FARM FISHING HOLES: GAPS IN FEDERAL REGULATION OF OFFSHORE AQUACULTURE

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I. INTRODUCTION

Fish might be considered "brain food,"[1] but there is nothing smart about the way the United States currently manages its seafood production. Although the U.S. government has long promoted the health benefits of products from the sea—even urging Americans to double their seafood intake[2]—it has fallen far behind in developing a domestic source for this seafood. Currently, the United States relies on an almost primitive method for domestic seafood production: taking animals found naturally in the wild. However, this approach is no longer sustainable: most federally managed capture fisheries are either stable or declining, with forty-eight currently overfished, and forty subject to overfishing in 2010.[3] What seafood the United States does not take from its own fisheries it imports; in

1. Anahad O'Connor, *The Claim: Fish Is Brain Food*, N.Y. TIMES, Jan. 3, 2006, http://www.nytimes.com/2006/01/03/health/03real.html?_r=0.

2. The 2010 federal Dietary Guidelines for Americans recommends that Americans more than double their current seafood consumption. NOAA, MARINE AQUACULTURE POLICY 1–2 (2011), *available at* http://www.nmfs.noaa.gov/aquaculture/docs/policy/doc_aquaculture_policy_2011.pdf.

3. NAT'L MARINE FISHERIES SERV., 2010 REPORT TO CONGRESS ON THE STATUS OF U.S. FISHERIES 1–3 (2010), *available at* http://www.nmfs.noaa.gov/stories/2011/07/docs/report.pdf. According to the National Marine Fisheries Service ("NMFS"), "[a] stock that is subject to overfishing has a fishing mortality (harvest) rate above the level that provides for the maximum sustainable yield (i.e., rate of removals is too high). A stock that is overfished has a biomass level below its prescribed biological threshold (i.e., population size is too low)." *Id.* at 3.

2011 the United States imported as much as 91 percent of its seafood supply.[4] Fortunately, there is a way for the United States not only to ease the pressure on traditional fisheries—allowing them to recover—but also to provide a significant domestic source of seafood products: through the development and promotion of its domestic offshore aquaculture industry. However, this industry should not be allowed to expand free from regulation, as offshore aquaculture may have serious consequences for both marine and human environments. This Note recommends that a comprehensive regulatory framework be put in place now, in advance of the offshore industry's development, to ensure not only that the industry grows, but also that it does so in an environmentally conscious and sustainable way.

Aquaculture is the farming of shellfish, finfish, and plants in water.[5] Growing sources for protein, instead of taking them from the wild, is not a novel concept: humans have been raising their own beef, poultry, and pork ever since they switched from a hunter-gatherer lifestyle to an agrarian one. Aquaculture has been around for thousands of years, but it has not until recently received much attention or been actively utilized in many parts of the world. The United States has an even shorter history of aquaculture compared to the global industry,[6] and has only recently recognized aquaculture's economic potential. Despite its slow start, the United States has begun to push toward developing its domestic industry in order to provide jobs and to reduce reliance on foreign seafood imports.[7] Now, aquaculture is the fastest-growing agricultural sector in the nation.[8]

4. NOAA, *Farmed Seafood: In the U.S.*, FISHWATCH.GOV, http://www.fishwatch.gov/farmed_seafood/in_the_us.htm (last visited Mar. 28, 2013). Half of the imported seafood comes from aquaculture. *Id.*

5. NOAA, *Farmed Seafood*, FISHWATCH.GOV, http://www.fishwatch.gov/farmed_seafood/index.htm (last visited Mar. 28, 2013).

6. Aquaculture is one of the fastest growing forms of food production in the world; in fact, nearly half of the global seafood supply comes from aquaculture. FAO, WORLD AQUACULTURE 2010, at xi (2011), *available at* http://www.fao.org/docrep/014/ba0132e/ba0132e.pdf. And while global aquaculture production provided 60 million tons of farmed seafood in 2010, with an expected value of $119 billion, FAO, THE STATE OF WORLD FISHERIES AND AQUACULTURE 8 (2012), *available at* http://www.fao.org/docrep/016/i2727e/i2727e01.pdf, the $1 billion value of total U.S. aquaculture production "pales in comparison." NOAA, *Aquaculture in the United States*, NOAAFISHERIES.GOV, http://www.nmfs.noaa.gov/aquaculture/aquaculture (last visited Mar. 28, 2013).

7. The United States imports 91 percent of its seafood from foreign nations, half of which comes from aquaculture. NOAA, *Farmed Seafood: In the U.S.*, *supra* note 4.

8. John K. Borchardt, *Aquaculture: Opportunities in the Fastest-Growing Food Production System in the United States*, AREADEVELOPMENT.COM (July 2011), http://www.areadevelopment.com/FoodProcessing/July2011/US-DOC-Aquaculture-employment-goals-2622565.shtml; REBECCA J. GOLDBURG, MATTHEW S. ELLIOTT & ROSAMOND L. NAYLOR, PEW OCEANS COMM'N, MARINE AQUACULTURE IN THE UNITED STATES: ENVIRONMENTAL IMPACTS AND POLICY OPTIONS 1 (2001),

Traditionally, U.S. aquaculture farms are located inland, typically in ponds or tanks that grow freshwater fish. However, as Americans come to prefer products grown in the sea rather than in freshwater—saltwater shrimp is the number one imported seafood product[9]—marine aquaculture operations are sure to grow. Most marine farms are currently located nearshore or in state-owned coastal waters; however, as competition for space near the coast increases, the industry will inevitably move offshore.[10] Much to the delight of environmentalists and consumers alike, "offshore aquaculture" may also be healthier for both the marine environment and the human community, as effluents and diseases are more easily diluted and dispersed in the open ocean than in nearshore sites, which are usually located in bays or other areas with poor circulation. Offshore aquaculture, thus, has enormous potential in the United States: some proponents even believe we are in the early stages of a "blue revolution" of offshore aquaculture production.[11]

At the same time, offshore aquaculture poses a host of environmental risks, most of which are not properly addressed by current regulatory schemes. One of the biggest risks is the impact of intentionally or accidentally released farmed fish on native fish populations and marine ecosystems. Fish escapes can harm native populations by altering the genetic makeup of the wild population—many farmed fish are genetically modified to grow larger and mature faster—or by transferring diseases and pathogens generated in the high-density conditions of most farms. And while offshore aquaculture farms may enjoy the benefit of being located far offshore, making for easier dilution and dispersion of waste discharge, these farms also create substantial amounts of organic pollution in the form of nutrients which, when released in excess, can harm marine ecosystems in areas with weak currents and poor circulation. The use of drugs such as pesticides and antibiotics in offshore fish farms can also endanger the marine environment: once these chemicals are added to marine farms, they

available at http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Protecting_ocean_life/env_pew_oceans_aquaculture.pdf.

9. NOAA, *Farmed Seafood: Outside the U.S.*, FISHWATCH.GOV, http://www.fishwatch.gov/farmed_seafood/outside_the_us.htm (last visited Mar. 28, 2013).

10. States control the waters within three miles of their coasts, while the federal government controls the waters from three to two hundred miles off the coast. Beyond two hundred miles, the United States participates in international agreements relating to specific areas or species. EUGENE H. BUCK & HAROLD F. UPTON, CONG. RESEARCH SERV., R41613, FISHERY, AQUACULTURE, AND MARINE MAMMAL ISSUES IN THE 112TH CONGRESS 2 (2012), *available at* http://www.nationalaglawcenter.org/assets/crs/R41613.pdf. This Note is limited to regulation of aquaculture in federal waters.

11. *E.g.*, Dorothy W. Bisbee, Note, *Preparing for a Blue Revolution: Regulating the Environmental Release of Transgenic Fish*, 12 VA. ENVTL. L.J. 625, 632 (1993).

readily disperse into the marine environment and can impact nontarget species. The increased use of antibiotics in fish farms can threaten the human environment as well: overuse has led to an increased resistance in both fish and human bacteria, reducing the effectiveness of these drugs. Finally, offshore aquaculture farms may harm the marine environment by interfering with wild animals' use of their natural habitat, displacing wild fish populations, blocking passages for migrating species, or attracting marine predators. These environmental risks are significant, yet current federal regulation of offshore aquaculture does not adequately address them—mainly because there is no specific federal regulatory scheme for offshore aquaculture.

I propose that a comprehensive and centralized framework for the offshore aquaculture industry be developed, and the roles of the relevant federal agencies and regulatory bodies be clarified. Without such a framework, U.S. aquaculturists are discouraged from moving their operations offshore due to the lack of any regulatory consistency or predictability, which not only makes it difficult to obtain sufficient investment capital, but also leaves any offshore operation vulnerable to legal challenge. In fact, the very first commercial offshore aquaculture project to be issued a fishing permit to operate in federal waters was challenged in federal court.[12] At the same time, regulations are essential to ensuring that the environmental effects of offshore aquaculture—including biological, organic, and chemical pollution, the impact of escaped farmed fish on native populations and marine ecosystems, and habitat modification—are minimized.

This Note first explains why the offshore aquaculture industry needs to be regulated and why it is imperative that such regulations be put in place now. Specifically, Part II will explain why the ever-increasing demand for seafood will lead to a rise in aquaculture production. As the industry moves offshore into the federal waters of the open ocean (known as the exclusive economic zone, or "EEZ"), explicit regulations are needed to promote the offshore industry's development as well as to address its environmental effects. Part III highlights the deficiencies of the current regulatory system—namely, the problems of administrative overlap and ambiguous statutory bases for each agency's regulatory authority. Finally, Part IV recommends that Congress create, through new legislation, a comprehensive regulatory framework that identifies one federal agency as

12. *See* KAHEA v. Nat'l Marine Fisheries Serv., No. 11-00474 SOM-KSC, 2012 U.S. Dist. LEXIS 59244, at *6–8 (D. Haw. Apr. 27, 2012).

having primary regulatory authority over offshore aquaculture practices. Specifically, the proposed National Sustainable Offshore Act of 2011, which identifies the National Oceanic and Atmospheric Administration ("NOAA") as the lead agency to regulate offshore aquaculture, is the ideal legislation for such a task. Part V concludes.

II. WHY REGULATE NOW?

Prompt regulation of offshore aquaculture is needed for several reasons. As demand for seafood continues to increase, it is imperative that aquaculture supplements the U.S. domestic seafood supply. However, traditional U.S. aquaculture farms are no longer adequate: farms located inland or in coastal waters must compete more and more for space not only with commercial fishermen, but also with those wishing to use these waters for recreational purposes. Thus, aquaculture will inevitably move offshore from state-controlled to federally controlled waters. However, without a clear and comprehensive regulatory framework giving aquaculturists the incentives or legal assurances to operate in federal waters, developers are discouraged from taking their operations offshore. At the same time, the lack of any comprehensive regulatory framework has allowed some of the environmental risks of offshore aquaculture to go unchecked. Regulations are needed, then, to ensure not only that the industry is developed, but that it does so in a sustainable and precautionary way.

A. AQUACULTURE AS AN IMPORTANT CONTRIBUTOR TO DOMESTIC SEAFOOD SUPPLY

A compelling case can be made for growing more seafood in the United States. America's appetite for seafood continues to increase[13]—yet dwindling supplies of domestic fish stocks[14] have forced the United States

13. Per capita consumption of seafood in the United States has risen steadily over the past century from 11.2 pounds of edible meat in 1910 to 15.8 pounds in 2010. DAVID VAN VOORHEES, NAT'L MARINE FISHERIES SERVS., FISHERIES OF THE UNITED STATES 2011, at 94 (Alan Lowther ed., 2011), *available at* http://www.st.nmfs.noaa.gov/Assets/commercial/fus/fus11/FUS2011.pdf. *See also* Grimur Valdimarsson, *Fish in the Global Food Chain: Challenges and Opportunities*, *in* INTERNATIONAL SEAFOOD TRADE: CHALLENGES AND OPPORTUNITIES 17, 24 (Hjörleifur Einarsson & William Emerson eds., 2009) ("All projections point to increased demand for fishery products in the future . . . .").

14. Globally, supplies from traditional fisheries have been stable or have declined over the past twenty years. James L. Anderson & Diego Valderrama, *Trends in the International Trade of Seafood Products*, *in* INTERNATIONAL SEAFOOD TRADE: CHALLENGES AND OPPORTUNITIES, *supra* note 13, at 27; Valdimarsson, *supra* note 13, at 20–21.

to import 91 percent of its seafood.[15] Domestic aquaculture can help meet the growing demand for seafood, reduce the dependence on imports, and help rebuild wild fish stocks.

Over thirty years ago, Congress recognized the enormous potential of aquaculture for our nation's food supply. Acknowledging that traditional domestic fisheries were being harvested at unsustainable rates, that the United States imported most of its seafood, but that aquaculture contributed very little to domestic seafood production, Congress concluded that "[d]omestic aquacultural production, therefore, has the potential for significant growth."[16] It declared aquaculture development to be in "the national interest"[17] and enacted the National Aquaculture Act of 1980 to "encourag[e] aquaculture activities and programs in both the public and private sectors of the economy."[18] The passage of the Act undoubtedly led to an expansion of the aquaculture industry,[19] but not to the extent anticipated or hoped for. Twenty years later, when aquaculture still had not become a major player in seafood production, the Department of Commerce called for a fivefold increase in U.S. aquaculture production by 2025.[20] As of 2013, aquaculture still represents only 5 percent of the domestic seafood supply (in tons).[21] At the same time, domestic fisheries continue to be overharvested and the United States continues to rely on foreign nations for its seafood.

