

CRUELTY TO HUMAN AND NONHUMAN ANIMALS IN THE WILD-CAUGHT FISHING INDUSTRY

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I. INTRODUCTION

The welfare of animals killed for our consumption, and the treatment of agricultural workers involved in this industry, are pressing ethical issues not sufficiently discussed in the context of the fishing industry. While concerns about the welfare of terrestrial farmed animals gain some prominence in discussions about sustainability and food policy, concern for the welfare of fish killed for food lags far behind. This lack of concern for their welfare is in spite of considerable scientific evidence showing that fish experience pain, fear, and suffering. The fishing industry also has grave impacts on humans, which include health and safety issues, labor law violations, and even human rights abuses such as human trafficking, child labor, and slavery. Incorporating these less publicized concerns into our conversations about fishing is necessary in order to improve law, policy, and consumer awareness in this area.

II. BACKGROUND

A. TYPES OF ANIMALS INVOLVED

When we talk about the types of aquatic animals used in capture and farmed fishing, it is important to note that the list is very broad. It includes: finfish, crustaceans (e.g., shrimp, crab, lobster, oyster, crayfish); mollusks (e.g., snails, clams); pinnipeds (i.e., seals and sea lions); cephalopods (e.g., octopuses, squid, cuttlefish) and cetaceans (i.e., whales and dolphins).¹ Each of these categories of animals may be treated somewhat differently according to the laws or customs of different nations, and as a result, are more or less involved in the fishing industry.²

The narrowness of our conception of “fishing” needs to be broadened in order to make conscious and reasoned policy decisions. For example, although most people do not think of whaling when they think of fishing, perhaps because they are mammals,³ it is a part of the fishing industry.⁴ Whales are still killed for food (and for scientific purposes) in a number of countries.⁵ The killing of whales has been the source of significant controversy as it pertains to treaty rights, national sovereignty, culture and tradition, sustainability and ecosystem protection as well as the welfare of the animals themselves.⁶ Whaling is more widespread than is generally known.⁷ Notably, Japan, Norway, and Iceland argue for increased whaling quotas, relaxed regulation, and an end to the 1982 whaling ban imposed by the International Whaling Commission (IWC)—suggesting the need to protect fishing stocks by reducing the numbers of whales.⁸ But other countries are also involved. Indonesia continues whaling on a small scale using non-industrial methods,⁹

and in 2012, South Korea said it would undertake scientific whaling in its own waters.¹⁰ Russians in Chukotka Autonomous Okrug and natives of Bequia (Saint Vincent and the Grenadines) are permitted by the IWC to take certain numbers and types of whales each year.¹¹ Under an exception for indigenous populations, the United States,¹² Canada, and Greenland allow whaling for species covered by the IWC.¹³ The Faroe Islands is a semi-autonomous country and not a party to the international whaling ban; as such, it conducts hunts not covered by the IWC.¹⁴ Some think the Filipino whaling industry continues underground operations even after it became illegal in 1991.¹⁵ Between the 1985 ban and 2014, 1,355 whales were killed *legally* in the United States, not accounting for illegal killings.¹⁶ The conversations we have about whaling—with its cultural, environmental, and animal welfare concerns—also apply to other forms of fishing.¹⁷

B. USES OF AQUATIC ANIMALS

Aquatic animals are fished or farmed for multiple purposes. These uses include pet food, livestock and fish food, fertilizer, glue, oil, and by-products (oil and by-products are also sometimes used in human food).¹⁸ Indications are that all of these uses are increasing.¹⁹ Between 2010 and 2021, the anticipated growth of world aquaculture is 33%.²⁰ By 2025, the estimated growth of global fisheries and aquaculture production is 17%.²¹ Total fishery production is also expected to rise from 167 million tons in 2013-2015 to 196 million tons by 2025, with aquaculture moving from 44% of that total in 2013-2015 to 52% in 2025.²²

Putting aside the non-food reasons these animals are killed, and any conversation about the value, necessity, or utility of those actions, it is clear that even the nutrient-based uses of aquatic animals, particularly finfish, has changed significantly.²³ In 1960, agricultural use of fish meal²⁴ was predominantly, and almost evenly used for pig and chicken feed.²⁵ But by 2010, 73% of fish meal was used for aquaculture, 20% for pigs, 5% for chickens, and 20% for other uses.²⁶ A similar change has occurred in the use of fish oil. In 1960, 80% of fish oil was used for hardened edible use, and 20% was for industrial use.²⁷ By 2010, 71% was used for aquafeed, 24% was used for refined edible use, and only a small percent was used for hardened edible and industrial uses.²⁸

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C. TYPES OF FISHING

Different methodologies of fishing present different concerns. Wild-caught fishing is often called capture, and “farmed” fishing is often called aquaculture.²⁹ Operations conducted entirely on land are sometimes called on-shore facilities.³⁰ Hatcheries are on-shore facilities that breed fish or aquatic animals in tanks for households or to release into streams and lakes.³¹ Aquaculture operations can be both close to a shore³² or in the deep ocean.³³ Each jurisdiction has its own rules and regulations regarding these operations.³⁴ Large scale and industrial operations have the potential to create the most harm to oceans,³⁵ animals,³⁶ and workers.³⁷ Oversight and enforcement of the existing laws are often lacking due to political will, limited resources, or the challenges of policing either the open sea or private property.³⁸ While this article will focus specifically on the wild-caught fishing industry, it is important to note that the aquaculture industry also presents significant concerns, and in recent years it has eclipsed the scale of the wild-caught fish industry because of human consumption.³⁹ In 1974, aquaculture accounted for only 7% of fish consumed by humans, but by 2004 it had increased to 39%.⁴⁰ A 2016 Food and Agriculture Organization of the United Nations (FAO) report estimates that by 2020 over 50% of all (human and non-human) food fish will come from aquaculture, and by 2030 that number will be 62%.⁴¹

D. SCALE OF FISHING OPERATIONS

The 2016 FAO report also indicated that in 2014, 49.8 million tons of finfish and 30.3 million tons of other aquatic species were produced globally via aquaculture,⁴² and the FAO forecasts the 2017 total to reach 82.5 million tons.⁴³ For 2014, wild-caught fishing accounted for an additional 93.4 million tons of animals,⁴⁴ and it is projected to reach 91.2 million tons in 2017.⁴⁵ This compares with 311.6 million tons of meat and poultry produced globally in 2014,⁴⁶ which reached 322 million tons in 2017.⁴⁷ Official statistics on the amount of fish caught each year are not available because the FAO statistics are in tonnages, not individual animals.⁴⁸ A 2010 Fish Count Report estimated that humans catch and kill 0.97 to 2.74 trillion finfish every year.⁴⁹ This estimate may be too low since the FAO fisheries calculate the amount of fish captured via tonnage.⁵⁰ This estimate does not include fish who escape from fishing gear and die, fish caught illegally (i.e., poaching), animals caught unintentionally in nets or gear as by-catch, animals who are injured or killed by discarded fishing gear (i.e., ghostfishing), or any other unreported capture.⁵¹ Removal of this many animals has a significant impact on the ecosystem and can result in food chain imbalances and the impairment of a species’ ability to reproduce.⁵²

The FAO reports suggest that the global fish trade in 2017 is worth \$141 billion dollars annually with 152.5 million tons used for food, 14.7 million tons used for feed, and 5 million tons used for other purposes.⁵³ The FAO also notes that in 2014, 56.6 million people globally were directly employed in capture or aquaculture, with 84% of these workers in Asia, and 94% of the fish farming occurring in Asia.⁵⁴ Recent estimates for the United States suggest that the wild-caught fishing industry takes about

5 million tons of aquatic animals, with another half a million coming from aquaculture.⁵⁵

E. SCIENTIFIC UNDERSTANDINGS OF THE CAPACITIES OF AQUATIC SPECIES

Scientists now know far more about the capacities of aquatic animals, which include their capacity to feel pain and suffer.⁵⁶ Studies have shown that certain aquatic species have the following capacities: (1) sentience—fish, and other aquatic animals;⁵⁷ (2) physical feeling and pain and adrenal systems;⁵⁸ (3) consciousness;⁵⁹ (4) self-awareness;⁶⁰ (5) awareness of time and long and short-term memory;⁶¹ (6) emotional responses;⁶² (7) complex cognition;⁶³ (8) recognize human faces;⁶⁴ and (8) tool use.⁶⁵ Additional science addresses the ability of some aquatic species to cooperate across species, protect their young and each other, and engage in social learning and deception.⁶⁶

These new scientific understandings require a shift in our approach to fish and other aquatic species as well as a reassessment not just of our uses of them, but also of the laws that affect and fail to protect them.⁶⁷ *We* recognize that not many people want to forgo traditional practices in order to protect fish and other aquatic animals, but *we* suggest that better animal welfare practices results in better human welfare practices. Therefore, calls for improvements should be considered.

III. THE WELFARE OF WILD-CAUGHT FISH

Humans catch and kill trillions of fish every year.⁶⁸ Because of this staggering number, their suffering is a major ethical concern.⁶⁹ As noted above, physiological and behavioral studies show that fish have the capacity to feel pain.⁷⁰ Fish welfare is harmed when they are in pain.⁷¹ Fish are capable of learning and remembering complex information, which suggests they are capable of suffering.⁷² Being caught on a hook, being crushed under other fish, and being gutted while alive are all instances where fishing practices produce painful situations; therefore, the suffering of fish must be considered.⁷³ Like other sentient animals that humans exploit and kill, humans are morally obligated to protect fish from unnecessary pain and suffering.

