

**A CURRENT AFFAIR:  
ENSURING SUSTAINABLE AQUACULTURE IN THE  
U.S. EXCLUSIVE ECONOMIC ZONE**

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## INTRODUCTION

Modern society is increasingly reliant upon “fish farms” to supplement dwindling wild fish populations.<sup>1</sup> However, fish farms (also referred to as aquaculture) have historically been a source of numerous and significant problems for wild fish populations and for the eventual consumers of the farmed fish—humans.<sup>2</sup> For example, aquaculture takes place on such a scale in China that the waste generated by the process poses serious health risks to humans.<sup>3</sup> The health risks associated with aquaculture are found in the ecosystems surrounding fish farms and inside the farmed fish that eventually go to market.<sup>4</sup> Although the problems created for water quality and human consumption represent just a small sample of the issues that often accompany aquaculture, they alone amply justify the need to revise the limited aquaculture regulations in the United States (US). Such revisions are particularly necessary if the US wants to reduce its annual trade deficit for seafood, which surpassed 14 billion dollars in 2016.<sup>5</sup> As national and global demand for fish grows, the growth of aquaculture seems equally inevitable.<sup>6</sup>

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1. Rebecca Goldberg & Rosamond Naylor, *Future Seascapes, Fishing, and Fish Farming*, 3 FRONTIERS IN ECOLOGY AND THE ENV'T 21, 21 (2005).

2. U.S. Pub. Interest Research Grp. v. Atl. Salmon Me., LLC., 215 F. Supp. 2d 239, 247 (D. Me. 2002).

3. See David Barboza, *In China, Farming Fish in Toxic Waters*, NY TIMES (Dec. 15, 2007), [http://www.nytimes.com/2007/12/15/world/asia/15fish.html?pagewanted=all&\\_r=0](http://www.nytimes.com/2007/12/15/world/asia/15fish.html?pagewanted=all&_r=0) (explained best by Ye Chao) (“Our waters here are filthy... [t]here are simply too many aquaculture farms in this area. They’re all discharging water here, fouling up other farms.”).

4. *Id.*

5. U.S. DEP’T. OF COMM., NAT’L. OCEANIC AND ATMOSPHERIC ADMIN., CURRENT FISHERY STATISTICS NO. 2016-2, IMPORTS AND EXPORTS OF FISHERY PRODUCTS ANNUAL SUMMARY, 1 (July 19, 2016), <https://www.st.nmfs.noaa.gov/Assets/commercial/trade/Trade2016.pdf>.

6. See U.S. DEP’T OF COMM., NOAA AQUACULTURE PROG. (2010), [http://www.nmfs.noaa.gov/aquaculture/docs/aquaculture\\_docs/aq\\_fact\\_sheet\\_march\\_2010.pdf](http://www.nmfs.noaa.gov/aquaculture/docs/aquaculture_docs/aq_fact_sheet_march_2010.pdf) (discussing why aquaculture plays a critical role as the primary source in supplying fish as a food source against increasing global consumer demand. The supply of consumable fish is even more vulnerable since the Department of Agriculture and Health and Human Services recommended Americans to double seafood consumption published in the 2010 Dietary Guidelines for Americans; National Science and

If the US wants to reduce its seafood trade deficit while ensuring its aquaculture market develops safely and sustainably, now is the time for action.

One proposed solution to reduce the US trade deficit and meet the nation's growing demand for fish is to expand aquaculture operations into the US's Exclusive Economic Zone (EEZ). This type of aquaculture—as opposed to the type found in freshwater systems such as rivers and lakes—is referred to as “open ocean aquaculture.”<sup>7</sup> Until recently, this practice only existed in the US EEZ in a minor, research-based capacity or close to the shore and therefore under an individual state or territory's authority.<sup>8</sup> Although there are a variety of statutes that indirectly address offshore aquaculture, the lack of clear federal guidance and regulation in the US EEZ has prevented the practice from expanding further into off-shore territory.<sup>9</sup> Recently, however, the National Oceanic and Atmospheric Administration (NOAA) has taken concrete steps to open up certain parts of the US EEZ to aquaculture.<sup>10</sup>

However, NOAA's recent steps rely on a patchwork of regulatory authority—none of which was enacted with aquaculture in mind.<sup>11</sup> In other words, multiple agencies have a variety of roles and overlapping jurisdiction. State laws applicable to offshore aquaculture vary widely, while there is currently no national framework in place.<sup>12</sup> Structurally, these fish farms have changed dramatically since the relevant laws were put into place, and those changes continue to increase in both scope and complexity.<sup>13</sup> The US needs to proceed quickly to ensure a proper framework is in place to meet the growing demand for, and changing landscape of, aquaculture, as well as the environmental concerns that accompany both. In the polarized political climate of 2018, decreasing our national trade deficit while ensuring

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Technology Council Committee on Science Interagency Working Group on Aquaculture, National Strategic Plan for Federal Aquaculture Research (20142019)) [hereinafter “*National Research Plan*”].

7. INSTITUTE FOR AGRICULTURE AND TRADE POLICY, OPEN OCEAN AQUACULTURE (2004).

8. *Id.*

9. *See, e.g.* Marine Aquaculture Act of 1995, S. 1192, 104<sup>th</sup> Cong. § 2(a)(6) (1995) (stating that the Congressional findings state that the reason private industry has not invested in and developed marine aquaculture facilities within the U.S. is in part because “[O]ur marine waters are not susceptible to private ownership and because our marine waters also support other public trust uses, including navigation, fishing, recreation, and national defense.”).

10. Fisheries of the Caribbean, Gulf, and South Atlantic; Aquaculture, 81 Fed. Reg. 1,761, 1,762 (Jan. 13, 2016) (to be codified in 50 C.F.R. pt. 600 and 50 C.F.R. pt. 622).

11. *Id.* at 1,768–1,769.

12. Food and Agriculture Organization of the United Nations, National Aquaculture Legislation Overview United States of America (2018), [http://www.fao.org/fishery/legalframework/nalo\\_usa/en](http://www.fao.org/fishery/legalframework/nalo_usa/en).

13. Fisheries of the Caribbean, Gulf, and South Atlantic; Aquaculture, 81 Fed. Reg. 1,761, 1,798.

sustainable growth in an emerging industry should be a fairly non-partisan issue.

To understand the context in which these developments are occurring, as well as the need for a national framework, Section II provides a brief explanation of the background behind aquaculture and EEZs generally. Section III examines the economic reasons for allowing aquaculture to expand into the US EEZ, as well as the environmental problems created by open ocean aquaculture. Section IV provides an overview of the current legal regime applicable to aquaculture in the US EEZ, including NOAA's recent rule. Finally, Section V draws from Section IV, the National Sustainable Offshore Aquaculture Act of 2011, as well as state law, to suggest a bipartisan, comprehensive national framework to govern aquaculture in the US EEZ.

