U.S. SEAFOOD TRACEABILITY AS FOOD LAW AND THE FUTURE OF MARINE FISHERIES

BY
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While the global seafood business is valued at approximately $148 billion, many commercial fishing stocks are struggling to recover. Large seafood-importing States such as the United States should avoid fish that have been illegally captured or that are harvested using poor environmental practices, such as not reporting discards associated with the harvest. Traceability is a critical component of food law: to inform consumers not just of the origin of the food but also of the transit of a food through a complex supply chain. The United States has recently adopted a new rule on traceability designed to combat illegal fishing imports. As this Article suggests, the federal rule, as drafted, will be unlikely to change much in industry practice without additional targeted investments in traceability, including better implementation of wildlife crime whistleblower statutes, a more comprehensive set of environmental reporting standards for seafood sold in the United States or transiting through the United States, and additional support for the industry to better manage fishery-related processing waste.

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"In 1994, seafood may have peaked. According to an analysis of 64 large marine ecosystems, which provide 83 percent of the world's seafood catch, global fishing yields have declined by 10.6 million metric tons since that year. And if that trend is not reversed, total collapse of all world fisheries should hit around 2048."[1]

I. OVERVIEW

Is there a future for abundant marine fish? Or are we past peak wild seafood? This Article explores the nexus between food law and marine fisheries production to conclude that as oceans empty, greater investments will be needed to ensure compliance with the rule of law and to restore marine fisheries to cope with rapid environmental change. At least some of the needed investments will be in the form of legal interventions, including implementation of verifiable traceability practices within the global fish trade. This Article will focus on recent regulatory programs designed to promote traceability within the United States, the largest national fish import market in the world.[2]

As consumers—including corporate consumers—strive to improve their sustainability profiles, traceability is becoming increasingly important. In fact, according to a 3,000 person poll conducted in 2012, almost 80% of American consumers who regularly eat fish indicated that the use of sustainable catch methods to harvest fish is "important" or "very important."[3] Approximately half of the polled individuals were willing to pay

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1 David Biello, *Overfishing Could Take Seafood Off the Menu by 2048*, SCI. AM. (Nov. 2, 2006), https://perma.cc/8KRM-6XH7 (reporting on a paper released by 14 ecologists and economists on global trends in fishing).

2 FOOD & AGRIC. ORG. OF THE U.N., THE STATE OF WORLD FISHERIES AND AQUACULTURE: 2016, at 53 tbl.15 (2016), https://perma.cc/B8X5-ARND (reporting that the United States imported $20,317,000 of seafood in 2014, which accounts for about one-quarter of the imports from the top-ten fish-importing States).

3 Eliza Barclay, *Most Americans Eager to Buy Seafood That's 'Sustainable,'* NAT'L PUB. RADIO (Feb. 12, 2013), https://perma.cc/YKD5-GXWW (reporting on a poll conducted by Truven Health Analytics on behalf on National Public Radio in August 2012).

more for sustainable fish.[4] Large consumer multinationals such as Walmart are trying to meet this market demand by reconfiguring their supply chain through improved traceability.[5] While some of the early increase in demand driven by large buyers has strained the ability to deliver reliable and credible levels of sustainability,[6] consumers' desire to know the origins and journey of seafood—from hook or net to plate—is an emerging norm for a majority of American fish consumers.[7]

The traceability of fish back to sustainable fisheries, for Global North consumers who have options about what they eat, has consequences for fishing families that may not be benefiting from the global boom in seafood. Today, fish remain a critical part of the daily diet for many coastal communities, particularly in Global South States,[8] by providing basic, high-quality protein and key amino acids for people with no other access to this type of nutrition.[9] The Food and Agriculture Organization of the United Nations (FAO) estimates that around 3.1 billion people depend on seafood for at least 20% of their protein needs.[10] The number of people relying on

4 *Id.* (finding 24% of the polled individual would pay 10% more, 22% would pay 10%–20% percent more, and 3% would pay over 20% more).

5 *Walmart Policies and Guidelines: Seafood Policy*, WALMART (Feb. 17, 2017), https://perma.cc/72EQ-DFD7 ("[Walmart's] goal is to build transparency and continuous improvement in the seafood supply chain . . . [by] working with [their] suppliers and partners to track the management of fisheries from which [their] suppliers source so that [Walmart] can promote a sustainable supply. . . . By 2025, based on price, availability, quality, customer demand, and unique regulatory environments . . . Walmart . . . will require all fresh and frozen, farmed and wild seafood suppliers to source from fisheries who are: Third-party certified as sustainable using Marine Stewardship Council [standards] . . . or . . . certified by a program which follows the FAO Guidelines and is recognized by the Global Sustainable Seafood Initiative (GSSI) as such . . . or . . . actively working toward certification or in a Fishery Improvement Project . . . that has definitive and ambitious goals, measurable metrics, and time bound milestones." (citation omitted)).

6 Critics of sustainability certification argue that certifiers are ignoring ecosystem-based impacts of fisheries. For example, in a Marine Stewardship Council certified swordfish fishery, some boats catch more sharks than swordfish—leading to unsustainable levels of bycatch for ecologically important shark species. *See* Brian Palmer, *Is the Demand for Sustainable Seafood Unsustainable?*, PAC. STANDARD (May 7, 2015), https://perma.cc/RRF4-BREX.

7 *See* Barclay, *supra* note 3.

8 Anastasia Telesetsky, *The Global North, the Global South, and the Challenges of Ensuring Due Diligence for Sustainable Fishing Governance*, 26 TRANSNAT'L L. & CONTEMP. PROBS. 435, 438 (2017); *Many of the World's Poorest People Depend on Fish*, FOOD & AGRIC. ORG. U.N (June 7, 2005), https://perma.cc/L5JH-HC6F (noting that 97% of the world's fishers are in developing countries).

9 Fish contain "long-chain omega-3 fatty acids including eicosapentaenoicacid (EPA) and docosahexaenoic acid (DHA)." Jogeir Toppe, *The Nutritional Benefits of Fish Are Unique*, FOOD & AGRIC. ORG. U.N., https://perma.cc/HTL4-79CY (last visited July 22, 2017). DHA is essential for brain and neurological development among children. *Id.* While there are other sources of omega-3 fatty acids in, for example, vegetable oils, these acids need to be converted in a process that is inefficient and may not result in sufficient intake for necessary brain development. *Id.* Furthermore, recent studies have shown that consuming omega-3 supplements does not have the same benefits as consuming fish. *Id.*

10 THE STATE OF WORLD FISHERIES AND AQUACULTURE: 2016, *supra* note 2, at 4.

fisheries products may increase in the years to come,[11] as population numbers increase and other sources of protein such as livestock become increasingly unreliable due to desertification.[12]

Without traceability, there is little hope for disrupting current industrial practices, where marine fishing resources across the globe are increasingly exploited at unsustainable levels of fishing effort or where marine habitat is being destroyed by land-based human acts and omissions. Once abundant fishing grounds are in jeopardy due to the overcapacity of fleets.[13] Commercial marine fisheries that are tracked by FAO are generally declining.[14] Excess nutrients from the land have additionally turned "near-shore ecosystems into marine graveyards."[15] Eutrophication caused by excess nutrients contributes to harmful algal blooms (HABs), leading to the deterioration of aquatic ecosystems and, in some cases, food poisoning from toxin-producing phytoplankton.[16] The rapid loss of key habitats—e.g., coral reefs due to both inadequate coastal zoning protection and warming oceans[17]—is impacting breeding areas for fish and shellfish.[18] Sustainable

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11 If that past is any indicator, between 2012 and 2016, the number of people relying on seafood for 20% of their protein needs increased by 100 million. *Compare id.*, *with* FOOD & AGRIC. ORG. OF THE U.N., THE STATE OF WORLD FISHERIES AND AQUACULTURE: 2012, at 5 (2012), https://perma.cc/HV7P-BTMQ.

12 *See* Laura Pereira, *Climate Change Impacts on Agriculture Across Africa*, OXFORD RES. ENCYCLOPEDIA ENVTL. SCI., Mar. 2017, at 19–20; B. Rischkowsky et al., *Management Practices for Adapting Sheep Production Systems in the WANA Region to Climate Change*, *in* LIVESTOCK AND GLOBAL CLIMATE CHANGE 107, 107 (P. Rowlinson et al. eds., 2008).

13 DON HINRICHSEN, THE ATLAS OF COASTS & OCEANS: ECOSYSTEMS, THREATENED RESOURCES, MARINE CONSERVATION 50–51 (2011).

14 THE STATE OF WORLD FISHERIES AND AQUACULTURE: 2016, *supra* note 2, at 38. On the basis of assessed commercial stocks, FAO calculates that fish being harvested within biologically sustainable parameters have declined from 90% of the fish stocks being sustainably fished in 1974 to 68.6% of the fish being fished sustainably in 2013. *Id.* As of 2013, 31.4% of assessed commercial stocks are overfished. *Id.* Most of the ten most productive commercial species—including important food fish such as the Southeast Pacific anchoveta, Alaska pollock, and Atlantic herring—are fully fished and cannot sustain any additional production pressures. *Id.*

15 HINRICHSEN, *supra* note 13, at 36–37 ("Most of these dead zones are found in the waters of developed countries, and many of them in prime fishing grounds.").

16 *Id.* at 40–41 (noting that in Asia, China observed 84 HABs between 1990 and 2004, Japan observed 150 HABs between 1998 and 2002, and South Korea observed 304 HABs between 1999 and 2003).

17 *See NOAA Declares Third Ever Global Coral Bleaching Event*, NAT'L OCEANIC & ATMOSPHERIC ADMIN. (Oct. 8, 2015), https://perma.cc/Y4MR-8DML (indicating that due to warming waters, NOAA has observed unprecedented bleaching of coral in American waters, which is expected to continue into the future). *See also Majority of Sekisei Shoko Coral Reef Dies with 97% Extremely Severely Bleached*, RYUKYU SHIMPO (JAPAN) (Nov. 10, 2016), https://perma.cc/6G5X-BHUC (reporting on an October 2016 survey of the largest coral reef in Japan that determined that 97% of the reef bleached); Australian Gov't: Great Barrier Reef Marine Park Auth., *Coral Bleaching*, NAT'L OCEANIC & ATMOSPHERIC ADMIN. (June 2, 2016), https://perma.cc/542S-4Z5B (reporting on a 2016 survey of the Great Barrier Reef, finding a range of coral loss depending on the location within the reef, including 50% average coral loss in the Far Northern Management Area).

18 INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2014: IMPACTS ADAPTATION, AND VULNERABILITY: SUMMARIES, FREQUENTLY ASKED QUESTIONS, AND CROSS-CHAPTER BOXES 414, 426, 436 (Christopher B. Field et al. eds., 2014); *see also* S.J. Turner

fish production is not just desirable to soothe consumers' consciences, but it is essential for the future viability of the industry.

This Article starts with a few basic observations about the profitability of the industry and overfishing of wild marine fish. The next Part of the Article identifies two fishing supply transparency challenges for marine-captured fish brought into the U.S. market (illegal fishing and unreported fishing/discards) and the existing U.S. legal responses to tackling these fishing supply chain issues. Countries that are major consumers of fish products, such as the United States, must take precautionary management approaches when regulating the fish supply chain. While most regulatory attention has focused on food handling and safety concerns,[19] additional regulatory attention is needed to ensure that food is sourced from well-managed fisheries that do not jeopardize the future of fishery resources. While a growth in aquaculture technology may meet the needs of certain consumers of fish and seafood who have the capacity to pay certain premiums, aquaculture is unlikely to meet the needs of many artisanal and community fishing communities who do not have the existing financial capacity to invest in viable fish farms.[20] Any global transition from marine fishery resources to aquaculture resources will take time and systematic planning. In order to better protect existing marine fishery resources from further declines, the Article concludes with three recommendations: 1) bolster legal protection for commercial fishing industry whistleblowers, particularly for foreign crew harvesting fish outside U.S. waters; 2) require environmental traceability beyond the current, minimal traceability efforts for all fisheries products traded or transiting within U.S. territories; and 3) further regulate fish processing waste and seafood waste in the United States in order to both recover greater value for the industry and avoid food waste.