Like the United States, other nations have recognized the potential of aquaculture as a major food producer. Unlike the United States, however, these nations have acted to ensure that potential is realized. Worldwide, aquaculture has grown at an annual rate of 8.3 percent, "making it the fastest growing form of food production in the world."[22] Global aquaculture production is dominated by Asia, which accounts for 89 percent of production by quantity: China alone represents 62 percent of the global industry.[23] The United States ranks thirteenth in total aquaculture

15. NOAA, *Farmed Seafood: In the U.S.*, *supra* note 4.

16. National Aquaculture Act of 1980, 16 U.S.C. § 2801(a)(3) (2006).

17. *Id.* § 2801(c).

18. *Id.* § 2801(b)(4).

19. After the Act was passed in 1980, the value of the U.S. aquaculture industry rose by 400 percent through the 1990s to its current value of over $1 billion. AN OCEAN BLUEPRINT FOR THE 21ST CENTURY 330 (2004), *available at* http://www.oceancommission.gov/documents/full_color_rpt/22_chapter22.pdf.

20. GOLDBURG, ELLIOTT & NAYLOR, *supra* note 8, at 2–4.

21. NOAA, *Farmed Seafood: In the U.S.*, *supra* note 4.

22. NOAA, *Farmed Seafood: Outside the U.S.*, *supra* note 9.

23. *Id.*; FAO FISHERIES & AQUACULTURE DEP'T, THE STATE OF WORLD FISHERIES AND AQUACULTURE 2010, at 19–20 (2010), *available at* http://www.fao.org/docrep/013/i1820e/

production—behind countries such as Vietnam, Indonesia, India, Chile, Egypt, Japan, and Norway—despite being one of the top importers of these products.[24] Aquaculture accounts for 20 percent of the New Zealand seafood production and, with the support of the New Zealand government, has become a major export industry.[25] In Chile, with the help of the government-sponsored National Aquaculture Policy, aquaculture products represented a third of its total export volume of seafood in 2009.[26] Indeed, while global aquaculture production is valued at over $100 billion annually, total U.S. aquaculture production is just under $1 billion.[27] Thus, while the United States remains a major consumer of aquaculture products, it is still considered a minor producer on the global stage. Thirty years after the creation of the National Aquaculture Act, U.S. aquaculture still has the potential for significant growth.

B. DOMESTIC AQUACULTURE WILL EXPAND OFFSHORE

While domestic aquaculture can play an important role in U.S. seafood production, nowhere is this potential more significant than in the offshore sector. Currently, the domestic aquaculture industry is dominated by the production of freshwater fish: of the 5 percent of the U.S. seafood supply that is attributed to aquaculture, only 20 percent occurs in saltwater.[28] Indeed, freshwater species such as catfish and trout account for the vast majority of seafood raised in U.S. fish farms.[29] Yet, demand for freshwater fish may change as Americans' tastes evolve. In 2011, for instance, the United States' main seafood import was shrimp (measured at 1.3 billion pounds and valued at $5.2 billion), which grows in saltwater.[30] Several other marine species made up a significant portion of U.S. imports, including salmon ($1.9 billion) and tuna ($568 million).[31] Furthermore, while catfish consumption in the United States increased only 63 percent

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24. NOAA, *Farmed Seafood: Outside the U.S.*, *supra* note 9; FAO FISHERIES & AQUACULTURE DEP'T, *supra* note 23, at 21.

25. The United States is the number one export country for New Zealand farm-raised mussels. A. Jeffs, *National Aquaculture Sector Overview: New Zealand*, FAO FISHERIES & AQUACULTURE DEP'T, http://www.fao.org/fishery/countrysector/naso_newzealand/en (last visited Mar. 28, 2013).

26. *Chile Seafood Exports Value Down Slightly in September*, EFEEDLINK.COM, Dec. 2, 2009, http://www.efeedlink.com/contents/12-02-2009/36b40fa1-3ffb-45c6-bec9-fd660e81b6ea-a181.html.

27. NOAA, *Farmed Seafood: In the U.S.*, *supra* note 4; FAO, THE STATE OF WORLD FISHERIES AND AQUACULTURE, *supra* note 6, at 8.

28. *Id.*

29. GOLDBURG, ELLIOTT & NAYLOR, *supra* note 8, at 1.

30. DAVID VAN VOORHEES, *supra* note 13, at 58, 62.

31. *Id.*

from 1987 to 2006, salmon consumption increased a whopping 359 percent.[32] Demand for marine aquaculture products will therefore contribute to the shift from land-based aquaculture operations to marine projects.

At the same time, the growing marine aquaculture industry will have to compete for high-quality sites in the nearshore and coastal waters typically selected for marine farms. Competition for space and use of these state-owned waters with those wishing to use these areas for recreational activities, wildlife protection, or shipping operations will only intensify,[33] making offshore sites more and more appealing. And, although such offshore operations are often more expensive because they require more durable facilities to withstand storms and surges, new technology and interest in the industry will make this industry increasingly lucrative. Due to improved technology, increasing experience, and economies of scale, costs will shrink and the economic potential for offshore aquaculture will grow.[34]

Indeed, a number of U.S. aquaculturists are already experimenting with offshore technology: four projects in Hawaii, Puerto Rico, and New Hampshire involved open-ocean designs that could be viable far offshore.[35] The University of New Hampshire is currently working on technology that would allow species of mussels and scallops to be grown in far offshore facilities using special net containers suspended from floating rafts.[36] Kampachi Farms LLC (formerly "Kona Blue Water Farms," or "Kona Blue"), a Hawaii-based aquaculture company, has recently announced its

32. Diego Valderrama & James Anderson, *Interactions Between Capture Fisheries and Aquaculture*, *in* OFFSHORE AQUACULTURE IN THE UNITED STATES: ECONOMIC CONSIDERATIONS, IMPLICATIONS & OPPORTUNITIES 189, 197 (Michael Rubino ed., 2008), *available at* http://www.nmfs.noaa.gov/aquaculture/docs/economics_report/econ_report_all.pdf.

33. For an overview of aquaculture farm locations in state territories, see GOLDBURG, ELLIOTT & NAYLOR, *supra* note 8, at 3.

34. *See* Gunnar Knapp, *Economic Potential for U.S. Offshore Aquaculture: An Analytical Approach*, *in* OFFSHORE AQUACULTURE IN THE UNITED STATES: ECONOMIC CONSIDERATIONS, IMPLICATIONS & OPPORTUNITIES, *supra* note 32, at 15, 47–48; John McQuaid, *In Search of New Waters, Fish Farming Moves Offshore*, YALE ENVIRONMENT 360 (Dec. 3, 2009), http://e360.yale.edu/content/feature.msp?id=2216 (reporting that the cofounder of Kona Blue Water Farms, an aquaculture business operating only offshore, says the offshore industry will "achieve better economics as it scales").

35. U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-08-594, OFFSHORE MARINE AQUACULTURE: MULTIPLE ADMINISTRATIVE AND ENVIRONMENTAL ISSUES NEED TO BE ADDRESSED IN ESTABLISHING A U.S. REGULATORY FRAMEWORK 7 (2008).

36. John Forster & Colin Nash, *Current Status of Aquaculture in the United States*, *in* OFFSHORE AQUACULTURE IN THE UNITED STATES: ECONOMIC CONSIDERATIONS, IMPLICATIONS & OPPORTUNITIES, *supra* note 32, at 207, 221–22.

first successful harvest of fish grown in offshore waters using an innovative design that allows an unanchored cage to drift in open-ocean currents from three to seventy-five miles offshore.[37] The success of this project, the company's CEO noted, "demonstrates that we can grow fish in the open ocean with no negative impact on pristine ocean ecosystems."[38] He continued, "We must now apply ourselves to responsibly scale up this industry."[39] Optimistic about the offshore industry's development, Kampachi Farms next plans to test its design in waters six miles offshore where it can still move freely in currents while being close enough to shore for easy delivery of supplies.[40]

C. REGULATIONS NEEDED TO INCENTIVIZE OFFSHORE AQUACULTURE DEVELOPERS: THE KONA BLUE EXPERIENCE

As interest in offshore aquaculture grows, the developmental and technological barriers that were once major impediments to the industry will disappear. Now, the most significant obstacle is the lack of any clear and comprehensive regulatory framework to guide the industry's development.[41] An excellent example of this problem is illustrated by the experience of the Hawaii-based aquaculture corporation Kona Blue.[42] The company, which farms all of its yellowtail tuna in open-ocean facilities, has experienced relative success since 2001. Its high-quality tuna, along with its more "ocean-friendly" farming techniques, has gained support from consumers,[43] environmentalists,[44] and even the U.S. government.[45]

37. *First Farmed Fish Harvest in U.S. Waters*, WORLDFISHING.NET (Mar. 1, 2012), http://www.worldfishing.net/news101/first-farmed-fish-harvest-in-us-waters.

38. *Id.*

39. *Id.*

40. *Id.*

41. *See* HAROLD F. UPTON & EUGENE H. BUCK, CONG. RESEARCH SERV., RL 32694, OPEN OCEAN AQUACULTURE 14 (2010) ("The legal and regulatory framework for open ocean aquaculture will, in large part, determine whether private industry succeeds in establishing commercial operations.").

42. Kona Blue Water Farms was recently dissolved and replaced by Kampachi Farms, LLC. James Wright, *Kona Blue Dissolved, Kampachi Farms Launched*, SEAFOOD SOURCE (Sept. 19, 2011), http://www.seafoodsource.com/newsarticledetail.aspx?id=12169.

43. Its signature yellowtail tuna, "Kona Kampachi," has been featured on numerous high-profile chefs' menus and has been praised as "safe" and "sustainable" food. Suzi Fraser, *"Amazing" Kona Kampachi Served to Obamas*, AQUAFEED.COM (Jan. 30, 2009), http://www.aquafeed.com/read-article.php?id=2691.

44. Jeffrey M. O'Brien, *The Wonder Fish*, CNN MONEY, Apr. 21, 2008, http://money.cnn.com/2008/04/15/technology/wonder_fish.fortune/index.htm (acknowledging that "[n]o environmentalist will declare Kona Blue's model perfect," but quoting an aquaculture analyst who observed, "The success of aquaculture will depend on balancing ecological sustainability with economic realities. We're very impressed with Kona Blue's willingness to constructively engage with us and work on issues") (internal

Producing over one million pounds of Kona Kampachi per year,[46] the company increased its monthly sales by 200 percent in 2007,[47] and in 2009 even served its signature tuna to President Obama and his family.[48]

Kona Blue's open-ocean commercial operations, however, have so far been limited to state waters. Although its first experiment growing fish far offshore yielded a successful harvest,[49] the company's expansion into the EEZ has encountered significant challenges. According to Kona Blue CEO and cofounder Neil Sims, the most difficult aspect of launching a commercial project in federal waters is the permit process.[50] Under existing law, there is no way to obtain an aquaculture permit for operation in federal waters. Instead, aquaculturists must navigate their way through a bewildering array of authorities and jurisdictions. Several government agencies have a hand in aquaculture and can issue permits for their respective responsibilities, including the National Oceanic and Atmospheric Administration (regulating fisheries), the Army Corps of Engineers (regulating navigation), the Environmental Protection Agency (water quality), and the Food and Drug Administration (food safety)—yet no agency has the ultimate authority to issue an aquaculture permit in federal waters.[51] In fact, it is possible that an agency may simply choose not to become involved in a project's regulation or supervision. One aquaculture researcher commented that "if you were to submit an application for an aquaculture site in the EEZ, it's possible it would never be looked at by anyone."[52] At the same time, it is also possible that each

quotation marks omitted). Furthermore, Kona Blue's cofounder, a former marine biologist, released an analysis demonstrating that sustainably farmed fish actually have sixty times less of an ecological footprint on the ocean than wild-caught fish. Neil Sims, *Fish Farming Supports Ecological Efficiency*, THE GLOBAL AQUACULTURE ADVOCATE, May/June 2010, at 58–59, *available at* http://www.gaalliance.org/mag/May_June2010.pdf.

45. *See* FOOD & WATER WATCH, OFFSHORE AQUACULTURE KEPT AFLOAT WITH GOVERNMENT FUNDING 3 (2007), *available at* http://documents.foodandwaterwatch.org/doc/OOAFunding.pdf ("From 1998 to 2007, Kona Blue or its parent company, Black Pearls, Inc., received nearly $1.8 million . . . in grants from the Department of Commerce."). In 2001, for example, Kona Blue received a $1,499,090 grant from the National Institute of Standards and Technology (Department of Commerce) for "[z]ooplankton harvesting for open ocean aquaculture feed." *Id.* at 2.

46. Wright, *supra* note 42.

47. *Kona Blue Raises $2.6 Million for Expansion*, SEAFOOD SOURCE (Jan. 18, 2008), http://www.seafoodsource.com/newsarticledetail.aspx?id=1416.