## I. BACKGROUND

Aquaculture is believed to have begun sometime between 2000 and 1000 B.C.E., specifically with the cultivation of the common carp in China.<sup>14</sup> Although aquaculture has existed for thousands of years, the scale has recently increased quite dramatically—just as it has with industrial factory farms for livestock. Historically, many civilizations have viewed fisheries as a limitless resource that mankind could utilize without ever affecting.<sup>15</sup> Post World War II, the so-called “Blue Revolution” saw a tremendous increase in the harvest of our planet's marine fisheries.<sup>16</sup> In 1977, the year the United Nations Convention on the Law of the Sea (UNCLOS) was adopted, economically important fisheries began to collapse as a direct result of harvests regularly exceeding the fisheries' maximum sustainable yield.<sup>17</sup> As the reality of this limited resource set in, governments and aid agencies began to look to aquaculture as a feasible alternative from depleting wild fisheries to allow economic development to continue unhampered.<sup>18</sup> In 1970, NOAA supplied a grant to engineers, oceanographers, and marine biologists to explore the potential of aquaculture in that context.<sup>19</sup> Since then, aquaculture is considered a potential means to supplement dwindling fishery populations

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14. Herminio R. Rabanal, *History of Aquaculture*, ASEAN/SF/88/Tech. 7 (Apr. 1988), <ftp://ftp.fao.org/docrep/fao/field/009/ag158e/ag158e00.pdf>.

15. HUGO GROTIUS, *THE LAW OF WAR AND PEACE* 94 (1625) (effusing in 1625 that “The extent of the ocean is in fact so great that it suffices for any possible use on the part of all peoples for drawing water, for fishing, for sailing.”).

16. Michael Skladany, et al., *Offshore Aquaculture: The Frontier of Redefining Oceanic Property*, 20 *SOC'Y & NAT. RESOURCES: AN INT'L J.* 169 (2007).

17. *Id.*

18. *Id.* at 169–72.

19. *Id.* at 172.

to continue feeding the planet's ever-increasing population.<sup>20</sup> Only recently has the open ocean been considered for this purpose.

The UNCLOS established the EEZs for each nation.<sup>21</sup> The EEZs encompass the immediate waters adjacent to the coast of each nation and, generally, extend outward 200 miles.<sup>22</sup> The EEZs were established to hopefully avoid many of the armed conflicts which occurred when nations attempted to access resources off the shores of other countries.<sup>23</sup> EEZs provide each nation an exclusive right to utilize the fisheries within that zone or the option to lease that right to another nation when it is unable or unwilling to use the entirety of its fisheries' maximum sustainable yield ("MSY").<sup>24</sup>

Originally, a nation's ocean territorial boundary was governed by the "cannon shot" rule, which extended roughly three nautical miles off a nation's shoreline.<sup>25</sup> Because of the unique federal/state system of the US, authority within the three-mile "cannon shot" range was left to the states.<sup>26</sup> The territory past which the individual states have authority, out to a distance of 200 miles from the shore, falls under federal jurisdiction.<sup>27</sup> The US's EEZ is vast; in fact, it is the largest EEZ in the world.<sup>28</sup> As the US opens its EEZ to aquaculture, it is important to understand the potential benefits, as well as all the possible pitfalls.

## II. THE VALUE AND RISKS OF AQUACULTURE

Open ocean aquaculture, if done right, could help reduce the annual US trade deficit, potentially alleviate stress from wild fishery stocks, and

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20. UNITED STATES CENSUS BUREAU, <https://www.census.gov/popclock/world> (last visited October 7, 2018) (showing that the current world population is roughly 7.5 billion).

21. United Nations Convention on the Law of the Sea art. 55 Dec. 10, 1982, 1833 U.N.T.S. 396, 418.

22. *Id.* at 419.

23. *Id.* at 397 (stating the treaty was "[p]rompted by the desire to settle, in the spirit of mutual understand and cooperation, all issues relating to the law of the sea and aware of the historic significance of this Convention as an important contribution to the maintenance of peace, justice and progress for all peoples of the world").

24. *Id.* at 418.

25. NAT'L OCEANIC AND ATMOSPHERIC ADMIN., LAW OF THE SEA: HISTORY OF THE MARITIME ZONES UNDER INTERNATIONAL LAW, [http://www.nauticalcharts.noaa.gov/staff/law\\_of\\_sea.html](http://www.nauticalcharts.noaa.gov/staff/law_of_sea.html) (last visited Sept. 28, 2018).

26. U.S. DEP'T OF COMMERCE, OFFSHORE AQUACULTURE IN THE UNITED STATES: ECONOMIC CONSIDERATIONS, IMPLICATIONS & OPPORTUNITIES [hereinafter "*Commerce Report*"], at 2 (July 2008).

27. *Id.*

28. Rosamund L. Naylor, *Environmental Safeguards for Open-Ocean Aquaculture*, 22 ISSUES IN SCIENCE AND TECH., 3 (2006) (stating that the US EEZ covers 4.5 million square miles or 11.65 million km<sup>2</sup>); *Commerce Report*, *supra* note 26, at 3 (This figure is roughly 20% more than all U.S. terrestrial lands, and includes portions of the Arctic all the way to tropical marine habitats).

improve the nutritional value of American's diets. On the other hand, if implemented poorly, open ocean aquaculture has a significant potential to harm wild populations, deteriorate water quality, and harm the eventual consumer.

### A. The Value

"In 2012, consumers in the United States spent an estimated \$82.6 billion on seafood, making the U.S. one of the top three seafood markets worldwide."<sup>29</sup> However, the Department of Commerce estimates aquaculture production in the U.S. to amount to only \$1.3 billion annually.<sup>30</sup> Therefore, despite an increase in both global and national trends, the U.S. supplies only an estimated five-percent of the seafood that is consumed domestically.<sup>31</sup> This tremendous gap means that roughly "80 to 90 percent (by value) of the seafood that Americans eat is imported, creating a seafood trade deficit nearing \$11 billion in 2012."<sup>32</sup>

Half of all seafood the U.S. imports are produced through some form of aquaculture.<sup>33</sup> Aquaculture also supplies half of the world's seafood (60 million tons of seafood annually, valued at \$70 billion). The United Nations projects that to meet the growing demand for seafood most of the future supply will have to come from aquaculture.<sup>34</sup> In fact, according to a report by the World Resources Institute, aquaculture production will have to more than double by 2050 just to meet demand.<sup>35</sup> In the U.S., growth in aquaculture "has been below the world average, rising annually by 4% in volume and 1% in value."<sup>36</sup>

It is apparent that U.S. investors are not waiting for the federal government to sort out the problems with the regulatory scheme for

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29. NAT'L SCI. AND TECH. COUNCIL COMMITTEE ON SCI. INTERAGENCY WORKING GROUP ON AQUACULTURE, NAT'L STRATEGIC PLAN FOR FED. AQUACULTURE RES. (2014-1019) at 1 [hereinafter *National Research Plan*].

30. *Id.*

31. *Id.* at 7.

32. *Id.*

33. NAT'L OCEANIC AND ATMOSPHERIC ADMIN., MARINE AQUACULTURE POLICY 4 (2011).

34. *Supra* note 33.

35. Maanvi Singh, *Can Farmed Fish Feed The World Without Destroying The Environment?* NATIONAL PUBLIC RADIO: THE SALT (June 6, 2014, 12:27 PM), <http://www.npr.org/blogs/thesalt/2014/06/06/319247280/can-farmed-fish-feed-the-world-without-destroying-the-environment> (citing the World Resource Institute).