II. GLOBAL TRADE IN THE FISHING INDUSTRY AND OVERFISHING

Global trade is a significant driver of fish supply with about 78% of seafood products exposed to international trade competition.[21] Fish is one of the most traded commodities and is a major driver to national economic growth and development.[22] "In 2014, more than 200 countries reported

et al., *Fishing Impacts and the Degradation or Loss of Habitat Structure*, 6 FISHERIES MGMT. & ECOLOGY 401 (1999) (discussing the effects of fishing on marine habitat structure and heterogeneity).

19 *See Seafood Guidance Documents & Regulatory Information*, FOOD & DRUG ADMIN., https://perma.cc/HMV7-KRSC (last updated June 29, 2017) (providing links to various guidance, including guidance on "Fish and Fishery Products Hazards and Controls").

20 THE STATE OF WORLD FISHERIES AND AQUACULTURE: 2016, *supra* note 2, at 150. *See generally* KRISHEN J. RANA ET AL., FOOD & AGRIC. ORG. OF THE U.N., IMPACT OF RISING FEED INGREDIENT PRICES ON AQUAFEEDS AND AQUACULTURE PRODUCTION (2009), https://perma.cc/Z4QQ-TM82 (noting the rising costs of oil used in aquaculture feed).

21 THE STATE OF WORLD FISHERIES AND AQUACULTURE: 2016, *supra* note 2, at 51.

22 *See id.* (noting that 9% of the total agricultural exports (excluding forest products) are fish and seafood); *see also* WORLD BANK & FOOD & AGRIC. ORG. OF THE U.N., THE SUNKEN

exports and imports of fish and fishery products."[23] The top five exporters were China, Norway, Vietnam, Thailand, and the United States; the largest importers were the United States, Japan, China, and members of the European Union.[24] Between 1976 and 2014, world trade has increased 245% in quantity of fish traded and increased 515% when measuring fish traded for human consumption.[25] As measured by value, exports from developing countries account for over half of aquaculture and marine fish production.[26] In addition to the fish trade, there is also significant trade in fisheries services, including chartering of fishing vessels, fisheries research, and monitoring efforts.[27]

Some of this rapid increase in global trade of fishery products is the result of processing where the preparation of fish (e.g., fileting) is outsourced.[28] Other drivers of an increase in the globalization of the fishing industry include better transport, technological innovations in fishing, and trade liberalization.[29] The expanding interest in the fishery trade is, in part, due to its profitability. The global fish trade has increased from $8 billion in 1976 to $148 billion in 2014, with an annual average growth rate of approximately 8% over the period.[30]

Some fisheries are being actively managed for sustainability criteria. Catches from some of these fisheries accounted for 47% of the world's total marine catch in 2013 and are considered to be "oscillating around a globally stable value."[31] These fisheries include the Eastern Central Atlantic, Northeast Pacific, Eastern Central Pacific, Southwest Atlantic, Southeast Pacific, and Northwest Pacific.[32] Other fisheries—accounting for 21% of the global marine catch in 2013—are declining from historical peaks.[33] These fisheries include the Northeast Atlantic, Northwest Atlantic, Western Central Atlantic, Mediterranean and Black Sea, Southwest Pacific, and Southeast Atlantic.[34] Finally, there are fisheries—contributing 31% of the world's marine catch in 2013—where catch has been increasing since the 1950s.

BILLIONS: THE ECONOMIC JUSTIFICATION FOR FISHERIES REFORM 5 (2009), https://perma.cc/ZEF9-EJMJ (noting that 13% of the global agricultural trade is in fish).

23 THE STATE OF WORLD FISHERIES AND AQUACULTURE: 2016, *supra* note 2, at 51.

24 *Id.* at 53 tbl.15, 54 (explaining that the European Union, Japan, and United States together imported 63% of the value of traded fish and 59% of the quantity of traded fish).

25 *Id.* at 51–52 (noting that, in 2014, approximately 29% of trade in fish was for human consumption).

26 *Id.* at ii, 55 (noting that 54% of total fishery export value came from developing economies in 2014).

27 *Id.* at 51 ("The overall value generated by these fisheries services is not yet available.").

28 *See, e.g.*, Choy Leng Yeong, *NW Salmon Sent to China Before Reaching U.S. Tables*, SEATTLE TIMES (July 16, 2005), https://perma.cc/HKS8-RWS4 ("[F]ish processors in the Northwest . . . are sending part of their catch of Alaskan salmon or Dungeness crab to China to be filleted or de-shelled before returning to U.S. tables.").

29 THE STATE OF WORLD FISHERIES AND AQUACULTURE: 2016, *supra* note 2, at 51.

30 *Id.* at 52 (explaining the growth rate as 8.0% in nominal terms and 4.6% in real terms).

31 *Id.* at 39.

32 *Id.*

33 *Id.*

34 *Id.* at 39, 42.

These fisheries include the Western Central Pacific, Eastern Indian Ocean, and Western Indian Ocean.[35]

Export fisheries production is particularly important for areas such as the Western Central Pacific, where production grew to 12.4 million tons in 2013. Here, at least a quarter of the landings, including high-value fish such as tuna, are species that are either fully fished or overfished.[36] Even though the human population is relatively low in much of the Western Central Pacific,[37] this region is responsible for 15% of the global marine production and estimates have 23% of fish stocks in the region being fished beyond biologically sustainable levels.[38] As the FAO commented in its *2016 State of the World Fisheries* report, "[t]here is a need for effective management to restore the overfished stocks."[39]

The FAO recognizes that while fisheries management varies greatly across regions depending on governance capabilities, States can take measures to harmonize practices to eliminate avenues for destructive fishing practices. In 2009, FAO championed the adoption of the Port State Measures Agreement to combat illegal, unreported, and unregulated (IUU) fishing by encouraging States to exercise port-state controls to prevent IUU fishing vessels from accessing domestic ports and trading IUU fish.[40] States are expected to empower port inspectors with the ability to review documentation including catch, transshipment, and trade documents.[41] States following best fishing management practices are also expected to implement the Voluntary Guidelines for Flag State Performance,[42] which remind States of their obligation to domesticate international obligations involving Flag State responsibility including "tak[ing] effective action against non-compliance by vessels flying its flag."[43] Flag States are expected to have, "as a minimum[,] . . . mandatory requirements regarding fisheries-related data that must be recorded and reported in a timely manner by the vessels," including "catches, effort, bycatches and discards, landings, and transshipments."[44] Flag States are also expected to have appropriate

35 *Id.*

36 *Id.* at 44 (explaining that 77% of the fish stocks are fished at biologically sustainable levels).

37 U.N. POPULATION FUND, POPULATION AND DEVELOPMENT PROFILES: PACIFIC ISLAND COUNTRIES 4 (2014), https://perma.cc/4PUR-MJ4X (finding the population of fifteen Pacific Island States to be 9,937,000).

38 THE STATE OF WORLD FISHERIES AND AQUACULTURE: 2016, *supra* note 2, at 44.

39 *Id.* at 39.

40 *See generally* FOOD & AGRIC. ORG. OF THE U.N., AGREEMENT ON PORT STATE MEASURES TO PREVENT, DETER AND ELIMINATE ILLEGAL, UNREPORTED AND UNREGULATED FISHING (2009), https://perma.cc/U6E4-UYN5.

41 *Id.* at 26.

42 *See* Food & Agric. Org. of the U.N., *Report of the Thirty-Second Session of the Committee on Fisheries*, U.N. Doc. FIAP/R1167, at 65 (2017).

43 FOOD & AGRIC. ORG. OF THE U.N., VOLUNTARY GUIDELINES FOR FLAG STATE PERFORMANCE 1 ¶ 2 (2015), https://perma.cc/W9J4-AFBZ.

44 *Id.* at 7 ¶ 31.

enforcement regimes with the "capacity to detect and take enforcement action."[45]

Unfortunately, from a global fisheries management perspective, States offering registration under so-called "flags of convenience" (FOCs) assert little to no control over FOC vessels.[46] Vessel owners desiring to shirk conservation and management rules will register under a FOC and may even register under multiple FOCs as an added barrier to traceability.[47] To avoid detection, these same vessel owners are likely to engage in transshipment that involves a fishing vessel off-loading a catch onto a refrigerated cargo vessel and into holds where fish from various harvest events are mixed. By tracking satellite images, researchers discovered that transshipments are likely to be associated with regions with more IUU fishing, such as Russia's Exclusive Economic Zone (EEZ), Africa's EEZ, and the high seas.[48] Most of these transshipments are linked to vessels registered with FOCs, namely the Russian Federation, Kiribati, Taiwan, South Korea, or China.[49] According to researchers, a large quantity of fish from these transshipments eventually end up in Vladivostok and Murmansk, Russia; Montevideo, Uruguay; Busan, South Korea; and Abidjan, Cote d'Ivoire.[50] As of June 22, 2017, Russia and Cote d'Ivoire had not yet ratified or acceded to the Port State Measures Agreement, raising questions about the commitment of these States to combatting IUU fishing.[51]

The existing governance gap involving FOC vessels and perhaps other fishing nations suggests that States receiving imports of large quantities of fisheries products, such as the United States, must be increasingly vigilant regarding what fish are permitted to enter the supply chain. For a bulk commodity, where shipments arising from different regions of the world can be easily mixed, this is not an easy proposition. Credible catch documentation and reliable traceability mechanisms become essential for

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45 *Id.* at 7–8 ¶ 32.

46 DAVID KROODSMA ET AL., GLOB. FISHING WATCH, THE GLOBAL VIEW OF TRANSSHIPMENT: PRELIMINARY FINDINGS 3, 11, 16 (2017), https://perma.cc/UDM3-UTJL; *see also* LACEY MALARKY & BETH LOWELL, OCEANA, NO MORE HIDING AT SEA: TRANSSHIPPING EXPOSED 9 (2017), https://perma.cc/4A3Z-9CV2. According to the International Transport Workers' Federation, States that have issued or are issuing FOCs include Antigua and Barbuda, Bahamas, Barbados, Belize, Bolivia (landlocked), Cambodia, Cayman Islands, Comoros, Cyprus, Equatorial Guinea, Faroe Islands, Georgia, Honduras, Jamaica, Lebanon, Liberia, Malta, Mauritius, Moldova (landlocked), Mongolia (landlocked), Myanmar, North Korea, Panama, Sao Tome and Príncipe, St. Vincent, Sri Lanka, Tonga, and Vanuatu. *Flags of Convenience: Avoiding the Rules By Flying a Convenient Flag*, INT'L TRANSPORT WORKERS' FED'N, https://perma.cc/E3UY-VCM9 (last visited July 22, 2017).

47 KROODSMA ET AL., *supra* note 46, at 11; MALARKY & LOWELL, *supra* note 46, at 2, 9; *see, e.g.*, Orbital Admin., *Ex-Togolese Fishing Vessel Changes Flag in the High Seas*, STOP ILLEGAL FISHING (Mar. 15, 2011), https://perma.cc/Z82B-JRWV.

48 KROODSMA ET AL., *supra* note 46, at 2, 8–9 (estimating that 43% of likely and potential transshipment events occur on the high seas, 30% are in Russia's EEZ, and 10% are in the EEZ of African States).

49 *Id.* at 11 (noting FOCs account for 44% of likely transshipments).

50 *Id.* at 13.

