

LEGISLATION TO PROTECT THE WELFARE OF FISH

By
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This Article examines the marginalization of fish under current animal welfare laws and regulations, explores the treatment of farm-raised fish during transport and slaughter, and proposes legislation and regulations in these two areas. While evidence indicates that fish are capable of experiencing pain, fear, and suffering—the traditional considerations informing concepts of animal welfare—current pre-slaughter transport and slaughter practices are completely uninformed by notions of fish welfare. Comparing the cognitive and sensory capacities of fish to other animals currently receiving animal welfare recognition through official regulation, this Article argues that protections afforded to animals during transport and slaughter should similarly apply to fish. Using the World Organization for Animal Health’s Aquatic Animal Health Code as a model, this Article proposes model legislation for fish transport: the Humane Transport of Fish Act. This legislation would supplement regulations already in place at the state and federal level, which currently pertain only to regulating the aquaculture industry and food safety. This Article also proposes amending the “Humane Methods” section of the Humane Methods of Slaughter Act to include the slaughter of fish, and proposes related regulations to ensure that fish are humanely slaughtered. The massive amount of fish farmed in the United States and globally each year speaks to the potential impact formal regulation could have on the improvement and protection of fish welfare.

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I. INTRODUCTION

Within the growing field of animal law, fish are marginalized, especially with regard to protections for animals slaughtered for human consumption. Although fish are subjected to inhumane slaughter, poor living conditions, and cruelty like many land animals, their welfare is not a topic often discussed. Without protections or discussion in the legal community about fish welfare, they will continue to suffer greatly. This Article seeks to provide an overview of the treatment of farm-raised fish, noting welfare concerns, and suggesting legislation to improve fish welfare. The focus will be on two stages in the lives of fish: treatment during transport and slaughter.

II. OVERVIEW

A. Global Overview

Official statistics on the amount of fish caught each year are not available.¹ The Food and Agriculture Organization (FAO) of the United Nations gives statistics of farmed and wild-caught fish in tonnages, but does not give the mean weights of fish caught, making it difficult to calculate the total annual yield.² A 2010 Fish Count Report

¹ Alison Mood, fishcount.org.uk, *Worse Things Happen at Sea: The Welfare of Wild-Caught Fish* 70 (2010) (available at <http://www.fishcount.org.uk/published/standard/fishcountfullrptSR.pdf> [<http://perma.cc/0AgLVKUXWi6>] (accessed Nov. 16, 2013)).

² *Id.*; see Food & Agric. Org. of the U.N., Fisheries & Aquaculture Dept., *Fishery Statistical Collections, Global Production: Structure*, <http://www.fao.org/fishery/statis>

calculated the number of fish caught globally each year to be between 0.97 and 2.7 trillion.³ This number includes shellfish, which are not discussed in this Article.⁴ The majority of fish caught are Peruvian anchovy, skipjack tuna, Atlantic herring, Alaska pollock, and chub mackerel, meaning that a large portion of the total number of fish caught are finfish.⁵ This estimate does not include the number of fish raised in farms, caught illegally, or caught as bycatch and discarded.⁶ It also does not include fish that escape from nets and die, fish caught accidentally by lost gears, fish caught for use as bait or feed, or any other unreported capture.⁷ The estimated number of farm-raised fish killed globally each year is between 10 billion and 100 billion.⁸ Overall, the total number of wild-caught fish and farm-raised fish is in the order of a trillion.⁹ Because of the sheer staggering number of fish caught or farm raised each year, their suffering is a major animal welfare concern.¹⁰

The uses for fish and fish products are wide ranging. Most fishery production—which includes farm-raised and wild-caught fish—is used for human consumption.¹¹ About half of this is in the form of live and fresh fish.¹² Some of the remaining fish are used in products such as fish oil, protein supplements, or gelatin.¹³ The byproducts are used for non-food products, such as fishmeal.¹⁴ These products are used in pet food or feed for farmed fish or other livestock.¹⁵

This Article will focus on farm-raised fish: fish farming, also known as aquaculture, is one of the fastest growing sectors of animal-based food products.¹⁶ Over the next decade, aquaculture output is expected to rise by 33%, whereas wild-caught fishery capture is only ex-

tics/global-production/3/en [http://perma.cc/0Fahh5bRgPe] (accessed Nov. 16, 2013) (explaining that “[w]eight is measured in tonnes (generally in tonnes of live weight equivalent for aquatic animals, in wet weight for aquatic plants)”).

³ Mood, *supra* n. 1, at 72.

⁴ This Article will only speak to finfish (fish with fins).

⁵ Food & Agric. Org. of the U.N., Fisheries & Aquaculture Dept., *Overview: Major Trends and Issues* xvi (available at ftp://ftp.fao.org/FI/STAT/summary/YB_Overview.pdf (accessed Nov. 16, 2013)) [hereinafter FAO, *Overview*].

⁶ Mood, *supra* n. 1, at 71.

⁷ *Id.*

⁸ *Id.* at 11.

⁹ *Id.* at 72.

¹⁰ *Id.*

¹¹ FAO, *Overview*, *supra* n. 5, at xvii.

¹² *Id.*

¹³ Natl. Oceanic & Atmospheric Administration, *Feeds for Aquaculture*, http://www.nmfs.noaa.gov/aquaculture/faqs/faq_feeds.html [http://perma.cc/05NHnnB2tXv] (accessed Nov. 16, 2013); U.S. Dept. of Agric., Agric. Research Serv., *Finding New Uses for Fish Byproducts*, 55 Agric. Research Mag. 18, 18–19 (Apr. 2007) (available at <http://www.ars.usda.gov/is/ar/archive/apr07/fish0407.pdf> [http://perma.cc/0CcdQedtFN1] (accessed Nov. 16, 2013)) [hereinafter NOAA, *Feeds for Aquaculture*].

¹⁴ FAO, *Overview*, *supra* n. 5, at xvii.

¹⁵ NOAA, *Feeds for Aquaculture*, *supra*, n. 13.

¹⁶ Food & Agric. Org. of the U.N., Fisheries & Aquaculture Dept., *The State of World Fisheries and Aquaculture 2012* iii (available at <http://www.fao.org/docrep/016/i2727e/>

pected to rise by 3%.¹⁷ By 2018, farmed fish are expected to exceed wild-caught fish for human consumption.¹⁸ Although the welfare of wild-caught fish should not be discounted, the rapid growth of the aquaculture sector necessitates consideration of the welfare of farm-raised fish.

B. U.S. Overview

The most common species of fish farmed in the United States (U.S.) are catfish, trout, salmon, tilapia, and hybrid striped bass,¹⁹ all of which are used for human consumption. In a commercial sense, aquaculture production is of great importance to the U.S., comparable in value to 18% of the swine industry or 30% of the turkey industry.²⁰ The U.S. aquaculture industry is similar to traditional livestock industries in that it has a system of producers, processors, wholesalers, and retailers.²¹ The primary states that have fish farms include Mississippi, Arkansas, Alabama, Louisiana, Georgia, Idaho, North Carolina, Maine, Washington, Maryland, Florida, South Carolina, Virginia, West Virginia, Texas, and California.²² The main state that harvests live fish is Alaska.²³

C. Why Should We Care?

Welfare is a complex subject and is difficult to define.²⁴ However, there is extensive literature on this topic, and most considerations of an ideal state of welfare adopt one of the following four definitions:

- (1) The animal is in good physical health with all its biological systems working properly;
- (2) The animal is able to live a natural life and express the same behavior it would in the wild;
- (3) The animal does not have negative experiences such as pain, fear, and hunger, and has positive experiences, like social companionship; or

i2727e.pdf [<http://perma.cc/0wity7m5KPo>] (accessed Nov. 16, 2013)) [hereinafter *FAO, World Fisheries*].

¹⁷ *Id.* at 188.

¹⁸ *Id.* at 191.

¹⁹ U.S. Dept. of Agric./Animal & Plant Health Inspection Serv. (USDA/APHIS), *Overview of Aquaculture in the United States* 1 (Oct. 1995) (available at http://www.aphis.usda.gov/animal_health/nahms/aquaculture/downloads/AquacultureOverview95.pdf [<http://perma.cc/0BqFTTt4zRB>] (accessed Nov. 16, 2013)) [hereinafter *USDA/APHIS, Overview of Aquaculture*].

²⁰ *Id.*

²¹ *Id.*

²² *Id.* at 2, 4, 6, 10.

²³ *Id.* at 7.

²⁴ Felicity A. Huntingford & Sunil Kadri, *Welfare and Fish*, in *Fish Welfare* 19, 19 (Edward J. Branson ed., Blackwell Publ. 2008).

