.} NOAA (2021) Report on the Implementation of the U.S. Seafood Import Monitoring Program. 18p.
- ¹¹ NOAA (2019) Compliance Guide: U.S. Seafood Import Monitoring Program. 8p.
- 12. European Commission (n.d.) Illegal Fishing. Available: https://ec.europa.eu/oceans-and-fisheries/fisheries/rules/illegal-fishing_en. Accessed Oct 10, 2021.
- ¹³ Blanco-Fernandez C, Ardura A, Masiá P, et al. (2021) Fraud in Highly Appreciated Fish Detected from DNA in Europe May Undermine the Development Goal of Sustainable Fishing in Africa. *Scientific Reports* 11: 11423. doi: 10.1038/s41598-021-91020-w
- 14. Directorate General of Maritime Affairs and Fisheries (2015) A Pocket Guide to the EU's New Fish & Aquaculture Consumer Labels. European Commission. 20p.

- ^{15.} Warner, K, Mustain, P, Lowell B, Geren S and Talmage S (2016) Deceptive Dishes: Seafood Swaps Found Worldwide. Oceana. 24p.
- ¹⁶. Yozell S (2020) A Qualitative Assessment of SIMP Implementation in Four Countries. Stimson Center. 20p.
- ^{17.} Aylesworth S and Gutierrez I (2021) Unethical Seafood: How the US Import System Fails Consumers. In: *NRDC Expert Blog*. Available: https://www.nrdc.org/experts/sandy-aylesworth/unethical-seafood-how-us-import-system-fails-consumers. Accessed Nov 4, 2021.
- 18. Food and Agricultural Organization (2017) WECAFC Fishery Resources Report, Belize Lobster Fishery, Fisheries and Resources Monitoring System (FIRMS). Available: http://firms.fao.org/firms/fishery/1005/en. Accessed Oct 2, 2021.
- 19. Statistical Institute of Belize (2019) Abstract of Statistics. 193p.
- ^{20.} NOAA (n.d.) US Trade in Fishery Products. Available: https://www.fisheries.noaa.gov/foss/f?p=215:2:4807094589228::NO::: Accessed Oct 20, 2021.
- ^{21.} Fulton Fish Market (n.d.) Lobster- Frozen, Tail 9oz, Wild, Warm Water. Available: https://fultonfishmarket.com/frozen-lobster-tails-9oz.html. Accessed Nov 5, 2021.
- ²². Gongora M (2009) Assessment of the Spiny Lobster (Panulirus argus) of Belize Based on Fishery-Dependent Data. United Nations University Fishery Training Program. 38p.
- ^{23.} Mayhew J (2016) Perceptions of Fisheries Management, Gill Net Use and Income Diversification Among Small-Scale Fishers in Belize. Duke University. 49p.
- ^{24.} Navarro Ramirez A (2020) The Sea in Bildo's Eyes. MAR Fund. 28p.
- ^{25.} San Pedro Scoop (2017) Sea Front Sarteneja, Belize: A Charming Quiet Village. Available: https://www.sanpedroscoop.com/2017/04/sea-front-sarteneja-belize-charming-quiet-village.html. Accessed Oct 6, 2021.
- ^{26.} CLME+ Project (2017) Regional Closed Season for the Caribbean Spiny Lobster. Available: https://www.clmeproject.org/regional-closed-season-for-the-caribbean-spiny-lobster/. Accessed Oct 2, 2021.
- ^{27.} NOAA (n.d.) Caribbean Spiny Lobster. Available: https://www.fisheries. noaa.gov/species/caribbean-spiny-lobster. Accessed Oct 28, 2021.
- 28. Carcamo R (n.d.) Report on the Spiny Lobster Fisheries of Belize. Food and Agriculture Organization of the United Nations. 9p.
- ^{29.} Government of Belize (2003) Fisheries Act Chapter 210, Revised Edition 2003. 226p.

- ^{30.} Belize Fisheries Department (2016) Catch of the Quarter. 6p. Report No.: Volume 9, Number 1.