51 *See Parties to the Port State Measures Agreement*, FOOD & AGRIC. ORG. U.N., https://perma.cc/G2WM-69KK (last visited July 22, 2017).

ensuring sustainable fishery supply chains. Recognizing the extensive trade in fisheries products highlighted in this Part, the following Part explores in more detail the two primary challenges for providing sustainable marine fish to consumers: illegal fishing activity and unreported fishing activity. The following Part will also discuss U.S. legislative and regulatory efforts intended to improve fishery supply chain transparency.

III. TRANSPARENCY AND 21ST CENTURY FISH PRODUCTION

If you happen to be in a cafeteria line and the baked fish or the fish fingers look appetizing today, what can you, as a consumer, know about that fish? As a cafeteria manager, what can you know about the fish? Do you know what ocean the fish came from? Do you know how the fish was caught? Were there ecosystem-based conservation measures in place where the fish was caught? Do you know if the fishing vessel that caught your fish was in compliance with those measures? An average consumer remains blissfully unaware of how the fish came to be in the cafeteria.

This Part will examine two topics impacting the 21st century fish supply chain. The first topic is illegal and unregulated fishing ("illegal fishing") that remains pervasive across global fisheries. The second topic is unreported fishing, which may or may not accompany illegal fishing. Today, some percentage of unreported fish that have been captured are ultimately discarded. Without information about the discarded fish, fishery management projections for thresholds such as "maximum sustainable yield" become increasingly unreliable. For both the topics of illegal and unreported fishing, the current U.S. federal response to improve traceability of fish in order to combat destructive marine fishing practices is discussed.

A. Illegal Fishing

Policymakers have grouped a number of undesirable fishing practices under the rubric of "illegal, unreported, and unregulated fishing" or IUU fishing.[52] While it has generally not been a helpful policy development to group these three fishing practices together because it does not differentiate between the vast array of legal responses needed to change commercial fishing behavior, these practices do share a key aspect in common. Each arises when there is inadequate knowledge about supply practices due to low transparency in the supply chain.

For a given shipment of fish, the fish may have passed through numerous locations. The fish may have been caught, for example, in the Pacific Ocean. Some of the fish may have gone to a local processing plant on one of the Pacific Islands. Other fish may have been off-loaded while still at sea to a transshipment vessel. This vessel may have travelled West across the Pacific and off-loaded the fish in Hong Kong, where the fish might have

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[52] *Illegal, Unreported, and Unregulated (IUU) Fishing*, NAT'L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES, https://perma.cc/R24M-ETZH (last visited July 22, 2017).

been processed for shipment to the European Union or the United States after being possibly fileted or reconstituted into other products such as fish paste or fish patties. Or perhaps, the vessel travelled East across the Pacific to off-load in Seattle, Washington. Some of the fish may have been inspected and then sent back across the Pacific to China for gutting and fileting because labor is less expensive than in United States' plants.[53] Repackaged, the fish is sent back across the Pacific, sold to a wholesaler, and eventually appears at a U.S. grocery store in the frozen food aisle. At each stage that a fish travels—from harvest to plate—there are opportunities for illegal fish or fish that were captured outside of regulated areas to be "laundered" through the fishing supply chain. Given the profitability of the fisheries trade, especially for high-value fish such as tuna or toothfish,[54] there are incentives for engaging in illicit practices.

Because industrial fishing fleets are dispersed so widely across the globe, illegal fishing is generally not easy to detect reliably without the assistance of a fisheries observer who might be required to be onboard a vessel or a whistleblower from the crew who has first-hand knowledge of questionable practices. While notable progress has been made in such few years with respect to refining satellite detection of IUU fishing practices,[55] the satellites are still unable to collect enough evidence to change the effectiveness of global fisheries enforcement.[56] States recognizing that illegal fisheries products are entering ports have responded. At the international level, a number of key fishery product importing States, including the United States, have ratified the Port States Measures Agreement.[57] Since most IUU vessels will go to great lengths to hide their illegal activity, some form of verification system is necessary to uncover illegal activity in fisheries products.[58] For States trying to track the origin of fish shipments, some form of catch documentation is usually required.[59]

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53 Yeong, *supra* note 28.

54 *See* CAMILLO CATARCI, FOOD & AGRIC. ORG. OF THE U.N., MARKETS AND INDUSTRY OF SELECTED COMMERCIALLY-EXPLOITED AQUATIC SPECIES WITH AN INTERNATIONAL CONSERVATION PROFILE 169 (2004), https://perma.cc/W987-9UUW; JOHN VIRDIN, TUNA FISHERIES 7, https://perma.cc/5TMQ-U3F8 (last visited July 22, 2017); Dennis Gordon & Warren Judd, *The Ross Sea Toothfish Fishery*, N.Z. GEOGRAPHIC, https://perma.cc/2ECP-E3GL (last visited July 22, 2017).

55 *See* GLOBAL FISHING WATCH, https://perma.cc/DK3B-5S9E (last visited July 22, 2017) (providing tracking data for tens of thousands of fishing vessels via satellite).

56 *See* Recommendations of the Presidential Task Force on Combating Illegal, Unreported and Unregulated Fishing and Seafood Fraud, 79 Fed. Reg. 75,536, 75,538–39 (Dec. 18, 2014) (recommending additional best management practices to increase satellite efficacy).

57 *Parties to the Port State Measures Agreement*, *supra* note 51.

58 *See NOAA Trade Monitoring Programs to Go Electronic—Another Tool for Combatting IUU Fishing*, NAT'L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES (July 8, 2013), https://perma.cc/L5BT-S4JX (describing the International Trade Data System which tracks import and export of seafood).

59 *See* NAT'L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES, INTERNATIONAL FISHERIES: LEVELING THE PLAYING FIELD (2013), https://perma.cc/G5PR-X3HY; *Catch Document Scheme Instructions Sheets*, MINISTRY FOR PRIMARY INDUSTRIES: N.Z., https://perma.cc/594W-H99V (last updated Jan. 26, 2017).

1. Regional Catch Documentation Schemes for the United States

The United States is a member of regional fisheries management organizations (RFMOs), which have undertaken specific measures to combat illegal fishing by improving the transparency of the fisheries supply chain through a strategy of catch documentation. For example, in 2000, the Commission for the Conservation of Antarctic Marine Living Resources[60] (CCAMLR) introduced a "Catch Documentation Scheme" (CDS) for all toothfish species (*Dissostichus spp.*) because toothfish were being rapidly depleted.[61] Catch documentation was considered a necessary regulatory intervention given the remoteness of the CCAMLR Convention Area and the potential danger associated with enforcement at sea of fisheries measures.[62]

As of 2016, the CCAMLR parties reformed the CDS to address some loopholes that existed in the former conservation measures.[63] The new CDS requires individuals involved in the supply chain of toothfish to record the fish at each stage from capture to trade, including landing, transshipment, import, export, or re-export.[64] If the movements of the fish are recorded in good faith by suppliers, then this should improve transparency in the market and expose illegal transports of fish. As of 2017, any transfer of toothfish requires a catch document that might include a *Dissostichus* catch document, a *Dissostichus* export document, or a *Dissostichus* re-export document.[65] For countries that are CCAMLR members, the CDS must be

60 *See* Convention for the Conservation of Antarctic Marine Living Resources, May 20, 1980, 33 U.S.T. 3476, 19 I.L.M. 841 (entered into force Apr. 7, 1982). Articles VII–XIII of the Convention establish the Commission, which implements the provisions of the Convention. *Id.* arts. VII–XIII, at 33 U.S.T. 3482–87, at 19 I.L.M. 845–50.

61 *See Catch Documentation Scheme (CDS)*, COMM'N FOR CONSERVATION ANTARCTIC MARINE LIVING RESOURCES (May 10, 2017), https://perma.cc/L6ZB-AC45 ("Toothfish is marketed with a variety of names, including bacalao de produndidad (Chile), butterfish (Mauritius), Chilean sea bass (the United States and Canada), merluza negra (Argentina), mero (Japan) and ròbalo (Spain)."); *see also Illegal, Unreported and Unregulated (IUU) Fishing*, COMM'N FOR CONSERVATION OF ANTARCTIC MARINE LIVING RESOURCES, https://perma.cc/93FD-4TAW (last modified Dec. 19, 2013) (explaining that in the 1990s, IUU fishing for toothfish was "over six times the catch reported by authorised fishing vessels" and CCAMLR recognized that addressing this issue was a "critical need").

62 G. BRUCE KNECHT, HOOKED: PIRATES, POACHING, AND THE PERFECT FISH 107 (2006); *Protecting the Galápagos from Illegal Fishing*, WILDAID (July 13, 2015), https://perma.cc/8WNR-L3JG.

63 CONVENTION FOR THE CONSERVATION OF ANTARCTIC MARINE LIVING RES. (CCAMLR), CONSERVATION MEASURE 10-05, CATCH DOCUMENTATION SCHEME FOR *DISSOSTICHUS SPP.* ¶ 5 (2016), https://perma.cc/8ZT8-3EMY.

64 International Affairs; Antarctic Marine Living Resources Convention Act, 82 Fed. Reg. 6221, 6227–28 (Jan. 19, 2017) (to be codified at 50 C.F.R. § 300.106). Export and re-export are defined broadly to include movements through free-trade zones. *Id.* at 6223–24 (to be codified at 50 C.F.R. § 300.101); *see also* International Affairs; Antarctic Marine Living Resources Convention Act, 82 Fed. Reg. 9969, 9969–70 (Feb. 9, 2017) (delaying effective date until March 21, 2017).

65 International Affairs; Antarctic Marine Living Resources Convention Act, 82 Fed. Reg. at 6221, 6227 (to be codified at 50 C.F.R. § 300.101 and 50 C.F.R. § 300.106).

used for all toothfish captures regardless of where the toothfish were captured.[66]

In combination with a Vessel Monitoring System (VMS)—data that is required to be reported at least every four hours—from vessels operating within the CCAMLR Convention Area, CDS data can be used to verify the legality of fishing activity.[67] States are expected to verify VMS data and fishing authorizations to ensure that the toothfish were actually taken from a particular region defined either by CCAMLR or, if outside of the CCAMLR region, by FAO, and were legally taken.[68] CDS data includes, at a minimum, information about the vessel (e.g., name, home port, national registry number, and IMO/Lloyd's number where available), the license, the catch, fishing plan, landing port information, transshipment details (e.g., vessel name, name of the master, and name of port authority if transshipped at a port), and the ultimate recipient of shipment, when known.[69] For export shipments, States must also collect transport details of a shipment including cargo data.[70] If States are satisfied with their review of the information, they can issue a Flag State Confirmation Number vouching for the legality of fishing activity by its fishing vessel.[71] Relying on good faith, States are not supposed to issue catch documentation "if there is reason to believe that the information submitted by the vessel is inaccurate or that the [toothfish] were taken in a manner inconsistent with CCAMLR conservation measures if fishing occurred in the [Convention on Antarctic Marine Living Resources] Convention Area."[72]

Access to the catch documentation information by potential enforcers is critical. The National CDS contact officer for each CCAMLR member States has access to all CDS data related to an import.[73] States that are not Parties to CCAMLR may receive limited data in order to validate an individual toothfish shipment.[74] These States are expected to become Contracting Parties to CCAMLR or to at least "attain the status of a non-Contracting Party cooperating with CCAMLR."[75] What this means in practice

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66 International Affairs; Antarctic Marine Living Resources Convention Act, 82 Fed. Reg. at 6225–26. The Commission has membership from Argentina, Australia, Belgium, Brazil, Chile, China, European Union, France, Germany, India, Italy, Japan, Korea, Namibia, New Zealand, Norway, Poland, Russian Federation, South Africa, Spain, Sweden, Ukraine, United Kingdom, United States, and Uruguay. *Members*, COMM'N FOR CONSERVATION ANTARCTIC MARINE LIVING RESOURCES (Aug. 25, 2016), https://perma.cc/W8WG-F9YQ.