36. NAYLOR, *supra* note 28, at 1 (Worldwide, aquaculture production has grown annually by 10%, and its value by 7%. As demand grows and technology improves, it is believed these rates will only increase).

aquaculture, but are instead investing in other areas.<sup>37</sup> Japan, Korea, Ireland, Norway, China, and Spain are all improving offshore aquaculture technology and their accompanying legal regulatory schemes.<sup>38</sup> Only recently in the U.S., though, has this problem begun to be addressed. Under its authority to regulate “fishing,” NOAA set targets for producing \$5 billion worth of aquaculture, 600,000 jobs, and \$2.5 billion worth of goods and services.<sup>39</sup> However, without a proper regulatory framework to govern aquaculture, the environmental impacts from such a move could be tremendous.

### B. The Risks

Conservative estimates put the amount of EEZ territory needed to balance out the annual seafood deficit at roughly 500 km<sup>2</sup>, or less than 0.01% of the U.S. EEZ.<sup>40</sup> Proponents argue that this means the potential environmental effects could be spread out widely, minimizing the concentrated harm that can otherwise occur.<sup>41</sup> However, the environmental concerns accompanying aquaculture are not limited to pollution but also disease transfer to wild populations, invasive or genetically inferior species escapes, and additional stress on wild “feeder” fish populations.<sup>42</sup>

In Vietnam, Thailand, and China, the wastewater discharged by fish farming has destroyed entire mangrove forests, heavily polluted many waterways, and radically altered the ecological balance of coastal areas.<sup>43</sup> China, though, is by far the world’s leading producer, consumer, and processor of fish.<sup>44</sup> Fish farming in China has dramatically changed the waters of the country,<sup>45</sup> and although the same scale isn’t likely to occur in the U.S., it should serve as a precautionary example as the U.S. looks to expand its aquaculture production.

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37. U.S. DEPT. OF COM., *supra* note 26, at 5.

38. *Id.* (Additionally, in 2007, the European Union established an Offshore Aquaculture Technology Platform with partners from 16-member countries and Norway).

39. STEPHEN PHILLIPS, MARINE AQUACULTURE ISSUE PAPER (2005).

40. DEP’T OF COM., *supra* note 26, at 4-5.

41. OCEAN CONSERVANCY, RIGHT FROM THE START: OPEN-OCEAN AQUACULTURE IN THE UNITED STATES 15–16 (2011).

42. See Garrett Wheeler, *A Feasible Alternative: The Legal Implications of Aquaculture in the United States and the Promise of Sustainable Urban Aquaculture Systems*, 6 GOLDEN GATE U. ENVTL. L.J., 297, 300-01 (2013) (proposing one solution to these problems, though outside of the scope of this article, such as using more expensive closed-loop, land-based fish farms).

43. Barboza, *supra* note 3.

44. Ling Cao et al., *China’s Aquaculture and the World’s Wild Fisheries*, 347 SCIENCE, 133 (2015).

45. Barboza, *supra* note 3 (stating “more than half of the rivers in China are too polluted to serve as a source of drinking water” and many of “the biggest lakes in the country regularly succumb to harmful algal blooms” due to the practice).

Because the process—like Concentrated Animal Feeding Operations (“CAFOs”) in the U.S.—concentrates a significant amount of animals into a small space, the waste generated by those animals can pose problems for the surrounding environment. In China, farmers have coped with the toxic water arising from fish farms by mixing illegal veterinary drugs and pesticides into their fish feed.<sup>46</sup> This practice may help keep their fish stocks alive, but it also leaves harmful residues in the seafood, which can create health risks for consumers.<sup>47</sup> Recently, the U.S. has blocked imports of certain types of fish from China after inspectors detected traces of illegal drugs linked to cancer.<sup>48</sup> Both the European Union and Japan have also imposed temporary bans as well after illegal drug residues were discovered in Chinese seafood.<sup>49</sup>

When a disease called infectious salmon anemia spread through farmed salmon in Maine, 1.5 million fish were destroyed (valued at \$25 million).<sup>50</sup> Although supporters of the industry called the event a natural disaster, workers hired to dispose of the fish blamed inadequate management practices, including overstocking the pens.<sup>51</sup> These diseases can also affect human health because often the producer will still send the fish to market so long as it doesn’t exhibit excessive symptoms.<sup>52</sup> Additionally, naturally occurring parasites known as sea lice can have similarly devastating consequences on wild populations.<sup>53</sup> Sea lice do not normally pose a threat to wild populations, but high concentrations of fish create high concentrations of sea lice.<sup>54</sup> When wild fish migration routes move through high concentrations of the parasite the result can be disastrous for wild juvenile fish.<sup>55</sup>

One of the biggest environmental concerns surrounding aquaculture is escaped species. From 1996 to 2012, 25,768,729 farmed fish were reported to have escaped their enclosures.<sup>56</sup> That number is certainly a conservative estimate, as escapes occur due to bad weather, technology failure, and a variety of other occurrences that make it difficult to actually know how many fish escape.<sup>57</sup> Some estimates put the total number of escapes between 3–5%

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46. *Id.*

47. *Id.*

48. *Id.*

49. *Id.*

50. Courtney Carroll, *Fish Farming and the Boundary of Sustainability: How Aquaculture Tests Nature’s Resources*, 2 WR: J. OF THE ARTS & SCI. WRITING PROGRAM 56, 60 (2009/2010).

51. *Id.*

52. *Id.* at 61.

53. *Id.*

54. *Id.*

55. *Id.*

56. CENTER FOR FOOD SAFETY, REPORTED ESCAPES FROM FISH FARMS: 1996–2012 (2012).

57. EVA B. THORSTAD ET AL., INCIDENCE AND IMPACTS OF ESCAPED FARMED ATLANTIC SALMON *SALMO SALAR* IN NATURE 44 (NINA Special Report 36, 2008).



of all farmed fish.<sup>58</sup> One additional problem with escaped farm fish is that, in 2005, 36% of the total world production of farmed fish was in regions where the species is exotic.<sup>59</sup> These escaped farmed fish compete for resources and, in some cases, can quickly dominate ecosystems.<sup>60</sup>

Another problem with certain species of escaped farm fish is that they are sometimes capable of interbreeding with wild populations. For example, successful spawning by escaped female salmon has been documented frequently.<sup>61</sup> The physical and genetic differences affect behavior, competitive ability, and spawning success rates.<sup>62</sup> These are then passed on to new generations of wild salmon, affecting the population's overall survival and breeding chances.<sup>63</sup>

Finally, many farmed fish are fed a diet of smaller bait fish, species like anchovies and menhaden, which are ground up and converted into "fishmeal."<sup>64</sup> It can take a full five pounds of fishmeal to produce just one pound of farmed salmon.<sup>65</sup> Bait fish are also used for nonfood products like pet food, makeup, farm animal feed, and fish oil supplements.<sup>66</sup> Thus, although the aquaculture business often touts the notion that farms are necessary to meet society's growing populations, there are many estimates that argue fish farming is actually consuming more fish than produced.<sup>67</sup> Because China's fish production has tripled in the past 20 years, with roughly three-quarters of its supply now coming from fish farms, its industry is still putting tremendous pressure on wild fisheries because of the demand for fishmeal and fish oil produced from wild species.<sup>68</sup> However, some forward-thinking fish farmers have begun to experiment with more sustainable fish feed.<sup>69</sup> The current legal patchwork in the US involving aquaculture is not

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58. CENTER FOR FOOD SAFETY, *supra* note 56.

59. THORSTAD, ET AL., *supra* note 57, at 7.

60. *The National Wildlife Federation, Invasive Species Asian Carp (2018)*, <https://www.nwf.org/Educational-Resources/Wildlife-Guide/Threats-to-Wildlife/Invasive-Species>.