- 31. Yucatán Times (2021) The Maya Octopus, A Species Endemic to the Yucatán Peninsula with High Ecological and Commercial Value. Available: https://www.theyucatantimes.com/2021/05/maya-octopus-a-species-endemic-to-the-yucatan-peninsula-with-high-ecological-and-commercial-value/. Accessed Oct 12, 2021.
- ³² Araujo M, López-Rocha J and Poot-López G (2015) Spatial Analysis of the Abundance and Catchability of the Red Octopus Octopus maya (Voss and Solís-Ramírez, 1966) on the Continental Shelf of the Yucatán Peninsula, Mexico. *Journal of Shellfish Research* 34: 481–492. doi: 10.2983/035.034.0232
- 33. The Safina Center Seafood Analysts (2015) Common Octopus, Red Octopus. The Safina Center & Monterey Bay Aquarium Seafood Watch. 40p.
- 34. World Integrated Trade Solutions (n.d.) Mexico Molluscs: Octopus (Octopus Spp.), Frozen, Dried, Salted or in Brine Exports by Country in 2018. Available: https://wits.worldbank.org/trade/comtrade/en/country/MEX/year/2018/tradeflow/Exports/partner/ALL/product/030759. Accessed Oct 28, 2021.
- 35. Markaida U, Méndez-Loeza I and Rosales-Raya M (2017) Seasonal and Spatial Trends of Mayan Octopus, Octopus Maya, Population Dynamics from Campeche, Mexico. *Journal of the Marine Biological Association of the United Kingdom* 97: 1663–1673. doi: 10.1017/S0025315416001132
- 36. Yucatán Times (2018) The Maya Octopus a Unique Species Endemic of Yucatán. Available: https://www.theyucatantimes.com/2018/08/the-maya-octopus-a-unique-species-endemic-of-yucatan/. Accessed Oct 19, 2021
- ^{37.} Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentacíon (2014) Acuerdo Por El Que Se Da a Conocer el Plan de Manejo Pesquero de Pulpo (O. Maya y O. Vulgaris) del Golfo de México y Mar Caribe. 47p.
- 38. Gobierno de México (2020) Acuerdo Por El Que Se Modifica El Aviso Por El Que Se Da a Conocer El Establecimiento de Épocas y Zonas de Veda Para La Pesca de Diferentes Especies de La Fauna Acuática en Aguas de Jurisdicción Federal de los Estados Unidos Mexicanos, Publicado el 16 de Marzo de 1994. 2p.
- 39. Wang Z and Ragsdale C (2018) Multiple Optic Gland Signaling Pathways Implicated in Octopus Maternal Behaviors and Death. *Journal of Experimental Biology* doi: 10.1242/jeb.185751
- ^{40.} Oceana México (2019) Auditoría Pesquera: México. Oceana. 48p.

- ⁴¹. Delegación SADER Yucatán (2019) Cifras Aceptables en el Cierre de la Temporada de Captura de Pulpo. In: *Gobierno de Mexico*. Available: https://www.gob.mx/agricultura/yucatan/articulos/cifras-aceptables-en-el-cierre-de-la-temporada-de-captura-de-pulpo?idiom=es. Accessed Oct 20, 2021.
- ⁴² Yucatán Today (n.d.) Campechan Cuisine. Available: https://yucatantoday.com/campechan-cuisine/?lang=en. Accessed Oct 11, 2021.
- ^{43.} Ruvalcaba A (2021) "Una Mafia" Opera La Pesca Furtiva en Costa Esmeralda de Yucatán. In: *Inforural*. Available: https://www.inforural.com. mx/una-mafia-opera-la-pesca-furtiva-en-costa-esmeralda-de-yucatan/. Accessed Oct 21, 2021.
- ⁴⁴. El Faro Yucateco (2021) Furtivismo Responsabilidad de Pescadores y Empresarios. Available: https://www.elfaroyucateco.com/economia/furtivismo-responsabilidad-de-pescadores-y-empresarios/. Accessed Oct 5. 2021.