(4) The animal is free from hunger and thirst, undue environmental challenge, disease and injury, behavioral restriction, and mental suffering.²⁵

These welfare definitions help scientists determine how fish welfare can be measured and if fish are in a good state of welfare.²⁶ Physical health is measured by the physical condition of the animal, such as growth rate and presence or absence of disease or injuries.²⁷ The health of a fish's biological systems is shown through measurements relating to its nutrition, metabolic state, hormones, brain biochemistry, immune system, and reproductive system.²⁸ To determine the natural behavior of fish, a behavioral study called a "choice test" is used to allow animals to express their natural preferences.²⁹ Many researchers use a combination of physical health and behavioral experiences to determine overall welfare.³⁰

The concept of animal welfare is traditionally applied to animal species that have the ability to feel pain, fear, and suffering.³¹ Therefore, in order to apply the concept of animal welfare to fish, we must first accept that fish feel pain and have the ability to experience fear and suffering. Recent physiological and behavioral studies show that fish do have the capacity to perceive pain.³² Additionally, there is significant evidence that the welfare of fish is harmed when they are in fearful or painful situations.³³ As a result, the pain and suffering of fish must be considered because aquaculture practices include potentially painful and fearful situations, such as slaughter.³⁴

Studying fish welfare can be a difficult task because fish do not emit the signals that are often used to study pain, such as facial movements and vocalizations.³⁵ Some scientists believe that fish cannot suffer because fish brains lack the neocortex.³⁶ In humans, this part of

²⁵ *Id.* at 20–21. The fourth definition is also known as the five freedoms. Farm Animal Welfare Council, *Five Freedoms*, <http://www.fawc.org.uk/freedoms.htm> [<http://perma.cc/0nPnZKJQBdP>] (updated Apr. 16, 2009) (accessed Nov. 16, 2013).

²⁶ Huntingford & Kadri, *supra* n. 24, at 19.

²⁷ *Id.* at 24.

²⁸ *Id.*

²⁹ *Id.*

³⁰ *Id.* at 25.

³¹ Paul J. Ashley & Lynne U. Sneddon, *Pain and Fear in Fish*, in *Fish Welfare* 49, 49 (Edward J. Branson ed., Blackwell Publ. 2008).

³² *Id.*; see generally *id.* at 53–68 (discussing the results of various studies evidencing that fish have the capacity to feel pain).

³³ See *id.* at 68 (discussing the results of various studies suggesting that "[fish] well-being is adversely affected by potentially painful and fearful situations").

³⁴ *Id.* at 49.

³⁵ Huntingford & Kadri, *supra* n. 24, at 21.

³⁶ *Id.* at 22; see e.g. James D. Rose, *The Neurobehavioral Nature of Fishes and the Question of Awareness and Pain*, 10 *Revs. in Fisheries Sci.* 1, 29 (2002) (available at <http://www.nal.usda.gov/awic/pubs/Fishwelfare/Rose.pdf> [<http://perma.cc/0vty8a58f1o>] (accessed Nov. 16, 2013)) ("The fundamental neural requirements for pain and suffering are now known. Fishes lack the most important of these required neural structures, and

the brain controls the conscious perception of pain.³⁷ Therefore, those who consider the neocortex to be essential in pain perception argue that fish cannot be conscious of their pain because their brains lack this key part.³⁸ But magnetic resonance imaging (MRI) studies, which allow scientists to observe areas of brain activity, show that when a human is in pain, areas besides the neocortex are also working.³⁹ These other areas are present in fish brains,⁴⁰ so it is possible that a different part of the fish brain controls pain perception.⁴¹

Moreover, fish are vertebrates, like birds and mammals; therefore, their physiological and behavioral responses to pain and fear are similar.⁴² Pain and fear are survival tools. Pain allows an animal to detect a potentially harmful stimulus and avoid it,⁴³ and fear is a behavioral and physiological response to a perceived harmful stimulus and helps the animal evade a threat.⁴⁴ Studies show that fish respond physiologically to pain similarly to higher vertebrates, and alter their behavior in response to noxious stimuli.⁴⁵ Measuring this response is one of the best methods used to assess pain in animals.⁴⁶ In a study investigating pain in rainbow trout, fish were injected in the lip with acetic acid and bee venom.⁴⁷ The fish appeared to show they were in pain by exhibiting behavioral changes, such as an enhanced respiration rate, not feeding, rubbing their lips on the aquarium glass, and rocking from side to side.⁴⁸ Increased respiration rate is a common sign of pain in higher vertebrates as well.⁴⁹

Additionally, fish are capable of learning and remembering complex information, which suggests they are capable of suffering.⁵⁰ Studies have shown that fish have the capacity to learn to recognize specific individuals or groups of individuals; to tell the difference between the competitive abilities of separate schools of fish and use this information to determine which school to join; and to remember the aggressive interactions between neighbors and use this information when deciding whether to fight.⁵¹ Other studies have shown that fish can learn by

they have no alternative neural systems for producing the pain experience. Therefore, the reactions of fishes to noxious stimuli are nociceptive and without conscious awareness of pain.”)

³⁷ Rose, *supra* n. 36, at 27.

³⁸ *Id.* at 29; Victoria Braithwaite, *Do Fish Feel Pain?* 12 (Oxford U. Press 2010).

³⁹ Braithwaite, *supra* n. 38, at 12.

⁴⁰ *Id.*

⁴¹ Huntingford & Kadri, *supra* n. 24, at 22.

⁴² *Id.* at 21.

⁴³ *Id.*

⁴⁴ Ashley & Sneddon, *supra* n. 31, at 50.

⁴⁵ *Id.*; Victoria A. Braithwaite & Philip Boulcott, *Can Fish Suffer?*, in *Fish Welfare* 78, 88 (Edward J. Branson ed., Blackwell Publ. 2008).

⁴⁶ Ashley & Sneddon, *supra* n. 31, at 60.

⁴⁷ *Id.*

⁴⁸ *Id.*

⁴⁹ *Id.*

⁵⁰ Braithwaite & Boulcott, *supra* n. 45, at 88.

⁵¹ *Id.* at 86.

watching others.⁵² Fish can also learn the most efficient route from point A to point B, and move around their environment in a manner that minimizes predator interaction.⁵³ These studies illustrate the complex cognitive processes of fish, thereby refuting the hypothesis that fish lack the cognitive ability to be conscious of pain.⁵⁴

In 2004, the United Kingdom (U.K.) Fish Veterinary Society (FVS) organized a meeting in Edinburgh, Scotland to discuss current studies relating to fish welfare.⁵⁵ Representatives from a wide range of groups were present at the meeting, including FVS members, fish farmers, government representatives, and members of special interest groups.⁵⁶ At the meeting, attendees presented and discussed the physiological and behavioral studies of fish referred to in this Article. At the end of the meeting, it was determined that sufficient evidence exists to indicate that fish have the ability to suffer.⁵⁷ The consequence of this conclusion is that moral consideration must be given to the suffering of fish, and they must be afforded protection.⁵⁸

III. TYPES OF AQUACULTURE SYSTEMS AND WELFARE CONCERNS

A. *Types of Aquaculture Systems*

There are four main types of aquatic production systems: artificial pond, open water, raceway, and water recirculating.⁵⁹ The most common system is the artificial pond system.⁶⁰ These systems are the source of most farm-raised catfish, tilapia, bass, and baitfish.⁶¹ Open water aquaculture systems enclose fish in a cage or basket in an existing body of water, such as in a lake, pond, or ocean.⁶² Common species raised in open water aquaculture are salmon, flounder, and cobia.⁶³ In a raceway aquaculture system, water is continuously passed through the system.⁶⁴ This system has a higher production rate than pond or open water systems because the continual exchange of

⁵² *Id.*

⁵³ *Id.* at 87.

⁵⁴ *Id.* at 86.

⁵⁵ Edward J. Branson & Peter J. Southgate, *Introduction*, in *Fish Welfare* 1, 1 (Edward J. Branson ed., Blackwell Publ. 2008).

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ *Id.* at 1–2.

⁵⁹ LaDon Swann, *A Basic Overview of Aquaculture* 6 (Aug. 1992) (available at <http://www.ncrac.org/NR/rdonlyres/677E72D0-E0F1-43E8-A4D7-D90CBB4DDDF7/0/tb102.pdf> [<http://perma.cc/0FGYgoGsk4K>] (accessed Nov. 16, 2013)).

⁶⁰ *Id.* at 7.

⁶¹ Natl. Aquaculture Assn., *About U.S. Aquaculture*, <http://thenaa.net/faqs/about-us-aquaculture> [<http://perma.cc/0fxwBcvXXQh>] (accessed Nov. 16, 2013).

⁶² Swann, *supra* n. 59, at 7.

⁶³ Natl. Aquaculture Assn., *About U.S. Aquaculture*, *supra* n. 61.