67 Antarctic Marine Living Resources (AMLR); Centralized Vessel Monitoring System; Preapproval of Fresh Toothfish Imports; Customs Entry Number; Electronic Catch Documentation Scheme; Scientific Observers; Definitions; Seal Excluder Device; Information on Harvesting Vessels, 72 Fed. Reg. 48,496, 48,496 (Aug. 23, 2007) (codified at 50 C.F.R. pt. 300).

68 CCAMLR, CONSERVATION MEASURE 10-05, *supra* note 63, ¶ 5.

69 *Id.* ¶ A5(ii), (viii).

70 *Id.* ¶ A2.

71 *Id.* ¶ 5.

72 *Id.*

73 CCAMLR, Basic Documents—Part 12, Rules for Access to Catch Documentation Scheme Data ¶ 1 (2013), https://perma.cc/DKX3-C5KD.

74 *Id.* ¶ 3.

75 CONSERVATION MEASURE 10-05, *supra* note 63, ¶ C1.

for the United States, as an active participant in the CDS, is that any "Chilean sea bass" that enters the United States will have a documented and verifiable track record of its supply chain.[76]

The CCAMLR CDS focused on toothfish is, however, still not a watertight enforcement system because it still relies upon the good faith involvement of the Flag State to ensure that a Flag State Confirmation is merited as part of the CDS.[77] Providing such a confirmation may prove tricky when the Flag State officials have no means of making a visual confirmation about, for example, the quantity of catch. Even though States are expected to verify compliance with CCAMLR conservation measures through inspections of all of its flagged vessels that leave from or arrive at its ports or, "where appropriate," transit its Exclusive Economic Zone, this provision does not cover distant water fishing fleets that may rarely enter the ports of their Flag State.[78] While some regions, such as the European Union, have publicly available information about distant water fleets that might be operating in the CCAMLR Convention Area, this information is difficult to obtain from States.[79]

In addition to the United States' commitment to catch documentation under CCAMLR, the United States has also agreed to a bluefin tuna catch documentation scheme under the International Commission for the Conservation of Atlantic Tunas (ICCAT).[80] The ICCAT scheme is similar in concept to the CCAMLR scheme and requires every Contracting Party, Co-operating non-Contracting Party, and other cooperating entities to submit information electronically that will be used to identify the origin of harvested bluefin tuna.[81] Specifically, parties must prohibit "any landing, transfer, delivery, harvest, domestic trade, import, export or re-export of bluefin tuna without a completed and validated [blue catch document], bluefin tuna re-export certificate or ICCAT transfer declaration."[82] Regional observers are on board certain types of vessels, including all tropical tuna vessel during area-time closures, all transshipment vessels, and 20%–100% of

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76 *See supra* note 64 and accompanying text.

77 *See* International Affairs; Antarctic Marine Living Resources Convention Act, 82 Fed. Reg. 6221, 6223–24 (Jan. 19, 2017) (codified at 50 C.F.R. § 300.101) (relying on Flag State for verification as part of the CDS program).

78 *See* CONSERVATION MEASURE 10-05, *supra* note 63, ¶ 8.

79 *See Database on EU External Water Fleet*, WHO FISHES FAR, https://perma.cc/V9FM-8WEK (last visited July 22, 2017).

80 INT'L COMM'N FOR THE CONSERVATION OF ATL. TUNAS (ICCAT), RECOMMENDATION 08-12, RECOMMENDATION BY ICCAT AMENDING RECOMMENDATION 07-10 ON AN ICCAT BLUEFIN TUNA CATCH DOCUMENTATION PROGRAM (2008), https://perma.cc/XH56-CS5V. In 2010, ICCAT introduced an electronic system to replace the former system that permitted paper submissions. ICCAT, RECOMMENDATION 10-11, RECOMMENDATION BY ICCAT ON AN ELECTRONIC BLUEFIN TUNA CATCH DOCUMENT PROGRAMME (EBCD) (2010), https://perma.cc/JV3U-GPJE.

81 *Compare* CCAMLR, CONSERVATION MEASURE 10-05, *supra* note 63, ¶ 2–3, *with* ICCAT, RECOMMENDATION 11-20, RECOMMENDATION BY ICCAT AMENDING RECOMMENDATION 09-11 ON AN ICCAT BLUEFIN TUNA CATCH DOCUMENTATION ¶ 1 (2010), https://perma.cc/8AP4-MRJA.

82 INT'L COMM'N FOR THE CONSERVATION OF ATL. TUNAS, REPORT OF THE INDEPENDENT PERFORMANCE REVIEW OF ICCAT 48 (2016), https://perma.cc/AR3C-UEPJ.

eastern bluefin tuna fishing vessels.[83] In addition to the catch document program for bluefin tuna, ICCAT States are required to have "statistical documents or re-export certificates that have been validated by the relevant government" for imports of bigeye tuna and swordfish.[84] ICCAT is considering phasing out these "statistical documents" and instead requiring catch documentation in the bluefin tuna program that could be shared across regional tuna management organizations.[85]

2. United States' Implementation of Regional Fisheries Management Organizations: Transparency Obligations and Catch Documentation Schemes

The United States has implemented some of its obligations under CCAMLR, ICCAT, and the Security and Accountability for Every Port Act of 2006[86] by requiring parties to file electronically in the government-wide International Trade Data System when they are importing, exporting, or re-exporting certain fish products such as bluefin tuna, toothfish, or swordfish.[87] The rule consolidated permits for regulated seafood products under the Antarctic Marine Living Resources Program, Highly Migratory Species Program, and the Tuna Tracking and Verification Program.[88] Importers are expected to provide information about "place of catch" defined as the "area of the ocean where the fish was harvested."[89]

In addition to its obligations to implement international catch documentation for toothfish and Atlantic bluefin tuna, the United States is in the process of implementing its own Catch Documentation Scheme that will only initially focus on at-risk fisheries.[90] On December 9, 2016, the National Oceanic and Atmospheric Administration (NOAA) issued a final rule regarding "permitting, reporting and recordkeeping procedures for the importation of certain fish and fish products, identified as being at particular risk of . . . IUU fishing or seafood fraud."[91] The "Seafood Import Monitoring

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83 *Id.* at 47.

84 *Id.* at 48.

85 *See generally* ICCAT, RECOMMENDATION 15-10, RECOMMENDATION BY ICCAT TO CLARIFY AND AMEND ASPECTS OF ICCAT'S BLUEFIN TUNA CATCH DOCUMENTATION PROGRAM TO FACILITATE THE APPLICATION OF THE EBCD SYSTEM (2015), https://perma.cc/RX3M-HH5L.

86 Pub. L. No. 109-347, 120 Stat. 1884 (codified in scattered sections of 6, 19, 31, 42, 46, and 47 U.S.C.).

87 *See* International Affairs; Antarctic Marine Living Resources Convention Act, 82 Fed. Reg. 6221, 6222 (Jan. 19, 2017) (codified at 15 C.F.R. pt. 902 and 50 C.F.R. pt. 300). *See also* 50 C.F.R. § 300.185(2)(i)–(iii) (2016).

88 Trade Monitoring Procedures for Fishery Products: International Trade in Seafood; Permit Requirements for Importers and Exporters, 81 Fed. Reg. 51,126, 51,127 (Aug. 3, 2016) (codified at 50 C.F.R. pts. 216, 300, 600, and 660).

89 U.S. CUSTOMS & BORDER PROT., CBP AND TRADE AUTOMATED INTERFACE REQUIREMENTS: APPENDIX PGA 33–34 (2017), https://perma.cc/ZJW5-27TW.

90 Gilles Hosch, *Catch Documentation Schemes: Practices and Applicability in Combating IUU Fishing*, FOOD & AGRIC. ORG. U.N., https://perma.cc/3PVU-3Z5J (last visited July 22, 2017).

91 Magnuson-Stevenson Fishery Conservation and Management Act; Seafood Import Monitoring Program, 81 Fed. Reg. 88,975, 88,975 (Dec. 9, 2016) (to be codified at 15 C.F.R. pt.

Program" rule was created in response to recommendations from the National Ocean Council on how best to implement President Obama's proposed "Comprehensive Framework to Combat Illegal, Unreported, and Unregulated Fishing and Seafood Fraud."[92] Importers, exporters, and re-exports are now required to obtain an annually renewable International Fisheries Trade Permit to trade the fish and fish products regulated under this rule.[93] Under this permit, importers must collect catch and landing documentation on certain fish and fish products and electronically report these to a central database that will be used by the National Marine Fisheries Service (NMFS) to verify that the fish were not illegally harvested.[94] In theory, this should improve the traceability of species deemed to be "at risk." In terms of harvest location, the importer, however, only needs to provide information required by a coastal State for fishing within a foreign EEZ and for fishing beyond national jurisdiction the general FAO area where the fish or seafood was harvested.[95] As of 2017, there are twenty major FAO fishing regions, as seen below.

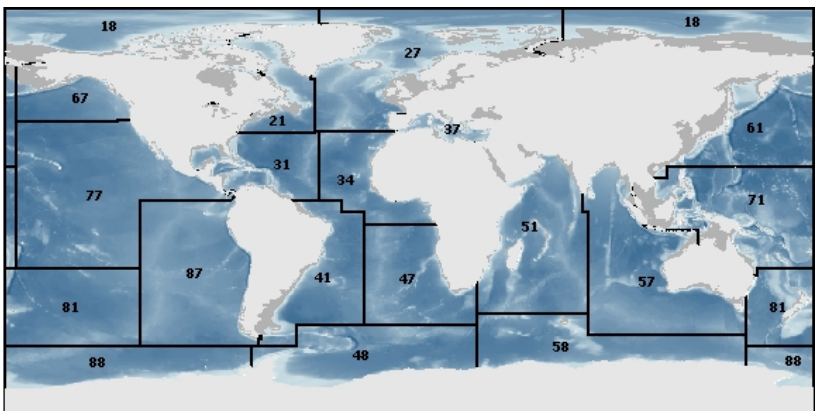

Figure 1: Providing the Twenty FAO Fishing Regions[96]

902 and 50 C.F.R. pts. 300, 600). NOAA is part of the Department of Commerce and is charged with conserving and managing coastal and marine ecosystems and resources. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS) is an office within NOAA. This Article refers to the office as NMFS.

92 *Id.* at 88,976; Memorandum Establishing a Comprehensive Framework to Combat Illegal, Unreported, and Unregulated Fishing and Seafood Fraud, 2014 DAILY COMP. PRES. DOC. 464 (June 17, 2014).

93 Magnuson-Stevenson Fishery Conservation and Management Act; Seafood Import Monitoring Program, 81 Fed. Reg. at 88,975.

94 *Id.* at 88,987 (codified at 50 C.F.R. § 300.323); *see also id.* (codified at 50 C.F.R. § 300.324) ("The data reporting and recordkeeping requirements under the program enable verification of the supply chain of the product offered for entry back to the harvesting event(s).").

95 *Id.* at 88,986–87 (to be codified at 50 C.F.R. § 300.321); *id.* at 88,980.

96 FOOD & AGRIC. ORG. OF THE U.N., CWP HANDBOOK OF FISHERY STATISTICAL STANDARDS—SECTION H: FISHING AREAS FOR STATISTICAL PURPOSES, https://perma.cc/29VA-6962 (last visited July 22, 2017) [hereinafter FAO HANDBOOK SECTION H].

