Deceptive Dishes: Seafood Swaps Found Worldwide

OCEANA Protecting the World's Oceans

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Steve De Neef

Executive Summary

Seafood fraud is a serious global problem that undermines honest businesses and fishermen that play by the rules. It also threatens consumer health and puts our oceans at risk. As global fishing becomes more expansive and further industrialized, seafood fraud and its related impacts could get even worse. This update of Oceana's 2014 review of seafood fraud studies demonstrates the global scope of the problem, but also reveals some promising trends due to recent regulations in the European Union (EU) that are increasing transparency and traceability as well as addressing illegal, unregulated and unreported (IUU) fishing. An interactive map of global seafood fraud cases and studies compiled by Oceana can be found at oceana.org/seafoodfraudmap.

Seafood fraud comes in different forms, including species substitution—often a low-value or less desirable seafood item swapped for a more expensive or desirable choice—improper labeling, including hiding the true origin of seafood products, or adding extra breading, water or glazing to seafood products to increase their apparent weight. The focus of this review is seafood mislabeling and species substitution.

The majority of assessed fisheries around the world are already being fished at or over their sustainable limits. And the risk of overexploitation only increases when considering the complexity and opacity of the global seafood supply chain, which is rife with illegal fishing, human rights abuses, inadequate management, and with the exception of a few model countries, little to no traceability. However, these problems can and should be addressed. Oceana maintains that with proper management, the oceans' wild fisheries could provide a responsibly caught, nutritious seafood meal to 1 billion people every day.[1] But proper management requires transparency and accountability.

> "Seafood fraud is a serious global problem that undermines honest businesses and fishermen that play by the rules, threatens consumer health, and puts our oceans at risk.

In 2014, Oceana documented the global reach of seafood fraud in its review of the literature, identifying reports of fraud in 29 countries. At the time of its release, Oceana's report was the most comprehensive review of seafood fraud publications ever, citing 103 sources, including investigations by journalists, peer-reviewed literature, and government and non-governmental organization (NGO) documents. A similar analysis of 51 peer-reviewed studies published since 2005 found a 30 percent average rate of fraud globally, a rate consistent with Oceana's own additional investigations into seafood fraud in the United States, which found mislabeling rates for fish, shrimp and crab between 30 and 38 percent.[2]

This update to Oceana's 2014 global fraud report reviewed more than double the number of studies and cases as previous reviews, looking at seafood fraud globally and examining more than 200 peer-reviewed journal articles, popular media sources, and public documents from governments and NGOs.

A presidential task force has released a proposed rule to address IUU fishing and seafood fraud, two problems that are linked due to a global, complex and opaque seafood supply chain and that share a common solution: full-chain traceability for all seafood. The proposed rule includes traceability requirements that would only apply to 13 "at-risk" types of seafood, and

Highlights of this review include:

- One in five of the more than 25,000 samples of seafood tested worldwide was mislabeled, on average. The studies reviewed found seafood mislabeling at every sector of the seafood supply chain: retail, wholesale, distribution, import/export, packaging/processing and landing.
- Seafood fraud was investigated in 55 countries and found on every continent except for Antarctica.
- Every study found seafood fraud, except for one.
- Asian catfish, hake and escolar were the three types of fish most commonly substituted. Specifically, farmed Asian catfish was sold as 18 different types of higher-value fish.
- More than half (58 percent) of the samples substituted for other seafood posed a species-specific health risk to consumers, meaning that consumers could be eating fish that could make them sick.
- Eighty-two percent of the 200 grouper, perch and swordfish samples tested in Italy were mislabeled, and almost half of the substituted fish that were sold were species that are considered threatened with extinction by the International Union for Conservation of Nature (IUCN).
- In Brazil, 55 percent of "shark" samples tested were actually largetooth sawfish, a species considered by the IUCN to be critically endangered and for which trade is prohibited in Brazil.
- Ninety-eight percent of the 69 bluefin tuna dishes tested in Brussels restaurants were mislabeled.

those requirements would be in effect only from the boat or farm to the U.S. border. While a valuable first step, the rule as proposed would be inadequate.

Extension of traceability requirements inside the U.S. border could help prevent mislabeling and fraud that occurs within the U.S. supply chain, instances of which have been documented and compiled in a recent Oceana report. Of the 60 different misidentified types of seafood in that report, only 26 percent would be covered by the rule. Seventy-seven percent of the legal cases reviewed (since 2001), in which seafood was found or suspected to be mislabeled, involved fraud that occurred within the U.S. In other words, the rule as proposed ends traceability at the border and would do nothing to prevent those particular cases of seafood fraud within the United States.

The EU offers a lesson on whether more transparency, traceability and seafood labeling requirements can help reduce fraud. At the turn of this century, the EU began developing legal provisions aimed at tracing seafood and providing more consistent information to consumers. Following these early legal provisions, academic and government-sponsored seafood mislabeling investigations revealed weaknesses in the rules and their implementation and enforcement. These studies, which gained attention in the media, likely helped sway the public and policymakers to strengthen rules governing the EU seafood market. In 2008, the EU established measures for combating illegal fishing that included, among others, catch documentation requirements for all imported seafood in the EU market. These measures went into effect in January 2010. Additional provisions that went into effect in 2012 and 2014 require even more stringent traceability and labeling requirements to ensure that fisheries products can be traced back and checked throughout the supply chain.

While many factors influence seafood fraud rates, studies of seafood fraud that were done both before and after the stronger EU fisheries control, traceability and seafood labeling rules were implemented have indicated that, for the most part, where regulations have been in effect and enforced, rates of fraud have decreased.