A. FISHING METHODS

The major fish capture methods are: trawling; purse seining; gill, tangle, and trammel nets; rod and line fishing; trolling; pole and line fishing; and longline fishing.⁷⁴ Many fish are injured in the process of being captured.⁷⁵ By-catch—the capture of non-target animals, who are usually thrown back into the sea as dead or dying back—is also a concern with most fishing methods.⁷⁶

1. TRAWLING

In trawling, a large net is dragged through the water or along the ocean floor to catch fish.⁷⁷ Fish caught by trawling are chased to exhaustion (the time varies considerably depending on species), panic, and are scraped and injured by the net.⁷⁸ Some suffocate or are crushed to death under the weight of other fish.⁷⁹ One study showed a 29% to 61% mortality rate for fish caught when trawling.⁸⁰ One study showed a 30% to 72% mortality rate (usually from injuries or exhaustion) of fish who escape

trawling.⁸¹ Additionally, when pulling fish up from deep water, they suffer decompression injuries—that is, parts of their gut are forced out through their mouths and anuses, their swim bladders burst, and their eyes bulge out of their sockets.⁸²

2. PURSE SEINING

In purse seining, a large net slowly surrounds fish and is closed at the top like a drawstring bag.⁸³ Fish panic and violently try to escape as the net gets smaller.⁸⁴ During capture, fish may be attacked by predators, and they may experience severe exhaustion and injury from other fish, the net, and when brought on board.⁸⁵ If the net is lifted out of the water to bring the fish on board, many are crushed to death.⁸⁶ Fish that are deliberately let out of the net experience high death rates up to 90%.⁸⁷ Fish caught through purse seining may also experience decompression injuries.⁸⁸

3. GILLNETTING

A gillnet hangs in the ocean and ensnares fish who swim into it by their gills.⁸⁹ Fish caught in gillnets panic and feel afraid.⁹⁰ They experience severe exhaustion during a long duration of capture spanning hours or even days (it is more stressful the longer it takes), and considerable injury is done to their skin and scales, thus interfering with their ability to breathe properly, and causing them to suffocate.⁹¹ Some fish are attacked by predators when ensnared in the net.⁹² When the net is brought onboard and the fish are taken out of it—they can suffer further injury.⁹³ Escapees are impaled on a gaff (i.e., iron hook).⁹⁴

4. TANGLE AND TRAMMEL NETTING

Tangle and trammel nets catch fish by entangling them instead of snaring their gills.⁹⁵ Fish caught by these methods likely suffer similarly to those caught by gillnets, except that that with tangle and trammel nets, fish can breathe normally and suffer less severe physical injury.⁹⁶ One study showed that 28% of fish died in trammel nets, and this increases with the duration of capture process.⁹⁷

5. ROD AND LINE FISHING & TROLLING

In rod and line fishing, fish are caught individually on a hook and line.⁹⁸ In trolling, baited lines are towed through the water.⁹⁹ Fish caught on hooks experience fear, panic, stress, and pain (most fish are hooked in or around their mouths or through their eyes).¹⁰⁰ The fear and pain that fish experience increases when the line that they are hooked to is pulled.¹⁰¹ Fish caught by trolling experience severe exhaustion.¹⁰² Fish may be impaled on a gaff to bring them onboard.¹⁰³

6. POLE AND LINE FISHING & LONGLINE FISHING

In pole and line fishing, bait (i.e., live fish) is used to stir up a feeding frenzy.¹⁰⁴ Fish are then caught on hooks, swung aboard, and slammed onto the deck, which disengages them from the hook.¹⁰⁵ In longline fishing, hundreds to thousands of baited hooks (sometimes with impaled live fish) are on one line to catch fish.¹⁰⁶ There is a long duration of capture, ranging from hours to days.¹⁰⁷ Fish caught on hooks may be attacked by predators.¹⁰⁸ Baited cages are also used to capture fish.¹⁰⁹

Fish do not experience much physical injury from this method of fishing, but they may be stressed from confinement or may be attacked by predators during the process.¹¹⁰

Live bait fish are sometimes used when catching fish.¹¹¹ Bait fish suffer fear and distress from capture, confinement (it may be for days or weeks), hook impalement, being dropped into the water (an unfamiliar environment), and being unable to escape predators.¹¹²

B. THE SLAUGHTER OF WILD-CAUGHT FISH

The majority of wild finfish who are caught die by suffocation or live gutting.¹¹³ These are prolonged ways to die. How quickly fish lose consciousness depends on their species, how well they are adapted to tolerate low levels of oxygen, their escape response (activity burns up their oxygen reserves), and the air temperature.¹¹⁴ One study showed that fish who are suffocated and eviscerated (disemboweled) become unconscious in 25 to 65 minutes, and fish who are suffocated lose consciousness in 65 to 250 minutes.¹¹⁵ Another study found that it took 2.6 to 9.6 minutes for fish who are suffocated to lose consciousness, and it took 4.5 minutes for fish who are exsanguinated (have their gills cut) to lose consciousness.¹¹⁶ Fish are also sometimes put on ice as they suffocate, which prolongs the time to lose consciousness in some species, but decreases it in other species.¹¹⁷

Additional slaughter methods include, stunning (i.e., percussive and electrical); CO₂ suffocation; baths (i.e., salt, ammonia, or ice); decapitation; asphyxiation; live chilling; gutting while alive; pithing; shooting; use of dynamite to stun or kill. Methodologies and legal restrictions vary by jurisdiction. No humane slaughter laws apply to fish or aquatic animals in the United States.¹¹⁸

C. REDUCING SUFFERING CAUSED BY FISHING

The suffering of fish can be reduced in many ways. First, the use of live bait fish should be banned, as it is unnecessary, and they suffer greatly.¹¹⁹ Second, the duration of capture should be reduced by requiring lines and nets to be checked more often, as fish suffer more the longer they are caught on a line or in a net.¹²⁰ Gillnets, which ensnare fish, should be checked every thirty minutes, as fishes' stress levels are higher the longer they are ensnared in the net.¹²¹ Third, the use of gear and equipment that causes less injury to fish should be required (e.g., circle hooks instead of traditional j-shaped hooks should be used), and the better handling of fish and the careful removal of the hook from the fish should also be required.¹²² Fourth, gillnets should be banned, and tangle nets should be used instead. Tangle nets cause less suffering because they only entangle fish, and they do not ensnare their gills.¹²³ Fifth, fishers should be required to catch fish from shallower depths (under twenty to thirty meters) to reduce decompression injuries.¹²⁴ Sixth, methods of handling and landing fish that are less painful than gaffing, and that minimize their time outside of water should be developed and required, so that they are not suffocating in air—for instance, fish pumping systems can be used.¹²⁵

To reduce fishes' suffering during slaughter, it should be required that fish are rendered unconscious before they are killed.¹²⁶ This would require that fish be rendered unconscious soon after being taken out of water, so they do not experience the (minutes to hours of) pain of being suffocated or gutted alive.¹²⁷ Methods that cause immediate loss of consciousness that lasts until death (so they do not feel themselves being killed) should be used—such examples include percussive stunning (i.e., a blow to the head), spiking (i.e., inserting a spike into the brain), and electrical stunning.¹²⁸ Immediately after stunning, fish should be bled out or killed with an electrical current.¹²⁹ Additionally, the wild-caught fishing industry should adopt automatic percussive and electrical stunning, which are devices sometimes used on boats for farmed fishing.¹³⁰ Lastly, a system for using food grade anesthetics in water, like AQUI-S, to anesthetize fish before stunning and killing should be developed so as to further reduce the pain and trauma associated with being taken out of the water (if the stunning method requires this) and stunned.¹³¹

D. MAKING LEGAL CHANGES

Globally, 93.4 million tons of fish were captured in 2014.¹³² The countries with the highest captures were China, Indonesia, the United States, and the Russian Federation.¹³³ Most fish were captured in the Northwest Pacific, Western Central Pacific, Northeast Atlantic, and Eastern Indian Ocean.¹³⁴ Many countries need to adopt new laws to provide meaningful protection for wild-caught finfish. For instance, fish welfare laws could be adopted by adding protection of their welfare to: (1) the 2030 Agenda for Sustainable Development;¹³⁵ and (2) the Code of Conduct for Responsible Fisheries.¹³⁶

1. THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

In September 2015, United Nations' Member States adopted the 2030 Agenda for Sustainable Development.¹³⁷ The Agenda's goal is to end poverty and hunger while sustainably managing natural resources (which includes wild animals killed for consumption).¹³⁸ The Agenda includes seventeen Sustainable Development Goals (SDGs), a set of "aspirational objectives with 169 targets expected to guide actions of governments, international agencies . . . and other institutions over the next 15 years (2016–2030)."¹³⁹ The SDGs set out specific objectives for countries to meet within a given time frame, with periodic monitoring to measure progress towards the objectives and ensure that no country is lagging behind.¹⁴⁰ The FAO is working with countries to ensure SDGs are integrated in national and regional policy.¹⁴¹

Many of the SDGs focus on justice. They include ending inequality, poverty, and hunger, ensuring inclusive quality education, gender equality, and access to food, water, and sustainable energy.¹⁴² One goal, SDG 14, expressly focuses on the oceans: to "conserve and sustainably use the oceans, seas and marine resources."¹⁴³ Justice for all, not just humans, should be included in these goals. In the context of our food system, justice for animals should mean, at the very least, not causing them unnecessary suffering.¹⁴⁴ Therefore, SDG 14

should be expanded with this suggested text to include the objective of protecting animals: "to protect the welfare of fish and other sentient aquatic animals who are used and killed for consumption."