What this means is that harvest location information, particularly for fish captured beyond national jurisdictions, will yield little useful information, especially in an area as broad as the Pacific or the Arctic. The U.S. approach has yet to be tested, but in terms of broadly protecting ocean resources, it may be too limited in its reach. As currently structured, there is no specific consumer labeling requirement for fish except for the market name of the fish, general place of origin, and whether a fish is wild caught or farm raised.[97] This information leaves a great deal unstated, for a consumer seeking sustainable sourcing may not know how the fish was harvested. Non-governmental organizations have tried to fill the gap with Seafood Watch ratings indicating fish products that are more likely to have been harvested sustainably.[98]

B. Unreported Fishing

Discards are harvested fish, aquatic life, and seaweed that are returned to the sea.[99] Discards are often required to be reported but may not be accurately reported because of concerns that this reporting may negatively impact future calculations of the total allowable catch due to concerns of declining fish stocks.[100] In many cases, discards may be lawful because a fishing operator is either required to return something to the sea (e.g., a protected species such as a shark) or is allowed to return something to the sea after reporting the discard.[101] In some instances, returning species alive to the sea is consistent with sustainable fisheries management because the practice returns a species with a high probability of survival (e.g., crab) or a healthy egg-bearing individual to the sea.[102]

Discard practices may become problematic when an organism that is returned to the sea is unlikely to survive or is already dead.[103] Three types of discard practices are more likely to involve either illegal practices or undesirable management practices: high grading for economic profit, which

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97 7 C.F.R. § 60.300 (2016).

98 *See* MONTEREY BAY AQUARIUM SEAFOOD WATCH, DEVELOPING SEAFOOD WATCH RECOMMENDATIONS (2017), https://perma.cc/JJ2P-T663 (providing an overview of the Seafood Watch ratings and methodologies).

99 Jah Petter Johnsen & Søren Eliasen, *Solving Complex Fisheries Management Problems: What the EU Can Learn from the Nordic Experiences of Reduction of Discards*, 35 MARINE POL'Y 130, 130 (2011). Definition of bycatch and discards are often inconsistent across jurisdictions. The term discards implies a return to the sea. The term bycatch is frequently used in laws and regulations and can refer to both discarded catch and incidental catch (non-target fish that are retained). This Article will use both terms, but the substantive focus will only be on fish and shelllfish returned to the sea and not related bycatch issue involving seabirds and mammals.

100 Trevor A. Branch et al., *Replacing Trip Limits with Individual Transferable Quotas: Implications for Discarding*, 30 MARINE POL'Y 281, 282 (2006) (observing that "[b]iased estimates of discard fractions may therefore lead to setting of [total allowable catches] that are overly optimistic or pessimistic").

101 Johnsen & Eliasen, *supra* note 99, at 130.

102 *Id.*

103 *Id.*

often happens with the capture of smaller fish; unreported releases of discards to avoid regulatory enforcement; and unreported releases of aquatic life that exceed fishery management quota levels.[104]

1. United States' Response to Managing Discards

Managing discards is challenging in most global fisheries. The United States has tried a variety of approaches to address illegal discarding within U.S. fisheries. Under the regulations implementing the Magnuson-Stevens Fishery Act,[105] U.S. commercial vessels operating under a federal fishing permit may be required to submit "vessel monitoring system" catch reports or "vessel trip reports" that include information about the vessel's fishing activity, including data on the catch composition (species and weight) of both landed and discarded fish.[106] Some of the regulations are very specific in relation to commitments under regional fisheries management organizations' measures such as the Western and Central Pacific Fisheries Commission. For example, U.S. fishers operating with purse seines are expected to report all at-sea discards of bigeye tuna, yellowfin tuna, and skipjack tuna on a specific form because these tuna should not be discarded unless the fish are unfit for human consumption, there is insufficient storage space for the fish, or a serious malfunction of equipment occurs requiring that fish be discarded.[107] In common pool fisheries in the Northeast, a vessel may not discard any legal-sized cod prior to reaching its landing limit.[108] In shared multi-species fisheries with Canada, under a current special access program, U.S. fishers are expected to daily report total pounds of discarded haddock, cod, yellowtail flounder, winter flounder, witch flounder, American plaice, and white hake.[109]

In order to minimize discards in a variety of fisheries, the United States has a variety of discard management rules in place to enhance environmental stewardship; these include restrictions on harvesting juvenile fish,[110] gear restrictions to minimize capture of non-target species,[111] and

104 Branch et al, *supra* note 100, at 282, 289.

105 Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. §§ 1801–1884 (2012).

106 50 C.F.R. § 300.218(a) (2016) (requiring commercial fishing operators to submit reports that identify amount of fish discarded as part of a trip to capture highly migratory species in the Pacific Ocean); *id.* § 300.341(a) (requiring that U.S. flagged high seas vessels record the amount of fish discarded); *see also* Possession and Trip Limit Implementation for the Common Pool Fishery, 82 Fed. Reg. 20,285, 20,285 (2017) ("We will continue to monitor common pool catch through vessel trip reports, dealer-reported landings, vessel monitoring system catch reports, and other available information.").

107 50 C.F.R. § 300.218(e); *id.* § 300.223(d).

108 *Id.* § 648.86(b)(1)–(2).

109 NAT'L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES, U.S./CANADA MANAGEMENT AND SPECIAL ACCESS PROGRAMS FOR SECTOR VESSELS 5 (2015), https://perma.cc/LP8A-55G9.

110 *See, e.g.*, 50 C.F.R. § 660.60(c)(1)(i), (c)(2)(ii) (extending size limits as a routine management measure).

limitations on fishing in known spawning areas for certain species.[112] Occasionally, exemptions are made (e.g., summer flounder mesh size), but these exemptions may be revoked if a vessel is found to be discarding more than 1% of its catch of summer flounder per trip.[113]

Responsible for regional U.S. fisheries, United States Fishery Management Councils offer a variety of approaches to managing discards. In some West Coast fisheries, certain vessels participating in individual fishing quota (IFQ) programs may discard IFQ species as long as the species have been recorded and deducted from the quota package for the vessel.[114] Certain other species must be discarded, such as Pacific halibut, when it is captured by the limited entry bottom trawl sector.[115]

Other U.S. fisheries, including multi-species fisheries in the Northeast, are operated under "sectors."[116] In this context, "sectors" refer to a group of persons with a limited access vessel permit operating under a fishery management plan who have received a shared total allowable catch and who have entered into a contract imposing certain fishing restrictions for the course of one year.[117] In order to benefit from the sector's total allowable catch (TAC) as well as several exemptions,[118] a sector must consist of at least three people who do not have ownership in each other's operations.[119] The Council must approve the sector, and each approved sector must submit a fisheries operation plan to NMFS including how it will handle discards.[120]

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111 *See, e.g.*, *id.* § 679.24(b) (requiring parties fishing in Gulf of Alaska and the Bering Straits using longline pots to take measures not to catch groundfish species which are considered "protected species" when pots are deployed).

112 *Id.* § 679.21(e) (detailing prohibited species catches of red king crab while fishing for groundfish depending on a calculation of the "abundance and spawning biomass of red king crab").

113 *Id.* § 648.108(a)–(b).

114 *Id.* § 660.112(b)(xiii).

115 ELIZA HEERY ET AL., PACIFIC HALIBUT BYCATCH IN THE U.S. WEST COAST GROUNDFISH FISHERY FROM 2002 THROUGH 2009, at 5 (2010), https://perma.cc/F268-T7QQ.

116 50 C.F.R. § 648.2.

117 *Id.* For an example of "sectors," see GREATER ATL. REG'L FISHERIES OFFICE, NAT'L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES, SECTOR MANAGER CONTACT INFORMATION (2017), https://perma.cc/5FHL-DE6P.

118 Exemptions available for vessels participating in a sector include no trip limits on allocated stock, no groundfish days-at-sea restriction, no seasonal closures in certain designated fishing grounds, and the ability to use certain types of mesh. GREATER ATL. REG'L FISHERIES OFFICE, NAT'L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES, GREATER ATLANTIC REGION BULLETIN: GROUNDFISH SECTOR AND EXEMPTION APPROVAL 1 (2014), https://perma.cc/2TEL-HSUP.

119 50 C.F.R. § 648.87(a)(4).

120 *Id.* § 648.87(a)(2) ("NMFS will only approve a new sector that has received the Council's endorsement."); *id.* § 648.87(b)(1)(v)(B) ("A sector must develop and implement an at-sea or electronic monitoring program that is satisfactory to, and approved by, NMFS for monitoring catch and discards."); *id.* § 648.87(b)(2)(xi) (requiring submitted operation plans or submitted sector contracts to include "[d]etailed plans for the monitoring and reporting of landings and discards").

In a multispecies sector, a sector must have quota available for all stocks in the area, even where it is only targeting one fish such as monkfish.[121] Any catch, including discards of multispecies stocks, will count against a sector's quota.[122] Sectors must "not discard any legal-sized groundfish of allocated stocks, including legal-sized, unmarketable fish . . . of stocks allocated to sectors, unless that vessel's sector is otherwise exempt."[123] Legal-sized but unmarketable fish must be landed.[124] Undersized fish that are discarded must be reported weekly.[125] In addition, certain vessels within a sector are prohibited from retaining certain species such as ocean pout, windowpane flounder, and Atlantic wolffish.[126] Sector vessels not fishing in exempted fisheries are also required to have in place an at-sea monitoring program funded by the industry and to collect data on vessel operations and discards.[127] Where there is problematic activity by a member of a sector, all members agree to comply with a "stop fishing" order until NMFS reviews next steps.[128] Sector members are expected not to exceed quotas, or all of the members may be held jointly and severally liable for quota overages, discarding of legal sized fish, and misreporting catch including discards.[129]

In 2006, the North Pacific Fishery Management Council adopted Amendment 80 to the Bering Sea and Aleutian Islands Fishery Management Plan, providing for the formation of harvesting cooperatives in the Bering Sea and Aleutian Islands for non-pollock trawl groundfish.[130] Under this amendment, cooperatives were given limited access privilege with the expectation that the members of the cooperatives would lower their discard rates and potentially improve the value of their harvested species.[131] The reforms proved to be effective because they offered flexibility in the system,

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121 *Id.* § 648.87(b)(1)(ii).

122 NAT'L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES, SECTOR VESSEL REGULATIONS OVERVIEW: FISHING YEAR 2015, at 36 (2015), https://perma.cc/JTD6-6K7S.

123 *Id.* at 19.

124 50 C.F.R. 648.87(b)(1)(v)(A); SECTOR VESSEL REGULATIONS OVERVIEW: FISHING YEAR 2015, *supra* note 122, at 19.

125 50 C.F.R. § 648.87(b)(1)(v)(A) ("Discards of undersized regulated species . . . by a sector vessel must be reported to NMFS consistent with the reporting requirements specified in paragraph (b)(1)(vi) of this section."); *id.* § 648.87(b)(1)(vi)(B) ("Each sector must submit weekly reports to NMFS . . . includ[ing] . . . discards.").

126 *Id.* § 648.86(k)–(l).

127 GREATER ATL. REG'L FISHERIES OFFICE, NAT'L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES, NORTHEAST COASTAL COMMUNITIES SECTOR MEMBERSHIP AGREEMENT AND OPERATIONS PLAN 34 (2015), https://perma.cc/FZ2Y-GAXW.

128 *Id.* at 15.

129 50 C.F.R. § 648.87(b)(1)(iv).

130 *See* Fisheries of the Exclusive Economic Zone Off Alaska; Allocating Bering Sea/Aleutian Islands Fishery Sources; American Fisheries Act Sideboards, 72 Fed. Reg. 21,198, 21,198–99 (Apr. 30, 2007) (codified at 50 C.F.R. pt. 679); N. PAC. MGMT. COUNCIL, AMENDMENT 80 TO THE FISHERY MANAGEMENT PLAN FOR GROUNDFISH OF THE BERING SEA AND ALEUTIAN ISLANDS MANAGEMENT AREA (2006), https://perma.cc/M46T-9KAF.