⁶⁴ *Id.*

fresh water removes wastes.⁶⁵ Trout are most commonly raised in raceway systems.⁶⁶

There are a number of problems inherent in aquaculture that can affect the welfare and stress levels of farm-raised fish. For example, aggressive behavior is a common problem,⁶⁷ which can lead to injuries to fins, eyes, and opercula (the bony flap that covers the gills).⁶⁸ In addition, farmers often tag fish by clipping their fins, which may be stressful and painful.⁶⁹ Fish raised in aquaculture also experience disease;⁷⁰ however, the only vaccine available is for a common trout disease.⁷¹ Other factors that may affect the welfare of farm-raised fish include the feeding schedule, stocking density, water quality, and water temperature.⁷²

B. Pre-Slaughter Transport and Other Preparations

Farm-raised fish endure pre-slaughter withdrawal of food, crowding, and removal from water.⁷³ The period of starvation may last from a few days to a month.⁷⁴ Unfortunately, there are no published studies to determine the effect of the starvation period on fish welfare.⁷⁵ Fish are crowded together in order to facilitate their removal from the tank, pond, or cage before slaughter,⁷⁶ which is stressful to fish because they are chased into a smaller area using nets or barriers, and water quality deteriorates quickly.⁷⁷ Fish are then removed from water to be killed on-site or to be transported to a slaughter station.⁷⁸ Removal from water is also a stressful experience for fish and injuries can occur when fish are crowded together in the net.⁷⁹

Fish are mainly transported to slaughter using well boats.⁸⁰ These boats hold large volumes of fish, which due to overcrowding, leads to poor water quality.⁸¹ The time of transport varies, from less than an hour to almost thirty hours.⁸² Research has not been done on the welfare of fish being transported on well boats, but entire shipments of

⁶⁵ Swann, *supra* n. 59, at 8.

⁶⁶ Natl. Aquaculture Assn., *About U.S. Aquaculture*, *supra* n. 61.

⁶⁷ Ashley & Sneddon, *supra* n. 31, at 68.

⁶⁸ *Id.*

⁶⁹ *Id.*

⁷⁰ Nick Read, *Fish Farmer's Perspective of Welfare*, in *Fish Welfare* 101, 103 (Edward J. Branson ed., Blackwell Publ. 2008).

⁷¹ *Id.*

⁷² *Id.* at 104.

⁷³ David H. F. Robb, *Welfare of Fish at Harvest*, in *Fish Welfare* 217, 219, 221, 226 (Edward J. Branson ed., Blackwell Publ. 2008).

⁷⁴ *Id.* at 219.

⁷⁵ *Id.* at 220.

⁷⁶ *Id.* at 221.

⁷⁷ *Id.* at 221, 223.

⁷⁸ *Id.* at 228.

⁷⁹ Robb, *supra* n. 73, at 226.

⁸⁰ *Id.* at 228.

⁸¹ *Id.*

⁸² *Id.*

fish have died when being transported this way.⁸³ Fish are loaded off the well boat through a pump, and are either sent directly to the slaughter station or put in a holding cage, where they will again be crowded and removed.⁸⁴

C. Slaughter

Animal welfare was not of concern during the development of slaughter methods for fish. Instead, the methods used to slaughter fish were developed to achieve a uniform product, efficiency, and processor safety.⁸⁵ Common slaughter methods include carbon dioxide narcosis, live chilling, asphyxiation (suffocation) in air, live gutting, percussive stunning, and electrical stunning.⁸⁶ The method of carbon dioxide narcosis is the method routinely used in commercial slaughter,⁸⁷ which consists of placing fish in water with high levels of dissolved carbon dioxide.⁸⁸ Studies on this method show that fish have an immediate and strong aversive reaction to entering the carbon dioxide solution.⁸⁹ The fish are left in the water until they stop moving, then they are taken out of the water, sliced, and bled out.⁹⁰ However, they do not immediately lose consciousness via this method, but are merely rendered immobile.⁹¹ And because they are slaughtered as soon as they stop moving, most are killed when fully conscious.⁹²

Another popular method for slaughtering farmed fish is through the use of live chilling.⁹³ With this method, fish are placed in cold water or ice.⁹⁴ This lowers their muscle activity and puts them in an almost paralyzed state.⁹⁵ Fish show violent escape behavior when this method is used.⁹⁶ Depending on the temperature, fish lose consciousness within 2.6 to 9.6 minutes.⁹⁷ However, some fish are only put in chilled (not ice) water before slaughter, which reduces their activity so they are handled more easily.⁹⁸ Because chilled water does not cause the fish to lose consciousness, most are fully conscious when slaughtered by this method as well.⁹⁹

⁸³ *Id.* at 229.

⁸⁴ *Id.* at 230.

⁸⁵ Ashley & Sneddon, *supra* n. 31, at 67.

⁸⁶ Mood, *supra* n. 1, at 66; Robb, *supra* n. 73, at 231, 233, 235, 237.

⁸⁷ Robb, *supra* n. 73, at 231.

⁸⁸ *Id.*

⁸⁹ *Id.* at 232.

⁹⁰ *Id.*

⁹¹ *Id.*

⁹² *Id.*

⁹³ Robb, *supra* n. 73, at 233.

⁹⁴ *Id.*

⁹⁵ *Id.*

⁹⁶ Mood, *supra* n. 1, at 67.

⁹⁷ Robb, *supra* n. 73, at 233.

⁹⁸ *Id.* at 234; Mood, *supra* n. 1, at 66–67.

⁹⁹ Robb, *supra* n. 73, at 234.

Other slaughter methods used are asphyxiation in air and gutting alive without stunning.¹⁰⁰ Fish have a strong aversive reaction and are acutely stressed when they are removed from water.¹⁰¹ A considerable amount of time elapses before death when using these two methods: with live gutting, a fish will die within 25 to 65 minutes; and with asphyxiation in air, a fish will die within 55 to 250 minutes.¹⁰² Percussive and electrical stunning may be humane methods if done correctly, and they are discussed in more detail in Part IV(D)(2).

IV. CURRENT LAWS AND PROPOSED LEGISLATION

There are no federal or state laws that specifically pertain to fish welfare. While there are federal and state laws that regulate the aquaculture industry, these relate to certificates for export, conducting research, providing technical information, and assistance for building ponds and financing through farm loans.¹⁰³ Some regulations do touch on animal health, and cover control of algae, bacterial slime, or other pests, tolerances for pesticide residues, and drugs to treat or prevent parasites or diseases.¹⁰⁴ There is also a seafood safety program operated by the U.S. Food and Drug Administration (FDA) under the Federal Food, Drug, and Cosmetic Act, the Public Health Service Act, and other related regulations, which pertains to the safety of fish and fish products.¹⁰⁵ However, there is no law that relates directly to fish welfare.

There are two main federal laws that relate to farmed animal welfare: the Twenty-Eight Hour Law¹⁰⁶ and the Humane Methods of Slaughter Act (HMSA),¹⁰⁷ regulating the transportation and slaughter of animals, respectively.

A. *The Twenty-Eight Hour Law*

The Twenty-Eight Hour Law regulates the transportation of livestock.¹⁰⁸ The main purpose of the Law is to prevent cruelty to animals during transport,¹⁰⁹ and it states that animals may not be confined “in

¹⁰⁰ Mood, *supra* n. 1, at 66. These methods are very common in the slaughter of wild-caught fish, but that topic is outside the scope of this Article.

¹⁰¹ *Id.*

¹⁰² *Id.*

¹⁰³ USDA/APHIS, *Overview of Aquaculture*, *supra* n. 19, at 17, 20.

¹⁰⁴ *Id.* at 20.

¹⁰⁵ U.S. Food & Drug Administration, *Seafood Guidance Documents & Regulatory Information*, <http://www.fda.gov/food/guidanceregulation/guidancedocumentsregulatoryinformation/seafood/ucm2006751.htm> [<http://perma.cc/0uWn2uduXs2>] (accessed Nov. 16, 2013) [hereinafter FDA, *Seafood Guidance*].

¹⁰⁶ 49 U.S.C. § 80502 (2006).

¹⁰⁷ 7 U.S.C. §§ 1901–1907 (2006).

¹⁰⁸ 49 U.S.C. § 80502.

¹⁰⁹ Harry Goding & A. Joseph Raub, Bureau of Animal Indus., *The 28-Hour Law Regulating the Interstate Transportation of Livestock: Its Purpose, Requirements, and Enforcement*, 589 U.S. Dept. of Agric. Bull. 1, 2–3 (Jan. 5, 1918) (available at <https://>

a vehicle or vessel for more than [twenty-eight] consecutive hours without unloading the animals for feeding, water, and rest.”¹¹⁰ The Law applies to the transport of livestock by land or sea,¹¹¹ and applies to those “transporting animals from a place in a State, the District of Columbia, or a territory or possession of the United States through or to a place in another State, the District of Columbia, or a territory or possession”¹¹² Animals must be humanely unloaded into pens to be fed, given water, and allowed to rest.¹¹³ The Law also protects the health and condition of the animals so that the quality of the meat is not affected.¹¹⁴

The Twenty-Eight Hour Law assigns the responsibility of providing food, water, and rest to the owner or person having custody of the animals.¹¹⁵ If the owner fails to do so, the carrier, receiver, trustee, or lessee of the carrier, or the owner or master of a vessel transporting the animals is required to feed and hydrate the animals at the expense of the owner.¹¹⁶

Although “animal” is not defined in the Twenty-Eight Hour Law, the U.S. Department of Agriculture (USDA) has stated that the Law does not apply to poultry because it is not a species included in the statement of policy.¹¹⁷ The statement of policy mentions cattle, calves, horses, mules, sheep, goats, lambs, kids, and swine.¹¹⁸ Therefore, it follows that the Twenty-Eight Hour Law does not apply to fish because, like poultry, fish are not a species expressly included in the statement of policy. However, because fish can feel pain and suffer, similar to the animals covered by the HMSA, they too should be afforded protection during transport.