The FAO helps countries meet the SDGs through the creation of targets and indicators, and provides advice on how to meet these in the United Nations Development Programme (UNDP) Support to the Implementation of the SDGs.¹⁴⁵ The FAO could create a target for reducing the suffering of fish, and an indicator to measure progress toward that goal, such as the number of countries that have adopted more humane fishing and slaughter methods. The concrete suggestions to reduce the suffering of wild-caught finfish could be included in the UNDP Support to the Implementation of SDG 14 and would make a meaningful impact in helping countries regulate their fisheries in ways that could reduce the suffering of sentient aquatic animals, like fish.¹⁴⁶

2. THE CODE OF CONDUCT FOR RESPONSIBLE FISHERIES

In 1995, more than 170 Members of the FAO adopted the Code of Conduct for Responsible Fisheries.¹⁴⁷ The Code includes goals, principles, and practical steps that Members can take to implement the principles in its national policies, such as in industry codes of good practice or legislation.¹⁴⁸ It represents a global consensus on a wide range of issues and was created by many different stakeholders in the aquaculture and fishing industries, including governmental and non-governmental organizations, fishers, aquaculturists, and the FAO.¹⁴⁹

The Code establishes principles and standards for conservation, management, and development for all fisheries, in accordance with relevant international laws.¹⁵⁰ It provides guidance to Members on how to establish or improve their legal framework regarding fisheries and guidance in creating and implementing new international agreements.¹⁵¹ One objective of the Code is to "promote protection of living aquatic resources . . ." ¹⁵² The protection of "aquatic resources" who are sentient animals,¹⁵³ like fish, should include protecting their welfare. The Code states as a general principle that, "[t]he right to fish carries with it the obligation to do so in a responsible manner."¹⁵⁴ Responsible fishing should mean giving consideration to fishes' welfare and reducing their suffering. The Code also states that "management decisions for fisheries should be based on the best scientific evidence available."¹⁵⁵ This should require Members to take into account the scientific consensus that finfish can feel pain and suffer in deciding how to manage their fisheries. The management of fisheries includes where to fish, what animals to target and kill, and what equipment and methods to use.¹⁵⁶

The Code also states that, "fisheries management organizations should apply a precautionary approach widely to conservation, management and exploitation of living aquatic resources in order to protect them . . . taking account of the best scientific evidence available."¹⁵⁷ This may mean that even if Members disagree on the strength of the evidence for pain in finfish (which many scientists believe is strong), they should apply a

precautionary approach to protecting fish welfare, and take steps to reduce unnecessary suffering.

The Code should also adopt, as a general principle, the protection of fish welfare. *We* suggest adding the following language to Article 6: “The right to fish carries with it the obligation to do so in a humane manner. Fishing methods and equipment should not cause unnecessary suffering to fish and other sentient animals. Fish caught for consumption should be given a swift and a humane (as possible) death, by rendering them unconscious before they are killed.” This language should be expanded, using the recommendations for decreasing the suffering of fish through the regulation of methods and equipment, in Article 7, Fisheries Management, and Article 8, Fishing Operations.

IV. AN OVERVIEW LABOR & HUMAN RIGHTS ISSUES IN THE GLOBAL FISHING INDUSTRY

The current state of wild fish stocks around the world is a hotly discussed topic in both popular media and academic writing.¹⁵⁸ As was discussed above, the welfare of the individual animals caught up in this system often gets overlooked. Similarly, in comparison to the environmental impacts, the welfare of the people working in this industry has received little attention until recently.¹⁵⁹ This section will provide a brief overview of some of the most pressing issues facing fishers around the world.

Despite the existence of general international labor conventions, and even conventions specific to fishing, such as the 2007 “Work in Fishing Convention,”¹⁶⁰ commercial fishing remains one of the most dangerous professions in the United States (and the world) today. Due to the fact that approximately 80% of seafood eaten in the United States today is imported, we must pay close attention to the labor and human rights issues associated with our imported seafood.¹⁶¹ To complicate matters further, both practically and legally, a significant portion of the United States’ imported seafood is caught in the United States, exported overseas for processing, and then reimported into the United States.¹⁶² This creates a very complex supply chain because it involves multiple legal jurisdictions, and it makes traceability and enforcement difficult.¹⁶³ Currently, most imported seafood in the United States comes from China, Thailand, Canada, Indonesia, Vietnam, and Ecuador.¹⁶⁴ As discussed below, many of these top exporting countries have well documented issues with general occupational hazards and working conditions as well as other more egregious human rights abuses.

A. OCCUPATIONAL HAZARDS & POOR CONDITIONS

The International Labor Organization (ILO) identifies fishing as a highly hazardous sector.¹⁶⁵ Working conditions aboard fishing vessels are amongst the worst working conditions in any industry in the world.¹⁶⁶ At sea, vessels can often operate without scrutiny depending on the flag they carry, and whether they operate in areas with limited monitoring, control, surveillance, and enforcement (MSCE)—such as the high seas.¹⁶⁷ While the

subsequent sections will discuss some of the more egregious labor and human rights issues in the global fishing industry, it is important to note that the general conditions aboard fishing vessels across the world are often substandard.¹⁶⁸ Well documented issues aboard vessels, especially in “developing” countries, include insufficient building standards, small unsuitable boats venturing far out to sea, a lack of safety equipment and training, infrequent inspections, and much more.¹⁶⁹

B. HUMAN TRAFFICKING & SLAVERY

According to the ILO, while the transatlantic slave trade has been abolished for two centuries, at least 21 million people continue to work under coercion.¹⁷⁰ Today it is estimated that approximately 90% of the world’s forced labor is extracted by private agents in labor-intensive industries like fishing.¹⁷¹ Human trafficking in the fishing sector is extremely prevalent.¹⁷² In 2014, the United States Department of State Trafficking in Persons Report found indications of human trafficking in both the wild-caught and aquaculture sectors in the following countries around the world: Angola, Bangladesh, Belize, Burma, Burundi, Cambodia, Comoros, Costa Rica, Democratic Republic of the Congo, Fiji, Ghana, Indonesia, Israel, Jamaica, Kenya, Madagascar, Malawi, Mauritius, Mongolia, Namibia, Federated States of Micronesia, Sierra Leone, Singapore, Solomon Islands, Sri Lanka, Taiwan, Tanzania, Thailand, Timor-Leste, United Kingdom, and Vietnam.¹⁷³ In 2016, a single Associated Press investigation in South East Asia led to the release of more than 2,000 slaves.¹⁷⁴ This is one isolated instance, but it may help to give perspective as to the scale of this issue globally.

C. EXPLOITATION OF MIGRANT WORKERS

Sadly, many people who fall victim to human trafficking and slavery in the fishing industry are migrant workers.¹⁷⁵ Lack of documentation, debt from trafficking fees, and language barriers make migrants particularly vulnerable to coercion and slavery. Thailand is one of the countries that has received the most media attention in relation to this particular issue.¹⁷⁶ While it is inherently difficult to find records of how many people are enslaved on Thai fishing vessels, the Thai government itself estimates that up to 300,000 people work within its fishing industry—90% of whom are migrants.¹⁷⁷ Lured by Thailand’s more prosperous economy and large pool of unskilled jobs, the vast majority of these migrants come from neighboring countries such as Cambodia and Burma.¹⁷⁸ Often times, these migrants pay brokers to help traffic them over the border and find them work in factories, on plantations, or at construction sites—but many of them will be sold onto boats instead to fill a massive labor shortage in Thailand’s fishing sector.¹⁷⁹

D. CONCLUSIONS & RECOMMENDATIONS REGARDING INTERNATIONAL LABOR & HUMAN RIGHTS

Labor and human rights abuses in the fishing industry continues to be a huge problem around the world. There are many reasons why this problem persists. First, there are the practical

concerns such as the difficulty of monitoring seafood imports to determine their origin, which is something the illegal fishing industry benefits from.¹⁸⁰ Second, global climate change and fish stock depletion are forcing vessels to go further out to sea, thus spending longer periods away from the shore.¹⁸¹ This can negatively impact the welfare of employees while simultaneously making policing these vessels more difficult.¹⁸² Third, the abuse of migrant workers is prevalent in this industry. A current example of this issue is the mass exodus of the Rohingya people from Myanmar.¹⁸³ It is estimated that at least 400,000 of this minority Muslim group have fled Myanmar in 2017 alone.¹⁸⁴ These refugees, and others in different parts of the world that heavily depend on fishing, are often stateless or working without documentation.¹⁸⁵ Increased pressure from climate change and fish stock depletion, along with a high demand for cheap seafood makes migrant workers with a fragile financial and legal status vulnerable to coercion into human trafficking and slave labor—thus creating a market for cheap or free labor in an already under-policed industry.¹⁸⁶

Labor and human rights issues in this sector are a complex international problem. Addressing this problem successfully will be difficult without cooperation from national level governments, the international community, and the private sector.¹⁸⁷ This complex and multifaceted issue requires a multipronged approach including: (1) integrating human rights and labor concerns into the broader fight against illegal, unregulated and underreported (IUU) fisheries; (2) combatting human trafficking; and (3) combatting the global refugee crisis and exploitation of migrant workers.

Tackling IUU fishing more broadly requires increased funding from the international community and the increased use of technology to facilitate greater tracking and transparency in the seafood supply chain.¹⁸⁸ Specifically, the Environmental Justice Foundation has recommended that the FAO proceed with the development of a comprehensive Global Record of shipping vessels that will assign each industrial vessel a Unique Vessel Identifier (UVI) and contain information on vessel ownership and fishing activities.¹⁸⁹ This could also be used as a method of monitoring working conditions on vessels and compliance with fisheries law.¹⁹⁰

The current international legal structure gives the United States, European Union, and other major seafood importers room to tackle human trafficking more seriously via trade law. For example, the U.S. Department of State can move countries with evidence of human trafficking to a lower tier in their annual Trafficking in Human Persons Report—so that they bear the consequences of poor human rights enforcement.¹⁹¹ The European Union has a similar program.¹⁹² This means that it is not just the responsibility of the exporting countries to combat this problem, but also the countries importing the products of, and benefiting from, this abuse.¹⁹³ These mechanisms need to be used robustly, i.e., by introducing a complete boycott of countries using slave labor in their fishing industry. As outlined above, because so many countries violate labor laws in this context, some would argue that adding enforcement

mechanisms are not practicable if people in the United States and Europe wish to continue eating seafood at the current rates.¹⁹⁴

Unfortunately, many of the reasons underlying the labor issues in fishing are hugely complex and multifaceted.¹⁹⁵ One such underlying issue is the global refugee crisis, which often results in the exploitation of migrant workers.¹⁹⁶ While many of these refugee crises issues remain outside of the scope of this paper, it may be worthwhile to consider the very current Rohingya example to help us understand this problem. As mentioned above, Rohingya people have been fleeing Myanmar for many years.¹⁹⁷ Other South East Asian countries along with the international community have been grappling with this crisis for some time.¹⁹⁸ One suggestion, which has been raised by commentators, is the possibility of adopting a European Union type approach to this migration issue.¹⁹⁹ Europe is also dealing with a migration crisis, though it not an identical situation by any means.²⁰⁰ The European Commission devised a plan for resettling refugees that would divide migrants up based on an European Union member country's economic prosperity, number of refugees already taken in, unemployment rate, and other factors.²⁰¹ Southeast Asian countries could establish a similar formula, based on gross domestic product (GDP), unemployment rates, and other factors to determine how many refugees should be resettled and where. A commentator writing for *The National* also suggested that international powers could make promises to resettle a certain number of the Rohingya each year for the next decade.²⁰² "Washington [State] has taken in large numbers of migrants from vastly different cultures before – the Hmong in the 1970s and 1980s, or the Bhutanese in the past 10 years."²⁰³ During these types of refugee crises, it is difficult to focus on other human rights violations that are occurring in the fishing industry, or even to notice the overlap in issues. But it is important to look at the local and global factors in human rights violations affecting the fishing industry in order to tackle them directly and broadly.