- ⁴⁵. Mexico News Daily (2021) Fishermen Claim Illegal Fishing Out of Control in Yucatán. Available: https://mexiconewsdaily.com/news/fishermen-claim-illegal-fishing-out-of-control-in-yucatan/. Accessed Nov 1, 2021.
- ^{46.} Cardenas Luna D and Fernandez Rivera Melo J (2020) El Pulpo y La Pesca: Retos Para Lograr La Sostenibilidad en La Actividad Pesquera. In: *Este Pais*. Available: https://estepais.com/ambiente/el-pulpo-y-la-pescaretos-para-lograr-la-sostenibilidad-en-la-actividad-pesquera/. Accessed Nov 22, 2021.
- ^{47.} Lliteras E (2021) Pesca Furtiva en Yucatán Está Fuera de Control. In: *La Jornada Maya*. Available: https://www.lajornadamaya.mx/yucatan/175935/pesca-furtiva-en-yucatan-esta-fuera-de-control. Accessed Oct 27, 2021.
- ^{48.} Delegación SADER Yucatán (2021) Inicia Pesca de Pulpo en el Sureste Mexicano, del 10 de Agosto al 15 de Diciembre. In: *Gobierno de Mexico*. Available: https://www.gob.mx/agricultura/yucatan/articulos/inicia-pesca-de-pulpo-en-el-sureste-mexicano-del-1-de-agosto-al-15-de-diciembre?idiom=es. Accessed Oct 20, 2021.
- ^{49.} Food and Agricultural Organization (2014) Philippines, Fishery & Aquaculture Country Profiles. Available: https://www.fao.org/fishery/en/facp/phl?lang=en. Accessed Oct 2, 2021.
- ^{50.} Food and Agriculture Organization (2020) The State of World Fisheries and Aquaculture 2020. 244p.
- 51. Lamarca N (n.d.) Fisheries Country Profile: Philippines. In: Southeast Asian Fisheries Development Center. Available: http://www.seafdec.org/fisheries-country-profile-philippines/. Accessed Nov 10, 2021.

- ^{52.} Seafood Watch Monterey Bay Aquarium (n.d.) Wild-Caught Crab in Philippines. Available: https://www.seafoodwatch.org/our-projects/wild-caught-crab-in-philippines. Accessed Oct 20, 2021.
- ^{53.} Suerte N (2015) Feasibility of Blue Swimming Crab Portunus Pelagicus Linnaeus 1758 and Red Seaweed Kappaphycus alvarezii Doty Poly. *Mindanao Journal of Science and Technology* 13.
- ^{54.} Warner K, Hirshfield M, Lowell B, Disla C and Ortenzi K (2015) Oceana Reveals Mislabeling of Iconic Chesapeake Blue Crab. Oceana. 15p.
- 55. Kunsook C, Gajaseni N and Paphavasit N (2014) The Feeding Ecology of the Blue Swimming Crab, Portunus pelagicus (Linnaeus, 1758), at Kung Krabaen Bay, Chanthaburi Province, Thailand. *Tropical Life Sciences Research* 25: 13–27.
- ^{56.} Global Marine Commodities (2020) The Philippines' Blue Swimming Crab (Portunus pelagicus) Fishery, Root Cause Analysis Report. 55p.
- ^{57.} Chesapeake Bay Foundation (2008) Bad Water & the Decline of Blue Crabs in the Chesapeake Bay. 24p.
- ^{58.} Siason I, Ferrer A, Monteclaro H, et al. (n.d.) Philippine Case Study on Conflict Over Use of Municipal Water: Synthesis of Three Case Studies in the Visayan Sea. University of the Philippines in the Visayas. 25p.
- ^{59.} Mapa D (2021) Highlights of the Region VI (Western Visayas) Population 2020 Census of Population and Housing (2020 CPH). In: *Philippines Statistics Authority*. Available: https://psa.gov.ph/content/highlights-region-vi-western-visayas-population-2020-census-population-and-housing-2020-cph. Accessed Oct 11, 2021.