48. Fraser, *supra* note 43.

49. *See supra* note 37 and accompanying text.

50. James Wright, *Kona Blue Ventures into Federal Waters*, SEAFOOD SOURCE (Aug. 30, 2011), http://www.seafoodsource.com/newsarticledetail.aspx?id=11988 ("In fact, Sims said that obtaining the permit was the most challenging aspect of the . . . [p]roject.").

51. *See infra* Part III.A.

52. McQuaid, *supra* note 34 (quoting Richard Langan, the director of the University of New

agency could assert jurisdiction over a different aspect of the operation, resulting in a disjointed and patchy administrative regime that is both costly and confusing.[53] Without a clear or defined framework that streamlines the permitting process and clarifies regulatory requirements, aquaculturists like Kona Blue looking to expand offshore seem to be swimming against the current.[54]

A comprehensive federal framework for regulating the offshore industry is needed to address another significant obstacle inhibiting the industry's growth. As long as the government fails to put in place a framework that both guides offshore aquaculturists and protects their exclusive right to farm fish in federal waters, any offshore project is vulnerable to legal challenge. Kona Blue, the first company to receive a one-year federal permit from the National Marine Fishery Service ("NMFS") to farm fish in the EEZ, dealt with this very challenge in federal court. In 2011, NMFS was sued by a native Hawaiian nonprofit, KAHEA, and a consumer-rights organization, Food & Water Watch, for issuing a fishing permit to Kona Blue allowing it to operate its offshore facility in federal waters.[55] Without clear federal oversight of the industry, offshore operators like Kona Blue are left to defend their projects on a case-by-case basis. For example, Food & Water Watch, a group opposed to all aquaculture activities, has challenged individual aquaculture operations in court numerous times under various laws.[56] Other opponents of aquaculture, such as commercial and recreational fishing interests hoping not to have to compete with aquaculture, have also challenged aquaculture projects under the existing legal scheme. For instance, opponents have lobbied their respective Regional Fishery Councils,[57] which were created

Hampshire's Atlantic Marine Aquaculture Center).

53. This point is discussed further *infra* Part III.A.

54. *See* Erin R. Englebrecht, Comment, *Can Aquaculture Continue to Circumvent the Regulatory Net of the Magnuson-Stevens Fishery Conservation and Management Act?*, 51 EMORY L.J. 1187, 1203 (2002) ("[T]his disjointed regulatory scheme leaves the aquaculture industry, as well as affected parties and interested citizens, only guessing as to which laws apply and which agency is accountable for oversight at different stages of aquaculture ventures.").

55. KAHEA v. Nat'l Marine Fisheries Serv., No. 11-00474 SOM-KSC, 2012 U.S. Dist. LEXIS 59244, at *1–2 (D. Haw. Apr. 27, 2012); *see infra* Part III.B.3.

56. *See, e.g.*, *KAHEA*, 2012 U.S. Dist. LEXIS 59244, at *2 (suing the National Marine Fisheries Service under NEPA and the Magnuson-Stevens Fisheries Conservation Act for issuing a commercial fishing permit to an aquaculture operator in federal waters); Food & Water Watch, Inc. v. U.S. Army Corps of Eng'rs, 570 F. Supp. 2d 177, 177 (D. Mass. 2008) (suing the Corps under National Environmental Protection Act for issuing a permit to researchers for aquaculture research).

57. "[C]ommercial fishing interests made up 49% of appointed voting members of the eight Regional Fishery Management Councils between 1990 and 2001; recreational fishing interests made up 33%, and all other interests combined made up 17%." Thomas A. Okey, *Membership of the Eight*

by the Magnuson-Stevens Act[58] to regulate all fisheries matters in their respective regions, to keep them from implementing aquaculture programs. In 2009, aquaculture opponents sued the Gulf of Mexico Regional Fishery Council for implementing an aquaculture program into its management plan.[59] Opponents have even lobbied their congressional representatives to introduce legislation that would halt all aquaculture activities in the United States.[60]

Without a comprehensive regulatory framework in place to guide the offshore industry, the attacks on aquaculture projects in federal waters such as those proposed in the Gulf of Mexico or launched by Kona Blue will not stop. Aquaculturists must be given the incentives and legal assurances needed to expand offshore, or else they will move their operations abroad. Indeed, frustrated by the lack of any clear or predictable regulatory or permitting framework, companies such as Kona Blue are already starting to take their offshore operations overseas. Although most express their wish to stay in U.S. waters, they admit it makes more sense to move to an area that has clear and predictable management.[61] Indeed, would-be investors and lenders interested in offshore operations are suspicious of investing in activities in the United States given the industry's uncertain future, and would rather finance foreign operations: U.S. investors have already contributed to offshore operations in areas off the Caribbean and Latin America.[62] Kona Blue recently chose to expand its operations from waters

Regional Fishery Management Councils in the United States: Are Special Interests Over-Represented?, 27 MARINE POL'Y 193, 193 (2003). *See infra* notes 135–36 and accompanying text.

58. Magnuson-Stevens Fisheries Conservation and Management Act, 16 U.S.C. §§ 1852–53 (2006).

59. *See* Gulf Restoration Network, Inc. v. Nat'l Marine Fisheries, Serv., 730 F. Supp. 2d 157, 157 (D.D.C. 2010) (alleging that the Fishery Management Plan for regulating offshore aquaculture in the Gulf of Mexico violated provisions of the Magnuson-Stevens Act and NEPA); *infra* Part III.B.

60. For example, the Research in Aquaculture Opportunity and Responsibility Act was introduced in the Senate in 2010, which would have resulted in a three-and-a-half-year delay in the development of the U.S. offshore aquaculture industry. Research in Aquaculture Opportunity and Responsibility Act of 2010, S. 3417, 111th Cong. § 3(a) (2010). The bill failed to move forward before the legislative year ended, but a year later another bill was introduced in the House that would have had a similar effect: H.R. 574 would prohibit the Secretary of the Interior or Secretary of Commerce from authorizing commercial finfish aquaculture operations in federal waters without specific congressional approval. H.R. 574, 112th Cong. § 1 (2011). In effect, it would strip NOAA of its authority to issue commercial fishing permits to aquaculturists in federal waters and would render NOAA's new National Aquaculture Policy a nullity.

61. *See* McQuaid, *supra* note 34 (noting that one American aquaculturist chose to transfer his offshore operations from U.S. waters to Panama in part because of "bureaucratic frustration").

62. Michael Rubino, *Introduction to* OFFSHORE AQUACULTURE IN THE UNITED STATES: ECONOMIC CONSIDERATIONS, IMPLICATIONS & OPPORTUNITIES, *supra* note 32, at 1, 5.

off Hawaii to Mexico;[63] another offshore aquaculturist recently moved his business from U.S. waters off the coast of Puerto Rico to Panama.[64] As Kona Blue's CEO explained,

> [T]he concern going forward is the permit pathway . . . . If you make it available, [entrepreneurs] will come and make investments. American entrepreneurs realize an opportunity when they see one. The biggest constraint we hear from them is, "Will we be allowed to scale this [up]? How can we be sure that we can build an industry here?"[65]

Thus, if the U.S. government wishes to keep its domestic offshore aquaculture industry afloat, it must focus on revising its current regulatory regime.

D. REGULATIONS NEEDED TO ADDRESS ENVIRONMENTAL CONCERNS

While a federal regulatory framework is crucial to promoting the offshore aquaculture industry, it is also needed to create rules and regulations addressing the extensive environmental concerns associated with such activities. Offshore aquaculture can negatively impact the marine environment through (1) biological pollution, (2) organic pollution and eutrophication, (3) chemical pollution, and (4) habitat modification.

1. Biological Pollution

Biological pollution may be caused by the unintentional release of farmed fish into the ocean, which can harm native fish populations in a number of ways. Nonnative farmed fish can compete with native fish for food, habitat, or spawning grounds. In the Pacific Northwest, escaped fish from salmon farms have threatened or displaced native salmon populations for years,[66] while many scientists believe nonnative escaped fish contributed to the extinction and endangerment of several native fish species, such as the bonytail and humpback chubs, the desert pupfish, the Gulf sturgeon, and the June and razorback suckers.[67] Because farmed fish are either selectively bred or artificially engineered to mature faster and

63. Nina Wu, *Kona Blue Seeks Mexico Expansion*, HONOLULU STAR BULLETIN, Apr. 9, 2009, http://archives.starbulletin.com/content/20090409_Kona_Blue_seeks_Mexico_expansion. *See also* McQuaid, *supra* note 34 (discussing U.S. aquaculture with Kona Blue's CEO, who laments that "a lot of entrepreneurship and investment is flowing overseas").

64. McQuaid, *supra* note 34.

65. Wright, *supra* note 50 (quoting Neil Sims).

66. Between 1987 and 1996, at least a quarter million Atlantic salmon escaped on the West Coast. GOLDBURG, ELLIOTT & NAYLOR, *supra* note 8, at 6–7.

67. Mary Liz Brenninkmeyer, Comment, *The Ones That Got Away: Regulating Escaped Fish and Other Pollutants from Salmon Fish Farms*, 27 B.C. ENVTL. AFF. L. REV. 75, 84 (1999).

grow larger, they can also alter the genetic makeup of wild populations by interbreeding, which can decrease that population's fitness.[68] Scientists and policymakers alike are already calling for regulation of genetically modified or "transgenic" fish.[69] Finally, escaped fish can create biological pollution by introducing parasites and pathogens to native stock, the incidences of which are increased by aquaculture's practice of raising large densities of fish in small areas. One deadly pathogen, infectious salmon anemia ("ISA"), was first detected in the United States in Maine in 2001,[70] and by 2011 had made its way to the West Coast.[71] The virus, highly contagious, can kill up to 70 percent of fish on infected farms and could "devastate" Pacific salmon stocks if left unchecked.[72] In fact, a 2007 outbreak of the virus was responsible for decimating the Chilean salmon aquaculture industry, reducing production by half and resulting in more than $2 billion in losses.[73]

Notably, the risk of escaped fish may be higher in offshore aquaculture facilities since they are often more susceptible to damage by storms and are more likely to experience accidental releases of fish and their pathogens. In fact, net pens—the kind currently used in most offshore

68. "In Maine, escaped farmed Atlantic salmon may threaten the survival of endangered wild stocks by flooding the wild salmon gene pool. . . . Computer models indicate that, under certain conditions, breeding between wild fish and faster-growing transgenic fish could drive local fish populations to extinction." GOLDBURG, ELLIOTT & NAYLOR, *supra* note 8, at 7–9.

69. *See* John Forster, *Emerging Technologies in Marine Aquaculture*, *in* OFFSHORE AQUACULTURE IN THE UNITED STATES: ECONOMIC CONSIDERATIONS, IMPLICATIONS & OPPORTUNITIES, *supra* note 32, at 51, 61–62 (describing genetically modified aquaculture organisms as "an area where caution and further research are needed"); Dorothy W. Bisbee, Note, *Preparing for a Blue Revolution: Regulating the Environmental Release of Transgenic Fish*, 12 VA. ENVTL. L.J. 625, 655–59 (1993) (arguing that federal regulation is needed to address the risks of large-scale release of transgenic fish); Alison L. Van Eenennaam & Paul G. Olin, *Careful Risk Assessment Needed to Evaluate Transgenic Fish*, 60 CAL. AGRIC. 126, 131 (2006) (outlining the risks associated with transgenic fish and observing that "[t]here are currently no international standards regarding the confinement of transgenic fish to prevent their potential release or escape into the environment"); *Risks Involved with Transgenic Fish*, SCIENCEDAILY (Sept. 1, 2009), http://www.sciencedaily.com/releases/2009/08/090827073250.htm (reporting that researchers who have studied transgenic fish are urging caution). In 2003, California passed legislation making it "unlawful to spawn, incubate, or cultivate any . . . transgenic fish species" in state waters and amended its Code of Regulations to make it unlawful to "possess, transport, or import aquatic transgenic animals." *Issue: Transgenic Fish*, SERC, http://www.serconline.org/transFish/stateactivity.html (last updated Feb. 11, 2005).

70. Bill Delaney, *Infectious Salmon Disease Spreads in U.S.*, CNN (May 4, 2001), http://archives.cnn.com/2001/fyi/news/05/04/sick.salmon/index.html.

71. Max Follmer, *Deadly Flu-Like Salmon Farm Disease Jumps to Wild*, TAKEPART.COM (Oct. 18, 2011), http://www.takepart.com/article/2011/10/18/deadly-flu-salmon-farm-disease-jumps-wild.

72. One researcher called ISA a "cataclysmic threat," and a fisheries expert in Seattle warned of a "disease emergency." *Id.*

73. Alexei Barrionuevo, *Norwegians Concede a Role in Chilean Salmon Virus*, N.Y. TIMES, July 28, 2011, at A8, *available at* http://www.nytimes.com/2011/07/28/world/americas/28chile.html.

facilities—are "extremely prone to fish escapes" because of their vulnerability to storm damage, accidents during transfers, and damage from boats or other marine life.[74] Indeed, nearly one hundred thousand Atlantic salmon escaped from net pens in Washington in 1996, with another three hundred thousand escaping from a single farm in 1997.[75] Any potential offshore facility, therefore, must be regulated and managed to avoid this risk.