The World Trade Organization recognizes the World Organization for Animal Health (OIE) as the body for setting animal health standards.¹¹⁹ The OIE drafts standards, distributes them to Member Countries for review and comment, revises the standards, and presents them for adoption.¹²⁰ The OIE’s main goals are to improve

ia601704.us.archive.org/34/items/28hourlawregulat589godi/28hourlawregulat589godi.pdf [http://perma.cc/3XA9-5F85] (accessed Nov. 16, 2013)).

¹¹⁰ 49 U.S.C. § 80502(a).

¹¹¹ *Id.*

¹¹² *Id.*

¹¹³ *Id.* at § 80502(b).

¹¹⁴ Goding & Raub, *supra* n. 109, at 3.

¹¹⁵ 49 U.S.C. § 80502(b).

¹¹⁶ *Id.* at § 80502(b)(1).

¹¹⁷ Ltr. from W. Ron DeHaven, Administr., U.S. Dept. of Agric., Animal & Plant Health Inspection Serv., to Peter A. Brandt, Atty., Humane Socy. of the U.S., *Response to Petition for Rulemaking 1* (Sept. 22, 2006) (copy on file with *Animal Law*).

¹¹⁸ See 9 C.F.R. § 89.1(a) (2013) (describing the amount of feed qualifying as “sustaining rations” for each of these species under specific circumstances during transit).

¹¹⁹ USDA/APHIS, *International Standard Setting Activities*, http://www.aphis.usda.gov/import_export/animals/oie [http://perma.cc/0fZQV3dSBEQ] (accessed Nov. 16, 2013).

¹²⁰ *Id.*

animal health and welfare and prevent the spread of disease.¹²¹ The Southeast Poultry Research Laboratory collaborates with the OIE's Aquatic Animal Health Standards Commission (AAHSC) to set aquatic animal health standards, which are compiled in the Aquatic Animal Health Code.¹²² The AAHSC is concerned with aquatic animal health and welfare,¹²³ and organizes scientific meetings and drafts proposals dealing with aquatic animal diseases and welfare.¹²⁴ The 2013 Aquatic Animal Health Code contains a section pertaining to the welfare of farmed fish during transport.¹²⁵

*B. Proposed Legislation to Protect Fish Welfare during Transport:
The Humane Transport of Fish Act*

The following legislation is proposed, The Humane Transport of Fish Act, primarily adopting language from the Aquatic Animal Health Code¹²⁶ with the following sections: Purpose, Scope, Responsibilities, Competence, Transport Planning, and Loading, Transporting, and Unloading the Fish.

1. Purpose

Congress finds that the use of humane methods in the transport of fish prevents cruelty during transport.¹²⁷

2. Scope

This law applies to the transport of fish by water or land “from a place in a State, the District of Columbia, or a territory or possession of the United States through or to a place in another State, the District of Columbia, or a territory or possession[.]”¹²⁸

¹²¹ USDA/APHIS, *Factsheet: Collaborating with the World Organization for Animal Health (OIE)* 1 (May 2011) (available at http://www.aphis.usda.gov/publications/animal_health/2011/fs_woah_oie.pdf [<http://perma.cc/029w6YJGDZv>] (accessed Nov. 16, 2013)).

¹²² *Id.* at 4.

¹²³ World Org. for Animal Health, *Aquatic Animal Health Stands. Commn., September 2011 Report* 1 (2011) (available at http://www.aphis.usda.gov/import_export/animals/oie/downloads/aahc_oct11/aahc-communication-80-oct11-ou.pdf [<http://perma.cc/04ZbUoWNvjK>] (accessed Nov. 16, 2013)).

¹²⁴ World Org. for Animal Health, *Aquatic Animal Health Standards Commission (Aquatic Animals Commission)*, <http://www.oie.int/en/international-standard-setting/specialists-commissions-groups/aquatic-animal-commission-reports/aquatic-commission> [<http://perma.cc/03SYg4ErSbQ>] (accessed Nov. 16, 2013).

¹²⁵ World Org. for Animal Health, *Aquatic Animal Health Code (2013)* ch. 7.2 (16th ed., OIE 2013) (available at http://www.rr-africa.oie.int/docspdf/en/Codes/en_csaa.pdf [<http://perma.cc/6H6J-ZLCH>] (accessed Nov. 16, 2013)) [hereinafter *Aquatic Animal Health Code*].

¹²⁶ *Id.* at ch. 7.2.

¹²⁷ This text is based on the Twenty-Eight Hour Law's purpose. Goding & Raub, *supra* n. 109, at 2–3.

¹²⁸ This text is adopted from 49 U.S.C. § 80502(a).

3. *Responsibilities*

“All personnel handling fish throughout the transportation process are responsible for ensuring that consideration is given to the potential impact on the welfare of the fish.”¹²⁹ “Owners and managers of fish at the start and at the end of the journey are responsible for: the general health of the fish and their fitness for transport at the start of the journey and to ensure the overall welfare of the fish during the transport regardless of whether these duties are subcontracted to other parties; ensuring trained and competent personnel supervise operations at their facilities for fish to be loaded and unloaded in a manner that avoids injury and causes minimum stress; having a contingency plan available to enable humane killing of the fish at the start and at the end of the journey, as well as during the journey, if required; [and] ensuring fish have a suitable environment to enter at their destination that ensures their welfare is maintained.”¹³⁰ “Transporters, in cooperation with the farm owner/manager, are responsible for planning the transport to ensure that the transport can be carried out according to fish health and welfare standards including: using a well maintained vehicle that is appropriate to the species to be transported; ensuring trained and competent staff are available for loading and unloading, and to ensure swift humane killing of the fish, if required; having contingency plans to address emergencies and minimi[z]e stress during transport; [and] selecting suitable equipment for loading and unloading of the vehicle.”¹³¹

4. *Competence*¹³²

“All parties supervising transport activities, including loading and unloading, sh[all] have an appropriate knowledge and understanding to ensure that the welfare of the fish is maintained throughout the process.”¹³³ “Competence may be gained through formal training and/or practical experience.”¹³⁴ “All persons handling live fish, or who are otherwise responsible for live fish during transport, sh[all] be competent”¹³⁵ according to their responsibilities listed in the Responsibilities section. “[F]arm owners/managers, and transport companies have a responsibility in providing training to their respective staff and other personnel.”¹³⁶ “Any necessary training should address species-specific knowledge and may include practical experience on: fish behavio[]r,

¹²⁹ *Aquatic Animal Health Code*, *supra* n. 125, at art. 7.2.1.

¹³⁰ *Id.* at art. 7.2.1(2) (internal numbering and emphasis omitted).

¹³¹ *Id.* at art. 7.2.1(3) (internal numbering and emphasis omitted).

¹³² While the Twenty-Eight Hour Law has no similar “Competence” section for farm animals, fish are so dissimilar to other animals that it is important that personnel be specifically trained to handle fish.

¹³³ *Aquatic Animal Health Code*, *supra* n. 125, at art. 7.2.3.

¹³⁴ *Id.*

¹³⁵ *Id.* at art. 7.2.3(1).

¹³⁶ *Id.* at art. 7.2.3(2).

physiology, general signs of disease and poor welfare; operation and maintenance of equipment relevant to fish health and welfare; water quality and suitable procedures for water exchange; methods of live fish handling during transport, loading and unloading (species-specific aspects when relevant); methods for inspection of the fish, management of situations frequently encountered during transport such as changes in water quality parameters, adverse weather conditions, and emergencies; [and] methods for the humane killing of fish¹³⁷ in accordance with the Humane Methods of Slaughter Act for the killing of fish for disease control purposes.

5. *Transport Planning*¹³⁸

“Vehicles and containers used for transport of fish sh[all] be appropriate to the species, size, [and] weight”¹³⁹ “Vehicles and containers sh[all] be maintained in good mechanical and structural condition to prevent predictable and avoidable damage of the vehicle that may directly or indirectly affect the welfare of transported fish.”¹⁴⁰ “Vehicles (if relevant) and containers sh[all] have adequate circulation of water and equipment for oxygenation as required to meet variations in the conditions during the journey and the needs of the animals being transported”¹⁴¹ “Water quality (e.g. oxygen, [carbon dioxide] and [ammonia] level, pH, temperature, salinity) sh[all] be appropriate for the species being transported and method of transportation.”¹⁴² “Equipment to monitor and maintain water quality may be required depending on the length of the transport.”¹⁴³ “Prior to transport, feed should be withheld from the fish, taking into consideration the fish species and life stage to be transported.”¹⁴⁴ “[O]nly fish that are fit for transport sh[all] be loaded.”¹⁴⁵ “Reasons for considering [the] unfitness of fish for transport include: displaying clinical signs of disease; significant physical injuries or abnormal behavior, such as rapid ventilation or abnormal swimming; recent exposure to stressors that adversely affect behavior or physiological state (for example extreme temperatures, [or] chemical agents); [and] insufficient or excessive length of fasting.”¹⁴⁶ “Transport procedures sh[all] take account of

¹³⁷ *Id.* at art. 7.2.3(3).