In an increasingly interconnected international trade community, marketplaces benefiting from trade relationships and labor from the countries mentioned above should take responsibility to support these countries' efforts to address human rights issues in the fishing industry.²⁰⁴ The nature of this industry is internationally interdependent; therefore, any solutions to this problem will need to be addressed at the national and international level as well as by the public and private sectors. In the context of overfishing, the international community has made some progress on collaborating for internationally beneficial solutions. Now we need to take a closer look at this industry and its impacts on human and non-human animals.

V. AN OVERVIEW OF LABOR ISSUES IN THE DOMESTIC FISHING & AQUACULTURE INDUSTRY

In addition to human rights concerns, workers in the fishing industry face many health and safety issues.²⁰⁵ Some of these problems are the same as their terrestrial animal agricultural worker counterparts, and some are unique.²⁰⁶ The focus here

will be on the capture segment of the fishing industry, with a brief mention of related problems in the aquaculture segment.

A. HEALTH AND SAFETY ISSUES

Discussions of fishing tend to conjure placid images of a small boat and a few friends fishing comfortably for pleasure or business.²⁰⁷ In reality, the hazards facing workers in this industry are some of the worst of any industrial sector in the United States.²⁰⁸ They include: noise; chemical exposure; fishing gear and mechanical accidents; boating accidents; musculoskeletal injuries; respiratory and immune issues; injuries cause by extreme weather; sleep deprivation; physical and psychological injuries from stress and challenges of the work, and; the lack or malfunctioning of protective equipment.²⁰⁹ Some of these injuries result in death or permanent disability.²¹⁰

In other industries, especially in the United States, accidents on the job can be responded to quickly by emergency personnel.²¹¹ Even on remote farms, medical assistance may not be terribly far away.²¹² However, for a worker injured at sea, or even on a large lake or remote river, getting attention for emergency medical conditions can be a significant hurdle.²¹³

Additional hurdles to safety include the age of fishers in this labor market. In the United States and elsewhere, some are very young,²¹⁴ and some are considerably older individuals.²¹⁵ These factors lead to additional health and safety concerns.²¹⁶ There are further hurdles to maintaining a safe working environment for those workers who do not speak English well because employers may not translate safety information, or there may be delays or confusion around communicating injuries.²¹⁷

Some of the work of the fishing industry takes place in production facilities that are prone to their own set of harms, including: repetitive motion injuries; physical injuries; psychological injuries from working long hours or days at a time, especially for those whose work focuses on killing rather than capturing animals; and zoonotic or other disease transfers.²¹⁸ Though not often calculated in industrial harm, low wages, contract work and job insecurity,²¹⁹ especially when coupled with immigration status insecurity,²²⁰ are also significant forms of harm that need to be addressed and remedied.

Agriculture and fishing are two of the deadliest jobs in the United States.²²¹ In 2014, fishing was the second worst industry in terms of health and safety, behind only logging, with a fatality rate of 110.9 per 100,000 workers.²²² The fishing industry is also poor at dealing with the economic cost of lost work and health costs because laborers in this industry had an average annual salary of only \$37,640.²²³ By comparison, terrestrial agriculture was listed as the sixth worst industry with a death rate of 26.7 per 100,000 workers (though they were somewhat better off economically with an average annual salary of \$69,880).²²⁴ In 2015, data for the agricultural, fishing, hunting, and forestry industries were merged and had the third highest *count and rate* of fatal work injuries.²²⁵

In addition to dangerous working conditions and low pay, laborers in the fishing industry also face incidences of unpaid

wages with no clarity about who to make complaints to.²²⁶ They face layoffs and interruptions to work based on weather conditions and overfishing.²²⁷ They also have to work harder, longer, and further from home to catch the same numbers of fish because stocks have been depleted and competition has increased.²²⁸ Some workers report additional problems on the job, such as harassment and concerns for their safety that stem from their gender or cultural backgrounds.²²⁹

Because some laborers in the fishing industry are independent contractors rather than employees, they face additional problems.²³⁰ They do not receive health or unemployment insurance, nor do they receive sick-leave or vacation days from their employers.²³¹ They do not always know whether they will be employed through the season, and they do not know how much work they will have from season to season.²³²

Though we are not focusing on the aquaculture segment of the fishing industry, it is useful to note some of the particular safety concerns those workers face. These include heavy metal toxins, such as lead and mercury and acute toxicity that may result from copper sulfite used as algicide, net or wood preservatives, or copper pipes.²³³ Additional concerns include closed-loop, indoor, water-recirculating production systems; harmful algal blooms in marine environments, which can cause paralytic, neurologic, amnesic, and diarrhetic shellfish poisonings and ciguatera fish poisoning; bacteria (such as *Mycobacterium marinum* and *Streptococcus iniae*) and nematode, cestode, trematode, and protozoan parasites found in fish that cause human infections; and infections, such as the shellfish origin of Norwalk virus infection.²³⁴

B. LEGAL PROTECTIONS

Policy and regulatory approaches can address dangerous working conditions to ensure the protection of the workers who are not in positions to protect themselves. However, the fishing industry has fewer health and safety regulations than most might assume along with a tangled web of oversight that leaves significant room for confusion and lack of enforcement.²³⁵

Some legal protections do exist. These include state or federal Occupational Safety and Health Administration (OSHA) regulations;²³⁶ Labor Department rules (including the Fair Labor Standards Act of 1938, as Amended);²³⁷ and the Merchant Marine Act of 1920, (the Jones Act), which allows injured people to make claims.²³⁸ For certain problems, state criminal laws or regulatory protections might apply, and in some cases, transportation rules could also be helpful.

Agencies with enforcement authority for issues relating to workers in the fishing industry include: OSHA, through the Department of Labor; the Coast Guard via the U.S. Armed Forces; U.S. Department of Homeland Security in peacetime; U.S. Department of Navy in wartime; and the local police when state or local criminal offenses are involved. Other agencies have oversight of non-worker related aspects of the fishing industry, such as the National Oceanic and Atmospheric Administration (NOAA) via the Department of Commerce; the U.S. Fish and Wildlife Service (FWS) via the Department of Interior; and the

U.S. Department of Agriculture (USDA) via the Department of Commerce. There may be additional regulations from these agencies that workers can rely on if their employers fail to follow applicable rules.

Health and safety standards for workers are set by OSHA or delegated to state authority when plans have been approved by OSHA.²³⁹ Twenty-two states, Puerto Rico, and the Virgin Islands have OSHA-approved state plans.²⁴⁰ These plans are required to be at least as effective as federal OSHA standards and may go further than the federal guidelines.²⁴¹ States may adopt their own standards and enforcement policies, though most have adopted standards that are identical to the federal OSHA standards.²⁴² OSHA has foreign language guidance that mandates safety instructions be offered in different languages where applicable—some states have created versions of these as well.²⁴³

OSHA does not address fishing in a separate sub-part of the regulations, so it is only covered by the general duty clause,²⁴⁴ the general industry,²⁴⁵ and the agricultural sections (which may potentially apply to aquaculture operations).²⁴⁶ There are shipyard and marine terminal standards as well.²⁴⁷ These sections that include specific standards need to apply the general duty clause where those specific standards are silent.

OSHA generally addresses some of the issues fishers may face including: noise; ventilation; air quality; equipment and protective gear; emergency action plans; work surfaces; ladders; stairways; workplace hazards; and medical and first aid.²⁴⁸ However, some of the guidelines are not helpful for workers on fishing boats where surfaces are routinely slippery, and air quality cannot be improved by proper ventilation or temperature regulation. The commercial diving and logging industries have their own sub-parts to address industry specific concerns.²⁴⁹ The fishing industry does not, and it should. The Coast Guard also implements some safety regulations through the Department of Homeland Security.²⁵⁰ The Coast Guard published a notice of rulemaking in 2016 to align its work with recent legislation.²⁵¹

Congress passed the Fishermen's Protective Act of 1967 (enacted in 1971),²⁵² which sounds like it should protect the safety of fishers, but it focuses on vessel rights, compensation for seizure, and other economic aspects of the trade.²⁵³ The largest work of Congress is the Magnuson-Stevens Fishery Conservation and Management Act, which relates to and regulates the health and use of fisheries, but not the health of the workers.²⁵⁴ Congress is currently working on the Honest Fishermen Act of 2017 for consumer protection and product traceability.²⁵⁵ Even when there are stories in the news about safety issues facing fishers, they often neglect U.S. workers.²⁵⁶ Reports about the fishing industry from those tasked with protecting it give short shrift to worker safety issues.²⁵⁷ The Center for Disease Control (CDC) developed a manual called, *Safety Training for Fishermen*.²⁵⁸ They have also, through the National Institute for Occupational Safety and Health (NIOSH), made recommendations in order to reduce risks.²⁵⁹ But it is unclear how many fishers have access to this material from their employers or how many employers are in compliance with the recommendations

and requirements.²⁶⁰ NOAA has a specific safety program for its observers, who are increasingly at risk when doing their jobs.²⁶¹

C. POTENTIAL REFORMS

Some relatively simple regulatory reform is possible. OSHA could adopt a specific set of guidelines that apply to the fishing industry. Given the differences between fishing for trout, salmon, lobster, crabs, shrimp—to name a few—this would be a significant undertaking. But it would be worth the effort to protect workers from the poor conditions they have in common, and it could leave room for some additional regulatory requirements that relate to specific segments of the industry. In addition to looking at other industry specific models for this type of regulation, OSHA could also look to the United Kingdom and the European Union for examples of their regulations in place to protect workers.²⁶²

In addition to new regulations, attention must be paid to enforcement of the regulations that currently exist and to removing barriers facing workers who wish to exercise their rights. More resources need to be spent in enforcement and more clarity is required in informing workers of their rights and assisting them in exercising those rights. Legal and health services should be more readily available for workers in terms of affordability and numbers of service providers.