2. Organic Pollution and Eutrophication

Aquaculture systems can contribute to organic pollution and eutrophication of aquatic environments by discharging fish wastes and uneaten fish feed into the water column.[76] Eutrophication, or nutrient loading, occurs when a body of water becomes enriched with organic material, which stimulates nutrient concentrations to harmful levels.[77] High levels of nitrogen and phosphorus, the main nutrients in fish food, are considered to be the primary causes of environmental degradation in marine waters—contributing to low dissolved oxygen levels ("dead zones"), murky water, seagrass and coral death, fish kills, and possibly harmful algal blooms.[78] These nutrients are deposited from marine aquaculture systems directly into the water and are free to escape into the marine environment: as much as 70 percent of total phosphorus and 80 percent of total nitrogen found in the feed added to marine fish farms may be discharged.[79] Although offshore facilities may decrease the instances of eutrophication because strong currents in the open ocean can dilute or disperse these organic wastes and nutrients, the risk of environmental degradation is serious for facilities that are located in shallow waters or in weak current systems. Indeed, one study found that 80 percent of the nitrogen and phosphorous added to marine fish farms contribute to eutrophication.[80]

3. Chemical Pollution

Chemical pollution is caused by the extensive use of antibiotics, pesticides, herbicides, hormones, parasiticides, and fertilizers in

74. Brenninkmeyer, *supra* note 67, at 83.

75. *Id.* at 83–84.

76. GOLDBURG, ELLIOTT & NAYLOR, *supra* note 8, at 13.

77. *See* Brenninkmeyer, *supra* note 67, at 81 (discussing the interaction between aquaculture discharges, eutrophication, and toxic algae blooms).

78. GOLDBURG, ELLIOTT & NAYLOR, *supra* note 8, at 12–13.

79. *Id.* at 13.

80. *Id.*

aquaculture operations. Once these chemicals are added to marine farms, they readily disperse into the environment and can impact nontarget species.[81] For example, one parasiticide used in marine aquaculture systems to kill sea lice—but which is toxic to marine invertebrates—can remain in the water column for up to five hours and travel up to a half mile from the application site.[82] Furthermore, overuse of antibiotics in fish farms may pose a health risk to farmed fish, native fish, and even humans.[83] One recent study found that excessive use of antibiotics in fish farms in Chile and Norway has led to an antibiotic resistance in several of the aquatic bacteria causing infection and disease.[84] Because many of the bacteria found in the aquatic environment belong to the same group as human pathogens, scientists are now worried that "resistant genes from bacteria in aquaculture have spread to human pathogens."[85] This threat is taken seriously by the U.S. government: the Fish and Wildlife Service is required to recommend to the Food and Drug Administration which drugs should or should not be allowed for use in private aquaculture projects.[86]

4. Habitat Modification

Finally, offshore aquaculture facilities can impact the aquatic environment by modifying marine habitats and interacting with other marine life. Aquaculture facilities can interfere with wild animals' use of their natural surroundings, displace wild fish populations, block passage of migrating fish, and attract marine predators. Many marine animals become accidentally entangled in the facilities, particularly predators.[87] Indeed, when Kona Blue drafted an environmental assessment[88] before receiving

81. *Id.* at 14–16.

82. *Id.* at 16.

83. *See* GOLDBURG, ELLIOTT & NAYLOR, *supra* note 8, at 16–17.

84. *Antimicrobial Resistance in Fish Pathogenic Bacteria and Other Bacteria in Aquatic Environments*, SCI. DAILY (Nov. 19, 2012), http://www.sciencedaily.com/releases/2012/11/121119104367.htm.

85. *Id.* (noting that the development of resistance to antibiotics in aquatic bacteria "poses a serious threat to public health").

86. *AADAP Summary*, FISH & WILDLIFE SERV., http://www.fws.gov/fisheries/aadap/history.htm (last updated Jan. 16, 2013).

87. For example, sharks have been observed attacking and becoming entangled in offshore pens. Txema Galaz & Alessandro De Maddalena, *On a Great White Shark,* Carcharodon Carcharias *(Linnaeus, 1758), Trapped in a Tuna Cage Off Libya*, *Mediterranean Sea*, 14 ANNALES SER. HIST. NAT. 2 (2004), *available at* http://www.zrs.upr.si/media/uploads/files/galaz%20et%20al.pdf (discussing various instances of interactions between sharks and tuna farm facilities).

88. Environmental assessment reports are required by the National Environmental Policy Act. 42 U.S.C. § 4331–1432 (2006). If the agency proposing the federal action finds, after drafting an environmental assessment report, that the action will have no significant effects on the environment, it may forgo the preparation of an environmental impact statement and instead publish a Finding of No

its permit to operate in federal waters, it acknowledged that its project may affect other kinds of marine life, even federally protected species, by attracting predators and creating risks of collision or entanglement with the nets and lines used in its net pens.[89] Marine life is also threatened when aquaculturists employ certain deterrent devices to keep predators and other animals away from their facilities, such as acoustic harassment devices, which can disorientate and pain marine species.[90] Moored facilities themselves can damage the seafloor and benthic environment: Kona Blue was penalized in 2011 for damaging twenty-eight coral colonies when it parked a one-hundred-foot cage on a coral reef off the Hawaii coast.[91] Moreover, because state and federal conservation laws protect much more of the coastal marine zone than the open ocean, offshore aquaculture projects have the potential to adversely affect open-ocean marine habitats more than their nearshore counterparts.

Offshore aquaculture has the potential to become a significant aspect of U.S. seafood production. Yet, without an effective regulatory framework in place, incentives to participate in offshore activities are few and the industry will flounder. At the same time, an ineffective regulatory scheme will allow the environmental risks of offshore aquaculture to go unchecked, which could have serious consequences for both marine and human environments. For these reasons, it is imperative that a precautionary national framework be in place *in advance* of industry development. Part III below will examine whether an effective framework does in fact already exist.

III. DEFICIENCIES OF THE CURRENT REGULATORY SCHEME

The current regime for regulating offshore aquaculture needs to be revised. There is no lead federal agency for regulating offshore aquaculture and no comprehensive law directly addressing how it should be

Significant Impact ("FONSI"), which is what NMFS did in the *KAHEA* case. 40 C.F.R. §§ 1508.11–13 (2012); KAHEA v. Nat'l Marine Fisheries Serv., No. 11-00474 SOM-KSC, 2012 U.S. Dist. LEXIS 59244, at *7 (D. Haw. Apr. 27, 2012).

89. NOAA & NAT'L MARINE FISHERIES SERV., ENVIRONMENTAL ASSESSMENT: PROPOSED ISSUANCE OF A PERMIT TO AUTHORIZE THE CULTURE AND HARVEST OF A MANAGED CORAL REEF FISH SPECIES (*SERIOLA RIVOLIANA*) IN FEDERAL WATERS WEST OF THE ISLAND OF HAWAII, STATE OF HAWAII 29–32 (2011) [hereinafter KONA BLUE ENVIRONMENTAL ASSESSMENT]. For instance, to get to its offshore location in the EEZ, the facility had to pass through the Hawaiian Islands Humpback National Marine Sanctuary, where several protected dolphin and whale species are found. *Id.* at 11.

90. GOLDBURG, ELLIOTT & NAYLOR, *supra* note 8, at 18.

91. Jessie Schiewe, *Cash for Coral*, HONOLULU WEEKLY (Apr. 20, 2011), http://honoluluweekly.com/diary/2011/04/cash-for-coral/.

administered, regulated, and monitored. Multiple federal agencies are then left to assert their authority to regulate different aspects of offshore aquaculture under a variety of existing laws that were not designed for this purpose.[92] This system can lead to both overregulation of some aspects of the industry, such as overlapping permitting requirements, as well as underregulation of other aspects, such as the effects of escaped farmed fish on natural ecosystems. Furthermore, because none of the existing laws were designed to deal specifically with aquaculture, many are left vulnerable to challenge as proper legal bases for regulatory authority.

A. ADMINISTRATIVE OVERLAP CREATES PATCHY REGULATION

A number of federal agencies have invoked authority to regulate aquaculture activities in federal waters under various statutory authorities: EPA under the Clean Water Act, the Endangered Species Act, the National Environmental Protection Act, the Ocean Dumping Act, and the Federal Insecticide, Fungicide, and Rodenticide Act; NOAA under the Magnuson-Stevens Fishery Conservation and Management Act, the National Marine Sanctuaries Act, the Marine Mammal Protection Act, the Fish and Wildlife Coordination Act and the Endangered Species Act; Army Corps of Engineers under the Rivers and Harbors Act and the Outer Continental Shelf Lands Act; U.S. Coast Guard under the Rivers and Harbors Act; the Fish and Wildlife Service under the Fish and Wildlife Coordination Act, the Endangered Species Act, and the Lacey Act; Food and Drug Administration under the Food, Drug, and Cosmetic Act; and Department of Agriculture under the National Aquaculture Act. Under this patchy regulatory scheme, each agency imposes its own independent requirements with little interagency cooperation or collaboration—resulting in both overlapping regulatory requirements as well as gaps in the regulation of certain serious environmental risks.

The most significant consequence of allowing multiple agencies to invoke regulatory authority over different aspects of offshore aquaculture is that there is currently no centralized or streamlined process for obtaining a permit to operate a farm in federal waters.[93] As discussed in Part II.C, the permitting process is often cited as the single greatest constraint to offshore

92. U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 35, at 2. Even NOAA has declared, "[C]urrent U.S. law does not provide clear mechanisms to allow commercial aquaculture operations in federal waters." NOAA FISHERIES SERV., CHANGING TIDES: AQUACULTURE 3 (2008), *available at* http://www.nero.noaa.gov/nero/outreach/CTFeb2008.pdf.

93. *See* Englebrecht, *supra* note 54, at 1203 (describing the current regulatory regime as "disjointed").

aquaculture development. Because there is no specific permitting system for offshore aquaculture, multiple agencies have invoked their authority to require permits for various aspects of the aquaculture activities. This complex multiagency permitting system is confusing, time-consuming, and costly.

Furthermore, there are instances where the permit required from each agency actually addresses the same problem—allowing some aspects of offshore aquaculture to become even overregulated by various federal agencies. One such example is water quality: the discharge permit required by the EPA controls the direct "discharge of pollutants into the navigable waters" of the United States,[94] while at the same time the Section 404 permit required by the Corps controls the "discharge of dredged or fill material into the navigable waters" of the United States.[95] The Section 10 siting permit[96] required by the Corps also takes into consideration "effects and cumulative impacts upon the water quality."[97] Thus, an aquaculturist must obtain three different permits that all independently evaluate the farm's effect on water quality. It may be that this independent-review approach does more to guarantee that a specific environmental risk like water quality is controlled; yet surely a more coordinated and streamlined process is most efficient for both the government and potential permit seekers.

While the application of overlapping jurisdictions to offshore aquaculture can lead to overregulation of certain environmental risks, it can also lead to underregulation of other risks. The impact of escaped nonnative and transgenic fish on native species is especially likely to avoid regulation. Although the FDA has stated it intends to regulate the use of transgenic fish in aquaculture facilities, it has yet to promulgate any rules and has little expertise in dealing with impacts other than those on human

94. Clean Water Act, 33 U.S.C. § 1342 (2006) (giving the EPA the authority to issue discharge permits when implementing the National Pollutant Discharge Elimination System).

95. *Id.* § 1344 ("Any discharge of dredged or fill material into the navigable waters . . . bringing an area of the navigable waters into a use to which it was not previously subject, where the flow or circulation of navigable waters may be impaired . . . shall be required to have a permit under this section.").

96. River and Harbor Act of 1899, 33 U.S.C. § 403.

97. GRANVIL TREECE, TEX. A&M UNIV. SEA GRANT COLL. PROGRAM, UPDATED GOVERNMENTAL PERMITTING AND REGULATORY REQUIREMENTS AFFECTING TEXAS COASTAL AQUACULTURE OPERATIONS 13 (2005), *available at* http://texas-sea-grant.tamu.edu/WhatWeDo/online%20publications/TexasPerMan.pdf. *See also* U.S. ARMY CORPS OF ENG'RS, REGULATORY PROGRAM OVERVIEW 4 (2003), *available at* http://media.swf.usace.army.mil/pubdata/environ/regulatory/introduction/regprog.pdf (explaining what relevant factors the Corps considers when granting a Section 10 permit, including "fish and wildlife values, water supply, [and] water quality").

health.[98] The EPA may have authority to regulate escaped fish under the Clean Water Act, but only if the farms are considered "point sources" and only if the escaped fish are considered "pollutants."[99] The Endangered Species Act may give authority to NMFS or EPA to consider the impacts of escaped fish on certain native species, but only if those species are listed as "threatened or endangered" by the federal government,[100] which only a few of the species involved in aquaculture are.