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This in-depth examination into global seafood fraud shows that it is still a serious problem, hurting consumers' health and wallets, and threatening marine wildlife and ecosystems. However, traceability and accountability, where in place and enforced, appear to reduce rates of fraud in the EU. If the United States adopts comprehensive, full-chain traceability, it will be more difficult for bad actors to mislead consumers and exploit our oceans. It could also serve as a model elsewhere.

The Presidential Task Force on Combating IUU Fishing and Seafood Fraud is at a critical crossroads. As the proposed Seafood Import Monitoring Program rule is being finalized and beyond, there are key opportunities to ensure that all seafood sold in the U.S. is safe, legally caught and honestly labeled.

The President's Task Force should:

- Require key information to follow seafood through the full supply chain, from the boat or farm to the dinner plate. That information should include species-specific names, where and how a product was caught, or whether it was farmed.
- Expand traceability requirements to all seafood in the final rule or, at a minimum, commit to a timeline to do so.
- Extend traceability requirements through the entire seafood supply chain.
- Provide consumers with more information about the seafood they purchase and eat.

Introduction

The Food and Agriculture Organization of the United Nations (FAO) reported this year that global seafood trade and consumption are at all-time highs.[3] The FAO 2016 State of World Fisheries and Aquaculture report described the "tremendous potential" of our oceans and inland waters to provide nutritious meals for a global population expected to reach 9.7 billion by 2050. But with the majority of assessed fisheries around the world already either fully fished or overexploited, wild-caught seafood may not be able to reach that potential by 2050.

Seafood fraud, specifically species substitution or mislabeling, is an old and growing problem. It threatens consumer health and safety, cheats consumers when they pay higher prices for a mislabeled lower-value fish, and hides harmful practices like illegal fishing, poorly-regulated aquaculture and human rights abuses.

Following the release of Oceana's seafood fraud reports[4] and growing public attention to the issue, President Obama established the Task Force on Combating IUU Fishing and Seafood Fraud,[5] which released its final recommendations in March 2015.[6] While IUU fishing and seafood fraud are related but different problems, they share a similar solution: traceability. In 2016, the Task Force issued a proposed rule, creating the Seafood Import Monitoring Program that will implement some of its traceability recommendations.[7] The rule would require information to follow the product from the boat or farm to the U.S. border, including how and where a fish is caught or harvested, along with a species-specific name. These traceability requirements, however, would only apply to 13 types of seafood deemed "at-risk" of illegal fishing and seafood fraud.

The limited scope of the proposed rule leaves the door open for continued fraud and may even incentivize fraud and mislabeling of the species covered by the rule. In order to avoid additional scrutiny and documentation requirements, unscrupulous actors may decide to mislabel seafood products that are covered by the rule as seafood products that are not covered. Oceana, other NGOs, some fishermen and seafood industry members, chefs and concerned citizens have called for the traceability requirements in the proposed rule to extend to all seafood species, and also for the additional product information (such as a species-specific name, and how and where the seafood product was caught or farmed) to be available through the entire seafood supply chain—all the way to the end consumer.

Aquaculture has been playing a growing role in seafood fraud. Seafood consumers across the world may be eating several increasingly popular farmed fish without even realizing it. Asian catfish, or pangasius, a variety of catfish farmed largely in Southeast Asia, farmed Atlantic salmon and farmed tilapia are making their way onto dinner plates, but are frequently disguised as wild-caught, higher-value fish. Not only do these swaps cheat consumers, but many aquaculture facilities damage surrounding ecosystems, and use chemicals and antibiotics that can harm consumer health.[8]

The following pages contain an update to Oceana's 2014 global review of seafood fraud, nearly doubling the number of countries where fraud was investigated by including data from more than 100 additional studies.[9] To help capture the scope of seafood fraud, Oceana created an interactive map that illustrates the widespread and global nature of the problem.

With a supply chain that remains largely opaque and unaccountable, the seafood industry will continue to be susceptible to IUU fishing and fraud. However, the EU case study described in detail later in this report suggests that these problems can be addressed through the enforcement of comprehensive requirements for increased transparency and traceability.

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Global Review of Seafood Fraud

To identify the scope of seafood fraud, specifically mislabeling and species substitution, Oceana reviewed more than 200 published studies, including English language peer-reviewed journal articles, popular media sources, and public government and NGO documents (see Bibliography and Appendix for more detail). These data were analyzed to identify general trends in seafood fraud, including relationships to the presence or lack of regulation. Oceana also developed an interactive map to illustrate the global scale of seafood fraud.

This updated review covers 55 countries on every continent except Antarctica. The United States and Europe account for three-quarters of the studies and cases in this review, but seafood fraud has been investigated in a growing number of countries, including Egypt, India and China. While documented seafood fraud stretches back to 1915, the bulk of the studies have been conducted since 2005. One hundred and forty-one of those studies included quantitative data, totaling 25,700 samples of seafood analyzed for mislabeling.

The total number of samples analyzed in each study reviewed ranged from three to 4,652, but most of the studies analyzed fewer than 100 samples. While the average mislabeling rate worldwide is 34 percent, the rate normalized to sample size is 19 percent. This means that the average was weighted by sample size, so studies with a greater number of samples were given a higher weight. Nearly one in every five samples tested worldwide, on average, was found to be mislabeled. In the U.S., studies released since 2014 found an average weighted fraud rate of 28 percent.

> “These issues are especially problematic when the ambiguity or mislabeling is intentional and laws are deliberately broken. And indeed, laws are being broken on a global scale.