131 Fisheries of the Exclusive Economic Zone Off Alaska; Allocating Bering Sea/Aleutian Islands Fishery Sources; American Fisheries Act Sideboards, 72 Fed. Reg. at 21,198–99; N. PAC. MGMT. COUNCIL, *supra* note 130, at 4 § 3.7.5.

with fishers having a large choice of fishing grounds and no longer having to compete as actively with other fishing fleets in order to exercise harvest capacity.[132]

In 2009, the North Pacific Fishery Management Council implemented a new incentive plan agreement for managing discards in the Bering Sea Pollock Fishery as part of its "Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area" (FMP).[133]

2. Global Fisheries' Response to Discards

Given the challenges inherent for U.S. fisheries to properly manage discards, especially those discards that might qualify as food waste, many questions remain about the transparency of discard practices within fisheries that export to the United States. In some fisheries, such as regional tuna fisheries in the Pacific Islands, observers are required on board vessels to evaluate whether a vessel is complying with conservation measures.[134] In other fisheries, such as the European Union, there is a no-discard policy for certain regional fisheries operating under quotas.[135] The challenge for managing discards as a perverse externality of a growing global fish supply chain is finding some mechanism for measuring the level of waste and harvest inefficiency at the fleet level. Some undesirable levels of industry-wide discarding can be addressed with innovations in equipment and introduction of new practices.[136] Other possibilities for addressing underreporting due to illegal discarding are discussed in Part IV, including

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132 Joshua K. Abbott et al., *Hidden Flexibility: Institutions, Incentives, and the Margins of Selectivity in Fishing*, 91 LAND ECON. 169, 191 (2015).

133 Fisheries of the Exclusive Economic Zone Off Alaska; Chinook Salmon Bycatch Management in the Bering Sea Pollock Fishery, 75 Fed. Reg. 53,026, 53,027–29 (Aug. 30, 2010) (codified at 15 C.F.R. pt. 902 and 50 C.F.R. pt. 679) (implementing Amendment 91 to the FMP). Under the incentive plan agreements implemented by Amendment 91 to the FMP, groups of pollock fishers operating as a "fleet" could agree to actively reduce their bycatch/discards of Chinook salmon in order to ensure access to productive fishing grounds. *Id.* at 53,027. Each fleet would be assigned an aggregated available base cap which is shared at the outset among the vessels comprising the fleet. *Id.* at 53,028. Fleets with low Chinook salmon bycatch/discard rates could continue to fish across the region, while fleets with average or high rates of bycatch/discard would be excluded from fishing in areas where there were likely to be high levels of salmon bycatch/discards, and once a fleet's available cap had been reached, a fleet must stop fishing for pollock unless it can obtain additional "base cap" from another vessel, fleet, or sector to take Chinook. *Id.* at 53,029.

134 *Observer Program*, PARTIES TO NAURU AGREEMENT, https://perma.cc/U7JT-4WFG (last visited July 22, 2017).

135 Council Regulation 1380/2013, art. 15, 2013 O.J. (L 354) 22 (EU). This larger reform of the Common Fisheries policy includes the "discard ban" at Article 15. *Id.* at 35–37.

136 The 2014 Winner of the World Wildlife Fund International Smart Gear Competition was an air-powered sampler for purse seine fishing. *International Smart Gear Competition*, WORLD WILDLIFE FUND, https://perma.cc/Y5P7-E3LJ (last visited July 22, 2017). This innovation permits a vessel to take a sample of the fish that it is likely to be bringing onto deck before the net is lifted out of the water so that a fishing vessel can decide to release the net before taking it out of the water if the species makeup is unprofitable. *Id.*

potentially protecting foreign whistleblowers and facilitating increased processing of fishery products currently regarded as industry waste.

IV. RECOMMENDATIONS TO IMPROVE ECOLOGICALLY MEANINGFUL TRANSPARENCY ACROSS THE FISHERY SUPPLY CHAIN

The Article concludes with several recommendations intended to enhance the ability of the United States to address illegal and unreported fishing in the fisheries supply chain. The three suggestions that follow include: 1) bolstering legal protection for industry whistleblowers operating in the fishing industry; 2) requiring enhanced environmental traceability for all fisheries products traded or transiting within U.S. territory; and 3) tackling waste generated by both fish processors and consumers.

A. Legal Protection for Industry Whistleblowers, Particularly Foreign Whistleblowers

The front line of compliance efforts is the crew of fishing vessels. These men and women see firsthand how a vessel is fishing and whether the vessel is complying with bycatch and discard regulations or is engaging in IUU fishing practices. Obtaining eyewitness information from fishing crews can be challenging, particularly from foreign fishing crews. Given the vulnerability of many crew members to retaliation by fishing vessel owners and the concern over losing their livelihood, crew members are unlikely to report illegal activity associated with their own vessel.[137] Even if crew members might be willing to raise concerns about the operation of other vessels, this information may not be reliable as evidence because the information may be the product of hearsay arising from conversations with crew members of the boat alleged to be illegally fishing, or it may be unreliable because of the distance at which an eyewitness from a different vessel might be viewing an incident.[138]

Because it is more likely that illegal fishing will take place on a vessel that has little State oversight, such as a vessel sailing under a FOC, crews on these vessels are likely to be an important source of information for government prosecutions.[139] As of 2016, there has been inadequate attention given by federal agencies to seeking information from potential

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137 Stephen M. Kohn, *Monetary Rewards for Wildlife Whistleblowers: A Game-Change in Wildlife Trafficking Detection and Deterrence*, [1-2016] 46 Envtl. L. Rep. (Envtl. L. Inst.) 10,054, 10,064.

138 While there are no specified regulatory distances that fishing boats are expected to operate from each other, fishing vessels are expected to follow navigation rules based on the International Regulations for Preventing Collisions at Sea, Oct. 20, 1972, 28 U.S.T. 3459, 1050 U.N.T.S. 16. As implemented within domestic legal systems, these rules require vessels to keep safe distances from fishing vessels engaged in trawling or purse seining. *Id.* art. IX, rule 26.

139 *See* Kohn, *supra* note 137, at 10,064 (noting the difficulty in uncovering violations absent crewmembers coming forward).

whistleblowers for wildlife crimes such as IUU fishing.[140] Whistleblowers can receive monetary awards under a number of statutes including the Lacey Act,[141] the Endangered Species Act,[142] the Rhinoceros and Tiger Conservation Act,[143] the Antarctic Conservation Act,[144] the Fish and Wildlife Improvement Act,[145] and the Wild Bird Conservation Act[146] for information that leads to an arrest, conviction, or forfeiture.[147] Under the Fish and Wildlife Improvement Act, NMFS can provide whistleblower payments from agency appropriations for information that can be used to prevent IUU fishing under a wide range of national laws including the High Seas Driftnet Fisheries Enforcement Act;[148] the Illegal, Unreported and Unregulated Fishing Enforcement Act;[149] the Magnuson-Stevens Fishery Conservation and Management Act; the Shark Finning Prohibition Act;[150] and the Sustainable Fisheries Act.[151] While Congress has amended both the Lacey Act and the Endangered Species Act so that there is no cap on the amount of money that a potential whistleblower might be entitled to collect and has allocated appropriations for the payment of whistleblowers that do not depend on government recovery from enforcement actions,[152] there has been little effort to implement these amended laws, as evidenced by "no reported cases under [the] laws, no published regulations, and no reward application procedures."[153]

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140 *Id.* at 10,054–55.

141 16 U.S.C. § 701 (2012); *see also* Lacey Act Amendments of 1981, 16 U.S.C. §§ 3371–3378.

142 Endangered Species Act of 1973 (ESA), 16 U.S.C. §§ 1531–1544.

143 Rhinoceros and Tiger Conservation Act of 1994, 16 U.S.C. §§ 5301–5306; *see also* Rhinoceros and Tiger Conservation Act of 1998, 16 U.S.C. §§ 5305a–5305b; Rhinoceros and Tiger Conservation Reauthorization Act of 2001, 16 U.S.C. § 5305c.

144 Antarctic Conservation Act of 1978, 16 U.S.C. §§ 2401–2413.

145 Fish and Wildlife Improvement Act of 1978, 16 U.S.C. §§ 712, 742*l*.

146 Wild Bird Conservation Act of 1992, 16 U.S.C. §§ 943–943c, 4901–4916.

147 *See* Lacey Act Amendments of 1981, 16 U.S.C. § 3375(d); ESA, 16 U.S.C. § 1540(d); Rhinoceros and Tiger Conservation Act of 1998, 16 U.S.C. § 5305a(f) (incorporating the Lacy Act Amendments of 1981's reward provision); Antarctic Conservation Act of 1978, 16 U.S.C. § 2409(b); Fish and Wildlife Improvement Act of 1978, 16 U.S.C. § 742*l*(c), (k); Wild Bird Conservation Act of 1992, 16 U.S.C. §§ 4912(c), 4913(b) (incorporating the Lacy Act Amendments of 1981's reward provision).

148 16 U.S.C. §§ 1826a–1826c.

149 Port State Measures Agreement Act of 2015, 16 U.S.C. §§ 7401–7409 (Supp. III 2016) (also called the Illegal, Unreported, and Unregulated Fishing Enforcement Act of 2015).

150 16 U.S.C. § 1822 (2012).

151 16 U.S.C. §§ 1803, 1861a, 1881–1883, 5107–5107b. NMFS gains this authority from *id.* § 742*l*(k)(2); *see also* Kohn, *supra* note 137, at 10,068 app. B (providing a complete list of statutes authorizing NMFS to provide whistleblower payments).

152 Lacey Act, 16 U.S.C. § 3375(d) ("The amount of the reward, if any, is to be designated by the Secretary or the Secretary of the Treasury, as appropriate."), ESA, 16 U.S.C. § 1540(d) ("The amount of the reward, if any, is to be designated by the Secretary or the Secretary of the Treasury, as appropriate."); Fish and Wildlife Improvement Act, 16 U.S.C. § 724*l*-1 (permitting from fiscal year 2012 and onwards "up to $400,000 to remain available until expended, may at the discretion of the Secretary be used for payment for information, rewards, or evidence concerning violations of laws administered by the Service").

153 Kohn, *supra* note 137, at 10,055.

With an estimate that 20%–32% of marine seafood—worth between $1.3 and $2.1 billion—is being illegally imported into the United States,[154] it is surprising that the whistleblower provisions in U.S. statutes are underutilized as tools for combatting IUU fishing.[155] If the statutory rewards are to generate information likely to result in prosecutions for systematic violations of conservation and management measures, the government must do a better job of promoting the existence of whistleblower rewards to potential informants. For example, the United States might identify specific communities where larger IUU fishing operations likely recruit their crews and advertise the conditions for receiving awards within that community. With the ever-increasing access to the internet, the United States could also devise a social media strategy so that individuals searching on-line for fishing crew opportunities might also find, as part of their search, websites describing whistleblower awards.

Stephen Kohn, one of the founders of the National Whistleblower Center, offers a number of proposals of how to strengthen the possibility of crew members being willing to inform, but first, they must have knowledge of the wildlife trafficking statutes' whistleblower provisions.[156] He suggests guaranteed minimum awards of $25,000—even if it ultimately exceeds the amount of a collectable fine—in order to increase potential participation,[157] and he also suggests adding a provision that rewards whistleblowing individuals who may have participated in a crime but did not plan or initiate the crime.[158]

Key to any successful whistleblower program is the ability of the agencies to maintain confidentiality of informants.[159] Because at least some IUU fishing activity is linked to organized crime,[160] ensuring that informants whose information is the basis for a prosecution remain safe from harm is critical. While the witness security program coordinated under the United States Marshals Service has typically been used to protect individuals who provide key evidence for the prosecution of gangs members, terrorists, and drug traffickers, the program may also be appropriate for informants whose lives might be threatened by reporting fisheries crimes.[161] The current program would authorize the protection of key witnesses threatened by

154 Ganapathiraju Pramod et al., *Estimates of Illegal and Unreported Fish in Seafood Imports to the USA*, 48 MARINE POL'Y 102, 111 (2014) (percentages by weight).

155 Kohn, *supra* note 137, at 10,069, app. C & D (noting that between 2004 and 2015, less than $300,000 of rewards were offered to whistleblowers, aggregating the Endangered Species Act and Lacey Act).