Another environmental effect left unsatisfactorily regulated is the impact offshore aquaculture has on the habitats and ecosystems of the marine environment. The Army Corps of Engineers determines if the siting of a certain farm will impact the marine habitat, but it has little expertise in assessing the ecological implications on the marine environment. At the same time, the National Marine Sanctuaries Act gives NOAA authority to regulate actions that might impact habitats in federal waters, but only if those habitats are in federally designated marine sanctuaries.[101] The Magnuson-Stevens Fisheries Conservation and Management Act ("MSA") gives NOAA authority to regulate activities affecting fish populations and habitats, but only if the fishery or habitat is included in a federally designated Fishery Management Plan and only if the aquaculture activity is indeed considered "fishing" under the Act.[102] As it stands, the agency with the least experience in assessing risks to marine habitats, the Army Corps of Engineers, is given primary responsibility to judge whether a farm will negatively impact the marine environment, while the most appropriate agency, NOAA, is given authority to regulate the impacts on only selected marine habitats.

The current administrative overlap occurring in federal waters creates one final concern: with the various statutes triggered by offshore aquaculture, it is unclear which agency should most appropriately take the lead in the industry's regulation and management.[103] For example, the

98. What few rules the FDA does have with respect to aquaculture's effects on human health may even prove unsatisfactory. Although the FDA regulates which antibiotics are allowed in aquaculture projects these rules may prove inadequate as fish strains develop resistance to antibiotics. *See* Graham M. Wilson, Note, *A Day on the Fish Farm: FDA and the Regulation of Aquaculture*, 23 VA. ENVTL. L.J. 351, 394 (2004) (concluding that the problems of increasing antibiotic resistance and the development of genetic engineering technologies pose special problems requiring agency supervision).

99. Clean Water Act, 33 U.S.C. § 1342.

100. Endangered Species Act of 1973, 16 U.S.C. § 1533(a)(1) (2006).

101. National Marine Sanctuaries Act, 16 U.S.C. § 1431(b).

102. Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. § 1801(b). *See infra* Part III.B.3.

103. *See* Englebrecht, *supra* note 54, at 1204 (noting that there is a "lack of leadership and

Endangered Species Act ("ESA") grants authority to EPA, NOAA, and Fish and Wildlife Service to regulate federal activities that could harm threatened or endangered species. Because the ESA gives three different agencies overlapping jurisdiction, it is difficult to determine exactly which agency is most appropriate to regulate an aquaculture activity. This problem was illustrated in *Wild Fish Conservancy v. EPA*, in which the EPA mistakenly believed it was the single agency authorized to evaluate a fish farm's effects on an endangered species of salmon.[104] The EPA had endorsed a state regulation that exempted a salmon farm from water quality standards, concluding the regulation would have no adverse effect on the endangered species. A federal court, however, ruled that the EPA did not have authority under the ESA to make this kind of decision on its own. Instead, the EPA had to consult with the appropriate federal environmental oversight body, and "[i]n this case, the appropriate federal environmental body was the [National Marine] Fisheries Service."[105] Had the roles of each agency in aquaculture regulation been previously identified, or had one agency been designated as the "lead" agency to regulate aquaculture, this interagency confusion could have been avoided.[106]

B. AMBIGUOUS LEGAL BASES FOR REGULATORY AUTHORITY

Another deficiency of the current regulatory regime for offshore aquaculture is that the regulatory statutory authority of each agency is shaky at best. None of the above-mentioned statutes, with the exception of the National Aquaculture Act, was meant to deal specifically with aquaculture. Each law must therefore be tailored and tweaked to allow the respective federal agency to invoke its jurisdiction, leaving any agency's power to regulate such activities vulnerable to legal challenge. I will describe a few examples.

1. Challenges to EPA's Authority to Regulate Offshore Aquaculture

The EPA has asserted its authority to regulate aquaculture activities

organization amongst the various federal agencies overseeing aquaculture").

104. Wild Fish Conservancy v. EPA, No. C08-0156-JCC, 2010 U.S. Dist. LEXIS 41838, at *4–7 (W.D. Wash. Apr. 28, 2010). *See also* Nossaman LLP, *EPA Ordered to Consult with NMFS Regarding Water Quality Exemptions for Salmon Farms*, ENDANGERED SPECIES L. AND POL'Y BLOG (May 16, 2010), http://www.endangeredspecieslawandpolicy.com/2010/05/articles/court-decisions/epa-ordered-to-consult-with-nmfs-regarding-water-quality-exemptions-for-salmon-farms/.

105. *Wild Fish Conservancy*, 2010 U.S. Dist. LEXIS 41838, at *4.

106. Englebrecht, *supra* note 54, at 1204–05 ("Highlighting the lack of coordination for addressing the ecological impacts of aquaculture . . . , many advocate the need for one federal agency to take the lead in regulating aquaculture activities.").

under the Clean Water Act ("CWA"), which allows it to require "point sources" to obtain permits for any "pollutants" they discharge into "U.S. waters" pursuant to its National Pollutants Discharge Elimination System ("NPDES").[107] The EPA has decreed that certain aquaculture projects—"concentrated aquatic animal production facilities" ("CAAPs")—are subject to its NPDES permit program and under its regulatory authority.[108] However, three characteristics specific to offshore aquaculture projects leave the EPA's authority under the CWA vulnerable to legal challenge: (1) the offshore location of such projects, (2) the use of net pens and other free-floating facilities, and (3) the kind of "biological pollution" offshore projects can create.

The offshore location of aquaculture projects in federal waters threatens the EPA's authority under the CWA. Under the Act, EPA regulates the direct discharge of pollutants into U.S. navigable waters. "Navigable waters" include interstate waters and intrastate lakes and rivers.[109] An offshore aquaculture farm would not be in the United States' "navigable waters," and would apparently fall out of CWA jurisdiction. Fortunately, the EPA has enacted a rule that calls for any CAAP facilities directly discharging wastewater into U.S. territorial waters (extending to twelve miles offshore) to comply with effluent guidelines.[110] However, an aquaculture farm is considered a CAAP facility subject to CWA regulations only if it is a "significant contributor of pollution to waters of the United States."[111] A farm located far offshore, such as the design launched by Kampachi Farms that can float up to seventy-five miles offshore,[112] may not contribute significantly to pollution in U.S. waters—even though it may create much pollution and environmental damage at its offshore location—and would not be subject to the EPA's regulatory authority.[113]

The use of net pens, free-floating devices, and new technological designs in offshore aquaculture projects also leaves the EPA's regulatory

107. Clean Water Act, 33 U.S.C. § 1342 (2006).

108. 40 C.F.R. § 122.24 (2000). *See also* U.S. Pub. Interest Research Grp. v. Atl. Salmon of Me., L.L.C., 215 F. Supp. 2d 239, 255–56 (D. Me. 2002) (holding that net pens constitute CAAP facilities and are subject to CWA permit requirements). An offshore fish farm would most likely not be considered a CAAP facility. *See infra* notes 111–13 and accompanying text.

109. 40 C.F.R. § 112.2 (2013).

110. *Id.* § 112.24.

111. *Id.*

112. *See supra* note 37 and accompanying text.

113. D. Douglas Hopkins, Rebecca J. Goldburg & Andrea Marston, *An Environmental Critique of Government Regulations and Policies for Open Ocean Aquaculture*, 2 OCEAN & COASTAL L.J. 235, 243–44 (1997).

authority under the CWA vulnerable to challenge. Land-based aquaculture facilities have an obvious or distinct pipe for releasing wastes and other pollutants, allowing these farms to fall clearly within the EPA's authority to regulate "point sources";[114] the structures used in offshore projects may not. In *U.S. Public Interest Research Group v. Atlantic Salmon of Maine, L.L.C.* ("*USPIRG*"), an aquaculturist operating off the coast of Maine argued that its net pen farm was not a point source subject to the NPDES permit program because it was not a "discrete, confined and direct conveyance" of pollutants.[115] Rather, because the net pens were free floating, water could flow through them and disperse any pollutants through the natural processes of tides and currents.[116] The district court rejected this narrow interpretation of a point source, emphasizing that "a point source exists where there is an *identifiable* source from which the pollutant is released," and concluded that the net pens constituted point sources subject to CWA requirements.[117] Despite this ruling, it is questionable whether new technologies implemented in offshore farms would be considered point sources under the CWA. For instance, unmoored or free-floating open-ocean designs like the one launched by Kampachi Farms are transitory and drift with the currents, and therefore may not represent an identifiable source of pollutants. Thus, the EPA's authority under the CWA to regulate aquaculture in federal waters may disappear as open-ocean technologies advance.

Finally, the CWA only applies to point sources that discharge "pollutants" into U.S. waters.[118] There is no question that this provision allows the EPA to regulate the traditional organic pollutants that are released from fish farms, such as wastes and nutrients. However, offshore farms are more susceptible to another kind of pollution—the accidental release of farmed fish, and it is unclear whether this kind of "biological materia[l]" constitutes "pollution" under the CWA.[119] In *USPIRG*, a federal court agreed that it does, concluding that the "pollutants" discharged from a net pen operation could come not only in the form of harmful pesticides, but also from escaped nonnative fish threatening native wild salmon

114. Clean Water Act, 33 U.S.C. § 1362(14) (2006).

115. U.S. Pub. Interest Research Grp. v. Atl. Salmon of Me., L.L.C., 215 F. Supp. 2d 239, 251 (D. Me. 2002).

116. *Id.* at 253.

117. *Id.* at 255–56.

118. 33 U.S.C. § 1251(a).

119. *See* Jeremy Firestone & Robert Barber, *Fish as Pollutants: Limitations of and Crosscurrents in Law, Science, Management, and Policy*, 78 WASH. L. REV. 693, 729 (2003) (analyzing whether the CWA should treat fish escaped from fish farms as pollutants).

populations.[120] The district court relied on *National Wildlife Federation v. Consumers Power Co.*, which had found that "live fish, dead fish and fish remains annually discharged into Lake Michigan by the . . . facility [were] pollutants within the meaning of the CWA, since they [were] 'biological materials.'"[121] However, the same year *USPIRG* was decided, the Ninth Circuit held in *Ass'n to Protect Hammersley v. Taylor Resources* that biological materials produced from a mussel farm, including feces, metabolic byproducts, and shells, were not considered "pollutants" under the CWA.[122] The Ninth Circuit argued that the pollutants referred to in the CWA were specifically the "waste product[s] of a human or industrial process," and because the mussel byproducts and shells were not man-made, but rather the result of "natural biological processes," the biological waste was not subject to CWA requirements.[123] Thus, a court could hold that escaped fish from offshore farms are not "waste product[s] of a human or industrial process," but rather, like the mussel byproducts, are biological materials not subject to EPA regulatory authority.

In addition to the CWA, the EPA's regulatory authority under various other statutes is vulnerable to challenge. As discussed earlier, a court may decide that the EPA is not the appropriate federal agency to evaluate the impacts of aquaculture operations under the ESA.[124] The Federal Insecticide, Fungicide, and Rodenticide Act gives the EPA authority to regulate pesticides in any agricultural project, but a recent amendment to the Act exempts pesticides used in projects involving "producers of farm raised finfish (e.g., catfish, trout, goldfish, tropical fish, minnows) and/or hatching fish of any kind."[125] The Ocean Dumping Act gives the EPA authority to regulate the dumping of material into federal waters, but the Act also allows for the dumping of "materials when such deposit is made for the purpose of developing, maintaining, or harvesting fisheries resources."[126] An aquaculturist could escape regulation under this Act by simply arguing that any fish farm is a "fishery resource" and that any food, pesticide, or other material added was "for the purpose of developing the

120. *U.S. Pub. Interest Research Grp.*, 251 F. Supp. 2d at 248.

121. Nat'l Wildlife Fed'n v. Consumers Power Co., 862 F. 2d 580, 583 (6th Cir. 1988) (citations omitted).

122. Ass'n to Protect Hammersley v. Taylor Res., Inc., 299 F.3d 1007, 1017–18 (9th Cir. 2002).

123. *Id.* at 1017.

124. *See supra* Part III.A.

125. Application of Pesticides to Waters of the United States in Compliance with FIFRA, 70 Fed. Reg. 5093, 5094, 5098 (Feb. 1, 2005).

126. 33 U.S.C. § 1402(f) (2006). *See also* Hopkins, Goldburg & Marston, *supra* note 113, at 246 ("[T]he Ocean Dumping Act should be viewed only as a federal law of last resort for protecting the environment from discharges associated with open ocean aquaculture facilities.").

resource." Finally, although the EPA has authority under the National Environmental Protection Act ("NEPA") to require all federal agencies taking action to assess the impacts on the environment,[127] the statute is not results-based. That is, NEPA cannot prohibit aquaculture activities that may adversely impact the environment—it can only require that such impacts be properly identified.