Fraud was found at every level of the seafood supply chain, though the majority of the studies (80 percent) were conducted at the retail level, such as restaurants or grocery stores. The remainder of the studies included samples from the wholesale and distributor level, the import level, or at a number of points in the supply chain. Less than 3 percent involved cases or studies at the point of landing and/or packaging and processing, and just three studies focused on online seafood markets, an emerging sector of the seafood supply chain where labeling rules are still vague.

The most frequent types of seafood investigated for mislabeling varies across the globe. Snapper, grouper and salmon were the most studied in the United States; cod, hake and sole in Europe; and cod, shellfish and snapper were the most studied elsewhere (Appendix Tables 1-3). The most common seafood substitutes identified across multiple studies globally are Asian catfish, hake and escolar, or oilfish (Appendix Table 4).

Seafood fraud was identified in all 200 plus studies reviewed except one. The exception, one small study in Tasmania, found no explicit fraud but did highlight unclear seafood labeling practices.[10] For instance, hake was sold as “smoked cod,” which although misleading, is permissible under Australia’s seafood labeling rules.

The Tasmania study resembles others in countries where lax labeling rules may not lead to fraud per se, but probably result in consumers thinking they are getting one seafood product when it is actually another. Cases like these were not included in Oceana’s map or analysis, but evidence indicates that seafood consumers are often misled even if it does not violate local or regional seafood labeling rules. For example, a study in western India found restaurants selling “crab,” which was actually cheaper varieties mixed in with more expensive ones.[11] At the same time, the EU allows each member state (or country) to adopt its own commercial market names for seafood.[12] In France, “colin” is the single market name for six different species, including hake (*Merluccius spp*), saithe (*Pollachius virens*), European pollock (*Pollachius pollachius*), marbled rockcod (*Notothenia rossii*), Alaska pollock (*Theragra chalcogramma*) and even Patagonian toothfish (*Dissostichus eleginoides*).[13]

Other studies identified vague market names that include a number of species, some of which may have different prices, conservation statuses or health risks. A study in Greece found that hake, cod, haddock and whiting were all labeled “bakaliaros,” despite some species posing higher allergy risks than others.[14] Sixty-six different species are allowed to be sold as “grouper” in the U.S., making it nearly impossible for consumers to know which actual fish they are buying and undermining their ability to make seafood choices based on sustainability or other reasons.[15] Though laws were not broken in these cases, vague labeling rules potentially cheat consumers, harm their health, or make them unwitting accessories to fishing or aquaculture practices that are illegal or harm the environment.[16] These issues are especially problematic when the ambiguity or mislabeling is intentional and laws are deliberately broken. And indeed, laws are being broken on a global scale.

Seafood fraud was investigated in 55 countries on every continent except for Antarctica.

Interactive map: oceana.org/seafoodfraudmap


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Highlights

This review not only demonstrates the global scope of seafood fraud, but also brings up a number of serious concerns that illustrate the need for prompt and decisive action to combat these illegal activities. The examples below represent just a sampling of many ongoing practices that threaten consumer health, hurt consumers' wallets, cheat honest fishermen and seafood businesses, and contribute to the depletion of ocean resources.

Health

More than half (58 percent) of the samples identified as substitute species in this analysis carried a species-specific health risk to consumers, meaning these risks could not be adequately screened or mitigated due to the mislabeling.[17] These health risks include parasites, environmental chemicals and aquaculture drugs, and other natural toxins, including those described below:[18]

- **Histamine or scombrotoxin poisoning**, produced in the decomposition of certain tuna-related species, which can cause tingling or burning of the mouth or throat, rash or hives, low blood pressure, itching, headache, dizziness, nausea, vomiting, diarrhea, fluttery heartbeat and trouble breathing;
- **Ciguatera**, a natural toxin in certain reef fish from affected waters, which can cause long-term debilitating neurological symptoms, including temperature reversal (not being able to distinguish between hot and cold) and painful tingling;
- **Tetrodotoxin**, a toxin found in certain pufferfish species, which can cause symptoms ranging from numbness and tingling to paralysis and death; and
- **Gempylotoxin**, a natural toxin found in escolar and oilfish, which can cause oily bowel discharge, nausea, vomiting and stomach cramps.

One commonly mislabeled fish with a species-specific health risk is escolar. Escolar and its close cousin oilfish are species that contain naturally occurring gempylotoxin and have been associated with outbreaks of severe gastrointestinal problems. Oceana's seafood fraud investigations revealed more than 50 cases of escolar being sold as "white tuna" in sushi restaurants in the U.S., while a study in South Africa found oilfish being substituted for swordfish and steenbras.[19] A number of outbreaks of gastrointestinal symptoms were reported in two Australian states after customers ate what they thought was “rudderfish,” but what was likely actually escolar.[20] Escolar sold as “butterfish” also led to outbreaks in Spain and Australia, as did oilfish sold as cod or seabass in Hong Kong and Canada.[21]

Pufferfish have been found substituted for squid in Italy, cod in China, filefish in Taiwan, and monkfish in Chicago.[22] Many species of pufferfish can harbor the natural toxins tetrodotoxin and saxitoxin, which can be deadly at the right dose. The Chicago case sickened the couple who purchased the mislabeled fish and sent the woman to the hospital with numbness, tingling and chest pain. She required weeks of rehabilitative care.[23]