Consumer awareness campaigns could be effective tools to educate workers about harms, ways to protect themselves from harm, and remedies available after harm occurs. One driver of change is information, which is greatly needed in this sector to understand and assess current realities and to inform efforts to improve the industry. The FAO has made this one of its focal points.²⁶³ It has also produced reports that are helpful to understand the problems faced by fishers in developing countries.²⁶⁴

VI. ADDITIONAL ISSUES BEYOND THE SCOPE OF THIS ARTICLE


There are of course significant environmental concerns related to both capture and aquaculture fisheries with regard to their impacts and their inputs.²⁶⁵ Though addressing environmental and environmental justice impacts is beyond the scope of this article, it is important to note, and to indicate that there are differing approaches to the conversation as well as some important controversies to consider.²⁶⁶

Tribal issues also complicate and inform conversations about fishing.²⁶⁷ Tribal treaty rights need to be recognized and supported because they are relevant in terms of competition for scarce resources.²⁶⁸ Tribal fishing also tends to offer alternative methodologies and concepts of sustainability that may offer more protection for fishers, the ecosystem, and the fish themselves.²⁶⁹ Another issue that is very important but beyond the scope of this paper is the impact of poverty on food security and the impact of related decision-making on the use of fisheries—both capture and aquaculture.²⁷⁰ It is also crucial to be mindful of how these conversations and policymaking decisions both impact and exclude native people, foreign workers,

and gender issues so that these problems can be alleviated. Doing so, *we believe*, will inure to the benefit of people, animals, and the environment.

VII. CONCLUSION

Much work needs to be done to protect workers and aquatic animals from the harms resulting from the fishing industry. Legal, health, and social education as well as increased legal regulation will help alleviate the problems discussed in this article. More far-reaching solutions are also

possible. Alternatives to the use of aquatic animals as food for humans or feed for other animals, or for industrial uses are possible. Increased venture capital funding would spur and hasten development of these alternatives, which would protect humans, animals, and the environment. In the meantime, outdated capture and aquaculture methods can be replaced by new technologies that are safer for people and less harmful to aquatic animals. The law plays an important role in responding to and preventing harms. The fishing industry is an area that is in dire need of the attention of legal reformers. 

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³² *Sustainable Aquaculture*, OCEAN FOUNDATION, <https://www.oceanfdn.org/resources/sustainable-aquaculture> (last visited Dec. 20, 2017) (description of near shore aquaculture systems).

³³ See, e.g., *About Us*, OPEN BLUE COBIA, <http://www.openblue.com/open-ocean-aquaculture> (last visited Dec. 20, 2017) (describing Open Blue’s use of deep water “SeaStations”); Rebecca R. Gentry, *Offshore Aquaculture: Spatial Planning Principles for Sustainable Development*, 7 ECOLOGY & EVOLUTION 733 (2016) (describing of Open Blue’s deep ocean farms).

³⁴ See generally *Aquaculture*, NOAA, http://www.nmfs.noaa.gov/aquaculture/faqs/faq_aq_101.html (last visited Dec. 20, 2017) (providing information about United States aquaculture regulations generally); *Aquaculture*, EUROPEAN COMM’N, https://ec.europa.eu/fisheries/cfp/aquaculture_en (last visited Dec. 20, 2017) (explaining that some countries are only recently beginning to develop aquaculture regulations); FAO, Kenya Gazette Supplement No. 156: Fisheries Management and Development Act, 2016 (Sept. 9, 2016), <http://extwprlegs1.fao.org/docs/pdf/ken160880.pdf> (providing Kenya’s fisheries laws as an example of diversity within the global regulations); *Fisheries Law*, HG.ORG LEGAL RESOURCES, <https://www.hg.org/fisheries-law.html> (last visited Dec. 20, 2017) (listing different laws, agencies, and organizations regarding fishing).

³⁵ See *Overfishing*, WORLD WILDLIFE FUND, <https://www.worldwildlife.org/threats/overfishing> (last visited Dec. 20, 2017); FACT SHEET: OCEAN FISH FARMING CAN HURT COMMERCIAL FISHING, FOOD & WATER WATCH (July 2008), https://www.foodandwaterwatch.org/sites/default/files/ocean_fish_farming_commercial_fs_july_2009.pdf; see generally *Fisheries Impact on the Ecosystem*, FAO,

<http://www.fao.org/docrep/006/y4773e/y4773e05.htm> (last visited Dec. 20, 2017) (noting the damages that aquaculture could cause to local environment and its respective ecology).

³⁶ See Brian Tomasik, *How Wild-Caught Fishing Affects Wild-Animal Suffering*, ESSAYS ON REDUCING SUFFERING (last updated Feb. 8, 2017), <http://reducing-suffering.org/wild-caught-fishing-affects-wild-animal-suffering/>; *Destructive Fishing Practices and Bycatch*, SLOW FOOD, http://slowfood.com/slowfish/pagine/eng/pagina.lasso?id_pg=43 (last visited Dec. 20, 2017); *Fish Farming*, ANIMAL ETHICS, <http://www.animal-ethics.org/animal-exploitation-section/animals-used-food-introduction/fish-farming/> (last visited Dec. 20, 2017); see generally FISH FEEL, <http://fishfeel.org/> (last visited Dec. 20, 2017) (describing how industrial fishing hurts aquatic animals).

³⁷ See Debra M. Lambert et al., *Guidance on Fishing Vessel Risk Assessments and Accounting for Safety at Sea in Fishery Management Design*, NOAA 18, 22 (Aug. 2015), http://www.nmfs.noaa.gov/sfa/publications/technical-memos/nmfs_osf_tm2.pdf; OSHA, COMMERCIAL FISHING: FALL PROTECTION SAFETY FACT SHEET (2011), <https://www.osha.gov/Publications/fallprotectionsafety-commercialfishing-factsheet.pdf>; *Safety for Fisherman – Home*, FAO, <http://www.fao.org/fishery/safety-for-fishermen/en/> (last visited Dec. 20, 2017) (noting the dangers posed to workers) [hereinafter *Safety for Fishermen*].

³⁸ See Vanda Felbab-Brown, *The Vanishing Vaquita and the Challenges of Combating Wildlife Trafficking*, BROOKINGS (June 5, 2017), <https://www.brookings.edu/blog/order-from-chaos/2017/06/05/the-vanishing-vaquita-and-the-challenges-of-combating-wildlife-trafficking/>; *Fishing Problems: Poor Fisheries Management*, WORLD WILDLIFE FUND, http://wwf.panda.org/about_our_earth/blue_planet/problems/fisheries_management/ (last visited Dec. 20, 2017); *Fisheries*, GREEN FACTS, <https://www.greenfacts.org/en/fisheries/1-2/07-regulation.htm> (last visited Dec. 20, 2017); see generally Valentin Schatz, *Marine Fisheries Law Enforcement Partnerships in Waters Under National Jurisdiction: The Legal Framework for Inter-State Cooperation and Public-Private Partnerships with Non-Governmental Organizations and Private Security Companies*, 32 OCEAN YEARBOOK 1 (2018), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2987883 (noting key difficulties that exist in policing fishing industry).

³⁹ See STATE OF WORLD FISHERIES 2016, *supra* note 19, at 2.

⁴⁰ *Id.* (noting the limited consumption of farmed fish in the past and the growth in consumption of farmed fish today).

⁴¹ *Id.* at 70-79.

⁴² *Id.* at 5.

⁴³ FAO, FOOD OUTLOOK: BIENNIAL REPORT ON GLOBAL FOOD MARKETS 8 (June 2017), <http://www.fao.org/3/a-i7343e.pdf> (predicting increase in output of farmed finfish and other fish) [hereinafter FOOD OUTLOOK].

⁴⁴ STATE OF WORLD FISHERIES 2016, *supra* note 19, at 5.

⁴⁵ FOOD OUTLOOK, *supra* note 43, at 8 (projecting the expansion in amount of wild caught fish).

⁴⁶ *Id.* at 7.

⁴⁷ *Id.*

⁴⁸ Alison Mood, *Worse Things Happen at Sea: The Welfare of Wild-Caught Fish*, FISHCOUNT 70 (2010), <http://www.fishcount.org.uk/published/standard/fishcountfullrptSR.pdf>; *Fishery Statistical Collections: Global Capture Production*, FAO, <http://www.fao.org/fishery/statistics/global-capture-production/3/en> (last visited Dec. 20, 2017).

⁴⁹ A. Mood & P. Brooke, *Estimating the Number of Fish Caught in Global Fishing Each Year*, FISH COUNT 14 (2010), <http://fishcount.org.uk/published/std/fishcountstudy.pdf>.

⁵⁰ See *id.* (“[T]he number of fish represented by an average annual recorded capture tonnage . . . does not include fish caught in unrecorded capture nor the unaccounted numbers of fish that escape from fishing gear but are fatally stressed or injured in the process.”); Daniel Pauly & Dirk Zeller, *Catch Reconstructions Reveal That Global Marine Fisheries Catches Are Higher Than Reported and Declining*, 7 NATURE COMM. 1, 1-6 (Jan. 19, 2016), <https://www.nature.com/articles/ncomms10244.pdf>.

⁵¹ Mood & Brooke, *supra* note 49, at 13.