2. Challenges to the Army Corps of Engineers' Authority to Regulate Offshore Aquaculture

The Army Corps of Engineers presently has the authority to determine the siting of structures in federal waters under the River and Harbor Act of 1899 ("RHA")[128] and the Outer Continental Shelf Lands Act ("OCSLA").[129] Under these Acts, the Corps can require an aquaculturist to obtain a permit before constructing any facility in federal waters.[130] Yet whether it is appropriate to allow the Corps to control the siting of aquaculture facilities is questionable, due in large part to its lack of expertise in marine ecology. This fact has not gone unnoticed: in 2008, the Corps was sued for issuing an aquaculture research permit without properly considering the impacts the experiment could have on the wild fish populations and their habitats.[131] A federal court found that because the Corps had consulted with experts and gathered opinions from other state and federal agencies—namely, NMFS—about the possible environmental effects of the project, it was justified in issuing the permit.[132] It is significant that only because the Corps had consulted with NMFS and other experts was it able to grant the aquaculture researchers a permit.[133] Indeed, a PEW Oceans Commission Report advised that although the Corps "has

127. 42 U.S.C. § 4371 (2006). Several aquaculture projects have been challenged in court for failing to properly identify their impacts on the surrounding environment and native fish populations as required by NEPA. *See generally* KAHEA v. Nat'l Marine Fisheries Serv., No. 11-00474 SOM-KSC, 2012 U.S. Dist. LEXIS 59244 (D. Haw. Apr. 27, 2012) (dismissing NEPA claim on mootness grounds); Gulf Restoration Network, Inc. v. Nat'l Marine Fisheries Serv., 730 F. Supp. 2d 157 (D.D.C. 2010) (dismissing claim for lack of standing); Food & Water Watch, Inc. v. U.S. Army Corps of Eng'rs, 570 F. Supp. 2d 177 (D. Mass. 2008) (finding no NEPA violation).

128. River and Harbor Act of 1899, 33 U.S.C. § 403.

129. Outer Continental Shelf Lands Act, 43 U.S.C. § 1333(e) (2006).

130. 33 U.S.C. § 403; Hopkins, Goldburg & Marston, *supra* note 113, at 241 ("Historically, the Corps has required Section 10 permits for creation of 'any obstruction' in federal waters, unless authorized by Congress, in order to preserve unhindered navigational access of the nation's waters.").

131. *See Food & Water Watch*, 570 F. Supp. 2d at 181–83.

132. *Id.* at 187 (analyzing whether the Corps took the requisite "hard look" at the environmental effects of issuing the permit).

133. This begs the question of whether "the consulted federal agency," NMFS, should have been given the authority to issue the permit in the first place, rather than the Corps.

taken the lead in regulating offshore facilities . . . under the Rivers and Harbours Act of 1899 and the Outer Continental Shelf Lands Act[,] . . . [it] does not have a clear environmental mandate under those Acts, and lacks expertise to fully weigh ecological impacts in marine ecosystems."[134]

3. Challenges to NOAA's Authority to Regulate Offshore Aquaculture

NMFS and its parent agency NOAA have perhaps the clearest statutory grant of authority to regulate offshore aquaculture. The Magnuson-Stevens Fisheries Conservation and Management Act ("MSA") grants NMFS the authority to regulate and manage commercial fisheries in federal waters.[135] The Act established eight Regional Fishery Councils, made up of NMFS regional directors, state fisheries officials, and individuals knowledgeable about fishery conservation, to formulate regional Fishery Management Plans ("FMPs")—legally enforceable conservation and management regulations—to carry out the Act's objectives.[136] NMFS evaluates and approves each FMP to comply with the conservation and management standards set forth in the MSA.[137]

Under the MSA, NOAA asserts that it may regulate aquaculture in federal waters as an activity related to fisheries. Indeed, it has publicly recognized "its and NMFS' responsibility as experts in fisheries to oversee aquaculture's impact on the marine environment."[138] Acting on this authority, NOAA promulgated a National Aquaculture Policy in 2011 that set guidelines for Regional Fishery Councils choosing to include aquaculture activities into their FMPs.[139] However, NOAA's authority to regulate aquaculture in federal waters rests upon whether aquaculture is indeed considered a "fishing activity" under the MSA.[140] NOAA has long held the position that "fishing" encompasses aquaculture under the Act: in 1993 its general counsel issued a memorandum asserting that because the MSA's "broad" definition of "fishing" includes the "harvesting of fish,"

134. GOLDBURG, ELLIOTT & NAYLOR, *supra* note 8, at 24.

135. Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. §§ 1801–1884 (2006).

136. *Id.* §§ 1852–1853; Englebrecht, *supra* note 54, at 1208–09.

137. 16 U.S.C. § 1851; Englebrecht, *supra* note 54, at 1208.

138. Englebrecht, *supra* note 54, at 1205. *See* NOAA, AQUACULTURE POLICY 1 (1998), *available at* http://www.lib.noaa.gov/retiredsites/docaqua/noaapolicy.htm ("NOAA, having the greatest responsibility for the sustainable use and conservation of marine resources and the environment, is best suited to oversee aquaculture activities that affect marine ecosystems and occur in public waters.").

139. NOAA, MARINE AQUACULTURE POLICY, *supra* note 2.

140. *See* Englebrecht, *supra* note 54, at 1188 ("The question of whether aquaculture constitutes a 'fishing' activity pursuant to the Magnuson-Stevens Act has been pondered for nearly as long as the Act has been in place.").

aquaculture facilities in the EEZ are subject to the MSA.[141] Unfortunately, this opinion has not been endorsed by any congressional declaration and may not survive judicial scrutiny.[142] In fact, Congress specifically excluded "aquaculture" from the Act's 2007 reauthorization. Those opposed to NOAA's regulatory authority have publicized this detail: in response to the publication of NOAA's National Aquaculture Policy, one critic noted, "Inherent in NOAA's new policy is the agency's intention to advance aquaculture under the [MSA], our paramount fishing law. But as any fishermen will tell you, aquaculture is not fishing."[143] Another critic declared, "Proceeding with permitting that relies on the authority of the [MSA] is to cling to a legal fiction: that aquaculture is fishing."[144] Even representatives at NOAA believe that using the MSA to regulate aquaculture is "like fitting a round peg in a square hole" due to the MSA's heavy emphasis on regulating traditional commercial fisheries.[145]

Indeed, despite the widespread belief that NMFS and NOAA are best suited to regulate aquaculture in federal waters, their regulatory authority has been challenged in court several times over the past few years. In 2009, NOAA allowed the Gulf of Mexico Regional Fishery Council to amend its FMP to permit commercial aquaculture in its region's federal waters.[146]

141. William J. Brennan, *To Be or Not to Be Involved: Aquaculture Management Options for the New England Fishery Management Council*, 2 OCEAN & COASTAL L.J. 261, 262–63 (1997) (citing Memorandum from Jay S. Johnson, NOAA Deputy Gen. Counsel, and Margaret F. Haues, NOAA Assistant Gen. Counsel for Fisheries, to James W. Brennan, NOAA Acting Gen. Counsel 1 (Feb 7, 1993) [hereinafter 1993 Memorandum]). *See also* Englebrecht, *supra* note 54, at 1215; Letter from James W. Balsiger, Acting Assistant Adm'r for Fisheries, Dep't of Commerce, to Robert Shipp, Chairman, Gulf of Mexico Fishery Mgmt. Council 1 (Sept. 3, 2009), *available at* http://sero.nmfs.noaa.gov/sf/pdfs/Letter%20to%20the%20Gulf%20Council%20Regarding%20Aquaculture.pdf.

142. NOAA's interpretation of the MSA to include aquaculture would be granted heightened *Chevron* deference if it represented the agency's position and was embodied in informal rulemakings. Englebrecht, *supra* note 54, at 1229. However, the statements made by NOAA's general counsel in the 1993 Memorandum are not considered a position taken by the agency itself. *Id.* Thus, as Erin Englebrecht suggests, "NMFS may in fact be afforded no deference on the issue of whether aquaculture can be classified as 'fishing.'" *Id.* For greater discussion on the appropriate deference for NOAA's interpretation of the MSA, see *id.* at 1229–33.

143. *NOAA Aquaculture Policy Puts Future of Fish at Risk*, OCEAN CONSERVANCY (June 10, 2011) (quoting Dr. George H. Leonard, program director of the Ocean Conservancy's Aquaculture Program), http://tocdev.pub30.convio.net/news-room/aquaculture/noaa-aquaculture-policy-puts.html.

144. Allison Ford, *Statement in Response to New Obama Administration Marine Aquaculture Policy*, AHAB'S JOURNAL (June 10, 2011) (quoting Matt Tinning, Executive Director of the Marine Fish Conservation Network), http://ahabsjournal.typepad.com/ahabs_journal/2011/06/statement-in-response-to-new-obama-administration-marine-aquaculture-policy.html.

145. Telephone Interview with Brian Fredieu, Office of Aquaculture, NOAA (Jan. 18, 2012) (on file with author).

146. Because NOAA neither expressly approved nor rejected the plan, it went into effect by operation of law.

Environmentalists and fishing groups sued NOAA in federal court, arguing that the plan violated substantive provisions of the MSA, and that the decision to allow the plan to take effect was beyond NOAA's power under the MSA. Specifically, they claimed that aquaculture facilities in the Gulf would hurt both their personal and commercial interests by damaging the marine ecosystem and harming wild fish populations.[147] The court dismissed the case on ripeness grounds: because aquaculture had not yet taken place in the Gulf of Mexico pursuant to the plan, the claims were not ripe for judicial review.[148] However, the court noted, once NOAA took any action implementing the plan—that is, once an aquaculture project was actually permitted and constructed—the plaintiffs could sue to have the project and plan enjoined under the MSA.[149]

Two years later, this very situation occurred. In 2011, NMFS issued the nation's first commercial fishing permit to Kona Blue for an aquaculture facility located in the federal waters off of Hawaii. The one-year "Special Coral Reef Ecosystem Fishing Permit" authorized Kona Blue to "stock, culture, and harvest" around two thousand almaco jack fish in a brass-link mesh cage that would be continuously towed behind a vessel.[150] One month after the permit's issuance, a native Hawaiian organization and a national consumer-safety watch group, KAHEA and Food & Water Watch, respectively, challenged the permit in federal court.[151] They argued that NMFS lacked authority to issue the permit under the MSA—that "although [NMFS] may properly issue such permits authorizing 'fishing,' [Kona Blue]'s project involves aquaculture, which is not fishing under the MSA."[152] Furthermore, they argued, the Western Pacific Regional Council had not amended its FMP to allow for aquaculture activities, and even considered aquaculture to be one of seven nonfishing related activities,[153] meaning NMFS exceeded its authority under the MSA in issuing the fishing permit. Plaintiffs also argued that NMFS made a de facto rule that aquaculture is fishing under the MSA, in violation of the MSA and the Administrative Procedure Act ("APA"), and that NMFS violated NEPA by

147. Gulf Restoration Network, Inc. v. Nat'l Marine Fisheries Serv., 730 F. Supp. 2d 157, 165–66 (D.D.C. 2010).

148. *Id.* at 169–72.

149. *Id.* at 172.

150. KAHEA v. Nat'l Marine Fisheries Serv., No. 11-00474 SOM-KSC, 2012 U.S. Dist. LEXIS 59244, at *1–2 (D. Haw. Apr. 27, 2012).

151. *Id.*

152. *Id.* at *2.

153. Complaint at 22, KAHEA v. Nat'l Marine Fisheries Serv., No. 11-00474 SOM-KSC, 2012 U.S. Dist. LEXIS 59244 (D. Haw. Apr. 27, 2012).

failing to prepare an environmental impact statement.[154]

The District Court of Hawaii disagreed with the plaintiffs' arguments and in 2012 granted summary judgment to NMFS. The court explained that under the APA, it may only set aside the agency's issuance of the permit if the decision was "arbitrary and capricious, an abuse of discretion, or otherwise not in accordance with the law."[155] The court concluded that NMFS' determination that Kona Blue's project fell under MSA jurisdiction was not "arbitrary or capricious." Rather, it was entirely reasonable for the NMFS to conclude that Kona Blue's project, which allowed for the "stock, culture, and harvest" of jack fish, was encompassed by the MSA's "broad" definition of "fishing," which includes the "harvesting of fish."[156] Furthermore, the court agreed that the expansive reading of the MSA to cover more than traditional line-fishing activities did not contravene congressional intent, citing Congress's decision to include in the MSA's definition of "fishing" "any operations at sea in support of, or in preparation for" fishing[157] and a 2010 federal court decision holding that "the laying of lobster traps without bait" was considered "fishing" under the MSA.[158]

Finally, the court rejected the argument that the Western Pacific Regional Council's reference to aquaculture as a "non-fishing related activity" in its FMP meant that the Council believed aquaculture to be beyond the scope of the MSA. Rather, the court explained, "Plaintiffs [took] that statement out of context."[159] When the Council referred to aquaculture in its FMP, it was not seeking to define "aquaculture" or to "affect whether or how 'aquaculture' could be regulated," but rather included it in "a section addressing impacts that may adversely affect a fish habitat."[160] Indeed, the court noted, "There [was] no indication that the Council intended to say that everything listed as 'non-fishing' in that section was categorically outside the MSA's broad definition of

154. The NEPA claim was dismissed as being moot because Kona Blue had already completed its aquaculture project by the time the suit was heard in court. *KAHEA*, 2012 U.S. Dist. LEXIS 59244, at *11–20.

155. *Id.* at *23 (citing 5 U.S.C. § 706(2)(A) (2006)).

156. *Id.* at *25–30 (citing 16 U.S.C. § 1802 (2006)). The court stated that "[NMFS]' determination that [Kona Blue]'s project falls within the term 'harvesting' was reasonable. The project involves growing and gathering a 'crop' of almaco jack to sell for human consumption." *Id.* at 26–27.

157. Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. § 1802(16)(D).

158. *KAHEA*, 2012 U.S. Dist. LEXIS 59244, at *27 (citing Duckworth v. United States, 705 F. Supp. 2d 30, 45–48 (D.D.C. 2010)).

159. *Id.* at *29.

160. *Id.* at *29–30.

'fishing.'"[161] Therefore, NMFS did not exceed its regulatory authority on these grounds.

While *KAHEA v. National Marine Fisheries Service* may appear to give NMFS solid authority to regulate future offshore fish farms, the debate is far from over. First, the *KAHEA* plaintiffs will not lightly abandon their crusade to end aquaculture activities: both Food & Water Watch and KAHEA have a long history of challenging aquaculture operations.[162] Secondly, the federal court in *KAHEA* did not expressly declare that any aquaculture activity is subject to NMFS regulation under the MSA. Instead, it issued summary judgment to NMFS because "NMFS' characterization of the [Kona Blue] project as 'fishing' was not arbitrary, capricious, an abuse of discretion, or otherwise contrary to law."[163] It is still possible that a different aquaculture project might not so easily fall within the definition of "fishing" under the MSA, in which case NMFS indeed would exceed its authority in attempting to regulate it. In fact, many of the Regional Councils have expressly classified aquaculture as a nonfishing activity in their regional FMPs.[164] Thus, under the current MSA, the notion that "aquaculture should be at some times and some places classified as 'fishing' and at others as 'non-fishing'"[165] casts further doubt on NMFS' regulatory authority under the Act.

Finally, not even NMFS believed that the Kona Blue permit would contribute to the development of the offshore aquaculture industry. In the report[166] it published before issuing the fishing permit to Kona Blue, NMFS agreed that the project would not "hasten the development, approval, and implementation of industrial-scale ocean aquaculture."[167] Rather, in response to comments from the public expressing concern that the permit "would open NMFS to a flood of applications for permits by operators wishing to undertake oceanic aquaculture in federal waters across the nation," the NMFS assured that it found "no evidence to support the concern expressed that there [would] be a nationwide rush to permit

161. *Id.* at *30.

162. *See, e.g.*, Food & Water Watch, Inc. v. U.S. Army Corps of Eng'rs, 570 F. Supp. 2d 177 (D. Mass. 2008) (challenging the Army Corps of Engineers' issuance of a siting permit for aquaculture research); *Ahi Feedlot Abandons Ship!*, KAHEA (Sept. 14, 2010, 7:48 PM), http://kahea.org/blog/ahi-feedlot-abandons-ship (taking credit when a company seeking a commercial aquaculture siting permit withdrew its permit application after the organization pressured the Army Corps of Engineers to hold a public hearing).

163. *KAHEA*, 2012 U.S. Dist. LEXIS 59244, at *30.

164. Englebrecht, *supra* note 54, at 1217.

165. *Id.* at 1223.

166. See *supra* note 88 and accompanying text.

167. KONA BLUE ENVIRONMENTAL ASSESSMENT, *supra* note 89, at 45.

aquaculture activities using fishery permits."[168] It explained that Kona Blue's project represented "the rare circumstance" where the applicant could demonstrate "the requisite experience" for harvesting fish and emphasized that the permit was "a one-time-permit limited in both scope and duration."[169] It concluded,

> [T]here is no evidence to conclude that approval of the current permit would have a cumulative effect of speeding up the approval of larger-scale projects. Each application would need to be coordinated in accordance would the permit process, and would need to comply with *all applicable laws* including project-specific environmental review.[170]

As discussed in Part III.A above, there are quite a few "applicable laws" dealing with offshore aquaculture, and an applicant wishing to comply with all of them faces a confusing and costly road. Thus, although *KAHEA* affirms NMFS' authority to issue this specific one-year fishing permit to this particular offshore aquaculture applicant, it does not represent a definitive victory for NMFS' ability to regulate all aquaculture activities in federal waters.

In sum, as long as there remains no clear regulatory framework for offshore aquaculture operations, regulation will proceed in a disjointed and unsatisfactory way. Some aspects of the industry will be subject to duplicative requirements and rules, while other aspects will fall through the cracks and significant environmental impacts will be left unaccounted for. At the same time, aquaculturists wishing to expand offshore will be deterred by the lack of any predictable and consistent regulation and will have to defend their operations through ad-hoc litigation. Regulatory gaps and uncertain legal bases for authority will allow opponents of the aquaculture industry to effectively challenge any project.

IV. DEVELOPING A NEW FRAMEWORK

A. CONGRESS SHOULD ENACT NEW LEGISLATION CREATING A NATIONAL OFFSHORE AQUACULTURE FRAMEWORK

A new and comprehensive framework for regulating offshore aquaculture is needed. However, there is much debate over how this can be best achieved. Some observers argue that federal agencies should use

168. *Id.*
169. *Id.*
170. *Id.* (emphasis added).

existing statutory authorities to create an aquaculture framework,[171] while others claim that Congress should enact new legislation specifically addressing offshore aquaculture.[172] Those in favor of using existing laws claim that the MSA or National Aquaculture Act of 1980 could be tweaked to give an agency authority to develop and implement a regulatory scheme for offshore aquaculture. For instance, NOAA could continue to use its authority under MSA to approve aquaculture fishery management plans that are consistent with its new National Aquaculture Policy.[173] However, as discussed in Part III.B.3 above, NOAA's regulatory authority under the MSA in the context of aquaculture is open to challenge. To eliminate this ambiguity, some have suggested that Congress simply amend the MSA to include aquaculture as a fishing activity subject to NOAA management. However, it is unlikely that this will happen: Congress knew of NOAA's plan to regulate aquaculture under the MSA when it reauthorized the Act in 2007, yet still deliberately excluded aquaculture from the Act's definition of "fishing activities."[174]

Furthermore, even if NOAA had authority under the MSA to regulate aquaculture in federal waters, as it claims, it would still not be able to enforce regulations in regions where the local Regional Fishery Council has chosen not to implement an aquaculture program into its FMP. Indeed,

171. *See, e.g.*, Lynne D. Davies, *Revising the National Offshore Aquaculture Act of 2007: Using State of Maine Aquaculture Laws, Regulations, and Policy Recommendations as a Prototype for the Proposed Framework*, 13 OCEAN & COASTAL L.J. 95, 105 (2007) ("Another general alternative include[s] making revisions to the National Aquaculture Act of 1980 . . . ."); M. Richard DeVoe & Catherine E. Hodges, *Management of Marine Aquaculture: The Sustainability Challenge*, *in* RESPONSIBLE MARINE AQUACULTURE 21, 37 (Robert R. Stickney & James P. McVey eds., 2002) (arguing that "the U.S. government should consider how and whether the industry could be best served by the existing institutional infrastructure" and stating "the United States should continue to pursue the development of a comprehensive revision of the 1980 National Aquaculture Act"); Englebrecht, *supra* note 54, at 1190 (suggesting that the MSA could "most effectively address aquaculture's adverse impacts on marine habitat"); Hopkins, Goldburg & Marston, *supra* note 113, at 257–58 (recommending that NOAA use its "broad authority for fishery conservation and management under the Magnuson Act to promulgate regulations requiring that open ocean aquaculture facilities be approved by NMFS").

172. *See* Brandee Ketchum, *Splitting Scales: Conflicting National and Regional Attempts to Manage Commercial Aquaculture in the Exclusive Economic Zone*, 6 J. FOOD L. & POL'Y 1, 4–5 (2010) (comparing two approaches to offshore aquaculture regulation—amending Fishery Management Plans to include aquaculture under the MSA, and enacting a comprehensive regulatory scheme proposed by Congress—and concluding that the latter provides "a better vehicle through which to manage both commercial objectives and environmental concerns").

173. *See* Ketchum, *supra* note 172, at 22–26 (discussing the Gulf of Mexico Fishery Management Council's proposal to amend its Fishery Management Plan to include aquaculture regulation, using existing MSA authority).

174. Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006, Pub. L. No. 109-479, § 3(b)–(c), 120 Stat. 3577–78 (2007); Telephone Interview with Brian Fredieu, *supra* note 145.

most Regional Fishery Councils have classified aquaculture as a nonfishing activity outside their jurisdiction over fisheries.[175] Furthermore, the National Aquaculture Policy published by NOAA in 2011 is only meant to guide those Councils choosing to implement aquaculture programs: it has no binding effect and creates no enforceable standards or regulations on either a FMP or any private aquaculture operation.[176] Thus, the MSA—even amended—may not be the appropriate source for NOAA to base its regulatory authority over aquaculture in federal waters.

Other academics argue that the National Aquaculture Act of 1980 could be used to establish an effective regulatory framework for offshore aquaculture. This Act may be an ideal basis for regulatory authority because it is the only existing federal law specifically designed to address aquaculture. However, since its inception in 1980, the Act has failed to influence aquaculture regulation in any meaningful way. Although it created the Joint Subcommittee on Aquaculture ("JSA"), a coordinating body of several federal agencies, and charged that committee with developing a "national aquaculture plan,"[177] the JSA has yet to promulgate any comprehensive regulations or even request the funds it needs to implement the plan. Furthermore, the Act places the Department of Agriculture ("DA") in charge of the JSA, an agency with little experience or expertise when it comes to marine aquaculture. It is possible that Congress could amend the Act to redesignate NOAA as the lead agency of the JSA. However, the domestic aquaculture industry is currently dominated by onshore operations—only 20 percent of U.S. farms are located in the ocean. This arguably makes the DA, given its jurisdiction over agricultural activities on land, the appropriate agency to oversee the U.S. aquaculture industry in its present form.[178] Indeed, the DA's budget for aquaculture research is much larger than NOAA's—not surprising given that onshore aquaculture operations make up a larger portion of the domestic aquaculture industry than do marine farms.[179] This makes it unlikely that the Act will be revised to identify NOAA as lead federal agency with respect to domestic aquaculture regulation.

Because of the concerns expressed above, existing statutes are not adequate bases of authority for implementing a federal regulatory

175. *See supra* note 164 and accompanying text.

176. Englebrecht, *supra* note 54, at 1205 ("While NMFS has advised that national standards in the form of 'best management practices' should be adopted, it is pursuing an optional rather than legally enforceable scheme.") (footnote omitted).

177. National Aquaculture Act of 1980, 16 U.S.C. § 2801(b) (2006).

178. Telephone Interview with Brian Fredieu, *supra* note 145.

179. *Id.*

framework for offshore aquaculture. Instead, Congress should enact new legislation that explicitly creates a national regulatory framework. Below, I will discuss what a proper framework should include and describe previous attempts to implement a marine aquaculture policy. I will conclude by endorsing the National Sustainable Offshore Aquaculture Act of 2011 as the ideal piece of legislation to create such a framework.

B. WHAT DOES AN EFFECTIVE REGULATORY FRAMEWORK LOOK LIKE?

In 2003, the Pew Oceans Commission, a bipartisan, independent group of American leaders in science, fishing, conservation, government, education and business, recommended that Congress implement a "new national marine aquaculture policy based on sound conservation principles and standards."[180] Five years later, the U.S. House of Representatives Committee on Natural Resources commissioned the Government Accountability Office ("GAO") to research and report to it how to go about developing such a framework. After meeting with a wide variety of important aquaculture stakeholders and analyzing laws, regulations, and studies, the GAO identified the key issues that should be addressed in the development of effective regulation.

First, the GAO noted that identifying a lead federal agency, as well as clarifying the roles and responsibilities of other relevant federal agencies, was central to the administration of an offshore aquaculture program.[181] Specifically, most stakeholders identified NOAA as the appropriate lead federal agency because of its expertise in fisheries and oceans management.[182] Indeed, most scholars and scientists agree that NOAA is best suited for assuming the role of lead federal agency due to its long history of managing ocean resources and its unique positioning through the Regional Fishery Councils to address the user-conflict problems associated with any resource proposal. As one article put it, "There are obvious impacts on wild capture fisheries and on marine mammals which no other federal agency could more effectively evaluate."[183]

The GAO also recommended that a streamlined permitting system be created to give offshore aquaculturists the legal right to occupy a given area and to establish terms and conditions for offshore aquaculture

180. PEW OCEANS COMM'N, AMERICA'S LIVING OCEANS: CHARTING A COURSE FOR SEA CHANGE xi (2003), *available at* http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Protecting_ocean_life/env_pew_oceans_final_report.pdf.

181. U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 35, at 4.

182. *Id*. at 4–5.

183. Hopkins, Goldburg & Marston, *supra* note 113, at 258.

operations.[184] Stakeholders again agreed that NOAA should be the primary agency to manage a permitting or leasing program for offshore aquaculture facilities.[185] Another important aspect of a regulatory framework was some kind of process to ensure proper management of environmental impacts, either by mandating facility-by-facility environmental review and monitoring, and / or enforcing policies mitigating the potential impacts of escaped fish and remediating environmental damage.[186] Finally, a regulatory framework must include a federal research component to help fill current gaps in knowledge about offshore aquaculture.[187]

As of 2013, Congress had yet to establish by legislation any such framework. However, this is not to say that legislators have not tried. Several bills have come before the House that, if enacted, would set up a comprehensive regulatory framework for offshore aquaculture. So far, Congress has failed to take the bait.