61. THORSTAD, ET AL., *supra* note 57, at 49.

62. *Id.* at 49.

63. *Id.*

64. Maddie Oatman, *We're Fishing the Oceans Dry. It's Time to Reconsider Fish Farms*, MOTHER JONES (July 2, 2014), <http://www.motherjones.com/environment/2014/07/aquaculture-feed-algae-nuts-mcfarland-springs-kenny-belov>.

65. *Id.*

66. *Id.*

67. Carroll, *supra* note 50, at 58.

68. Cao et al., *supra* note 44, at 1.

69. *See, e.g.* Oatman, *supra* note 64 (discussing the use of nuts from California that can't be sold because they're broken or disfigured. Additionally, the farmer discussed in the article has begun looking to excess barley produced as surplus in the beer industry as another alternative protein source for his fish which include: cobia, Florida pompano, coho salmon, Atlantic salmon, walleye, yellowtail, and White seabass).

sufficient to deal with the potentially disastrous effects of expanding US aquaculture into the EEZ.

### III. CURRENT LEGAL STATUS OF AQUACULTURE IN THE U.S. EEZ

Although Congress passed the National Aquaculture Act in 1980, the Act contains very little substance relevant to aquaculture in the US EEZ.<sup>70</sup> Partly due to the weakness of the 1980 Act, commercial aquaculture never expanded past the 3-mile “cannon shot” range that falls under state jurisdiction.<sup>71</sup> Other federal laws, however, do have some teeth when it comes to aquaculture regulation in the US EEZ—primarily the Clean Water Act (“CWA”) and the Magnuson-Stevens Fishery Conservation and Management Act, commonly referred to as the Magnuson–Stevens Act (“MSA”).<sup>72</sup> It is important to note that Congress did not have EEZ aquaculture in mind when passing these acts.<sup>73</sup> Therefore, neither act sufficiently provides for the environmental safeguards necessary to protect wild fisheries and the ocean environment.

#### A. The Clean Water Act

The CWA applies to all “waters of the United States,”<sup>74</sup> which includes the EEZ and any discharges into those waters. The CWA’s objective is “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.”<sup>75</sup> Under the CWA, “any discharge of any pollutant” into the Nation’s waters is deemed unlawful unless under the terms of a permit.<sup>76</sup> The permitting program, administered by the Environmental Protection Agency (“EPA”) under the broad authority provided to it by the

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70. See The National Aquaculture Act 16 U.S.C. § 2801 (2016) (occupying less than ten pages this Act is hardly a comprehensive regulatory scheme); 16 U.S.C. § 2801(a)(1) (1985) (acknowledging that “certain species of fish and shellfish exceed levels of optimum sustainable yield,” and that the sole focus of the Act is economic); 16 U.S.C. § 2801(c) (1985) (“declar[ing] that aquaculture has potential for reducing the United States trade deficit in fisheries products, for augmenting existing commercial and recreational fisheries and for producing other renewable resources, thereby assisting the United States in meeting its future food needs and contributing to the solution of world resource problems,” and failing to provide attention to environmental issues and establish safeguards).

71. Naylor, *supra* note 28, at 2.

72. See Jillian P. Fry et al., *Offshore Finish Aquaculture in the United States: An Examination of Federal Laws that Could be Used to Address Environmental and Occupational Public Health Risks*, 11 INT’L J. OF ENVTL RES. AND PUB. HEALTH 11964, 11969–70 (2014).

73. *Id.*

74. 33 C.F.R. § 323.2 (2012).

75. 33 U.S.C. § 1251(a) (2012).

76. 33 U.S.C. § 1311(a) (1995).

CWA, is called the National Pollutant Discharge Eliminating System (“NPDES”).<sup>77</sup> Applying the CWA to the EEZ, a “discharge” is considered “any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft.”<sup>78</sup> The “vessels or other floating craft” is an exclusion that applies only if the point source is used for transportation.<sup>79</sup>

### 1. Aquaculture Facilities as “Point Sources”

A “point source” is defined as “any discernible, confined and discrete conveyance, including but not limited to any... concentrated animal feeding operation, or vessel or other floating craft... from which pollutants are or may be discharged.”<sup>80</sup> An aquaculture facility is regulated as a “point source” by EPA if it qualifies as a Concentrated Aquatic Animal Production Facility (CAAP facility).<sup>81</sup> A CAAP facility can be either a cold-water facility or a warm water facility. A cold-water facility discharges for a minimum of 30 days per year, produces over 20,000 pounds of fish per year, and uses 5,000 pounds or more of feed per month. A warm-water facility discharges for a minimum of 30 days per year and produces 100,00 pounds of fish or more per year.<sup>82</sup> Additionally, EPA may designate a facility as a CAAP facility if EPA determines that the facility is a “significant contributor of pollution to waters of the United States.”<sup>83</sup>

Because offshore aquaculture facilities and their accompanying technologies are highly capital-intensive, for them to be economically sustainable for extended periods of time, it is likely that their production volumes will trigger the CAAP facility criteria.<sup>84</sup> Pilot projects, research facilities, and even small facilities which produce lower volumes of higher valued species would likely elude the CAAP facility designation. An

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77. 40 C.F.R. § 122.1 (2015).

78. 33 U.S.C. § 1362(12)(B) (2012).

79. *Nw. Env'tl. Advocates v. U.S. EPA*, 537 F.3d 1006, 1024 (9th Circ. 2008) (noting that Congress had subsequently “approved of the EPA’s decision not to exempt from the permitting process marine discharges from nontransportation vessels”); *See* 40 C.F.R. § 122.2 (2012) (defining “discharge of any pollutant” to mean “any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft that is being used as a means of transportation.”) (*emphasis added*).

80. 33 U.S.C. § 1362(14) (2012).

81. 40 C.F.R. § 122.24(a) (2018).

82. *Id.* § 122.24 app. C(b) (1–2) (stating that one exception applies to warm-water facilities if they operate in closed ponds and discharge only during periods of excess runoff).

83. *Id.* § 122.24(c).

84. *See generally* Michael Rubino, ed., *Offshore Aquaculture in the United States: Economic Considerations, Implications & Opportunities* (2008) (explaining the capital-intensive nature of offshore aquaculture facilities).

example is the Kona Blue facility, which has received a permit to use federal waters near Hawaii but falls below the CAAP facility requirements, and is therefore not subject to regulation as a point source nor the accompanying NPDES permit.<sup>85</sup>

## 2. Living Organisms as “Pollutants”

The CWA does not adequately address whether an escaped aquaculture fish is considered a pollutant.<sup>86</sup> Under the CWA, “pollutant” is defined as “dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.”<sup>87</sup> Most of the byproduct that comes from aquaculture facilities—including fecal matter, excess feed, antibiotics, and pesticides—falls within the definition of “pollutant.”<sup>88</sup> It is less clear, however, whether the fish that escape from aquaculture facilities are considered pollutants.