- ^{60.} Panay News (2018) Blue Swimming Crab Hatchery in Concepcion. Available: https://www.panaynews.net/blue-swimming-crab-hatchery-in-concepcion/. Accessed Nov 1, 2021.
- 61. Ortiz M and Abril L (2009) Local Economic Development and Youth Employment: The Case of Concepcion. doi: 10.13140/RG.2.1.3087.4645
- ⁶² Ferrer C (2018) Iloilo Eyes Hatchery for Blue Swimming Crabs. In: *Philippine News Agency*. Available: https://www.pna.gov.ph/articles/1037894. Accessed Nov 2, 2021.
- 63. Panay News (2018) Iloilo Seeks to Conserve Blue Crab Population. Available: https://www.panaynews.net/iloilo-seeks-to-conserve-blue-crab-population/. Accessed Nov 1, 2021.

- ^{64.} Panay News (2019) N. Iloilo Illegal Fishing Hotspot. Available: https://www.panaynews.net/n-iloilo-illegal-fishing-hotspot/. Accessed Nov 1, 2021.
- ^{65.} Nepomoceno J (2017) Illegal Fishers Arrested in Concepcion. In: *Sunstar Philippines*. Available: https://www.sunstar.com.ph/article/153576/Business/Illegal-fishers-arrested-in-Concepcion. Accessed Nov 9, 2021.
- 66. Nepomoceno J (2018) 86 Illegal Fishers Fall in Concepcion, Carles. In: Sunstar Iloilo. Available: https://www.sunstar.com.ph/article/1762595/ ILOILO/Local-News/86-illegal-fishers-fall-in-Concepcion-Carles. Accessed Nov 1, 2021.
- ^{67.} Mar del Peru (2021) Pota. Available: https://www.mardelperu.pe/pesca/13/pesqueria-pota. Accessed Nov 2, 2021.
- ^{68.} Food and Agricultural Organization (2021) Industry Still Struggling, But Hopes for Improvement in 2021. Available: https://www.fao.org/ in-action/globefish/market-reports/resource-detail/en/c/1253479/. Accessed Nov 15, 2021.
- ^{69.} Ministerio de la Producción (2018) Anuarío Estadístico de Pesca y Acuícola. 200p.
- 70. WWF Seafood Sustainability (n.d.) Peru Jumbo Flying Squid. Available: https://seafoodsustainability.org/portfolio/peru-jumbo-flying-squid/. Accessed Oct 20, 2021.
- ^{71.} McClure M (2015) Jumbo Squid. Monterey Bay Aquarium Seafood Watch. 43p.
- 72. Fishery Progress (n.d.) Peru Jumbo Flying Squid. Available: https://fisheryprogress.org/fip-profile/peru-jumbo-flying-squid-jig#:~:text=for%20artisanal%20fishers.-,Jumbo%20squid%20 represents%20the%20second%20biggest%20fishery%20in%20 Peru%20and,500%20thousand%20tons%20of%20squid. Accessed Nov 2, 2021.
- 73. Aroni E (2021) Follow the Lights: Squid Fishing in the Southeast Pacific Ocean. In: *Global Fishing Watch*. Available: https://globalfishingwatch.org/fisheries/squid-fishing-southeast-pacific/. Accessed Nov 2, 2021.
- ⁷⁴. Barratt I and Allcock L (2021) Dosidicus gigas, Humboldt Squid. International Union for Conservation of Nature. 8p.