¹³⁸ There is no comparable “Transport Planning” section in the Twenty-Eight Hour Law, but this section is necessary because water quality during transport is of prime importance to fish welfare, and needs can greatly differ between different fish species. Craig M. MacIntyre et al., *The Influences of Water Quality on the Welfare of Farmed Rainbow Trout: A Review*, in *Fish Welfare* 150, 150 (Edward J. Branson ed., Blackwell Publ. 2008).

¹³⁹ *Aquatic Animal Health Code*, *supra* n. 125, at art. 7.2.4(2).

¹⁴⁰ *Id.* (emphasis omitted).

¹⁴¹ *Id.* (emphasis omitted).

¹⁴² *Id.*

¹⁴³ *Id.* at art. 7.2.4(3).

¹⁴⁴ *Id.* at art. 7.2.4(4).

¹⁴⁵ *Aquatic Animal Health Code*, *supra* n. 125, at art. 7.2.4(4).

¹⁴⁶ *Id.* (emphasis omitted).

variations in the behavior [r] and specific needs of the transported fish species.”¹⁴⁷ “Handling procedures that are successful with one species may be ineffective or dangerous for another species.”¹⁴⁸ “Some species or life stages may need to be physiologically prepared prior to entering a new environment, such as by feed deprivation or osmotic acclimatiz[ation].”¹⁴⁹

6. *Loading, Transporting, and Unloading the Fish*

The loading and unloading of fish shall “be carried out, or supervised, by operators with knowledge and experience of the behavior [r] and other characteristics of the fish species being loaded to ensure that the welfare of the fish is maintained.”¹⁵⁰ When loading and unloading the fish, the equipment (such as nets, pumps, pipes and fittings) that is used must be free of sharp bends or protrusions and properly operated (appropriate to the size and number of fish).¹⁵¹ “[S]ome species of fish should be acclimatiz[ed] if there is a likelihood of the fish being transported in water of a significantly different temperature or other water parameters.”¹⁵² “The density of fish in a vehicle and/or container sh[all] be in accordance with scientific data where available and not exceed what is generally accepted for a given species and a given situation.”¹⁵³ During transport, “water quality [shall be] monitored and the necessary adjustments made to avoid extreme conditions.”¹⁵⁴ “Travel [shall be done] in a manner that minimi[z]es uncontrolled movements of the fish that may lead to stress and cause injury.”¹⁵⁵ “If the killing of fish is necessary during the transport [or unloading], it sh[all] be carried out humanely”¹⁵⁶ in accordance with the HMSA. “Fish sh[all] be unloaded as soon as possible after arrival at the destination, allowing sufficient time to ensure that the unloading procedure does not cause harm to the fish.”¹⁵⁷ “Some species of fish should be acclimatiz[ed] if there is a likelihood of the fish being unloaded into water of a significantly different quality (such as temperature, salinity, pH).”¹⁵⁸

C. *The Humane Methods of Slaughter Act*

The HMSA regulates the slaughter of livestock and states that “[n]o method of slaughtering or handling in connection with slaughtering shall be deemed to comply with the public policy of the [U.S.] un-

¹⁴⁷ *Id.* at art. 7.2.4(5).

¹⁴⁸ *Id.*

¹⁴⁹ *Id.*

¹⁵⁰ *Id.* at art. 7.2.6(3).

¹⁵¹ *Aquatic Animal Health Code, supra* n. 125, at art. 7.2.6(1)(b).

¹⁵² *Id.* at art. 7.2.6(1)(c).

¹⁵³ *Id.* at art. 7.2.6(2) (emphasis omitted).

¹⁵⁴ *Id.* at art. 7.2.7(1)(b).

¹⁵⁵ *Id.* at art. 7.2.7(1)(c).

¹⁵⁶ *Id.* at art. 7.2.7(2)(b).

¹⁵⁷ *Aquatic Animal Health Code, supra* n. 125, at art. 7.2.8(2).

¹⁵⁸ *Id.*

less it is humane.”¹⁵⁹ The “Humane Methods” section of the HMSA sets out the types of slaughter that are considered humane for certain animals.¹⁶⁰

The HMSA states that the Secretary of Agriculture is directed and authorized to conduct and assist research to determine humane methods of slaughter that are practical considering the speed and scope of slaughter operations, and current scientific knowledge.¹⁶¹ Under the HMSA, the Secretary must designate humane methods of slaughter and handling for each species of livestock.¹⁶²

The Secretary has promulgated regulations specifying various slaughter methods that are humane for farmed land animals, including the use of carbon dioxide gas, a captive bolt stunner, a firearm, and electric current.¹⁶³ The regulation relating to each humane slaughter method decrees that method valid for certain species, details the method, and states equipment and personnel requirements.¹⁶⁴

Under the HMSA, the Secretary may also designate slaughter methods that are not humane.¹⁶⁵ However, the Secretary has not decreed any methods of slaughter to be inhumane for farmed land animals in the regulations.¹⁶⁶

The USDA has promulgated regulations relating to the stunning of animals before slaughter.¹⁶⁷ The regulations state that animals shall be stunned before they are shackled, hoisted, thrown, cast, or cut.¹⁶⁸ The USDA has also promulgated some general regulations about animal holding facilities and handling prior to slaughter.¹⁶⁹ The regulations require holding equipment to be in good repair and free from sharp objects that may cause injury to the animals.¹⁷⁰ The regulation relating to the handling of farmed land animals states that moving the livestock shall be done with minimal excitement and discomfort to the animals.¹⁷¹ Implements used to drive animals shall be used as little as possible and certain implements used to drive animals that may cause injury or unnecessary pain shall not be used.¹⁷² Disabled and other animals unable to move shall be separated, and

¹⁵⁹ 7 U.S.C. § 1902.

¹⁶⁰ *Id.*

¹⁶¹ *Id.* at § 1904(a).

¹⁶² *Id.* at § 1904(b).

¹⁶³ 9 C.F.R. §§ 313.5–313.30.

¹⁶⁴ *See id.* at § 313.15 (detailing the requirements for the use of captive bolt stunners on certain animals).

¹⁶⁵ 7 U.S.C. § 1904(b) (providing that “the Secretary may . . . designat[e] methods which are not in conformity with [the Act]”).

¹⁶⁶ *See generally id.* at §§ 1901–1907 (covering only livestock).

¹⁶⁷ 9 C.F.R. § 313.2(f).

¹⁶⁸ *Id.*

¹⁶⁹ *Id.* at §§ 313.1–313.2.

¹⁷⁰ *Id.* at § 313.1(a).

¹⁷¹ *Id.* at § 313.2(a).

¹⁷² *Id.* at § 313.2(b)–(c).

animals held overnight shall have sufficient room in the holding pens to lie down.¹⁷³

The HMSA does not specifically mention poultry or fish; it only mentions cattle, calves, horses, mules, sheep, swine, and all other livestock.¹⁷⁴ In 2005, the USDA's Food Safety and Inspection Service (FSIS) issued a notice concerning poultry, titled *The Treatment of Live Poultry before Slaughter* which stated, "There is no specific federal humane handling and slaughter statute for poultry"¹⁷⁵ A district court reaffirmed this stance, holding that Congress intended to exclude poultry from the definition of livestock.¹⁷⁶ One of the reasons the court found poultry to not be covered by the HMSA was because in 1957, one year before the HMSA was passed, Congress enacted the Poultry Products Inspection Act (PPIA),¹⁷⁷ which provided "an elaborate system for the inspection, processing, and regulation of poultry and poultry products."¹⁷⁸ Because the PPIA has been interpreted as intending to occupy the field of regulations for poultry, and the HMSA does not explicitly refer to poultry, poultry are excluded from the HMSA.¹⁷⁹

It is likely that the USDA or a court would see fish as similarly situated to poultry, and would find that the HMSA also does not cover fish. Like poultry, fish are not specifically mentioned in the HMSA,¹⁸⁰ and the safety of fish and fish products is regulated by the FDA's seafood safety program.¹⁸¹ The purpose of the seafood safety program is to protect consumer safety by prohibiting adulterated or misbranded fish and fish products.¹⁸² This program is a complex system that regulates fish and fish products, and includes research, inspection, compliance, enforcement, outreach, and the development of regulations and guidance.¹⁸³ The FDA's seafood safety program is similar to the PPIA in that it also focuses on protecting consumer health and safety.¹⁸⁴ Distributed poultry products must be wholesome and unadulterated, and properly marked, labeled, and packaged.¹⁸⁵ Even though the PPIA and the seafood safety program only consider the safety of animal products for human consumption, since the PPIA has been interpreted as occu-

¹⁷³ 9 C.F.R. § 313.2(d)-(e).