Although some courts have held that living organisms constitute “biological materials” within the definition of a “pollutant,” other courts have held that living organisms do not constitute “biological materials.”<sup>89</sup> In *U.S. PIRG v. Atlantic Salmon of Maine, LLC*, the District Court determined that the release of non-native salmon from the aquaculture facility in which the salmon were raised constituted an addition of a pollutant.<sup>90</sup> The determining factor for the court was that the salmon were not native to the area.<sup>91</sup> Similarly, the Ninth Circuit has held that invasive species released into the waters during the discharge of ballast water from large ships falls within the definition of “biological material.”<sup>92</sup> In contrast, the Ninth Circuit, in an earlier case, held the definition of “biological materials” does not include excrement from mussels suspended from rafts.<sup>93</sup> Again, like *Atlantic Salmon*

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85. NAT'L OCEANIC AND ATMOSPHERIC ADMIN., FINDING OF NO SIGNIFICANCE IMPACT, ISSUANCE OF A PERMIT TO AUTHORIZE THE CULTURE AND HARVEST OF A MANAGED CORAL REEF FISH SPECIES (*SERIOLA RIVOLLANA*) IN FEDERAL WATERS OF THE WEST COAST OF THE ISLAND OF HAWAII, STATE OF HAWAII (2011).

86. 33 U.S.C. § 1362(6) (2012).

87. *Id.*

88. United States Pub. Interest Research Grp. v. Atl. Salmon of Me., LLC, 215 F. Supp. 2d 239 (D. Me. 2002).

89. *Id.*

90. *Id.* at 247.

91. *Id.*

92. Nw. Env'tl. Advocates v. U.S. EPA, 537 F.3d at 1021 (holding that the EPA did not actually challenge this characterization, so the court did not directly address the question).

93. Ass'n to Protect Hammersley, Eld, & Totten Inlets v. Taylor Res., Inc., 299 F.3d 1007, 1009 (9th Cir. 2002).

of *Maine*, whether the biological material occurred naturally in the area, or whether it was the result of human activity played a determinative role for the court.<sup>94</sup> Therefore, whether a living organism falls under the definition of “biological materials” is currently analyzed on a case-by-case basis, failing to provide aquaculture facilities with notice as to their liability when species escape.<sup>95</sup> Although unlikely, the individual NPDES permit of a CAAP facility could feasibly include such stipulations..

### 3. NPDES Permit Guidelines

The EPA has the authority to set different standards to ensure that point source pollutant discharges remain within particular environmental criteria.<sup>96</sup> EPA can set general effluent limitations guidelines (“ELG”) that apply to an entire industry and designate a specific numerical limit on the allowable discharge of a pollutant.<sup>97</sup> EPA also sets water quality standards (WQS) for point sources, requiring the facility to ensure their discharges do not exceed a particular limit.<sup>98</sup> Additionally, the EPA can set ocean discharge criteria (ODC), which establishes particular numerical limits for discharges that operate in the open ocean.<sup>99</sup>

The EPA established ELGs for aquaculture facilities in 2004, which apply to a majority of recirculating, flow-through, and net-pen facilities so long as they produce a minimum of 100,000 pounds of fish annually (though certain types of hatcheries are exempt).<sup>100</sup> This means all facilities that meet the minimum production may discharge pollutants under the terms of the ELG.<sup>101</sup> Whereas, any facility below this minimum production must obtain a NPDES permit with effluent limitations established by the individual permit, based solely on the judgment of the permit writer.<sup>102</sup>

In contrast, the ELGs for aquaculture facilities do not include numeric limitations, but only textual criteria.<sup>103</sup> Therefore the discharges of any

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94. *Id.*

95. *Compare Kahea v. Nat’l Marine Fisheries Serv.*, No. 12-16445, with U.S. Pub. Interest Research Group, 215 F. Supp. 2d 239 at 247.

96. U.S. ENVTL PROT. AGENCY, FINAL 2016 EFFLUENT GUIDELINES PROGRAM PLAN 11-12 (2018), [https://www.epa.gov/sites/production/files/2018-05/documents/final-2016-eg-plan\\_april-2018.pdf](https://www.epa.gov/sites/production/files/2018-05/documents/final-2016-eg-plan_april-2018.pdf).

97. *Id.*

98. 33 U.S.C. § 1313(e)(4) (2012).

99. 33 U.S.C. § 1343(a) (2012).

100. 40 C.F.R. § 451.20 (2017).

101. 40 C.F.R. § 451.22 (2007).

102. Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Source Category, 69 Fed. Reg. 51,892, 51,906 (Aug. 23, 2004) (hereinafter “2004 ELGs”).

103. *Id.* at 51,899.

aquaculture facility which requires an ELG for specific types of pollutants do not have to fall below specific numeric thresholds. Instead, these facilities must comply with requirements such as “efficient feed management and feeding strategies that limit feed input to the minimum amount reasonably necessary to achieve production goals and sustain targeted rates of aquatic animal growth[.]”<sup>104</sup> However, permit writers have discretion to impose site-specific numeric effluent limitations “in appropriate circumstances.”<sup>105</sup> Pursuant to complying with the textual provisions, the facility is required to develop and maintain best management practices (BMP), which describe the facility’s plan to achieve the provided narrative standard. Part of EPA’s reasoning for providing only textual criteria, is that some states had already established “numeric limits tailored to the specific production systems, species raised, and environmental conditions in the state.”<sup>106</sup>

EPA only requires water quality-based effluent limitations when technology-based limitations are inadequate to ensure the adequacy of the water quality.<sup>107</sup> Therefore, the national framework should include a requirement that the EPA set WQS for any EEZ area open to aquaculture. WQS identify designated uses for the area at issue, establish criteria to protect those uses, and include antidegradation provisions.<sup>108</sup> Under the CWA, states and tribes are required to create WQS for their waterbodies including coastal waters. But, the EPA must set the standards if a state or tribe fails to do so.<sup>109</sup> The CWA does not require the EPA to establish WQS for the EEZ, therefore it has not.<sup>110</sup>

The current ODC were issued by EPA in 1980,<sup>111</sup> and require the EPA administrator to make a determination whether a pollutant discharge into ocean water under federal authority “will cause unreasonable degradation of the marine environment.”<sup>112</sup> Unreasonable degradation includes “significant adverse changes in ecosystem diversity, productivity and stability of the biological community within the area of discharge and surrounding biological communities.”<sup>113</sup> The ODC provide specific factors to use in the evaluation<sup>114</sup> and a NPDES permit may only be issued when the

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104. 40 C.F.R. § 451.11(a)(1) (2018).

105. 2004 ELGs, *supra* note 102, at 51,899.

106. *Id.*

107. 33 U.S.C. § 1312(a) (2012).

108. U.S. ENVTL. PROT. AGENCY, WATER QUALITY STANDARDS HANDBOOK (2018), <https://www.epa.gov/sites/production/files/2014-10/documents/handbook-chapter1.pdf>

109. 33 U.S.C. § 1313 (b) (2012).

110. *Id.*

111. Ocean Discharge Criteria, Final Rule, 45 Fed. Reg. 65,942 (Oct. 3, 1980).

112. 40 C.F.R. § 125.122(a) (2017).

113. 40 C.F.R. § 125.121(e)(1).

114. 40 C.F.R. § 125.122(a)(1)-(10).

administrator determines that the discharge will not result in unreasonable degradation.<sup>115</sup> Additionally, every permit issued must specify a monitoring program, and allow for the permit to be modified or revoked if new data suggests the continued discharge may result in unreasonable degradation.<sup>116</sup> After the CWA, the Magnus-Stevens Act (MSA) has the next most statutory basis for regulating aquaculture in the US, and it is under this authority that NOAA has begun to take steps towards more regulation.