Case Study: Asian Catfish

Imposter Syndrome: What You Thought You Bought When You Were Served Pangasius

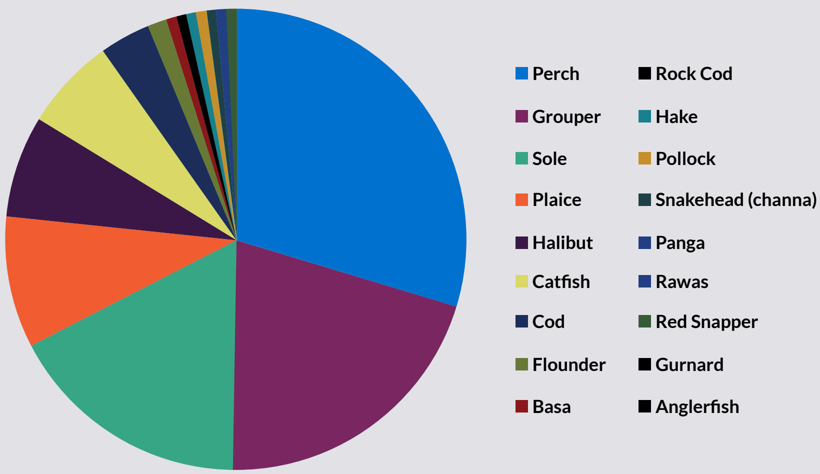

Figure 1. In 141 instances, pangasius was swapped for 18 different types of fish around the world, but mostly for perch, grouper and sole (See Appendix Table A4 for citations).

Asian Catfish Counterfeits Expanding Around the Globe

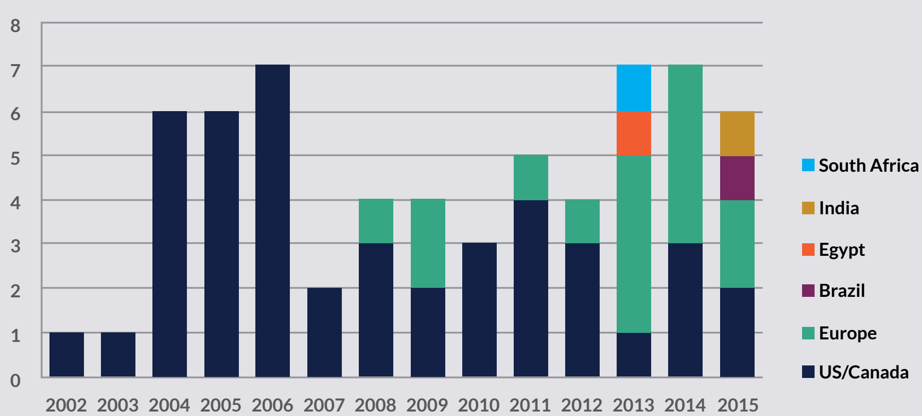

Figure 2. Timelines of pangasius substitution around the world using the number of studies, cases or reports finding pangasius fraud. Fraud involving pangasius substitutes appeared as early as 2002 in the U.S. Since then, the substitution of pangasius for more valuable products has increased.

Wallets

The global seafood trade is substantial. Millions of tons of seafood are caught or harvested, processed, packaged, shipped and sold every year, valuing $148 billion in 2014.[24] It is uncertain what the cost of seafood fraud is to this global value, but it is no doubt substantial. The estimated value of annual losses due to illegal fishing worldwide is between $10 billion and $23.5 billion.[25] Regardless of the exact annual value of seafood fraud and IUU fishing, there are plenty of economic incentives and opportunities for deception in the opaque global seafood market. This hurts consumers as well as honest fishermen and businesses.

Across the world, our review reveals that seafood mislabeling appears to be motivated primarily by economic gain through intentionally misleading buyers at every level of the seafood supply chain. About 65 percent of the studies reviewed include clear evidence of economically motivated adulteration of seafood products. In case after case, cheaper or less desirable fish were mislabeled as more expensive varieties.

Pangasius, the most commonly substituted fish worldwide, is frequently disguised as wild, higher-value fish. In total, pangasius has stood in for 18 types of fish worldwide (Figure 1). Investigative journalists first publically uncovered pangasius as a substitute for wild-caught fish in the U.S. in 2006,[26] but fraud involving pangasius substitutes appeared as early as 2002 in the U.S.[27] Since then, the substitution of pangasius for more valuable products has increased. The next earliest cases of pangasius substitution were in Canada and Europe in 2008,[28] followed by Egypt[29] and South Africa in 2013-2014,[30] Brazil in 2015,[31] and India in a 2016 study[32] (Figure 2). Although Europe now accounts for most of the cases of pangasius substitutions in our global analysis, the most recent large, pan-European study found pangasius replacing only 3 percent of the 3,900 samples.[33]


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Mislabeling is by no means restricted to pangasius. Consumers across the world are being cheated in cases involving a wide variety of seafood, as illustrated in the examples below:

- A 2015 German study found about half of the samples sold as "sole" to be lower-value fish upon testing.[34]
- In the United Kingdom, a consumer watchdog group discovered a number of cases in which haddock were being sold as more expensive cod, and whiting were being sold as more expensive haddock.[35]
- Lower-value South African hake was revealed to have been sold as higher-value European hake in Spain in a 2014 study.[36]
- In 2015, European researchers found that 14 percent of the products they tested labeled as European anchovies were replaced with lower-value fish.[37]
- A student project at a university in Chicago identified 16 mislabeled samples out of 52, mostly cheaper fish misrepresented as more expensive ones.[38]
- Due to its high price and the difficulty in identifying its source, caviar is especially susceptible to fraud. Of 27 caviar samples tested from a variety of vendors around the Black Sea and the Danube River, 10 were identified as something other than what the label claimed. Three of the "caviar" samples tested contained no animal DNA at all. It is unknown what exactly these counterfeit caviar samples were made of.[39]

Fraud occurs throughout the seafood supply chain, not just at restaurants and supermarkets. One case reported in Oceana's 2013 "Seafood Sticker Shock" report described the prosecution of a U.S. seafood processor for the mislabeling of 160,000 pounds of coho salmon as the more expensive Chinook, a value of $1.3 million.[40] An investigation underway in New England alleges that the owner of multiple fishing vessels and seafood processing facilities was able to hide roughly $154 million in illegally caught and mislabeled seafood in a decades-long scheme.[41]

Conservation

The oceans are in trouble. Overfishing, destruction of essential habitat (due to damaging bottom trawls), and bycatch (the killing of non-target species) have all led to severely depleted fish stocks, and more and more marine animals are ending up on a growing list of species threatened with extinction.