⁵² See *Overfishing*, WWF, <https://www.worldwildlife.org/threats/overfishing> (last visited Dec. 20, 2017) (stating that the makeup of marine communities is changing with an increase in prey marine species due to targeted fishing of predator marine species) [hereinafter *Overfishing*]; see also *Fisheries Impact on the Ecosystem*, FAO, <http://www.fao.org/docrep/006/y4773e/y4773e05.htm> (last visited Oct 22, 2017) (finding that a decrease of marine predators, including tuna or sharks, could lead to an abnormally large amount of marine prey

animals, which could create problems with the food chain and composition of species).

⁵³ FOOD OUTLOOK, *supra* note 43, at 8.

⁵⁴ STATE OF WORLD FISHERIES 2016, *supra* note 19, at 5.

⁵⁵ *Id.* at 11, table 2.

⁵⁶ See generally Ian Johnston, *Fish Are Sentient Animals Who Form Friendships and Experience ‘Positive Emotions,’ Landmark Study Suggests*, INDEPENDENT (Mar. 31, 2017), <http://www.independent.co.uk/news/science/fish-sentient-animals-friends-positive-emotions-study-study-source-ethics-eating-pescaterians-vegans-a7660756.html>; see also Donald M. Broom, *Considering Animals’ Feelings*, ANIMAL SENTIENCE 8-9 (2014), <http://animalstudiesrepository.org/cgi/viewcontent.cgi?article=1015&context=animsent> (asserting that fish have the capacity to feel pain); Nathan Runkle, *New Scientific Study: Crabs, Lobsters, and Other Aquatic Animals Feel Pain*, MERCY FOR ANIMALS (Jan. 18, 2013), <http://www.mercyforanimals.org/new-scientific-study-crabs-lobsters-and-other-aquatic-animals-feel-pain> (commenting that hermit crabs and prawns display behaviors of pain avoidance); Culum Brown, *Fish Intelligence, Sentience & Ethics*, ANIMAL STUDIES REPOSITORY (2015), http://animalstudiesrepository.org/cgi/viewcontent.cgi?article=1074&context=acwp_asie (stating that fish suffering from pain demonstrate lack of attention to stimuli).

⁵⁷ See Robert W. Elwood & Laura Adams, *Electric Shock Causes Physiological Stress Responses in Shore Crab, Consistent with Prediction of Pain*, ROYAL SOC’Y PUB. (2015), <http://rsbl.royalsocietypublishing.org/content/roybiolett/11/11/20150800.full.pdf> (concluding that decapods exhibit the requisite behavioral and physiological responses to aversive stimuli to indicate pain in animals); see also Barry Magee & Robert W. Elwood, *Shock Avoidance by Discrimination Learning in the Shore Crab Avoidance by Discrimination Learning in the Shore Crab (Carcinus maenas) is Consistent with a Key Criterion for Pain*, 216 J. OF EXPERIMENTAL BIOLOGY 353, 357 (2013), <http://jeb.biologists.org/content/jeb/216/3/353.full.pdf> (finding that crabs presented with two locations changed their previous preferred location based on learning which location administered a shock and this is indicative, though not definitive, of their ability to experience pain); Jennifer A. Mather & Claudio Carere, *Cephalopods are the Best Candidates for Invertebrate Consciousness*, ANIMAL SENTIENCE 2 (2016), <http://animalstudiesrepository.org/cgi/viewcontent.cgi?article=1127&context=animsent> (stating cephalopods have been accepted by neuroscientists as sentient animals); Gary Armstrong, *How is Nociceptive ‘Pain’ Processed by Squid?*, 216 J. OF EXPERIMENTAL BIOLOGY vii (2013), <http://jeb.biologists.org/content/jeb/216/17/vii.full.pdf> (stating cephalopods have complex nervous systems that allow them to interact socially and learn); Roger J. Crook, *Squid Have Nociceptors That Display Widespread Long-Term Sensitization and Spontaneous Activity After Bodily Injury*, 33 J. OF NEUROSCIENCE 10021, 10024-25 (June 12, 2013), <http://www.jneurosci.org/content/jneuro/33/24/10021.full.pdf> (stating that squid, like mammals, demonstrate adaptive responses to injuries and could potentially experience pain due to lingering activity in nociceptors after injuries); Olivia N. Werner, *Is the Lobster Worth Considering?*, 33 J. OF NEUROSCIENCE 5, 11 (2013), <http://www.jneurosci.org/content/33/24/10021.full> (stating that lobsters could feel pain). But see Jean S. Auplay et al., *Arm Injury Produces Long-Term Behavioral and Neural Hypersensitivity In Octopus*, 558 NEUROSCIENCE LETTERS 137, 141 (2013), <http://www.sciencedirect.com/science/article/pii/S0304394013009932> (concluding that octopuses “respond to noxious stimuli with reflex avoidance that probably does not require higher cognitive processing” and although octopuses arms and mantles contain sensory units that conduct noxious stimulation to higher processing center, whether there is pain associated with noxious sensory input is unclear).

⁵⁸ See Lynne U. Sneddon, *Pain in Aquatic Animals*, ANIMAL STUDIES REPOSITORY (2015), http://animalstudiesrepository.org/cgi/viewcontent.cgi?article=1054&context=acwp_asie (stating that fish, crustaceans, and mollusks (1) demonstrate behavioral responses to potentially painful events, and (2) that all three have at least most of the criteria needed to experience pain); Lynne U. Seddon, *Pain Perception In Fish: Indicators and Endpoints*, ANIMAL STUDIES REPOSITORY (2009), http://animalstudiesrepository.org/cgi/viewcontent.cgi?article=1010&context=acwp_aff (concluding “fish are capable of nociception and appear to experience a negative affective state”); see also Isabelle Maccio-Hage, *Pain in Fish*, FAIR-FISH (2005), http://www.fair-fish.ch/media/filer_public/c8/41/c841966b-11d3-4673-9476-fbd93c5ab3c6/tmpim-port0eseir.pdf (asserting that fish demonstrate their ability to feel pain through changes in behavior when confronted with noxious stimuli); Brown, *supra* note 56 (stating that fish have the requisite “hardware” to feel pain); Culum Brown, *How Fish Think and Feel, And Why We Should Care About Their Welfare*, WILDLIFE AUSTRAL. 13-14 (Mar. 2016), <https://www.researchgate.net/>

publication/297577331_How_fish_think_and_feel_and_why_we_should_care_about_their_welfare (finding that brain structures in fish include areas thought to be involved in emotional and cognitive functions); John Webster, *Fish are Sentient Beings*, 14, 17-22 (2009), <http://www.fishcount.org.uk/published/low/fishcountchapter3LR.pdf> (concluding fish are sentient animals, meaning they are capable of feeling fear and pain, and they do so via pain receptors, or nociceptors, which connect to the brain).

⁵⁹ See FRANCIS CRICK MEMORIAL CONFERENCE, THE CAMBRIDGE DECLARATION ON CONSCIOUSNESS (July 7, 2012), <http://fcmconference.org/img/CambridgeDeclarationOnConsciousness.pdf> (concluding that non-human animals, including octopuses, possess neurological substrates that create consciousness).

⁶⁰ See Brown, *supra* note 56 (asserting that fish may be capable of self-awareness as demonstrated by their ability to recognize themselves through smell).

⁶¹ See Lester R. Aronson, *Orientation and Jumping Behaviour in the Gobiid Fish Bathygobius Soporator*, 1486 Am. Museum Novitates 1, 17-18 (1951), <http://digitalibrary.amnh.org/bitstream/handle/2246/3993/v2/dspace/ingest/pdfSource/nov/N1486.pdf?sequence=1&isAllowed=y> (stating that goby fish use their memory of the surrounding topography when they are trapped in pools of water during low tides and can retain such memory for two weeks); Brown, *supra* note 56 (stating fish have demonstrated a capacity for long term memory by finding and remembering a certain way to avoid negative stimuli); A. Gómez et al., *Relational and Procedural Memory Systems in the Goldfish Brain Revealed by Trace and Delay Eyeblink-Like Conditioning*, 167 PSYCHOLOGY & BEHAVIOR 332, 338-340 (2016), https://www.researchgate.net/publication/308978310_Relational_and_procedural_memory_systems_in_the_goldfish_brain_revealed_by_trace_and_delay_eyeblink-like_conditioning (finding that memories of fish go further than just spatial knowledge or maps; like mammals, fish can form memories that connect stimuli to events); S. Perathoner et al., *Potential of Zebrafish as a Model for Exploring the Role of the Amygdala in Emotional Memory and Motivational Behavior*, 94 J. OF NEUROSCIENCE RES. 445, 446, (2016), https://www.researchgate.net/publication/292949100_Potential_of_zebrafish_as_a_model_for_exploring_the_role_of_the_amygdala_in_emotional_memory_and_motivational_behavior.

⁶² See V.A. Braithwaite & P. Boulcott, *Pain Perception, Aversion and Fear in Fish*, 75 DISEASES OF AQUATIC ORGANISMS 131, 136-37 (2007), http://www.int-res.com/articles/dao_0a/d075p131.pdf (concluding that fish may feel suffering based on the findings that: fish and mammals respond to aversive stimuli in similar ways; and fish have the ability to remember and anticipate aversive stimuli); Catarina I.M. Martins et al., *Behavioural Indicators of Welfare in Farmed Fish*, 38 FISH PHYSIOLOGY & BIOCHEMISTRY 17, 31 (2010), <http://link.springer.com/article/10.1007/s10695-011-9518-8> (stating that research in cognitive, neuromatic, and emotional areas of fish behavior show fish are sentient beings); Victoria A. Braithwaite & Felicity Huntingford, *Variation in Emotion and Cognition Among Fishes*, 26 J. AGRIC. & ENV'TL ETHICS 7 (2011), https://www.researchgate.net/publication/257576371_Variation_in_Emotion_and_Cognition_Among_Fishes (finding some species of fish do have to cognitive abilities to experience emotions); Sonia Rey et al., *Fish Can Show Emotional Fever: Stress-induced Hyperthermia in Zebrafish*, ROYAL SOC'Y PUB. (2015), <http://rspb.royalsocietypublishing.org/content/royprsb/282/1819/20152266.full.pdf> (concluding fish have the capacity for stress-induced hyperthermia and that indicates sentience or consciousness).