*B. The Magnuson-Stevens Fishery Conservation and Management Act*

The Magnuson-Stevens Act authorizes NOAA to regulate fishing in federal waters by producing Fishery Management Plans (FMP), which are developed by Regional Fishery Management Councils (Regional Councils). Once a Regional Council officially adopts an FMP, NOAA may approve and then formalize the FMP by issuing regulations pursuant to it.<sup>117</sup> Congress drafted and passed the MSA specifically with harvesting fish from wild fisheries in mind.<sup>118</sup> Yet NOAA has regularly issued policies outlining its position that aquaculture is within NOAA's authority under the Act.<sup>119</sup> Very few FMPs currently in operation address aquaculture. For example, a limitation on the use of unapproved gear. A vast majority of FMPs have limitations, which essentially prevent development of aquaculture projects without specific authorization. In 2016, NOAA finalized regulations to govern aquaculture in the U.S. EEZ.<sup>120</sup>

1. Authority to Regulate "Fishing"

Under the MSA, the Regional Councils have authority to create FMPs "for each fishery... that requires conservation and management."<sup>121</sup> NOAA believes it has authority under the MSA to regulate aquaculture because the MSA defines "fishery" to include "one or more stocks of fish which can be treated as a unit for purposes of conservation and management" and subsequently "any fishing of such stocks."<sup>122</sup> "Fishing," is defined to include

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115. 40 C.F.R. § 125.123(b).

116. *Id.* at § 125.123(d).

117. 16 U.S.C. §§ 1852–1853a.

118. 16 U.S.C. § 1801(b).

119. Fishery Management Plan for Regulating Offshore Aquaculture in the Gulf of Mexico-, 81 Fed. Reg. 1762, 1768 (Jan. 13, 2016) (to be codified in 50 C.F.R. pts. 600, 622) [hereinafter *2016 Final Rule*].

120. *Id.* at 1762.

121. 16 U.S.C. § 1852(h)(1).

122. 16 U.S.C. § 1802(13).

the actual or attempted “catching, taking or harvesting of fish.”<sup>123</sup> Under these definitions, NOAA’s Office of General Counsel issued a legal opinion in 1993 that concluded “fishing” includes aquaculture because “[u]se of the term harvesting is particularly significant since it adds an additional concept beyond ‘catching’ or ‘taking’—harvesting connotes the gathering of the crop.”<sup>124</sup> NOAA has since reiterated this stance.<sup>125</sup> But, NOAA’s authority under the MSA is in question because courts have interpreted the MSA differently.<sup>126</sup>

## 2. NOAA’s 2016 Aquaculture Regulations for the Gulf of Mexico

NOAA recently finalized regulations for its Gulf of Mexico FMP, which opened the region to commercial aquaculture for the first time.<sup>127</sup> These regulations require any aquaculture facility in the Gulf of Mexico to first obtain a permit from NOAA.<sup>128</sup> Under these new regulations, the Regional Administrator responsible for wild fishery stocks is also responsible for issuing aquaculture permits.<sup>129</sup> Although NOAA allows the public a brief opportunity to comment on each application,<sup>130</sup> NOAA provides no guidance as to how each determination is made.<sup>131</sup> Additionally, there is no mandatory consultation with the EPA prior to the issuance of an aquaculture permit.<sup>132</sup> In essence, although the regulations establish some standards (e.g. no genetically modified animals),<sup>133</sup> the Regional Administrator evaluates

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123. *Id.* at § 1802(16).

124. Memorandum from Jay S. Johnson, NOAA Deputy General Counsel, and Margaret F. Hayes, NOAA Assistant General Counsel for Fisheries, to James W. Brennan, NOAA Acting General Counsel (Feb. 7, 1993).

125. Memorandum from Constance Sathre, to Lois Schiff (June 9, 2011).

126. *Compare* *Kahea v. Nat’l Marine Fisheries Serv.*, No. 12-16445 (9th Cir. Oct. 29, 2013) (holding that NOAA has jurisdiction to regulate offshore aquaculture under the MSA, based on Skidmore deference to agency interpretation of a statute that the agency itself administers) *with* *Gulf Fishermen Ass’n v. Nat’l Marine Fisheries Serv.*, No. 2:16-cv-01271 (E.D. La. Sept. 25, 2018) (holding that NOAA does not have jurisdiction to regulate offshore aquaculture, based on the MSA’s plain language, purpose, statutory scheme, and legislative history).

127. 2016 Final Rule *supra* note 119, at 1762.

128. *Id.*

129. *Id.* at 1763.

130. *Id.* (allowing the public to comment for “up to 45 days”).

131. *Id.* at 1765–66, 1782, 1798 (failing to realize that such a case-by-case determination leaves the public in the dark as to how NOAA will evaluate such things as facility technology, the monitoring system used, the allowable concentration of fish in individual pens, type and quantity of feed as well as whether more sustainable alternatives have been explored, and the distance of the proposed site from potentially affected wild fisheries—just to name a few).

132. 2016 Final Rule *supra* note 119, at 1797–98 (requiring only consultation with “the Bureau of Ocean Energy Management and the Bureau of Safety and Environmental Enforcement, and other Federal agencies as appropriate.”).

133. *Id.* at 1,765.



adequacy of each applicant on a case-by-case basis, and without any baseline of environmental safeguards.

NOAA's lack of expertise in this area seems readily apparent, yet this has not deterred the agency from moving forward with its regulations. In explaining the apparently arbitrarily-created minimum site distance requirement (1.6 nautical miles), "NMFS notes there is no widely accepted standard for how far apart facilities should be sited and specifically seeks comment on this distance..."<sup>134</sup> Arguably, consultation with the EPA, which has expertise in water quality and water pollution distribution, might be a start. Even though CAAP facilities need to secure a permit from both NOAA and the EPA for the same activity, there is no indication that the two agencies communicate during the process.<sup>135</sup> If NOAA develops expertise on aquaculture technologies and species, EPA could use NOAA's expertise to develop a NPDES permit to ensure environmental compliance. Because the recent NOAA regulations do not include any requirement for consultation with EPA, there may still be confusion with the permits.

The final Environmental Impact Statement (EIS) for the Gulf Coast region was issued on June 26, 2009. On April 20, 2010, the Deepwater Horizon oil spill occurred in the Gulf of Mexico, which was the largest oil spill of its kind.<sup>136</sup> Although NOAA announced a Notice of Intent to prepare a supplemental EIS in January, 2013, no such supplemental EIS was issued. Not only is NOAA moving ahead with a potentially environmentally unsound proposal, it is doing so in the wake, and region, of one of the greatest environmental disasters known to mankind. Instead, Congress should act to ensure the US moves aquaculture into its EEZ with the proper environmental safeguards in place.

#### IV. A PROPOSAL FOR A NEW NATIONAL FRAMEWORK

NOAA's recent proposal for governing aquaculture in the Gulf of Mexico is wholly inadequate, specifically with respect to environmental safeguards and agency consultation. The U.S. government should create a new national framework to address environmental problems from EEZ

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134. Fishery Management Plan for Regulating Offshore Aquaculture in the Gulf of Mexico, 79 Fed. Reg. 51424, 51428 (proposed Aug. 28, 2014) (to be codified at 50 C.F.R. pts. 600, 622 [hereinafter *Fishery Management Plan*]).