C. PREVIOUS ATTEMPTS TO CREATE A FRAMEWORK THROUGH NEW LEGISLATION

In 2005, pressed by NOAA, Congress introduced legislation that would specifically authorize aquaculture in federal waters. The National Offshore Aquaculture Act[188] would have created a regulatory framework to allow for safe and sustainable aquaculture operations for fish and shellfish in U.S. federal waters.[189] It failed to pass, but in 2007 was reintroduced by both the Senate and the House of Representatives. The 2007 version[190] designated NOAA as the lead federal agency with respect to offshore regulation, giving it the authority to issue offshore aquaculture permits and establish environmental requirements. The Act also stressed the importance of interagency collaboration, requiring that NOAA work with other federal agencies to develop and implement a coordinated permitting process for offshore aquaculture.[191] Finally, it mandated a research and development program for all types of marine aquaculture.[192]

The bill, however, was challenged by a wide array of fishing,

184. U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 35, at 5–6.
185. *Id.* at 4.
186. *Id.* at 6.
187. *Id.*
188. National Offshore Aquaculture Act of 2005, S. 1195, 109th Cong. (2005).
189. *Id.*
190. National Offshore Aquaculture Act of 2007, H.R. 2010, 110th Cong. (2007).
191. *Id.* § 4(a)(1).
192. *Id.* § 2(a)(4).

environmental, and consumer groups. In a letter to the House of Representatives, environmental and fishing advocacy groups including the Ocean Conservancy, Sierra Club, Institute for Fisheries Resources, Food & Water Watch, and the Pacific Coast Federation of Fishermen's Associations declared their opposition to the bill, explaining that it "appears to promote aquaculture . . . at the expense of marine ecosystems and fishing communities."[193] They faulted the bill for failing to contain adequate environmental standards to eliminate or minimize the harms that aquaculture facilities pose to wild fish stock, ecosystems, water quality and habitat, marine wildlife, and endangered species and instead merely proposed that such impacts be considered and addressed to the extent necessary. In a separate report published by Food & Water Watch, the Act was criticized for including inadequate monitoring and fish-tagging provisions and lacking deficient mechanisms for enforcement and liability.[194] Further, the Act did not create a right of action for citizens to enforce the statute, a provision included in important environmental laws such as the ESA and the CWA, and contained no language to address liability for damage to the marine or human environment.[195] Ultimately, the bill failed to pass out of the Committee.

In 2009, after NOAA allowed the Gulf of Mexico Regional Fishery Management Council to implement an offshore aquaculture program despite there being no national program to regulate such projects, the National Sustainable Offshore Aquaculture Act[196] was introduced. The bill would have authorized aquaculture in federal waters, but unlike the National Aquaculture Act of 2007, it included binding environmental, socioeconomic, and liability standards. The Act would again authorize NOAA as the lead federal agency for regulation, giving it the authority to "determine appropriate locations for, permit, regulate, monitor, and enforce offshore aquaculture in the [EEZ]."[197] The Act would also require NOAA to issue legally binding national standards and regulations to prevent or minimize impacts on the marine ecosystem and fisheries.[198] Finally, it would establish a research program "to guide the precautionary

193. Letter from Inst. for Fisheries Res. et al., to Chairwoman Madeline Z. Bordallo, Subcomm. on Fisheries, Wildlife and Oceans, U.S. House of Representatives (Apr. 24, 2007), *available at* http://www.centerforfoodsafety.org/files/ltr_opposing_noaa_2007_aqua_bill-house.pdf.

194. *Analysis of the National Aquaculture Act of 2007*, FOOD & WATER WATCH, http://documents.foodandwaterwatch.org/doc/OOA_analysis-1.pdf (last visited Mar. 28, 2013).

195. *Id.* at 2.

196. National Sustainable Offshore Aquaculture Act of 2009, H.R. 4363, 111th Cong. (2009).

197. *Id.* § 2(2).

198. *Id.* § 2(2)–(3).

development of offshore aquaculture in the [EEZ] that ensures ecological sustainability and compatibility with healthy, functional ecosystems."[199] The bill, introduced by a congresswoman from California, was modeled off the state's Sustainable Oceans Act of 2006, which established strict aquaculture regulations.[200] Representative Capps declared that a comprehensive, commonsense framework must be created to ensure that offshore aquaculture development will proceed in an ecologically sustainable fashion, and noted, "We have a good model for doing this in my home state of California, which recently enacted landmark legislation on this topic."[201] She continued, "I believe this type of balanced, comprehensive and precautionary approach will work in California, and my legislation seeks to accomplish similar goals at the national level."[202]

Her prediction may not prove far off. Interestingly, the same group of environmentalists and fishing interests that had opposed the National Offshore Aquaculture bill voiced support for the National Sustainable Offshore Aquaculture bill. Arguing that the National Offshore Aquaculture Act was defective for not including statutory criteria or legally binding environmental standards, the opponents nonetheless agreed that "[s]ome of these issues have been addressed in legislation enacted in California in 2006 (the Sustainable Oceans Act)."[203] Although the National Sustainable Offshore Aquaculture Act failed to pass in 2009, it was reintroduced in 2011[204] just a month after NOAA issued the nation's first commercial fishing permit to Kona Blue. After its June 2011 reintroduction, the bill gained support from scientists and environmentalists: the Ocean Conservancy noted that the Act "is an opportunity to protect the U.S. from the risks of poorly regulated open ocean aquaculture."[205]

199. *Id.* § 2(4).

200. 2006 Cal. Legis. Serv. Ch. 36 (S.B. 201) (West). The Act creates a "comprehensive regulatory scheme for a future marine finfish aquaculture industry in California." Kelly O. Thomas, *The Sustainable Oceans Act: Will Fish Farmers Take the Bait?*, 38 MCGEORGE L. REV. 149, 153 (2007).

201. Press Release, Congresswoman Lois Capps, Capps Introduces Comprehensive, Sustainable Offshore Aquaculture Legislation (Dec. 18, 2009), *available at* http://capps.house.gov/press-release/capps-introduces-comprehensive-sustainable-offshore-aquaculture-legislation.

202. *Id.*

203. Letter from Inst. for Fisheries Res. et al., *supra* note 193, at 2.

204. National Sustainable Offshore Aquaculture Act of 2011, H.R. 2373, 112th Cong. (2011).

205. OCEAN CONSERVANCY, A PRECAUTIONARY APPROACH TO U.S. OPEN-OCEAN AQUACULTURE 2, *available at* http://act.oceanconservancy.org/site/DocServer/FederalMarine Aquaculture7.pdf.

D. THE NATIONAL SUSTAINABLE OFFSHORE AQUACULTURE ACT IS THE IDEAL LEGISLATION FOR CREATING AN EFFECTIVE NATIONAL REGULATORY FRAMEWORK

The National Sustainable Offshore Aquaculture Act is the ideal legislation for creating a federal regulatory framework. The bill contains every aspect the GAO recommended that an effective framework must include. First, it creates a comprehensive framework that integrates the relevant national and state laws and regional ocean planning and management efforts.[206] This eliminates the patchwork way in which environmental laws are currently applied to offshore aquaculture, providing regulatory certainty and legitimacy to the industry while also encouraging collaboration between federal, state, and regional agencies. Second, the Act identifies one federal agency as having primary regulatory authority over offshore aquaculture, and properly designates NOAA as the lead agency to ensure environmental protection.[207]

The Act also satisfies the third aspect of an effective regulatory system: a process for environmental review and monitoring. It establishes rigorous environmental standards to guide federal rulemaking and industry performances.[208] These standards address some of the major environmental concerns associated with offshore aquaculture, including fish escapes, disease, pollution, chemicals, and impacts on wildlife and predators. For instance, the Act allows fish to be cultured only if they are native to the local ecosystem and prohibits the culture of genetically modified species, decreasing the risk of harm to native fish populations in the event of escape.[209] To prevent the incidence of escape, the Act requires that all facilities "be designed, operated, and shown to be effective at preventing the escape of cultured fish into the marine environment and withstanding severe weather conditions and marine accidents."[210] Additionally, a permittee must tag or mark all cultured fish, and in the event of an escape, report the number of escaped fish and circumstances surrounding the incident to NOAA.[211] To minimize the impact of disease and pathogens on wild fish stock, the Act requires that all facilities be designed, located, and

206. H.R. 2373.

207. *Id.* §§ 2(2)–(3), 3(a).

208. *Id.* § 5(b)(2)(A) (NOAA shall enforce regulations when issuing permits that "to the extent feasible, establish numerical standards for environmental performance under such permits").

209. *Id.* § 5(j)(1).

210. *Id.* § 5(j)(1)(F).

211. *Id.* §§ 5(j)(1)(E)–(F).

operated to prevent the incubation and spread of disease and pathogens.[212] It also prohibits the use of antibiotics, pesticides, drugs, and other chemical treatments except where necessary to treat a diagnosed disease, and in such case only where its use is minimized to the maximum extent practicable and is approved by the Commissioner of the FDA.[213] The Act requires that NOAA consult with the EPA and other local and regional agencies to establish appropriate numerical limitations of nutrient inputs into the marine environment and that each permittee prevent discharges of pollutants into ocean waters to the maximum event practicable.[214]

Finally, the Act requires NOAA to consult with other federal agencies, coastal states, Regional Fishery Management Councils, academic institutions, and other interested stakeholders to establish and conduct a research program for sustainable offshore aquaculture.[215] The program would inform NOAA "how offshore aquaculture permitting and regulation can adopt a precautionary approach to industry expansion to ensure ecological sustainability" and help it "develop cost-effective solutions to the environmental and socioeconomic impacts of offshore aquaculture."[216] This requirement is consistent with the GAO's recommendation that a framework include a research component.[217]

Despite being endorsed by many environmental organizations, the National Sustainable Offshore Aquaculture bill died in the 112th Congress and was referred to the House Committee on Natural Resources, having received zero cosponsors.[218] The bill's failure may be due in part to the actions of the usual aquaculture opponents. Indeed, after the bill was first introduced in 2009, an organization of commercial fishermen sent a letter to the House of Representatives voicing its opposition, criticizing the bill for allowing "offshore aquaculture to be permitted in federal waters with limited safeguards and little or no accountability,"[219] and urging the House to "develop legislation to stop federal efforts to rush growth of the offshore aquaculture industry."[220] Furthermore, NOAA has yet to publicly endorse

212. *Id.* § 5(j)(2)(A).
213. *Id.* § 5(j)(2)(E).
214. *Id.* §§ 5(j)(3)(A)–(B).
215. *Id.* § 7 (b).
216. *Id.* §§ 7 (a)(1)–(2).
217. *See supra* note 187 and accompanying text.
218. *H.R. 2373 (112th): National Sustainable Offshore Aquaculture Act of 2011*, GOVTRACK, http://www.govtrack.us/congress/bills/112/hr2373 (last visited Mar. 28, 2013).
219. Letter from Commercial Fishermen of Santa Barbara, to Members of the Subcomm. on Insular Affairs, Oceans, and Wildlife, U.S. House of Representatives (Apr. 8, 2010), *available at* http://cfsb.info/forum/?p=748.
220. *Id.*

or even issue a position on the bill. Agencies such as NOAA and other environmental organizations must soon come forward in loud support of the bill to see that it is reintroduced and successful in Congress. If they do not, the current lack of any comprehensive regulatory regime may very well sink the entire offshore aquaculture industry.

V. CONCLUSION

The United States' attitude toward developing its offshore aquaculture industry must soon mirror its taste for seafood. The average American eats about sixteen pounds of seafood each year—the third-highest per-capita consumption rate in the world[221]—yet the nation still imports over 91 percent of its seafood products from other countries. About half of these products come from foreign aquaculture operations. In order to meet its own demand as well as become an important player in global seafood production, clearly the United States needs to step up its domestic aquaculture industry.

Marine aquaculture currently accounts for less than 20 percent of domestic aquaculture and predominately occurs in the state-owned waters close to shore. However, competition for space nearshore, along with technological developments in offshore facilities, has led to an increased interest in expanding aquaculture to federally regulated waters. While offshore development has the potential to increase U.S. aquaculture production, no comprehensive legislative or regulatory framework to manage such an expansion exists. Instead, multiple federal agencies have authority to regulate different aspects of offshore aquaculture under a variety of existing laws that were not designed for this purpose. This spotty supervision does not adequately address the potential environmental effects of offshore aquaculture and leaves each agency's basis for regulatory authority vulnerable to challenge. Furthermore, the lack of any federal policy decreases aquaculturists' incentives to take their operations offshore.

Now is the time for the federal government to take the lead in enacting a national and comprehensive regulatory framework for offshore aquaculture. The creation of such a framework is best achieved through enactment of new legislation, rather than relying on existing laws. Offshore aquaculture must be allowed to develop and grow into a thriving part of our domestic economy, but not at the expense of a healthy ocean.

221. NOAA, *U.S. Seafood Consumption Declines Slightly in 2009* (Sept. 9, 2010), http://www.noaanews.noaa.gov/stories2010/20100909_consumption.html.