To help certain species recover and to prevent their local or total extinction, some governments have put protections in place that limit the amount of those species fishers can catch or prohibit the killing of especially vulnerable species.[42] But some unscrupulous poachers flout these rules and then mislabel their catch to hide their illegal practices.

The studies compiled here bear troubling statistics. Sixteen percent of the species identified as substitutes are considered to have some level of elevated conservation risk (either threatened or close to becoming threatened with extinction in the near future) by the IUCN.[43] Most of those (nearly 12 percent of all the species substituted) are considered critically endangered, endangered or vulnerable. More than half of the species identified as substitutes were species that are categorized as "data deficient" or "not evaluated" by the IUCN, meaning it is not known whether or not these species have healthy populations.[44]

It is very important to have accurate seafood labels. Seafood buyers already have difficulty differentiating the responsibly caught snapper since species-specific names are often not offered, and even more concerning is the threat to at-risk species when they are caught and then sold as a more abundant variety. Oceana's past investigations found that 87 percent of snapper sampled nationwide were mislabeled.[45] In fact, 33 different species of fish were found to be substituted for the snapper sold. The majority of species sold under the name of "snapper" in the U.S.[46] have not had the population status of their stocks evaluated, so it is unclear whether most snapper species are actually sustainably fished or in jeopardy. Of the minority of the snapper species that have been assessed, 20 percent face a high risk of extinction in the wild.[47]

The FDA also allows 66 different species of fish to be sold under the acceptable market name "grouper."[48] In contrast to the snappers, most of the species marketed under the name grouper in the U.S. have been evaluated by the IUCN for their risk of extinction. Roughly 36 percent are at risk, and 3 percent of those are critically endangered.[49] Oceana's DNA tests identified a lower fraud rate of grouper compared to snapper (26 percent), but the types of fish being misrepresented were much more disconcerting. For example, gulf grouper, an IUCN endangered species, and speckled hind, an IUCN critically endangered species, were both misrepresented and sold as more sustainably managed fish.[50]

Researchers in Italy found that 82 percent of the 200 grouper, perch and swordfish samples they tested were mislabeled, and almost half of those mislabeled species are considered threatened with extinction by the IUCN.[51] Similarly, researchers in Brazil found 55 percent of "shark" samples tested were actually the IUCN critically endangered largetooth sawfish, a trade-prohibited species in Brazil.[52]

In Brazil, pink river dolphins and caimans (a large reptile) are coming under threat because they are illegally killed for use as bait for an unpopular catfish (*Calophysus macropterus*), known as "water vultures" by locals. Despite its undesirability, researchers noticed that landing data reflected an active fishery. At the same time, researchers noted that a "new" fish named "douradinha" started appearing in Brazilian markets, even though there was no known species identified by this name. Suspicious, researchers collected samples of douradinha, as well as other dubiously labeled market samples of "douradinho," "piratinga" and "dourado." It turned out that 60 percent of these fish were actually the undesirable "vulture" catfish. Because of its low price, public schools, hospitals, penitentiaries and the army may be major markets for this fish, which is alarming as it has been found to contain high levels of mercury.[53]

In China, sablefish is a popular product. A large majority of products marketed as sablefish in online Chinese seafood shops were found to actually be Antarctic or Patagonian toothfish. Both of these long-lived toothfish species are commercially valuable worldwide and have catch limits enforced via international conventions.[54] For these reasons, toothfish are targeted by IUU fishermen, who then market the catch as sablefish to allow them to hide their misconduct.[55]

In some cases, when a cheaper, more abundant fish is mislabeled as a more expensive, less-abundant fish, it can give consumers a perception that the stocks are healthier than they actually are. A 2014 study in Spain found that the more abundant ling were being mislabeled as the highly overfished cod.[56] Two other studies since then have found similar ling-for-cod substitutions.[57] In Brussels, bluefin tuna, a strictly managed fishery with a quota capped under a 20-year recovery plan, nevertheless appears on menus year-round. Of the 69 bluefin tuna dishes tested in Brussels restaurants, 98 percent were actually another species.[58] The appearance of these struggling species on menus could make it harder to argue for increased protections for cod and bluefin tuna when consumers think that the populations are healthy and abundant.

Consumption of anglerfish has increased in the European Union over the last few decades. To protect the species, the European Union set Total Allowable Catches (or TACs) that limit the number that can be fished each year. IUU fishing, as well as mislabeling at landing, makes enforcing these TACs difficult. In a 2008 study, 16 out of the 40 samples of anglerfish purchased in Spanish markets were mislabeled.[59] A similar mislabeling rate among frozen anglerfish products was found in Italy in 2012.[60]

> "
> Overfishing, destruction of essential habitat and bycatch have all led to severely depleted fish stocks, and more and more marine animals are ending up on a growing list of species threatened with extinction.

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Even marine mammals get mislabeled to hide their identity, avoiding laws prohibiting their sale. In an especially egregious example, according to a government report, a Santa Monica, California restaurant and two sushi chefs were charged for selling whale meat, including endangered sei whale meat.[61] The restaurant, which has since closed, had labeled the whale as fatty tuna to hide its true identity when it was shipped to the restaurant and then sold to diners as whale sushi.