135. See NAT'L OCEANIC AND ATMOSPHERIC ADMIN ET AL., A GUIDE TO THE APPLICATION PROCESS FOR OFFSHORE AQUACULTURE IN THE U.S. FEDERAL WATERS OF THE GULF OF MEXICO (2017), [https://sero.nmfs.noaa.gov/sustainable\\_fisheries/gulf\\_fisheries/aquaculture/documents/pdfs/permit\\_applicant\\_guide\\_updated\\_aug2017.pdf](https://sero.nmfs.noaa.gov/sustainable_fisheries/gulf_fisheries/aquaculture/documents/pdfs/permit_applicant_guide_updated_aug2017.pdf).

136. Campbell Robertson & Clifford Krauss, *Gulf Spill Is the Largest of Its Kind, Scientists Say*, N.Y. TIMES (Aug. 2, 2010), [http://www.nytimes.com/2010/08/03/us/03spill.html?\\_r=1&fta=y](http://www.nytimes.com/2010/08/03/us/03spill.html?_r=1&fta=y).

aquaculture before they actually occur. As a starting point, the National Sustainable Offshore Aquaculture Act of 2011 (“2011 Act”) demonstrates a good initial foundation for this framework. However, the national framework should include additional requirements.

#### A. *The National Sustainable Offshore Aquaculture Act of 2011*

The 2011 Act departs substantially from its predecessors.<sup>137</sup> It includes many significant environmental safeguards that should be incorporated into any new national framework for aquaculture in the US EEZ. Therefore, the 2011 Act should serve as a starting point for the proposed national framework to govern aquaculture in the US EEZ.

##### 1. Establishment of a Separate Advisory Board

The 2011 Act proposes to establish an Advisory Board within NOAA. The Advisory Board is responsible for environmental impact studies, permits and regulatory programs, research programs, coordination with other NOAA departments, outreach and training, consultation with Regional Fishery Management Councils (“Regional Councils”) and nonprofit conservation organizations, maintenance of informational database, among other things.<sup>138</sup> The Advisory Board must at minimum be comprised of: “representatives from the National Marine Fisheries Service, the commercial and recreational fishing industries, State or local governments, the Coast Guard, non-profit conservation organizations, members of academia with scientific or technical expertise in ocean and coastal matters, and representatives of the aquaculture industry.”<sup>139</sup> Advisory Board members must meet “at least once every six months[,]” serve two-year terms, and elect a chairperson.<sup>140</sup> The establishment of a separate advisory board for offshore aquaculture, which does not exist in the 2016 Final Regulations, is important for three reasons. First, wild fisheries and aquaculture harvesting are considerably different.<sup>141</sup> Interests of Advisory Board and Regional Council members may be similar, but their interests do not necessarily align because Regional Councils were

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

138. National Sustainable Offshore Aquaculture Act of 2011, H.R. 2373, 112th Cong. § 3(a)-(b) (2011) [hereinafter *2011 Act*].

139. *Id.* § 3(b)(2).

140. *Id.* § 3(b)(3) – (5)(A).

141. Porter Hoagland, Di Jin & Hauke Kite-Powell, *The Optimal Allocation of Ocean Space: Aquaculture and Wild-Harvest Fisheries*, 18 MARINE RESOURCE ECONOMICS 129, 130–31 (2003).

established to create FMPs for regulating wild fisheries, which do not always agree with the relatively new offshore aquaculture practices and technologies.<sup>142</sup> Second, the Regional Councils do not require representatives from non-profit conservation organizations,<sup>143</sup> which is crucial to ensure that environmental and conservation voices have an adequate say in the industry's development. Although representatives from the commercial and recreational fishing industries may often be at odds with conservation groups, requiring both parties on the Advisory Board will place them on the same side of this issue because both will be primarily concerned with the protection of wild fish populations. Third, election of the board's chairperson allows any representative, including those from non-profit organizations, to chair the board. This positive feature of the Act hopefully provides additional protection against agency capture.

## 2. Regional Environmental Impact Statements

The 2011 Act requires the Secretary of Commerce ("Secretary") to issue an offshore aquaculture Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) for each established region (which is the same as the geographic regions established under the MSA).<sup>144</sup> Each regional EIS must designate specific regions "that are not appropriate locations for the conduct of offshore aquaculture[.]"<sup>145</sup> Every regional EIS must consider siting offshore aquaculture facilities to avoid and minimize adverse impacts to the marine ecosystem, sensitive habitats, plants, and animals (specifically including impacts of escaped fish and use of "feeder" fish on wild fish populations).<sup>146</sup> All regional EISs must also consider cumulative effects of multiple aquaculture facilities and the designs, technologies, and operations intended to be employed by any aquaculture facility.<sup>147</sup> These regional EISs must be reviewed, revised, and published in the Federal Register every ten years.<sup>148</sup>

The regional EIS requirement is absolutely necessary to ensure that the agency considers the proper scope of potential impact. Because offshore aquaculture necessarily entails the discharge of various pollutants into the ocean, pollutants will disperse and can affect a wide area. These regional EISs will inform the Board of the particular regions that may be more heavily affected by aquaculture, prompting the Board to prohibit aquaculture in those

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142. 2016 Final Rule, *supra* note 119, at 1784.

143. 16 U.S.C. § 1852(b)-(c), (f)-(g) (2007).

144. 2011 Act § 4(a)-(b).

145. *Id.* § 4(c)(1).

146. *Id.* §§ 4(d)(1)-(2).

147. *Id.* §§ 4(d)(3)-(4).

148. *Id.* § 4(e).

regions. Maintaining and updating these regional EISs will require the agency to constantly monitor not just individual facilities and their immediate vicinity, but the impact on the entire region and necessarily all ecosystems within that region. Additionally, requiring each EIS to specifically address the impacts of escaped fish, forage fish used as feed, and fishmeal on wild populations can directly address some of aquaculture's biggest proven environmental problems. Finally, NOAA should require a regional EIA before opening the region for aquaculture. However, NOAA's 2016 Final Regulations are moving forward without an adequate EIS for the Gulf of Mexico that considers the potential environmental effects of aquaculture.

### 3. Permit Application Process

The 2011 Act requires a permit for any person to engage in offshore aquaculture.<sup>149</sup> Before a permit can be issued, the 2011 Act requires: an additional site-specific NEPA analysis;<sup>150</sup> notice to the public and a minimum of 90 days for comment;<sup>151</sup> the posting of a bond sufficient to cover the cost of removing the facility;<sup>152</sup> and consultation with federal agencies and coastal states, which are allowed to submit "a list of locations, species, or categories of species ... for which the coastal State opposes the conduct of offshore aquaculture."<sup>153</sup> If the coastal state submits any location or species for exception during consultation, NOAA may not issue a permit.<sup>154</sup> The 2011 Act prioritizes issuing permits to those proposed facilities "using technologies and practices that will substantially exceed compliance with the permit terms and conditions ...."<sup>155</sup>

However, the permit guidelines proposed by the 2011 Act are much stronger than what NOAA has proposed with its 2016 Final Regulations, though both may require a permit for the operation of an aquaculture facility. For any permit to be issued, the 2011 Act requires a site-specific NEPA analysis in addition to the regional EIS requirement, which would provide additional information and stronger environmental safeguards. Before the Board issues the permit, it must consider any information from the regional EIS. Additionally, every application must provide for public notice and comment for a minimum of 90 days. Any interested party has the opportunity to address any information they believe necessary to the permitting authority, which is then required to take that information into account when

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149. *Id.* § 5(a)(1).