156 *Id.* at 10,064–67.

157 *Id.* at 10,065.

158 *Id.* at 10,066.

159 *See, e.g.*, 17 C.F.R. § 240.21F-7 (2016).

160 U.N. OFFICE ON DRUGS & CRIME, FISHERIES CRIME, https://perma.cc/R77D-4JWH (last visited July 22, 2017) (noting that fisheries crime is often transnational and organized and includes illegal fishing, money laundering, and others).

161 U.S. MARSHALS SERV., FACT SHEET: WITNESS SECURITY (2017), https://perma.cc/JJZ5-65TM.

bodily injury if they can be identified as the informants offering evidence of organized crime or other serious offenses.[162]

B. Extending Environmental Traceability for all Fisheries Products Traded or Transferred Within the United States and Its Territories

While the requirement to have catch documentation seems to be making a difference by changing fishing industry actors' behavior, catch documentation under existing U.S. law is currently restricted to just a few key species because the focus has only been on illegal fishing.[163] This approach, while potentially pragmatic in terms of rolling out the implementation of the program, does not address ecosystem-based fishery management concerns. Catch documentation, if it is to serve a role in improving overall fisheries management by driving consumer behavior towards more sustainably managed fisheries, should be applied to all species traded within the United States or transiting through the United States. The information slated to be collected by the U.S.'s new program will be of limited use to implementing an ecosystem-based approach because it is not only stock specific but specific to a small subset of fish.[164] Even though NMFS, which is responsible for implementing the Seafood Import Monitoring Program,[165] agrees in principle with the recommendation to trace all fishery products, it is unclear when NMFS will propose a more comprehensive approach to seafood imports. Because the U.S. approach will rely on a risk assessment approach to ocean fishery management problems and is currently only identifying "at risk" fish and seafood species, the United States will not be contributing substantially to a necessary normative shift for the fishing industry to be more forthcoming about its practices.[166]

While acknowledging that it is difficult to design a program that will be comprehensive from its inception, the existing program, adopted in December 2016, appears to be already problematic in terms of attempting to achieve its goals of identifying illegally harvested products.[167] There are three problems: inadequate geographical harvesting information; insufficient

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162 18 U.S.C. § 3521(a)(1) (2012) (providing the Attorney General with the discretion to provide for relocation or protection of a witness or potential witness if "an offense involving a crime of violence directed at the witness" for testifying is "likely to be committed").

163 *See, e.g.*, 50 C.F.R. § 648.7 (2016) (providing regulations with respect to Atlantic mackerel).

164 *See* NAT'L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES, *Presidential Initiative on Combating Illegal, Unreported, and Unregulated (IUU) Fishing and Seafood Fraud*, https://perma.cc/XUU6-SZ7N (last visited July 22, 2017) (listing the set of species to be traced in the program's first phase as limited to approximately sixteen "priority species").

165 *See* Magnuson-Stevenson Fishery Conservation and Management Act; Seafood Import Monitoring Program, 81 Fed. Reg. 88,975 (Dec. 9, 2016) (to be codified at 15 C.F.R. pt. 902 and 50 C.F.R. pts. 300, 600).

166 *See Presidential Initiative on Combating Illegal, Unreported, and Unregulated (IUU) Fishing and Seafood Fraud*, *supra* note 147 (noting traceability program is "risk-based").

167 *See supra* notes 91–94 and accompanying text.

coverage of all fish products; and the ability to mix fishery products, reducing incentives to improve environmental performance.

First, the program only requires that importers collect information based on delineated FAO regions.[168] These regions are so broad that knowledge that a given shipment of tuna came from the Pacific is unlikely to provide much information to a regulator trying to understand whether the fish was illegally harvested or not.[169] Second, the program fails to address all sources of fish products. The Seafood Importing Monitoring Program does not apply to "fish oil, slurry, sauces, sticks, balls, cakes, puddings, meal and other similar highly processed fish products for which the species of fish comprising the product or the harvesting event(s) or aquaculture operation(s) of the product being entered, cannot be feasibly identified, either through inspection, labeling, or [Harmonized Tariff Standard (HTS)] code."[170]

Third, regulators are not requiring that fishery products be identifiable by a given harvest event.[171] The issue of segregation was a subject of concern for fish importers who believed that any requirement to segregate shipments would place an undue burden on the industry.[172] In responses to comments, NMFS indicated that, while segregation of shipments based on the harvests would not be required, the importer of record must document each harvest event "relevant to the contents of the shipment . . . . However, specific links between portions of the shipment and a particular harvest event are not required."[173] This "bulk" identification of fish that permits aggregation of fish in one shipment may reduce some of the incentive to improve environmental performance that would otherwise exist in a system with clear linkages between a given fish harvest and a given market.

While it is understandable that industrial vessels—due to multiple tows of a trawl—do not want to have the additional burden of paperwork, not all tows for a given vessel are necessarily legal. For example, as part of its operating permit, a vessel may be required to comply with certain conservation and management rules that might include retaining fish that would otherwise have been discarded.[174] An otherwise largely legal fishing

168 Magnuson-Stevenson Fishery Conservation and Management Act; Seafood Import Monitoring Program, 81 Fed. Reg. at 88,998 (to be codified at 50 C.F.R. § 300.324(b)(3)); *see also id.* at 88,980 ("For fishing beyond [U.S.] jurisdiction, the [FAO] Major Fishing Area codes . . . should be used.").

169 *See* FAO HANDBOOK SECTION H, *supra* note 96. The Pacific Ocean is broken up into seven regions, but even those subdivisions cover massive areas. *See id.*

170 Magnuson-Stevenson Fishery Conservation and Management Act; Seafood Import Monitoring Program, 81 Fed. Reg. at 88,979.

171 *Id.* at 88,998 (to be codified at 50 C.F.R. § 300.324(b)(3)).

172 *See id.* at 88,976–77 (responding to Comment 3).

173 *Id.* at 88,977, 88,989.

174 For example, the U.S. shore-based Pacific whiting fishery between 2004–2010 was managed under an Exempted Fishing Permit, which had permit conditions requiring full retention of catch in 2004 (allowing only "[d]iscards due to emergency or safety situations") and then subsequently requiring maximum catch retention (allowing discards as long as it does "not exceed one basket from any single haul"). HOWARD MCELDERRY ET AL., THE 2004 TO 2010 US

trip where a skipper is properly permitted to fish can also have some degree of illegal fishing attached. For example, on a particular trip, a vessel might deploy the net three times. The first two tows are successful, the hold is almost full, and the vessel has almost harvested its allotment of a commercially valuable fish. The last tow, however, is filled with low economic value fish. Because of the permit requirements, the vessel should retain these fish, but depending on whether there is an observer on board or a camera, these fish may be jettisoned and the skipper may deploy the net again in hopes of catching a more valuable commercial fish that can be landed and marketed. Unlike the two previous tows, this last fishing event should not be a deemed a "legal" event because it is performed in contravention to the articulated conservation measures of maximum retention.[175] However, under the U.S. reporting rules, fish from an "illegal" tow can then be added to the hold and mixed with the other fish,[176] making it impossible to distinguish between which fish were legally caught and which fish were illegally caught due to the failure to report a quantity of discards. While traceability should not lead to onerous regulatory burdens for members of the fishing industry, the information currently being requested under the U.S. regulations does not seem to be adequate to address the purpose of the program—to deter illegal fishing.

Finally, the regulation does not require that transshipment information be reported, even though transshipment activity—particularly from certain regions of the world or under FOCs—has been associated with facilitating IUU fishing.[177] The government acknowledged the value of transshipment information but declined to include it in the initial seafood importing monitoring program.[178] The government did not give a specific reason for leaving out transshipment information, which would provide credible traceability, but simply commented that "NMFS will consider key chain of custody data elements that could be established as mandatory reporting requirements" through a future rulemaking.[179]

Some segregation among catches on a vessel before imports are approved seems necessary to provide incentives for better fishing practices,

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SHORE-BASED WHITING EM PROGRAM: WHAT DID WE LEARN? 16–17 (2014), https://perma.cc/LC8R-NW7N.

175 *See* 16 U.S.C. § 1857(1)(A) (2012) (providing that it is unlawful for any person to violate the Magnuson-Stevens Fisheries Act). Sections of the Magnuson-Stevens Fisheries Act that address conservation measures in permits are codified at *id.* § 1824(b)(7)(F) (addressing "conservation and management" measures for fishing by foreign fishing vessels) and *id.* § 1853(b)(14) (providing that regional fisheries plans may "prescribe such other measures, requirements, or conditions and restrictions as are determined to be necessary and appropriate for the conservation and management of the fishery").

176 *See* Magnuson-Stevenson Fishery Conservation and Management Act; Seafood Import Monitoring Program, 81 Fed. Reg. at 88,998 (to be codified at 50 C.F.R. § 300.324(b)(3)) ("[S]pecific links between portions of the shipment and a particular harvest event are not required.").

177 KROODSMA ET AL., *supra* note 46, at 2, 11.

178 Magnuson-Stevenson Fishery Conservation and Management Act; Seafood Import Monitoring Program, 81 Fed. Reg. at 88,980.

179 *Id.*

even if all of the fish are legally harvested. For example, if a fishing vessel harvests 1,000 tons of fish using excellent implementation of bycatch conservation measures and 10,000 tons of fish using mediocre conservation measures, all of the harvest events associated with these fish would need to be recorded but then could be mixed at point of import.[180] The potential increased market value of the 1,000 tons of fish that were caught using superior conservation measures would be lost if the traceability measures allow for commingling of fish. For the rule to benefit fish stocks and fishing companies who use best practices, the rule should require some collection of data regarding the adequacy of the implementation of conservation measures for "bulk fish." While there are fishing companies already doing this type of tracing in order to secure better market value,[181] for other companies, little is known about the production or, in some cases, the identity of many fish flowing into U.S. trade channels.[182]

Given the existing political momentum behind the Port State Measures Agreement, catch documentation programs for enhancing traceability may become increasingly prevalent.[183] In response, FAO is finishing drafting a set of Voluntary Guidelines for Catch Documentation Schemes.[184] As presently drafted, these guidelines are very narrow in their application. The Guidelines emphasize that a catch documentation scheme must avoid creating trade barriers and should be based on "risk analysis and be proportionate to the risk that IUU fishing poses on the relevant stocks and markets."[185] Like the U.S. Seafood Import Monitoring Program, these Guidelines fail to take account of the need for environmental traceability across the fishing industry and not just for a handful of commercially significant stocks.[186]

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180 *See* Magnuson-Stevenson Fishery Conservation and Management Act; Seafood Import Monitoring Program, 81 Fed. Reg. at 88,998 (to be codified at 50 C.F.R. § 300.324(b)(3)).

181 *See, e.g.*, *Ocean to Plate Traceability*, MARINE STEWARDSHIP COUNCIL, https://perma.cc/5BDV-BF62 (last visited July 22, 2017) ("Supply chain businesses must identify and *separate* [Marine Stewardship Certification] certified product in order be certified . . . . (emphasis added)).

182 DR. KIMBERLY WARNER ET AL., OCEANA, DECEPTIVE DISHES: SEAFOOD SWAPS FOUND WORLDWIDE 8 (2016), https://perma.cc/LSL5-TZB4 (finding that fraud related to seafood labeling occurs within the United States, including for example, "the mislabeling of 160,000 pounds of coho salmon as . . . Chinook salmon, a value of $1.3 million"); Pramod et al., *supra* note 154, at 106 ("The highly internationalized seafood supply chain feeding imports into the United States and other major markets is one of the most complex and opaque of all natural commodities.").