¹⁷⁴ 7 U.S.C. § 1902(a).

¹⁷⁵ 70 Fed. Reg. 56624 (Sept. 28, 2005).

¹⁷⁶ *Levine v. Conner*, 540 F. Supp. 2d 1113, 1121 (N.D. Cal. 2008).

¹⁷⁷ 21 U.S.C. §§ 451-472 (2006).

¹⁷⁸ *Levine*, 540 F. Supp. 2d at 1117.

¹⁷⁹ However, the exclusion of poultry from the HMSA does not hold up under close scrutiny because the HMSA deals with the humane treatment of animals in connection with or during slaughter, and the PPIA deals with the safety of a meat product for the consumer.

¹⁸⁰ 7 U.S.C. § 1902(a).

¹⁸¹ FDA, *Seafood Guidance*, *supra* n. 105.

¹⁸² 60 Fed. Reg. 65125, 65126 (Dec. 18, 1995).

¹⁸³ FDA, *Seafood Guidance*, *supra* n. 105.

¹⁸⁴ 21 U.S.C. § 451.

¹⁸⁵ *Id.*

pying the poultry field, a court would likely view the seafood safety program as similarly occupying the fish field. Therefore, since fish are not specifically mentioned in the HMSA, and the FDA has a complex system in place to regulate fish product safety, fish are not covered by the HMSA.

Accordingly, fish currently receive no protection during slaughter under the HMSA.¹⁸⁶ However, as discussed in Part II(C), fish can feel pain, and as a result their welfare should be taken into consideration during slaughter.¹⁸⁷ The principle behind using humane methods when slaughtering animals is to kill the animal quickly with minimal fear and pain.¹⁸⁸ The HMSA states, “The use of humane methods in the slaughter of livestock prevents needless suffering.”¹⁸⁹ The HMSA had its origin in the concern for the humane treatment of animals and considerations of decency.¹⁹⁰ Another driving force behind this law was testimony of the revulsion felt toward inhumane methods of slaughter.¹⁹¹ These concerns should be extended to fish, and addressed through legislation to protect fish welfare during slaughter.

Common slaughter methods currently used do not kill fish quickly and do not minimize fear and pain.¹⁹² Carbon dioxide narcosis and live chilling slaughter methods do not result in an immediate loss of consciousness in fish,¹⁹³ and most fish harvested using these methods are slaughtered when they are fully conscious.¹⁹⁴ The live gutting and asphyxiation in air slaughter methods are also concerning because these methods take a considerably long time to kill the fish.¹⁹⁵ The author proposes amending the HMSA to include fish, and adopting language for the related regulations from the Aquatic Animal Health Code, which contains a section pertaining to the welfare of farmed fish during slaughter.¹⁹⁶

D. Proposed Legislation and Regulations to Protect Fish Welfare during Slaughter

1. Amendment to the Humane Methods Section of the HMSA

The “Humane Methods” section of the HMSA sets out the types of slaughter that are considered humane for certain ani-

¹⁸⁶ 7 U.S.C. § 1902(a).

¹⁸⁷ See Ashley & Sneddon, *supra* n. 31, at 68 (concluding that “there is significant evidence to suggest that [fish] well-being is adversely affected by potentially painful and fearful situations”).

¹⁸⁸ *Id.* at 67.

¹⁸⁹ 7 U.S.C. § 1901.

¹⁹⁰ H.R. Rpt. 95-1336 at 3, 5 (July 10, 1978).

¹⁹¹ *Id.* at 5.

¹⁹² See *supra* pt. III(C) (discussing the slaughter methods of carbon dioxide narcosis, live chilling, asphyxiation in air, and live gutting).

¹⁹³ Robb, *supra* n. 73, at 232–34.

¹⁹⁴ *Id.*

¹⁹⁵ Mood, *supra* n. 1, at 66.

¹⁹⁶ *Aquatic Animal Health Code*, *supra* n. 125, at ch. 7.3.

mals.¹⁹⁷ The following language should be added to this section of the HMSA to include humane methods of slaughter pertaining to fish:

In the case of fish, all animals shall be rendered insensible to pain by percussive stunning, spiking, shooting with a free bullet, or an electrical method that is rapid and effective before being bled out.

2. *Regulations on Humane Slaughter Methods*

The Secretary of Agriculture should promulgate regulations specifying various slaughter methods that are humane for fish.¹⁹⁸ As a starting point, the Secretary should experiment with the methods of humane slaughter listed in the Aquatic Animal Health Code, and should determine if these methods are humane, taking into consideration the speed and scope of slaughter operations. The Secretary should also have the power to designate methods of killing fish that are not humane.

Assuming the Secretary investigated and found these methods to be humane, the methods of humane slaughter for fish would be percussive stunning, spiking, shooting with a free bullet, and electrical stunning.¹⁹⁹

The following regulations relating to each method of stunning are proposed, adopting language from the Aquatic Animal Health Code.

a. *Percussive Stunning*

The slaughtering of carp and salmonids by using percussive stunning is designated as a humane method of slaughtering of such animals under the Act.²⁰⁰ “Percussive stunning is achieved by a blow of sufficient strength to the head applied above or immediately adjacent to the brain in order to damage the brain.”²⁰¹ “Mechanical stunning may be achieved either manually or using specially developed equipment.”²⁰² “The blow sh[all] be of sufficient force and delivered above or adjacent to the brain in order to render immediate unconsciousness.”²⁰³ “Fish sh[all] be quickly removed from the water, restrained and given a quick blow to the head, delivered either manually by a club or by automated percussive stunning.”²⁰⁴ “The effectiveness of stunning sh[all] be checked, and fish be re-stunned if necessary.”²⁰⁵ This method can be used both to stun and kill the fish.²⁰⁶

¹⁹⁷ 7 U.S.C. § 1902.

¹⁹⁸ This is based on 9 C.F.R. §§ 313.5–313.30.

¹⁹⁹ *Aquatic Animal Health Code*, *supra* n. 125, at art. 7.3.8.

²⁰⁰ *Id.* at art. 7.3.8(1).

²⁰¹ *Id.* at art. 7.3.6(2)(a).

²⁰² *Id.*

²⁰³ *Id.* at art. 7.3.7.

²⁰⁴ *Id.*

²⁰⁵ *Aquatic Animal Health Code*, *supra* n. 125, at art. 7.3.7.

²⁰⁶ *Id.*

b. Spiking

The slaughtering of tuna by using spiking or coring is designated as a humane method of slaughtering of such animals under the Act.²⁰⁷ “Spiking or coring are irreversible stunning and killing methods of fish based on physical damage to the brain by inserting a spike or core into the brain.”²⁰⁸ “The spike sh[all] be aimed on the skull in a position to penetrate the brain of the fish and the impact of the spike should produce immediate unconsciousness.”²⁰⁹ “Fish sh[all] be quickly removed from the water, restrained and the spike immediately inserted into the brain.”²¹⁰ This method can be used both to stun and kill the fish.²¹¹

c. Shooting with a Free Bullet

The slaughtering of tuna by a free bullet is designated as a humane method of slaughtering of such animals under the Act.²¹² “Shooting using a free bullet may be used for killing large fish (such as tuna).”²¹³ “The fish may either be crowded in a net and shot in the head from the surface, or individual fish may be killed by shooting in the head from under the water (commonly called lupara).”²¹⁴ “The shot should be carefully aimed at the brain.”²¹⁵ “The fish should be positioned correctly and the shooting range should be as short as practicable.”²¹⁶ This method can be used both to stun and kill the fish.²¹⁷

d. Electrical Stunning

The slaughtering of carp, eel, and salmonids by electrical stunning is designated as a humane method of slaughtering of such animals under the Act.²¹⁸ “Electrical stunning involves the application of an electrical current of sufficient strength and duration, and suitable frequency to cause immediate loss of consciousness and insensibility of the fish.”²¹⁹ “The conductivity of fresh and brackish water varies, so it is essential to establish the parameters of the electrical current to ensure proper stunning at the site of stunning.”²²⁰ “The electrical stunning device sh[all] be constructed and used for the specific fish species and their environment.”²²¹ “Unconsciousness following electrical stun-

²⁰⁷ *Id.* at art. 7.3.8.

²⁰⁸ *Id.* at art. 7.3.6(2)(b).

²⁰⁹ *Id.* at art. 7.3.7.

²¹⁰ *Id.*

²¹¹ *Aquatic Animal Health Code, supra* n. 125, at art. 7.3.7.

²¹² *Id.* at art. 7.3.8.

²¹³ *Id.* at art. 7.3.6(c).

²¹⁴ *Id.*

²¹⁵ *Id.* at art. 7.3.7.

²¹⁶ *Id.*

²¹⁷ *Aquatic Animal Health Code, supra* n. 125, at art. 7.3.7.

²¹⁸ *Id.* at art. 7.3.8(4).

²¹⁹ *Id.* at art. 7.3.6(3)(a).