⁶³ Lucie H. Salwiczek et al., *Adult Cleaner Wrasse Outperform Capuchin Monkeys, Chimpanzees and Orangutans in a Complex Foraging Task Derived from Cleaner – Client Reef Fish Cooperation*, 7.11 PLOS ONE 1, 5 (2012), <http://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0049068&type=printable>.

⁶⁴ Ulrike E. Siebeck, *Fish are Flexible Learners Who Can Discriminate Human Faces*, ANIMAL SENTIENCE 2 (2017), <http://animalstudiesrepository.org/cgi/viewcontent.cgi?article=1194&context=animsent>; see Cait Newport et al., *Discrimination of Human Faces by Archerfish (Toxotes Chatareus)*, SCI. REP. (June 7, 2016), <http://www.nature.com/articles/srep27523> (stating that fish can learn at least some aspects of human facial recognition).

⁶⁵ Brown, *supra* note 56.

⁶⁶ See generally JONATHAN BALCOMBE, WHAT A FISH KNOWS: THE INNER LIVES OF OUR UNDERWATER COUSINS 177, 195-199 (2016) (stating that fish learn from other species, engage in deception, and protect their eggs and their fry).

⁶⁷ See *Animal Protection Laws of the United States of America and Canada*, ANIMAL LEGAL DEF. FUND, <http://aldf.org/resources/advocating-for-animals/animal-protection-laws-of-the-united-states-of-america-and-canada/> (last

visited Dec. 20, 2017) (discussing state anti-cruelty laws with states that do not include aquatic animals in their protection).

⁶⁸ Mood & Brooke, *supra* note 49, at 14.

⁶⁹ See Mood, *supra* note 48, at 71 (explaining that about one trillion fish are caught each year).

⁷⁰ P. J. Ashley & L. U. Sneddon, *Pain and Fear in Fish*, in FISH WELFARE 49, 53-68 (Edward J. Branson ed., 2008).

⁷¹ See *id.* at 68 (discussing the results of various studies suggesting that “[fish] wellbeing is adversely affected by potentially painful and fearful situations”); see *infra* Section II (discussing the abilities of fish).

⁷² Victoria A. Braithwaite & Philip Boulcott, *Can Fish Suffer?*, in FISH WELFARE 78, 88 (Edward J. Branson ed., 2008).

⁷³ Ashley & Sneddon, *supra* note 70, at 49.

⁷⁴ Mood & Brooke, *supra* note 49, at 4-5.

⁷⁵ See Petri Suuronen, *Mortality of Fish Escaping Trawl Gears* 21 (FAO, Fisheries, Technical Paper No. 478, 2005), <http://www.fao.org/docrep/008/y6981e/y6981e00.htm> (explaining that all major fishing gear types can cause some injury to fish).

⁷⁶ See Mood, *supra* note 48, at 71; Kieran Kelleher, *Discards in the World's Marine Fisheries: An Update* iv (FAO Fisheries Technical Paper 470, 2005), <http://www.fao.org/3/a-y5936e.pdf> (stating that 8% of the catch is discarded); Harish, *How Many Animals Does a Vegetarian Save?*, COUNTING ANIMALS (Mar. 16, 2015), <http://countinganimals.com/how-many-animals-does-a-vegetarian-save> (stating that due to American consumption of seafood, an estimated 14 to 32 million animals are caught as bycatch every year). A discussion on how to reduce bycatch is outside the scope of this paper.

⁷⁷ Neville G. Gregory, *Fish*, in ANIMAL WELFARE AND MEAT SCI. 195 (1998).

⁷⁸ *Id.* at 198.

⁷⁹ *Id.*

⁸⁰ *Id.*

⁸¹ *Id.*

⁸² *Id.*

⁸³ *Id.* at 195.

⁸⁴ Mood & Brooke, *supra* note 49, at 33-34.

⁸⁵ See *id.* at 37 (explaining that when fish are hauled on board, the fish can be injured, crushed, severely exhausted, or attacked by predators when caught); A.P. Farrell et al., *Physiological Status of Coho Salmon (Oncorhynchus kisutch) Captured in Commercial Nonretention Fisheries*, 57 CANADIAN J. FISHERIES & AQUATIC SCIENCES. 1668, 1668 (2000) (explaining that after being captured, 303 adult coho salmon were found to be in a state of severe metabolic exhaustion after arriving onboard).

⁸⁶ Mood & Brooke, *supra* note 49, at 37.

⁸⁷ S.J. Lockwood et al., *The Effects of Crowding on Mackerel (Scomber Scombrus L.) — Physical Condition and Mortality*, 2 FISHERIES RES. 129, 145 (1983).

⁸⁸ See Mood & Brooke, *supra* note 49, at 33 (explaining that fish may die from “skin and scale damage incurred from collisions with other fish and with the net walls”).

⁸⁹ Gregory, *supra* note 77, at 195-96.

⁹⁰ Mood & Brooke, *supra* note 49, at 40.

⁹¹ See Farrell et al., *supra* note 85, at 1677 (explaining that gillnet caught fish maybe exhausted before they come onboard); Gregory, *supra* note 77, at 199 (explaining that gillnets cause considerable damage to skin and scales); Mood & Brooke, *supra* note 49, at 41 (explaining that fish can be caught in the net for a long time, which can prevent fish from breathing, cause skin and scales damages, and severe exhaustion).

⁹² Mood & Brooke, *supra* note 49, at 5.

⁹³ *Id.* at 41-42.

⁹⁴ See Gregory, *supra* note 77, at 199 (explaining that gaffing loose fish causes additional damage to the fish).

⁹⁵ Mood & Brooke, *supra* note 49, at 40.

⁹⁶ F.S. Chopin et al., *A Comparison of the Stress Response and Mortality of Sea Bream Pagrus Major Captured by Hook and Line and Trammel Net*, 28.3 FISHERIES RESEARCH 277, 285-87 (1996); see G.E. Vander Haegen et al., *Survival of Spring Chinook Salmon Captured and Released in a Selective Commercial Fishery Using Gill Nets and Tangle Nets*, 68 FISHERIES RES. 123, 123, 128-29 (2004) (bleeding is more common when fish are captured by gillnets than tangle nets).

⁹⁷ Chopin et al., *supra* note 96, at 277, 285-86 (“No fish survived longer than 18 h of capture by trammel net.”).

⁹⁸ Mood & Brooke, *supra* note 49, at 44.

- ⁹⁹ *Id.* at 47.
- ¹⁰⁰ *Id.*; Gregory, *supra* note 77, at 199–200.
- ¹⁰¹ JOHN WEBSTER, ANIMAL WELFARE: LIMPING TOWARDS EDEN 221–22 (James K. Kirkwood et al. eds., 2d ed. 2005).
- ¹⁰² Farrell et al., *supra* note 85, at 1669.
- ¹⁰³ Gregory, *supra* note 77, at 196.
- ¹⁰⁴ Mood & Brooke, *supra* note 49, at 49.
- ¹⁰⁵ *Id.*; see also Gregory, *supra* note 77, at 196 (explaining that because the hook is barbless, the fish disengages from the hook at the end of the swing).
- ¹⁰⁶ Mood & Brooke, *supra* note 49, at 52.
- ¹⁰⁷ *Id.*
- ¹⁰⁸ *Id.* at 53.
- ¹⁰⁹ *Id.* at 55.
- ¹¹⁰ *Id.*; see also R.G. Cole et al., *Selective Capture of Blue Cod Parapercis Colias by Potting: Behavioural Observations and Effects of Capture Method on Peri-mortem Fatigue*, 60 FISHERIES RES. 381, 381 (2003).
- ¹¹¹ Mood & Brooke, *supra* note 49, at 58; Gregory, *supra* note 77, at 201.
- ¹¹² Mood & Brooke, *supra* note 49, at 58.
- ¹¹³ *Id.* at 66; see also D. Robb & S. Kestin, *Methods Used to Fish: Field Observations and Literature Reviewed*, 11 ANIMAL WELFARE 269, 270–73 (2002) (explaining how fish are killed by removal from water, having their gills cut and then put back in the water, or having parts or all of their internal organs eviscerated).
- ¹¹⁴ See Mood & Brooke, *supra* note 49, at 66.
- ¹¹⁵ *Id.*
- ¹¹⁶ Robb & Kestin, *supra* note 113, at 270, 272.
- ¹¹⁷ See *id.* at 271 (timing for loss of brain function is based on the differential between the ambient fish temperature and the temperature of the ice); Mood & Brooke, *supra* note 49, at 66.
- ¹¹⁸ See Kelly Levenda, *Legislation to Protect the Welfare of Fish*, 20 ANIMAL L. 119, 127, 136–37 (2013).
- ¹¹⁹ See Mood & Brooke, *supra* note 49, at 62–63 (chumming and impaling baitfish on hooks should be avoided to reduce use and suffering).
- ¹²⁰ See *id.* at 62–63.
- ¹²¹ See *id.* at 41, 43, 62.
- ¹²² See *id.* at 45.
- ¹²³ See *id.* at 62.
- ¹²⁴ See Gregory, *supra* note 77, at 201; see Mood & Brooke, *supra* note 49, at 28, 61–63.
- ¹²⁵ See Mood & Brooke, *supra* note 49, at 61.
- ¹²⁶ See *id.* at 68; see generally Humane Slaughter of Livestock, 9 C.F.R. § 313.30 (2017) (recognizing that being rendered unconscious before being killed is required for some farmed land animals not chickens, although they make up the majority of land animals killed for consumption).
- ¹²⁷ See Mood & Brooke, *supra* note 49, at 61.
- ¹²⁸ *Id.*
- ¹²⁹ *Id.*
- ¹³⁰ *Id.*
- ¹³¹ *Id.* at 69.
- ¹³² STATE OF WORLD FISHERIES 2016, *supra* note 19, at 8.
- ¹³³ *Id.*
- ¹³⁴ *Id.*
- ¹³⁵ See *id.* at 3, 7.
- ¹³⁶ See *id.* at 5–6.
- ¹³⁷ U.N., TRANSFORMING OUR WORLD: THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT 6 (2015), <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf> [hereinafter TRANSFORMING OUR WORLD].
- ¹³⁸ *Id.* at 5.
- ¹³⁹ STATE OF WORLD FISHERIES 2016, *supra* note 19, at 5.
- ¹⁴⁰ *Id.*
- ¹⁴¹ See *id.*
- ¹⁴² TRANSFORMING OUR WORLD, *supra* note 137, at 14–18.
- ¹⁴³ *Id.* at 13.
- ¹⁴⁴ Total justice for animals within our food system would mean not unnecessarily killing them for consumption.
- ¹⁴⁵ See Sustainable Development Goal 14, U.N. SUSTAINABLE DEV. KNOWLEDGE PLATFORM, <https://sustainabledevelopment.un.org/sdg14> (last visited Dec. 20, 2017) (stating the specific goals to be achieved within a timeframe); see generally UNDP Support to the Implementation of the Sustainable Development Goals, U.N. DEV. PROGRAMME, <http://www.undp.org/content/undp/en/home/librarypage/sustainable-development-goals/undp-support-to-the-implementation-of-the-2030-agenda/> (last visited Dec. 20, 2017) (discussing the program’s policy initiatives to end poverty while reducing inequalities and exclusionary measures in place around the world).
- ¹⁴⁶ See generally UNDP Support to the Implementation of the Sustainable Development Goal 14, U.N. DEV. PROGRAMME SUSTAINABLE DEV. GOALS 6, 1–10 (Jan. 2016), http://www.undp.org/content/dam/undp/library/Sustainable%20Development/14_Oceans_Jan15_digital.pdf?download (discussing UNDP’s role in achieving Sustainable Development Goal 14).
- ¹⁴⁷ FAO, WHAT IS THE CODE OF CONDUCT FOR RESPONSIBLE FISHERIES? 2–12 (2001), <http://www.fao.org/3/a-x9066e.pdf> (discussing the principles, goals, and elements of the Code of Conduct) [hereinafter FISHERIES CODE OF CONDUCT 2001].
- ¹⁴⁸ See *id.* at 1–2.
- ¹⁴⁹ See *id.*
- ¹⁵⁰ See FAO, CODE OF CONDUCT FOR RESPONSIBLE FISHERIES, 2–3 (1995), <http://www.fao.org/3/a-v9878e.pdf> [hereinafter FISHERIES CODE OF CONDUCT 1995] (stating principles of article 2 of the Code of Conduct).
- ¹⁵¹ See *id.* at 2.
- ¹⁵² See *id.* at 2.
- ¹⁵³ See *id.* at 5, 6, 21, 25 (discussing the sentience of fish and other aquatic animals); *infra* Section II.
- ¹⁵⁴ FISHERIES CODE OF CONDUCT 1995, *supra* note 150, at 4.
- ¹⁵⁵ See *id.* at 5.
- ¹⁵⁶ See *id.* at 7, 21, 28, 29 (discussing how articles 6, 7, & 8 of the Code of Conduct regulate fishing locations, methods, and equipment and animals targeted).
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- ¹⁵⁸ See generally STATE OF WORLD FISHERIES 2016, *supra* note 19.
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²⁴⁵ 29 C.F.R. § 1910 (2012).