The European Union: A Promising Case Study

The European Union has enacted some of the world's earliest and strongest legal provisions to stop IUU fishing. In 2000, the EU began developing legal provisions aimed at tracing seafood and providing more consistent information to consumers,[62] and then strengthened the IUU provisions in 2008.[63] Since coming into force in 2010, these increased IUU provisions include a catch certification scheme for all imported and exported seafood, a third-country carding process that imposes import restrictions on countries that are not actively addressing IUU fishing, and penalties for EU nationals who engage in or support illegal fishing around the world. Additional EU regulations that went into effect in 2012 and 2014 require tracing of all seafood from catch or harvest to the retail level (i.e. grocers and restaurants).[64] Requirements expanding consumer information required on seafood products began in 2001 and have since been strengthened in the 2012 and 2014 provisions. [65]

The mandatory information now available to EU consumers about most of their seafood includes:

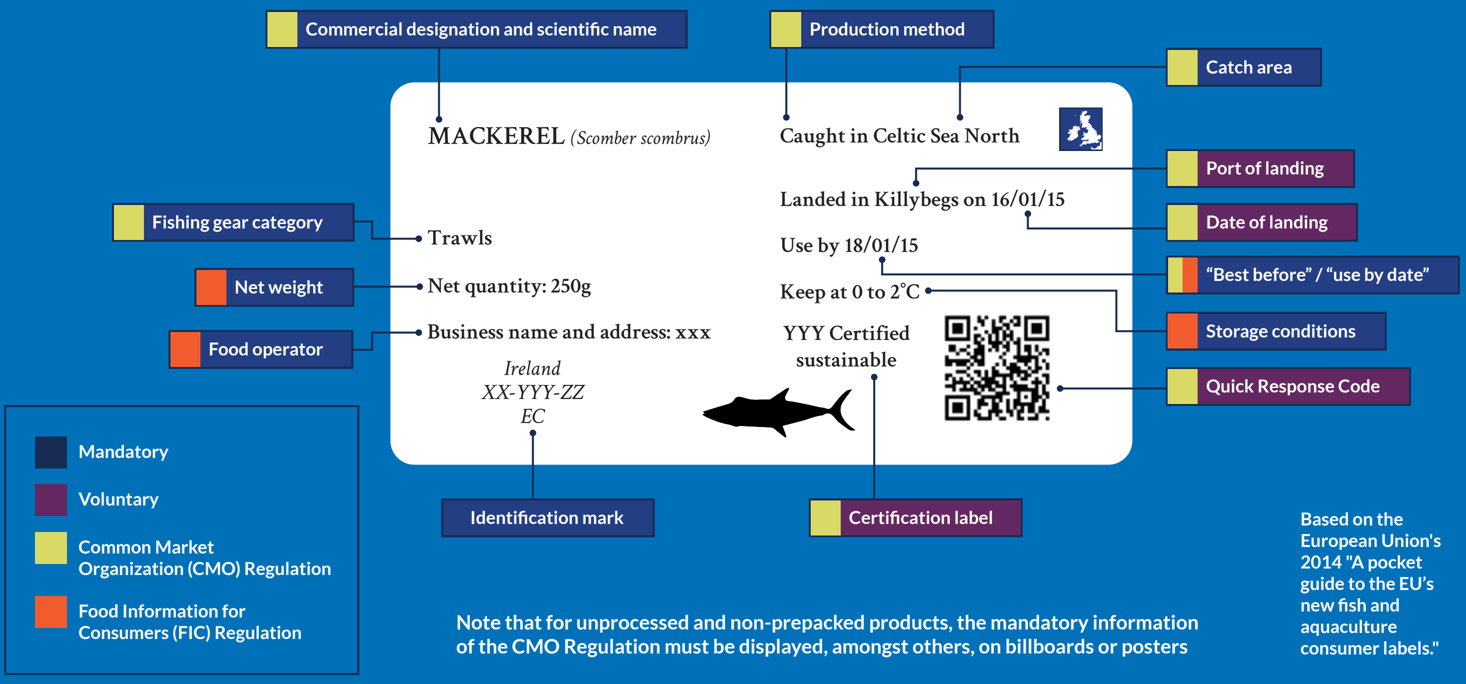
- the commercial and scientific names of the product;
- the production method: wild-caught (at sea or in freshwater) or farmed;
- the catch or production area where the fish was caught or farmed;
- the fishing gear used;
- whether the product is fresh, frozen or had been previously frozen;
- the "best before" and "use by" date; and
- information about allergens.[66]

While these provisions have increased fisheries control and the transparency of seafood information, certain weaknesses in the scope, implementation and information available to consumers remain.[67] For example, certain seafood products are exempt from the provisions: most processed or prepared food (i.e., cooked, steamed, breaded, fried or marinated) like caviar, several types of aquatic invertebrates (like jellyfish, sea urchins and sea cucumbers), and canned seafood. Also excluded from the rules are entire sectors of the seafood supply chain, such as restaurants (both dine-in and take away), canteens, hospitals, schools or catering enterprises, where higher mislabeling rates have been observed, yet are poorly studied.[68]

Are the rules working?

The EU's increased transparency and traceability in the supply chain, along with its measures to combat IUU fishing, offer an opportunity to observe whether these efforts are having a measurable effect on seafood fraud levels. Oceana examined the data on seafood mislabeling in the EU to see if any changes in the level of fraud could be detected over time. The quantitative analysis used in this review includes 70 studies looking at fraud and mislabeling in

Example of label for an unprocessed and prepacked fresh product



Note that for unprocessed and non-prepacked products, the mandatory information of the CMO Regulation must be displayed, amongst others, on billboards or posters

Based on the European Union's 2014 "A pocket guide to the EU's new fish and aquaculture consumer labels."