183 *Tracking Fish "From Sea to Plate" to Keep Illegal Catches Out of Global Supply Chains*, FOOD AND AGRIC. ORG. U.N., (April 12, 2017), https://perma.cc/4JQA-79HZ ("[O]nly a few [catch documentation] schemes had been established, and mostly focusing on high-value species whose overexploitation prompted particular concern, such as Chilean Seabass harvested in Antarctic waters, or Atlantic and Southern Bluefin Tuna. But with seafood trade at record highs and consumer demand still rising, catch documentation schemes are increasingly seen as a tool that could be more widely applied."); *Implementing the Port State Measures Agreement*, NAT'L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES, https://perma.cc/ABF9-DK9Z (last visited July 22, 2017).

184 *See* FOOD & AGRIC. ORG. OF THE U.N., DRAFT: VOLUNTARY GUIDELINES FOR CATCH DOCUMENTATION SCHEMES (2016), https://perma.cc/672Y-UVA2.

185 *Id.* § 4(d).

186 *See supra* notes 163–166 and accompanying text.

Even though a given stock such as herring may not be currently threatened by IUU fishing, the future of currently abundant stocks still depends on robust management. Keeping track of global management of fisheries is an essential safeguard for the fisheries of tomorrow.

Policymakers might be concerned that a broad traceability program will trigger concerns over technical barriers to trade. As long as the United States requires all suppliers, including U.S.-based suppliers, to provide certain basic information about the source of a shipment of fish, including what conservation or pollution control measures were implemented, a challenge to traceability rules on the basis of trade rules is unlikely to succeed. At first glance, this requirement might seem to penalize small producers, particularly in the Global South who do not have the infrastructure or know-how to create a traceability system. The inability for small foreign producers to sell into a market requiring traceability is not a foregone conclusion. Partnerships between U.S. seafood importers and foreign coastal communities may succeed in improving sustainable fishing practices as communities work towards long-term goals of achieving Marine Stewardship Council certification by enhancing traceability.[187]

While achieving transparency through traceability is beset with larger reporting challenges such as systemic fraud, requiring basic information to be transferred from hook to plate for all fish and fish products as they travel in the supply chain is an excellent first step towards bringing light to an industry where much remains hidden. Creating a culture of traceability should reward producers who can demonstrate that they have been conscientious in how they harvest. A consumer in a cafeteria line should be able to rest assured that the breaded fish sticks they are contemplating eating were not intentionally harvested in a manner with no regard for the future viability of the ecosystem.

C. The United States Needs to Intervene to Reduce Fish Processing Waste and Create Strategies to Reduce Consumer Waste

While most traceability efforts have focused on reducing illegally harvested fish or identifying what and how much is being discarded in a fishery, there has been little attention given to post-harvest waste associated

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187 *See* MARINE STEWARDSHIP COUNCIL, GLOBAL IMPACTS REPORT 2017 (2017), https://perma.cc/J4BW-VL22; *see also Sea Delight, LLC*, FISHCHOICE, https://perma.cc/DX94-KA8Q (last visited July 22, 2017) (describing Miami, Florida-based Sea Delight LLC as 1) the first company to join World Wildlife Fund's Seafood Savers program—a program that supports coastal community "Fishery Improvement Projects" in Indonesia for tuna harvesting—and 2) as a company assisting its suppliers in improving traceability in order to eventually achieve Marine Stewardship Council certification); *WWF and Sea Delight Work Together for More Responsibly-Caught Tuna and Bottomfish*, WORLD WILDLIFE FUND (June 14, 2012), https://perma.cc/J6EG-BW2P (describing collaboration with Vietnamese fishery stakeholders to improve fishing practices that may lead to Marine Stewardship Council certification); FISHING & LIVING, https://perma.cc/E45U-EBNX (last visited July 22, 2017) (describing an industry initiative to improve tuna fishery management in Indonesia, Vietnam, Cook Islands; and the Federated States of Micronesia, Fiji, and the Solomon Islands).

with fish processing.[188] In well-managed fisheries, including the Alaska fisheries, there are estimates that 1.1 million tons of fish processing waste is generated per year and about a quarter of this waste is ultimately discarded.[189] While much of the waste from the larger producers is processed into fish meal or oil and the government has required new seafood processing plants operating in locations such as the Bering Sea to include machinery to handle seafood processing byproducts, there remains a substantial portion of waste that is simply left to spoil rather than being further processed.[190] Individual States have a variety of means for managing fish processing waste including the use of landfills.[191] A large quantity of fish waste may also be generated abroad, as U.S. fishing companies send fish to be processed overseas to save on labor costs.[192] Local communities may use some of this waste in the form of fish heads or other fish parts deemed less desirable in a U.S. market where the fish processing plants are located.[193] Other processing waste may be dumped.[194]

In addition to waste generated by the U.S. fishing industry both at home and abroad, consumers are a primary source of waste. Of an estimated 2.3 billion pounds of seafood wasted annually in the United States, 1.3 billion pounds are wasted by consumers.[195] If the protein available in the 2.3 billion pounds of seafood were recovered, this would, in theory, meet the protein needs of 10.1 to 12.4 million people and the caloric needs for 1.5 million adults.[196]

In addition to raising awareness of the extent of the waste problem, the government may want to begin to track where post-harvesting waste is most prone to happen and help producers identify appropriate strategies. Given the existence of producer waste, the government might facilitate offering low-interest or no-interest loans through the Small Business Administration (SBA) or grants through NOAA to assist small producers in investing in machinery to transform their processing waste into fishmeal, fish oil, or

188 Peter Bechtel et al., *Developing the Potential of Fish Processing Byproducts Takes Guts, in* NAT'L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES, F/SPO-124, THE FUTURE OF AQUAFEEDS 12, 14 (2011), https://perma.cc/JQ3A-Q8KG.

189 *Id.* at 12.

190 *Id.* at 12–13.

191 *See, e.g.*, STATE OF MICH., DEP'T OF ENVTL. QUALITY, FISH WASTE EXEMPTION 2–3 (2011), https://perma.cc/XQ49-YC7P (providing various provisions for land-based fish disposal).

192 Op-Ed, Paul Greenberg, *Why Are We Importing Our Own Fish?*, N.Y. TIMES, June 22, 2014, at SR6.

193 *See, e.g.*, *From Fish Waste to Fish Wealth*, CARIBBEAN COMMUNITIES (July 20, 2016), https://perma.cc/2QMJ-HALE.

194 Bechtel et al., *supra* note 188, at 12.

195 Dave C. Love et al., *Wasted Seafood in the United States: Quantifying Loss from Production to Consumption and Moving Toward Solutions*, 35 GLOBAL ENVTL. CHANGE 116, 119–21 (2015); *Nearly Half of U.S. Seafood Supply Is Wasted, Study Shows*, SCI. DAILY (Sept. 23, 2015), https://perma.cc/Z639-JHRC (discussing Love et al., *supra*).

196 Love et al., *supra* note 195, at 121. Some of the so-called lost "protein" in this study is not recoverable for human use because it originates from discard practices that need to be addressed. *Id.* at 123–24.

other marketable products.[197] For processors who use overseas processing plants, particularly in Global South countries, the United States Agency for International Development (USAID) may want to provide loans or grants to assist processors to better manage fish processing related waste for use as food, fertilizers, or other products.[198] Consumer fish waste is more difficult to manage because it is a dispersed problem across thousands of households. In terms of trying to reduce the quantity of consumer waste, the government may want to help companies identify marketing and sale strategies to reduce waste as part of U.S. food security strategies. One strategy may be the repackaging of products to prevent or reduce spoil (e.g., splitting a fish into individual packages) or a broader social media and education campaign to remind consumers about the proper storage of fish.

V. CONCLUSION

This Article opened with the questions of whether there is a future for abundant marine fish or whether we are past peak wild seafood. The answer to these questions depends on whether future fishery management interventions are effective. Increasingly, because consumers are not apathetic to the sourcing of their food and are uneasy about consuming food that causes ongoing harm to the environment, there is increasing leverage at the import end of the multi-billion-dollar trade in global fisheries products to change current, secretive industry practices about sourcing. A commercial fishing culture built around verifiable traceability is central to understanding whether fish are being harvested in a manner more likely to boost long-term sustainability for both fisheries and fishing communities. While the U.S. embarks on its first regulatory efforts towards providing some form of standardized reporting for imported fish and seafood through the Seafood

197 SBA facilitates a variety of small business and microloans. These loans do not come from SBA directly but are provided by a variety of partners, such as community development organizations and micro-lending institutions, on the basis of SBA guidelines and a guarantee that SBA will repay some portion of the loans if the borrower defaults. The 7(a) Loan Program provides for loans to be extended for equipment purchases. ROBERT JAY DILGER, CONG. RESEARCH SERV., R41146, SMALL BUSINESS ADMINISTRATION 7(A) LOAN GUARANTY PROGRAM 6 (2016). The small business express loan provides financing up to $350,000. *SBA Express*, U.S. SMALL BUS. ADMIN., https://perma.cc/VQ2N-MJHW (last visited July 22, 2017). NOAA also offers small business innovation research grants of approximately $120,000 of phase 1 funding for companies with a startup idea in need of financing. *Three-Phase Program*, NAT'L OCEANIC & ATMOSPHERIC ADMIN., https://perma.cc/TP3L-NXF4 (last visited July 22, 2017). For example, one of the funded projects for 2017 was an autonomous vehicle for coastal monitoring that conforms with international collision regulations and runs on green power. *See* U.S. DEP'T OF COMMERCE, SMALL BUSINESS INNOVATION RESEARCH PROGRAM: ABSTRACTS OF AWARDS FOR FISCAL YEAR 2017 (2017), https://perma.cc/ZYW2-YRHG (providing information on all of the 2017 fund recipients).

198 USAID is authorized under the Foreign Assistance Act of 1961, Pub. L. No. 87-195, 75 Stat. 424 (codified in scattered sections of 22 U.S.C.) to "cooperat[e] extensively with developing countries in order to achieve environmentally sound development." 22 U.S.C. § 2151p (2012). This includes the development of microenterprises that might convert fish processing waste to fertilizers. *Id.* § 2213.

Import Monitoring Program, as currently designed, this program will not alleviate the pressures associated with premeditated illegal fishing or unreported fishing. Given the global nature of fishing, large-scale but undetected fish poaching is likely to continue without insiders offering information that could lead to prosecutions. As suggested above, if the U.S. government hopes to combat IUU fishing at the source, it should invest sufficient financial resources in implementing existing whistleblower provisions under existing wildlife protection statutes.[199] In the future, technology in the form of affordable forensic DNA testing to identify the origin of a specific fish may also play an increasing role in U.S. prosecutions based on seafood fraud.[200]

For fishing operations that may not currently be participating in best environmental practices, the current Seafood Import Monitoring Program also offers little feedback in terms of how fishing practices might be improved to avoid unintentional environmental harms such as bycatch. Importers are not required to collect information about how fish is collected or whether harvests comply with best environmental practices. Without the requirement to report this information, there is little incentive for fishing vessels to improve their at-sea performance. As also suggested above, additional and verifiable mandatory reporting on environmental and social practices on board fishing vessels should improve industry-wide practices.[201] Fishing companies that have been early adopters of best environmental and labor practices will benefit from immediate market access.

With a multi-billion-dollar market for seafood products, the United States can utilize its market position for broader change outside of the United States. In addition to looking outwards, the United States should also take stock of what is happening internally with both fish processed in U.S. processing plants and fish originating in U.S. waters that are sent to overseas processing plants. Fish processors should be prepared to report on how waste streams are handled and whether there are additional economic opportunities for producing fish oil and feed.[202] The future of abundant marine fish depends on economizing the use of existing fishery resources.

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199 *See supra* Part IV.A.

200 Erik Stokstad, *To Fight Illegal Fishing, Forensic DNA Gets Local*, 330 SCIENCE 1468, 1468–69 (2010) (describing European researchers' efforts to track "single nucleotide polymorphisms" as a means to distinguish between populations of fish).

201 *See supra* Part IV.B.

202 *See supra* Part IV.C.