²⁴⁶ *Id.* § 1928 et seq.

²⁴⁷ *Id.* § 1910.16 et seq.

²⁴⁸ See *id.* § 1910, subpart D – Walking Working Surfaces; § 1910, subpart G – Occupational Health and Environmental Control; § 1910, subpart H – Hazardous Materials; § 1910, subpart I – Personal Protective Equipment; § 1910, subpart K – Medical and First Aid.

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²⁶³ STATE OF WORLD FISHERIES, *supra* note 19, at 80-3, 112-113; FAO, SAFETY OF FISHERMEN I (2007), <http://www.fao.org/tempref/docrep/fao/012/ak204e/ak204e.pdf>; see generally *Safety for Fishermen*, *supra* note 37 (explaining that fishing is one of the most dangerous occupations).

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²⁶⁵ Mood & Brooke, *supra* note 49; *Fisheries Impact on the Ecosystem*, FAO, <http://www.fao.org/docrep/006/y4773e/y4773e05.htm> (last visited Dec. 20, 2017).

²⁶⁶ See James H. Tidwell & Geoff L. Allan, *Fish as Food: Aquaculture's Contribution*, EMBO REP. (2001), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1084135/>; Kristin Hettermann, *Fish as Food or Fish as Wildlife?*, SCIENTIFIC AM. (2017), <https://blogs.scientificamerican.com/guest-blog/fish-as-food-or-fish-as-wildlife/>; Alastair Bland, *Can We Feed The World With Farmed Fish?*, NPR (Aug. 15, 2017, 3:01 PM), <http://www.npr.org/sections/thesalt/2017/08/15/543675398/can-we-feed-the-world-with-farmed-fish/>; *Fish Feed*, FARMED & DANGEROUS, <http://www.farmedanddangerous.org/salmon-farming-problems/environmental-impacts/fish-feed/> (last visited Dec. 20, 2017); D. Schalekamp et al., *A Horizon Scan on Aquaculture 2015: Fish Feed*, GSDR 3 (2016), https://sustainabledevelopment.un.org/content/documents/1034769_Schalekamp%20et%20al_A%20Horizon%20Scan%20on%20Aquaculture%202015-Fish%20Feed.pdf; Albert G.J. Tacon & Marc Metian, *Global Overview on the Use of Fish Meal and Fish Oil in Industrially Compounded Aquafeeds: Trends and Future Prospects*, 154, 157 ELSEVIER AQUACULTURE (2008), http://www.nmfs.noaa.gov/aquaculture/docs/feeds/tacon_etal_global_fishmealoil_overview_2008.pdf; see generally Jillian P. Fry et al., *Environmental Health Impacts of Feeding Crops to Farmed Fish*,

ELSEVIER ENV'T INT'L (2016), https://ac.els-cdn.com/S0160412016300587/1-s2.0-S0160412016300587-main.pdf?_tid=8267b26c-d524-11e7-a5ca-00000aab0f01&acdnat=1511974024_60825b981cc008a83988cb2d94a88606 (explaining that poor and marginalized communities around the world disproportionately struggle to gain sustainable access to food, and with pollution and other detrimental affects from food production. These issues are present in discussions about fishing as well, including whether people or corporations have access to fisheries, whether the use of fish for commercial ventures deprives people of food, and whether the farming of fish helps address some environmental concerns while further marginalizing vulnerable communities or whether there are opportunities in farmed fishing for more self-sufficiency).

²⁶⁷ See e.g. *Makah Whaling Tradition*, *supra* note 12.

²⁶⁸ See generally MANITOBA GOVERNMENT, FISHING, HUNTING & GATHERING THE RIGHTS AND RESPONSIBILITIES OF FIRST NATIONS PEOPLE IN MANITOBA (Oct. 2009),

https://www.gov.mb.ca/sd/firstnations/hunting_fishing_oct_09.pdf; *Treaty: Promises Between Governments*, COLUMBIA RIVER INTER-TRIBAL FISH COMM'N, http://www.critfc.org/member_tribes_overview/treaty-q-a/ (last visited Dec. 20, 2017); *Serving the Treaty Tribes in Western Washington*, NW INDIAN FISHERIES COMM'N, <https://nwifc.org/about-us/> (last visited Dec. 20, 2017).

²⁶⁹ Sibyl W. Diver, *Towards Sustainable Fisheries: Assessing Co-management Effectiveness for the Columbia River Basin*, NATURE PROCEEDINGS 7 (2009), <http://proceedings.nature.com/documents/3754/version/1/files/npre20093754-1.pdf>.

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² See *The United States Meat Industry at a Glance*, N. AM. MEAT INST., <https://www.meatinstitute.org/index.php?ht=d/sp/i/47465/pid/47465> (last visited Nov. 1, 2017).

³ *Livestock Slaughter, 2016 Summary*, USDA, NAT'L AGRIC. STATISTICS SERV. 7 (Apr. 2017), <http://usda.mannlib.cornell.edu/usda/current/LiveSlauSu/LiveSlauSu-04-19-2017.pdf>.

⁴ See Jennifer Dillard, Note, *A Slaughterhouse Nightmare: Psychological Harm Suffered by Slaughterhouse Employees and the Possibility of Redress through Legal Reform*, 15 GEO. J. POVERTY L. & POL'Y 391, 392 (2008).

⁵ See *id.* at 393.

⁶ Paul Solotaroff, *In the Belly of the Beast*, ROLLING STONE, <https://www.rollingstone.com/feature/belly-beast-meat-factory-farms-animal-activists> (last visited Dec. 20, 2017).

⁷ *Slaughterhouse Workers*, FOOD EMPOWERMENT PROJECT, <http://www.foodispower.org/slaughterhouse-workers/> (last visited Nov. 6, 2017) [hereinafter *Slaughterhouse Workers*].

⁸ See Dillard, *supra* note 4, at 393.

⁹ U.S. GOV'T ACCOUNTABILITY OFFICE, WORKPLACE SAFETY & HEALTH: SAFETY IN THE MEAT & POULTRY INDUS., WHILE IMPROVING COULD BE FURTHER STRENGTHENED 31 (2005) [hereinafter WORKPLACE SAFETY & HEALTH].

¹⁰ *Id.*

¹¹ See Letter from Southern Poverty Law Center, to Esteemed Secretaries Perez & Vilsack & Drs. Michaels & Hagen 15 (Sept. 3, 2013) (on file with Southern Poverty Law Center Legacy Files).

¹² See *Prevention of Musculoskeletal Injuries in Poultry Processing*, OSHA 2 (2013), <https://www.osha.gov/Publications/OSHA3213.pdf>.

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²⁰ *Slaughterhouse Workers*, *supra* note 7.

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²⁷ *Slaughterhouse Workers*, *supra* note 7.

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³⁰ WORKPLACE SAFETY & HEALTH, *supra* note 9, at 32.

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