- 75. Tafur R, Villegas P, Rabí M and Yamashiro C (2001) Dynamics of Maturation, Seasonality of Reproduction and Spawning Grounds of the Jumbo Squid Dosidicus gigas (Cephalopoda: Ommastrephidae) in Peruvian Waters. Fisheries Research 54: 33–50. doi: 10.1016/S0165-7836(01)00379-4
- 76. Galván-Magaña F, Polo-Silva C, Berenice Hernández-Aguilar S, et al. (2013) Shark Predation on Cephalopods in the Mexican and Ecuadorian Pacific Ocean. *Deep Sea Research Part II: Topical Studies in Oceanography* 95: 52–62. doi: 10.1016/j.dsr2.2013.04.002
- 77. Varela J, Intriago K, Flores J and Lucas-Pilozo C (2017) Feeding Habits of Juvenile Yellowfin Tuna (Thunnus albacares) in Ecuadorian Waters Assessed from Stomach Content and Stable Isotope Analysis. Fisheries Research 194: 89–98. doi: 10.1016/j.fishres.2017.05.017
- 78. Loor-Andrade P, Pincay-Espinoza J, Carrera-Fernández M and Rosas-Luis R (2017) Feeding Habits of Billfishes (Carangaria: Istiophoriformes) in the Ecuadorian Pacific Ocean. *Neotropical Ichthyology* 15 doi: 10.1590/1982-0224-20160162
- 79. Valentine M (2020) Oceana Finds 300 Chinese Vessels Pillaging the Galapagos for Squid. Oceana. 8p.
- ^{80.} Guy A (2018) For Thousands of Peruvian Families, the Road Out of Poverty is Paved in Squid. In: *Oceana*. Available: https://oceana.org/blog/thousands-peruvian-families-road-out-poverty-paved-squid/. Accessed Oct 1, 2021.
- 81. WWF Seafood Sustainability (n.d.) Peruvian Government Cracks Down on Illegal Fishing. Available: https://seafoodsustainability.org/peruvian-government-cracks-down-on-illegal-fishing/. Accessed Oct 26, 2021.
- 82. Torrico G (2021) South America Plans Regional Response to Squid Overfishing. In: *China Dialogue Ocean*. Available: https://chinadialogueocean.net/15979-squid-overfishing-south-america-plans-regional-response/. Accessed Oct 22, 2021.
- 83. WWF (2018) Towards Sustainable Fisheries: Peruvian Government Commits to the Formalization of One of the Largest Fisheries in the World. Available: https://www.wwf.org.pe/en/?uNewsID=330856. Accessed Oct 25, 2021.
- ⁸⁴. Development Channel (2018) La Tortuga's Fishermen Wait for Legal Recognition. Available: https://www.developmentchannel. org/2018/08/27/la-tortugas-fishermen-wait-for-legal-recognition/. Accessed Oct 13, 2021.

- ^{85.} Aroni E (2020) Peruvian Fisheries Experience Massive Decline in Activity from COVID-19. In: *Global Fishing Watch*. Available: https://globalfishingwatch.org/news-views/peruvian-fisheries-covid-19/#:~:tex-t=According%20to%20the%20Global%20Fishing,pandemic%20on%20 March%2016%2C%202020. Accessed Oct 20, 2021.
- 86. Loew C (2021) Japan Importing More Humboldt Squid from Peru, While Massive Chinese Fleet Return. In: Seafood Source. Available: https://www.seafoodsource.com/news/supply-trade/japan-importing-more-humboldt-squid-from-peru-while-massive-chinese-fleet-returns?utm_source=marketo&utm_medium=email&utm_campaign=newsletter&utm_content=newsletter&mkt_tok=NzU2LUZXSiOwNjEAAAF_x5-iRbMV3hOcDFCK-jzf5wrAA4tpV7T7 RZMjyWd2bnx1WxIN6P9mzGpKRPPR-qLq4FCb7t7lFPvB-xVEmlzTcKxd9Rui4Vew6xzuRw1DZVVuyIO. Accessed Oct 23, 2021.
- ^{87.} Morales-Bojórquez E and Pacheco-Bedoya J (2017) A Mantle Length Structured Stock Assessment Model for Jumbo Squid, Dosidicus gigas, Fishery of the Ecuadorian Pacific: A Limited Data Approach. *Marine Biology Research* 13: 417–428. doi: 10.1080/17451000.2016.1272696
- ^{88.} White C (2016) Argentina Sinks Chinese-Flagged Vessel Suspected of Illegal Fishing. In: *Seafood Source*. Available: https://www.seafood-source.com/news/environment-sustainability/argentina-sinks-chinese-flagged-vessel-suspected-of-illegal-fishing. Accessed Nov 2, 2021.