Since 2001, mandatory requirements for consumer information on seafood products in the EU have been expanded. Information now available to EU consumers about most of their seafood includes: the commercial/scientific names of the product, the production method, the area where the fish was caught or farmed, the fishing gear used, whether the product is fresh, frozen or had been previously frozen, the "best before" and "use by" date, and information about allergens.

the EU, with publishing dates ranging from 2004-2016. Every EU country (or member state) except Cyprus has been sampled at least once, while the largest number of studies have been done in Spain (27), Italy (24) and the United Kingdom (16).

A total of 11,893 seafood samples have been analyzed for mislabeling in the EU. Of those, 1,708 were identified as mislabeled. One hundred and fifty-one unique species (and 28 more identified to the genus/family level) were found substituted for roughly 56 broad types of seafood sold. The most frequently studied types of seafood, by far, have been cod and hake, followed by sole, tuna and grouper. Mislabeling rates ranged from a low 0.5 percent in a survey of 218 products certified by the Marine Stewardship Council in 11 EU countries, to 89 percent in a study of 70 jellyfish products sold in Asian and Bangladeshi markets in Italy.[69] The average EU mislabeling rate in studies published over the past 12 years was 28 percent, while the average, normalized (or weighted) to sample size was 14 percent.

Oceana determined the average mislabeling rate of all the EU studies in each estimated year of sample collection, weighted by total samples analyzed in that year, and plotted results over time to see if any trends emerged.[70] This analysis showed a marked decrease in mislabeling rates since 2011 (See Appendix Figure 1a). Because there was no apparent trend in fraud rates before 2011, Oceana next grouped the data to time periods before and after 2011, and what emerged was a clearer apparent decrease in the rate of seafood mislabeling over time—one that appears to coincide with the enactment of stronger anti-IUU measures, seafood traceability rules and mandated consumer information (Figure 3).

Contributing to this trend, as well as providing the political will to enact reforms, were the large number of mislabeling studies that occurred since 2010 (Appendix Figure 1c), increased media attention and consumer awareness of the issue,[71] EU funded research on the problem, and increased monitoring and enforcement.[72]

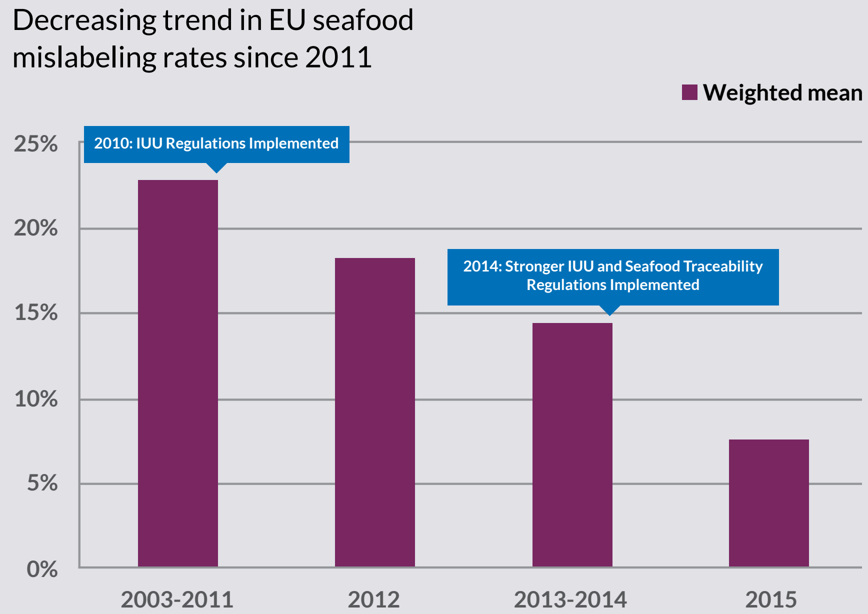


Figure 3. The average seafood mislabeling rates, weighted to sample size of all the combined studies in each time period. Since regulations were implemented in 2010, and then strengthened in 2014, rates of mislabeling appear to be declining. See Appendix for details on methods and studies used in this analysis.

The trend is promising, and though the limitations of the data prevent any definitive conclusion, this preliminary analysis indicates that the implementation of the EU traceability, increased fisheries control and mandatory seafood labeling provisions appears to be associated with declining rates of mislabeling. This inference is strengthened by the larger number of samples collected since 2011 from multiple studies covering nearly every country in the EU and by the lack of any apparent trend prior to 2012 (See Appendix Figure 1a).

While many of the studies undertaken since 2012[73] are consistent with this trend of lower mislabeling rates, other studies (17) revealed mislabeling rates of 15 percent or higher.[74] However, more than half of those were looking at products (e.g., jellyfish)[75] or sectors not covered by the EU legal provisions (e.g., processed products[76] and restaurants),[77] contained a mix of products (some covered by regulations, some not),[78] or were from ethnic shops with possible language barriers.[79] Also, some of the post-2012 studies that found rates of mislabeling above 15 percent did not state the date of sample collection,[80] so it is not clear if that fraud occurred before or after the regulations went into effect.

But some studies did not show markedly lower mislabeling rates, even in places and for products that should have been covered by the EU provisions,[81] showing that there is clearly room for improvement in the implementation, enforcement and strengthening of current legal provisions and the need for continued vigilance.