²²⁰ *Id.*

²²¹ *Id.* at art. 7.3.6(3)(b).

ning may be reversible.”²²² “In such a case fish sh[all] be killed before consciousness is recovered.”²²³ “Fish sh[all] be confined beneath the surface of the water, and there sh[all] be a uniform distribution of electrical current in the stunning tank or chamber.”²²⁴ “In semi-dry electrical stunning systems, fish sh[all] enter the device head first to ensure rapid and efficient stunning.”²²⁵ This method can be used both to stun and kill the fish.²²⁶

3. *Regulation on Equipment and Personnel*

“[E]quipment sh[all] be maintained and operated appropriately [and] it sh[all] be tested on a regular basis to ensure that performance is adequate.”²²⁷ “Personnel handling fish for stunning and killing sh[all] be experienced and competent in the handling of fish, and understand their behavio[]r patterns as well as the underlying principles necessary to carry out their tasks.”²²⁸ “Some stunning and killing methods may pose a risk to the personnel, therefore training sh[all] cover occupational health and safety implications of any methods used.”²²⁹

4. *Regulation on Inhumane Slaughter Methods*

Although the Secretary has not designated any slaughter methods as inhumane for farmed land animals,²³⁰ there are methods used for slaughtering fish that have been shown to result in poor fish welfare.²³¹ Therefore, the Secretary should designate these methods as inhumane under the HMSA, with this proposed language:

The following methods shall not be used as they result in poor fish welfare and do not meet the standard of humane slaughter: “carbon dioxide in holding water, chilling with ice and [carbon dioxide] in holding water, salt or ammonia baths, asphyxiation by removal from water, and exsanguination (bleeding out) without stunning.”²³²

5. *Regulation on Stunning*

“Effective stunning sh[all] be verified by the absence of consciousness.”²³³ “A backup stunning system is necessary.”²³⁴ “Any fish mis-stunned, or regaining consciousness before death, sh[all] be re-stunned

²²² *Id.* at art. 7.3.6(3)(c).

²²³ *Aquatic Animal Health Code, supra* n. 125, at art. 7.3.6(3)(c).

²²⁴ *Id.* at art. 7.3.6(3)(d).

²²⁵ *Id.* at art. 7.3.6(3)(e).

²²⁶ *Id.* at art. 7.3.7.

²²⁷ *Id.* at art. 7.3.6(1)(b).

²²⁸ *Id.* at art. 7.3.2.

²²⁹ *Aquatic Animal Health Code, supra* n. 125, at art. 7.3.2.

²³⁰ *See generally* 7 U.S.C. §§ 1901–1907 (covering only livestock).

²³¹ *Aquatic Animal Health Code, supra* n. 125, at art. 7.3.6(4).

²³² *Id.*; *see supra* pt. III(C) (providing a more in-depth look at some of these methods).

²³³ *Aquatic Animal Health Code, supra* n. 125, at art. 7.3.6(1)(c).

²³⁴ *Id.* at art. 7.3.6(1)(d).

as soon as possible.”²³⁵ “Stunning sh[all] not take place if killing is likely to be delayed such that the fish will recover or partially recover consciousness.”²³⁶ “While absence of consciousness may be difficult to recogni[z]e, signs of correct stunning include loss of respiratory movement (loss in opercular activity); loss of visual evoked response (VER); [and] loss of vestibulo-ocular reflex (VOR, eye rolling).”²³⁷

6. Regulation on Holding Facilities

“The holding facilities sh[all] be designed and specifically constructed to hold a certain fish species or group of fish species.”²³⁸ “The holding facilities sh[all] be of a size that allows holding a certain number of fish for processing in a given timeframe without compromising the welfare of the fish.”²³⁹ “Operations sh[all] be conducted with minimal injury and stress to the fish.”²⁴⁰ “[N]ets and tanks should be suitably designed to minimi[z]e physical injuries; water quality should be suitable for the fish species and stocking density; equipment for transferring fish, including pumps and pipes, sh[all] be designed and maintained to minimize injury.”²⁴¹

7. Regulation on Handling

“Fish sh[all] be unloaded, transferred and loaded for slaughter under conditions that minimi[z]e injury and stress to the fish.”²⁴² “Water quality sh[all] be assessed on arrival of fish prior to their unloading for slaughter, and corrective action taken as appropriate.”²⁴³ “Where possible[,] any injured or moribund fish sh[all] be separated and killed humanely.”²⁴⁴ “The crowding periods of fish sh[all] be as short and infrequent as possible to avoid stressful conditions arising[, and where feasible,] the handling of fish during transfers sh[all] be minimi[z]ed”²⁴⁵ “[W]hen applicable, fish sh[all] be allowed to swim directly into a stunning device without handling to avoid handling stress.”²⁴⁶ “Equipment used to handle fish, for example nets and dip nets, pumping devices and brailing devices, sh[all] be designed, constructed and operated to minimi[z]e physical injuries (e.g. pumping height, pressure and speed are important factors to consider).”²⁴⁷

²³⁵ *Id.*

²³⁶ *Id.* at art. 7.3.6(1)(e).

²³⁷ *Id.* at art. 7.3.6(1)(f).

²³⁸ *Id.* at art. 7.3.4(1).

²³⁹ *Aquatic Animal Health Code, supra* n. 125, at art. 7.3.4(2).

²⁴⁰ *Id.* at art. 7.3.4(3).

²⁴¹ *Id.* at art. 7.3.4(4).

²⁴² *Id.* at art. 7.3.5(1).

²⁴³ *Id.* at art. 7.3.5(2)(a).

²⁴⁴ *Id.* at art. 7.3.5(2)(b).

²⁴⁵ *Aquatic Animal Health Code, supra* n. 125, at art. 7.3.5(2)(c)–(d).

²⁴⁶ *Id.* at art. 7.3.5(2)(e).

²⁴⁷ *Id.* at art. 7.3.5(2)(f).

“There sh[all] be a contingency plan to address emergencies and minimi[z]e stress during unloading, transferring and loading fish.”²⁴⁸

V. CONSIDERATIONS

Beyond the text of the proposed legislation itself, there are two key considerations that must be taken into account as part of the discussion of enacting the Humane Transport of Fish Act and the amendment to the Humane Methods of Slaughter Act (HMSA). First, what effect will the proposed legislation have on the aquaculture industry? Second, how will the proposed legislation be enforced?

As a practical matter, fish welfare should be a concern of the aquaculture industry since increased welfare often leads to good production and good flesh quality.²⁴⁹ For example, using humane methods to slaughter farmed land animals eliminates bruising and other damage to the meat.²⁵⁰ Like animals slaughtered humanely under the HMSA, slaughtering fish humanely would lead to better meat quality.²⁵¹ Humane slaughter methods reduce stress and physical activity at slaughter.²⁵² Fish stunned using the electrical method have fewer gaps, tears, and rips in their flesh, less scale loss, and improved overall appearance.²⁵³ Wild-caught fish spiked as soon as they were landed had improved flesh quality.²⁵⁴ For these reasons, the U.S. aquaculture industry is starting to determine how to integrate more humane methods of slaughter into the system with minimal cost.²⁵⁵

Additionally, the public is becoming increasingly concerned about farmed fish welfare.²⁵⁶ Producers who treat their fish more humanely can market their product as such.²⁵⁷ Producers can also charge more for humanely treated fish because consumers are willing to pay more for humanely raised animal products.²⁵⁸ Since the consumption of fish

²⁴⁸ *Id.* at art. 7.3.5(2)(h).

²⁴⁹ Huntingford & Kadri, *supra* n. 24, at 23.

²⁵⁰ H. Rpt. 95-1336 at 2651 (July 10, 1978).

²⁵¹ Mood, *supra* n. 1, at 82.

²⁵² *Id.*

²⁵³ *Id.*; Ace Aquatec, *Humane Stunner FAQs*, <http://www.aceaquatec.com/FAQsStunner.htm> [<http://perma.cc/0NocZXHBdq8>] (accessed Nov. 16, 2013).

²⁵⁴ Mood, *supra* n. 1, at 81.

²⁵⁵ Tess Benson, *Advancing Aquaculture: Fish Welfare at Slaughter* 8 (2004) (available at <http://seafood.oregonstate.edu/pdf%20Links/Fish%20Welfare%20at%20Slaughter%20by%20Tess%20Benson%20-%20Winston%20Churchill%20Memorial%20Trust.pdf> [<http://perma.cc/02dMWw6D7XV>] (accessed Nov. 16, 2013)).

²⁵⁶ Huntingford & Kadri, *supra* n. 24, at 23.

²⁵⁷ *Id.*

²⁵⁸ See Mary Wilson, *Natural, Humane Labels Studied*, <http://feedstuffsfoodlink.com/story-natural-humane-labels-studied-71-66076> [<http://perma.cc/0ZuR83AZvUe>] (Feb. 18, 2008) (accessed Nov. 16, 2013) (stating that 33% to 53% of consumers will pay 10% more for humanely produced meat and dairy products); see generally K.M. Grimsud et al., *Households' Willingness-to-Pay for Improved Fish Welfare Breeding Programs for Farmed Atlantic Salmon*, 372–375 *Aquaculture* 19–27 (2013) (study finding that Norwegian consumers are willing to pay for ensuring welfare of farmed salmon) (on file with *Animal Law*).

products is not substantially increasing in the U.S, the domestic industry will develop only if it becomes competitive in the international market.²⁵⁹ The U.S. industry can be competitive by becoming a unique provider of humanely raised, transported, and slaughtered fish.