The apparent overall decreasing trend in seafood mislabeling in the EU observed since 2011 is encouraging. That the trend holds, even when including the results of studies not following the trend or that covered seafood products and sectors excluded by legal provisions, suggests that this trend could be attributed to the implementation of the EU's IUU regulations, traceability, labeling and other provisions (Figure 3). Furthermore, no such trend is evident in the U.S., another well-studied region with no requirements for transparency or traceability and comparatively less information available to consumers (weighted fraud average in U.S. since 2014 is 28 percent). A comparison of fraud rates in the EU and the U.S. strongly suggests that the EU legal provisions are contributing to a reduction in seafood mislabeling.

Conclusions and Recommendations

To date, this review and accompanying map comprise the most comprehensive collection of evidence of global seafood fraud and mislabeling. Mislabeling has been identified at every level of the seafood supply chain, and it is wide-reaching, appearing in nearly every country where mislabeling has been studied.

Seafood fraud affects consumer health when fish associated with health risks are mislabeled. This can expose consumers to toxins, mercury or even antibiotics and other chemicals used in aquaculture. Without honest seafood labeling, consumers cannot be confident in the health and safety of the seafood they choose. Unless we improve accountability and traceability, as well as the confusing and ineffective rules surrounding naming seafood on a global level, consumer health will remain at risk.

Traceability throughout the entire seafood supply chain—from boat or farm to plate—would help reduce the level of fraud and the financial harm that results, while also providing consumers with more information about their seafood products. This increased transparency can only instill greater consumer confidence that the seafood they are paying for is indeed what they are getting. Because mislabeling may be used to hide illegal fishing, it is doubly important to improve transparency and accountability, not just for economic reasons—annual losses due to illegal fishing worldwide are estimated to be between $10 billion and $23.5 billion annually[82]—but also to reduce the severe stress on fish populations and marine ecosystems.

> “Traceability throughout the entire seafood supply chain—from boat or farm to plate—would help reduce the level of fraud and the financial harm that results, while also providing consumers with more information about their seafood products.

The EU case study is promising. After the implementation of legal provisions aimed at preventing illegal fishing and improving transparency and accountability in the seafood supply chain, seafood fraud rates have seemingly begun to decrease since 2011, primarily in those EU countries where the rules are enforced, and for those products covered by the legal provisions. The preliminary data out of the EU suggest that catch documentation, traceability and consumer labeling is feasible and effective at combating seafood fraud.

The United States is poised to implement its own measures to fight IUU fishing and seafood fraud. If the U.S. adopts requirements similar to or stronger than those in the EU, it would mean that for the first time, the world's two largest seafood importers[83] could wield meaningful standards ensuring the legality, safety and honest labeling of seafood, the effects of which would be felt throughout the global seafood supply chain.

The future health of our oceans is bound inextricably to responsible stewardship. Governments across the world must insist upon well-managed fishing practices that will leave marine ecosystems healthy and productive for future generations. One way such practices can be assured is through a transparent and accountable seafood supply chain. Governments should require information about seafood—including which species it is, and how and where a fish is caught or harvested—to follow a product from the farm or the boat, all the way to the end consumer. Full-chain traceability is the only way to ensure that all seafood is safe, legally caught and honestly labeled.

The implications of the decisions made by the Presidential Task Force on Combating IUU Fishing and Seafood Fraud cannot be understated. A tepid response to the problem of seafood fraud will not suffice. If the final rule fails to include a timeline for expanding traceability requirements to all species and only traces seafood to the U.S. border, seafood fraud will continue to harm businesses, consumers and the oceans.

The Presidential Task Force on Combating IUU Fishing and Seafood Fraud is at a critical crossroads. As the proposed Seafood Import Monitoring Program rule is being finalized and beyond, there are key opportunities to ensure that all seafood sold in the U.S. is safe, legally caught and honestly labeled.

The President's Task Force should:

- Require key information to follow seafood through the full supply chain, from the boat or farm to the dinner plate. That information should include species-specific names, where and how a product was caught, or whether it was farmed.
- Expand traceability requirements to all seafood in the final rule or, at a minimum, commit to a timeline to do so.
- Extend traceability requirements through the entire seafood supply chain.
- Provide consumers with more information about the seafood they purchase and eat.

Building the Global Map

To demonstrate the scope of seafood fraud, specifically mislabeling and species substitution, Oceana reviewed the published literature, including peer-reviewed and popular literature as well as public government and NGO documents (see Appendix on how sources were found). Oceana used this literature to compile an interactive seafood fraud map as well as to gather information on general trends presented in this document. The locations of the icons on the map are based on the general geographic location where the study was conducted, to the level of specificity possible or practical. For example, the 14 metropolitan areas included in Oceana's national report are mapped, but not the surrounding seven states sampled in the study. For studies that did not provide specific sampling locations and only provided the country, icons were placed on the capital city or seat of government for that country. Note that icons on the map do not represent actual retail or sampling locations. The map layers are divided into four levels of mislabeling rates, the Oceana studies and "instances" of fraud. The latter includes other observations of fraud, such as news reports, court cases and disease outbreaks due to seafood mislabeling.

To access the Appendix and map, please visit oceana.org/DeceptiveDishes.

Endnotes

1 Figure obtained from Table S15 in Costello, C., Ovando, D., Clavelle, T., Strauss, C. K., Hilborn, R., Melnychuk, M. C., . . . Leland, A. (2016) Global fishery prospects under contrasting management regimes. Proceedings of the National Academy of Sciences, 113(18), 5125-5129. doi: 10.1073/pnas.1520420113; Since their calculations only account for 78% of global catches, Oceana scaled their number up to arrive at 90.5 million metric tons per year. This assumes that all fish is consumed as food (and not used in fishmeal/fish oil). Oceana then estimated a 30% processing loss and uses a serving size of 6 oz. to determine the number of meals per day.

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