One concern likely to arise regarding the proposed legislation is whether it will result in increased production costs. The Humane Methods of Fish Transport Act would not require any additional equipment other than water quality monitoring equipment, which is readily available.²⁶⁰ For the HMSA, much of the equipment needed for the humane slaughter methods is relatively cheap. Percussive stunning is done by using a club or a priest (heavy metal head attached to a stick), spiking or coring is done by using a small spike tool, and only a firearm is required for the free bullet method.²⁶¹

Mechanical systems are more expensive but have many benefits. They are more consistent, so they ensure accurate and effective stunning for all fish.²⁶² They require fish to be handled less, which means the fish are less stressed, and this leads to better meat quality.²⁶³ Fish can also be killed in groups with mechanical systems.²⁶⁴ Since there is less handling of fish, fewer workers may be required.²⁶⁵ Additionally, mechanical systems provide for a cleaner environment for workers.²⁶⁶ Mechanical systems are the most humane because they are the most accurate, there is less handling of fish, and fish spend less time out of water than with other methods.²⁶⁷

An additional concern likely to arise with regard to the proposed legislation is how the laws will be enforced. In 2008, Congress enacted the Food, Conservation, and Energy Act.²⁶⁸ The law amended the Federal Meat Inspection Act (FMIA)²⁶⁹ to add catfish as an “amenable species” under the Act;²⁷⁰ therefore, catfish and catfish products are now subject to inspection under the FMIA, which the Food Safety and

²⁵⁹ Since 2002, U.S. annual per capita fish consumption has stayed around 16 pounds. See Natl. Oceanic & Atmospheric Administration, Off. of Sci. & Tech., *Per Capita Consumption* 74 (2010) (available at http://www.st.nmfs.noaa.gov/st1/fus/fus10/08_perita2010.pdf [<http://perma.cc/02MXJUektuM>] (accessed Nov. 16, 2013)) (documenting U.S. annual consumption rate of fish from 1910 to 2010). But worldwide fish consumption is expected to rise 16% by 2021. FAO, *World Fisheries*, *supra* n. 16, at 190.

²⁶⁰ See e.g. Campbell Scientific, *Aquaculture*, <http://www.campbellsci.com/aquaculture#more> [<http://perma.cc/0kPFras2Nj7>] (accessed Nov. 16, 2013) (a company that sells customized aquaculture systems).

²⁶¹ *Aquatic Animal Health Code*, *supra* n. 125, at art. 7.3.6(2); Mood, *supra* n. 1, at 7–8.

²⁶² Benson, *supra* n. 255, at 19.

²⁶³ *Id.*

²⁶⁴ *Id.* at 24.

²⁶⁵ *Id.*

²⁶⁶ *Id.*

²⁶⁷ See *id.* at 20 (describing the benefits of mechanical systems, including that “fish are not handled” and spend “minimal time out of water”).

²⁶⁸ Pub. L. No. 110-246, 122 Stat. 2130 (2008).

²⁶⁹ Federal Meat Inspection Act, 21 U.S.C. §§ 601–695 (2006).

²⁷⁰ Pub. L. No. 110-246 at § 11016(b).

Inspection Service (FSIS) administers.²⁷¹ The humane methods of slaughter section in the FMIA requires the Secretary of Agriculture to prevent the inhumane slaughter of livestock by describing how inspectors can examine and inspect the methods by which amenable species are slaughtered and handled.²⁷² Unfortunately, Congress exempted catfish from the humane slaughter requirement in the FMIA.²⁷³ However, Congress did state that the Secretary should “take into account the conditions under which the catfish is raised and transported to a processing establishment” when examining and inspecting a catfish-meat food product.²⁷⁴

Since catfish were added as an amenable species under the FMIA, FSIS must create a new program for the inspection of catfish. The Office of Catfish Inspection Programs (OCIP) is currently under development and would create policies to implement and manage an inspection program,²⁷⁵ providing “regulatory oversight for catfish and catfish products.”²⁷⁶ OCIP would inspect facilities at every stage of catfish production, including the ponds where catfish are raised, the vehicles that transport them, and the “plants where they are slaughtered, processed, and packaged.”²⁷⁷ This program is facing fierce opposition,²⁷⁸ but could be the first mandatory inspection program for fish.²⁷⁹

Even though this program relates to food safety,²⁸⁰ it is important to the suggested legislation in this Article. Under the program, there would be inspectors at every stage of catfish production.²⁸¹ The FMIA requires the humane slaughter of amenable species (except catfish)

²⁷¹ 76 Fed. Reg. 10434, 10434 (proposed Feb. 24, 2011).

²⁷² 21 U.S.C. § 603(b).

²⁷³ 76 Fed. Reg. at 10435; 21 U.S.C. § 625.

²⁷⁴ 21 U.S.C. § 606(b).

²⁷⁵ U.S. Dept. of Agric., Food Safety & Inspec. Serv., *About FSIS: Office of Catfish Inspection Programs*, <https://web.archive.org/web/20130605201253/http://www.fsis.usda.gov/about/OCIP/index.asp> [<http://perma.cc/06Bvj1arg5w>] (updated Feb. 18, 2011) (accessed Nov. 16, 2013) [hereinafter *Office of Catfish Inspection Programs*].

²⁷⁶ *Id.*

²⁷⁷ *Id.*

²⁷⁸ *Id.* Under the 2012 Farm Bill, the Senate voted to eliminate the OCIP and repeal the catfish inspection program. Daniel Strauss, The Hill: Floor Action Blog, *Catfish Farm Bill Amendment Approved*, <http://thehill.com/blogs/floor-action/senate/233635-catfish-farm-bill-amendment-approved-> [<http://perma.cc/0Pjz9ctYHc7>] (June 19, 2012) (accessed Nov. 16, 2013). At the time this Article was written, the 2012 Farm Bill (which was introduced again in 2013) had not yet passed. H.R. 2498, 113th Cong. (June 25, 2013) (as introduced); Sen. 954, 113th Cong. (June 11, 2013) (as passed by Senate on June 10); see Ron Nixon, *New Catfish Inspections Pose Problem for a Trade Pact*, N.Y. Times A23 (Nov. 14, 2013) (detailing opposition to the program and noting that while the Agriculture Department has spent \$20 million to develop the program, it has yet to inspect a single fish).

²⁷⁹ *Office of Catfish Inspection Programs*, *supra* n. 275.

²⁸⁰ See 76 Fed. Reg. at 10440 (The purpose of the FMIA is to “protect the health and welfare of consumers from . . . adulterated or misbranded catfish or catfish products.” (internal citation omitted)).

²⁸¹ *Id.*

and appoints inspectors for the purpose of examining the methods by which amenable species are slaughtered to make sure they are humane.²⁸² This means that these inspectors could enforce the HMSA.

The inspector could also take into account the conditions under which the catfish are raised and transported to the processing establishment.²⁸³ It is proposed that inspectors have the ability to take samples of water to assess if the fish are being raised in a healthy environment that will create a safe and wholesome food product.²⁸⁴ This is helpful because water quality has a great impact on fish welfare, and monitoring it during transport is a main concern in the proposed Humane Transport of Fish Act. FSIS also proposed standards for the transportation of catfish to the processing plant.²⁸⁵ The vehicle used to transport the catfish needs to have sufficient water and oxygen to ensure that fish do not die by any means other than slaughter.²⁸⁶ The welfare of the fish in the transporting vehicle is a main concern, given that entire shipments of fish have died during transport.²⁸⁷ Requiring that fish arrive alive to the processing plant would also require improved conditions during transport.

Notably, the addition of the catfish as an amenable species under the FMIA suggests that the U.S. is willing to expand its laws to cover fish. Even though the FMIA does not specifically relate to fish welfare, many of the regulations that make fish meat a safe, wholesome, and unadulterated product will also improve fish welfare. Extending the FMIA to cover catfish will hopefully open the door for further considerations of farmed fish welfare.

VI. CONCLUSION

Currently, there are no federal or state laws protecting the welfare of fish. With regard to farmed land animals, there are two primary federal laws protecting animal welfare during transport and slaughter: the Twenty-Eight Hour Law and the Humane Methods of Slaughter Act (HMSA). Because evidence suggests that fish have the ability to feel pain, they too should be afforded protection. The proposed legislation, the Humane Transport of Fish Act, inclusion of fish in the HMSA, and the adoption of related regulations would help to improve and protect the welfare of fish during slaughter and transport.

²⁸² 21 U.S.C. § 603(b).

²⁸³ *Id.*

²⁸⁴ 76 Fed. Reg. at 10442–43.

²⁸⁵ *Id.* at 10443.

²⁸⁶ *Id.*

²⁸⁷ Robb, *supra* n. 73, at 229.