150. *Id.* § 4(g).

151. *Id.* §§ 5(e)(1)(3).

152. *Id.* § 6(c).

153. *Id.* § 8(c)(2)(A).

154. *Id.* § 8(c)(2)(C).

155. *Id.* § 5(h)(2).

determining whether or not to issue a permit. Finally, consultation with agencies and states provides yet another safeguard to ensuring that all relevant information will be in front of the permitting authority when it makes its decision. Allowing coastal states to designate locations, species, or categories of species for which permits cannot be issued provides an option for potentially affected states to take a precautionary approach until better information becomes available.

Another substantial difference exists between the 2011 Act and NOAA's 2016 Final Regulations. The 2011 Act requires the agency to give priority to applicants that will "substantially exceed compliance with the permit terms and conditions,"<sup>156</sup> which ensures that competition between potential applicants will minimize harmful environmental effects on the area at issue. This priority may also encourage prospective applicants to plan on more stringent technologies in order for the permitting agency to assess their application more positively. Additionally, the 2011 Act requires a bond from the applicant, which ensures that the private entity seeking a permit will suffer significant financial loss if they do not adhere to the specific terms of the permit. Ideally, this requirement will result in better management practices to ensure that the bond provided will not be forfeited because of simple negligent conduct. This requirement will also hopefully deter potential facilities that may plan on operations which would barely comply with the terms of their permit.

#### 4. Permit Terms and Requirements

Under the 2011 Act, every permit will be valid for a ten-year period and is eligible for renewal for another ten-year period.<sup>157</sup> Each permit issued:

"shall—(A) to the extent feasible, establish numerical standards for environmental performance under such permits; (B) to the extent such numerical standards are not feasible, establish narrative standards for such performance; and (C) to the extent such numerical standards and narrative standards are not feasible, require management practices, including implementation of best management practices for such performance."<sup>158</sup>

Every permittee must submit a comprehensive annual report that includes: data on escape events; estimates of stocks, harvests, and mortalities; nutrient

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156. *Id.* § 5

157. *Id.* §§ 5(g)(1)(A) – (B).

158. *Id.* § 5(b)(2).

data; impact on the water column and benthos; prevalence and extent of disease and parasites; use of antibiotics, pesticides, prescription and nonprescription drugs, and other chemical treatments; and sources of fish feed.<sup>159</sup> Every permittee must also make these annual reporting requirements public.<sup>160</sup>

Because of the relatively new nature of exposing the U.S. EEZ to aquaculture, the terms of each permit should be reduced to five-year intervals, at least for the initial period of the Act's implementation. The reduced term will force the permitting authority to reevaluate each permit to accommodate changes in each permit based on new information. However, this concern is already relatively addressed because the Act allows for the suspension, modification, or revocation of a permit "based on information obtained after the issuance of the permit (including information obtained under the research program [established by the Act])."<sup>161</sup> Ideally, instead of allowing for the agency to determine whether numerical criteria are "feasible," Congress should modify the Act to require the EPA to establish Water Quality Standards ("WQS") for areas designated for aquaculture facilities. These WQS would, in turn, be used as a basis for the permitting authority to establish numeric effluent limitations for discharges under each individual permit. Although the language of the act requiring numerical standards "to the extent feasible" is laudable, it provides too much discretion to the permitting authority to default to narrative standards that can be difficult to enforce. However, the stringent standards for annual reporting are significant requirements that allow for annual evaluation of the facility's ability to comply with the permit terms of its permit. Because the Act also allows for suspension, modification, or revocation of a permit for repeated violations,<sup>162</sup> this reporting requirement could quickly lead to the revocation of a permit for facilities having difficulty meeting the permit terms.

Permits must limit facilities to species only of a genotype that is native to the geographic region. Yet facilities must "ensure[] fish escapes will not harm the genetics of local wild fish," restrict cultivation of any species of special concern, and prohibit genetically modified species.<sup>163</sup> The use of wild fish as feed ingredients is prohibited, unless "they are sourced from populations with ecosystem-based management measures in place; and ... shows biomass is at or above maximum sustainable yield."<sup>164</sup> Additionally,

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159. *Id.* §§ 5(i)(2)(A) – (E).

160. *Id.* § 5(i)(3).

161. *Id.* § 11(d)(3).

162. *Id.* § 11(d)(1).

163. *Id.* § 5(j)(1)(A) – (D).

164. *Id.* §§ 5(j)(5)(A)(i)(ii).

permittees must minimize the use of fishmeal and fish oil derived from forage fisheries and use alternatives “to the maximum extent practicable.”<sup>165</sup> Finally, the Act specifically provides for enforcement of any permit terms by private citizen suits.<sup>166</sup>

The 2011 Act goes well beyond NOAA’s 2016 Final Regulations, particularly with the requirement for public reporting by aquaculture facilities and the citizen suit provision. The citizen suit provision is a tremendously important component for any action that opens up the US EEZ to aquaculture. Because of the federal government’s limited resources, citizen suits can help keep facilities in check prospectively because concerned citizens will monitor effluent discharges. Additionally, the 2011 Act provides more guidelines to the permit issuer so that the public will better understand the decision-making process—such as minimizing or prohibiting certain sources of fishmeal, requiring numeric effluent limitations on permits, prohibiting antibiotics, etc. However, the US government can ensure sustainable aquaculture from the start by improving the 2011 Act and enhancing its benefits.

### *B. Lessons from the CWA and the MSA*

Although a majority of facilities in the U.S. will likely trigger the CAAP facility classification,<sup>167</sup> the potential environmental harms from smaller facilities that do not trigger the classification are significant enough to merit requiring a NPDES permit.<sup>168</sup> A national framework could require a separate, perhaps less costly permitting process for these smaller facilities, but should still require the permitting agency to perform some type of environmental analysis. Such an analysis needs to include an evaluation of the proposed facility’s location, type of aquaculture performed, proposed technology and methods used, pathways of migratory fish and other potential environmental factors, and cumulative effects from other facilities in the area. Requiring a NPDES permit of smaller facilities would also allow the permitting authority to consider input from states that could be potentially affected by the facility.

Any implemented national framework should include a provision that defines living organisms that escape from aquaculture facilities—or are intentionally released—as “biological material” under the CWA. Including these organisms under the definition of “pollutant” would require facility operators to take measures to prevent escape events and hold them accountable for any negative environmental harms that result from

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165. *Id.* § 5(j)(5)(B)(C).

166. *Id.* § 11(f).

167. 40 C.F.R. § 122.24(b) (2018).

168. *See, e.g. supra* Section II (discussing the problem of escaped, invasive species).

negligence, improper management practices or use of technology, or simply a lack of proper planning.

Additionally, the national framework should require EPA to develop NPDES permitting guidance for aquaculture facilities. This guidance should include numeric effluent limitations for specific types of pollutants (fecal matter, excess feed, escaped fish, etc.). This guidance should prohibit discharges of certain types of dangerous substances (e.g. oil, grease, invasive species) and require water quality testing to ensure facility compliance. This permitting guidance should apply to all facilities, including those below the aquaculture ELG's current size threshold. These requirements are necessary to ensure that water quality of the surrounding area remains adequate for local species. Additionally, this guidance should require EPA to establish areas viable for open-ocean aquaculture and establish WQS for those areas. Because open-ocean aquaculture technology is relatively new, technology-based limitations would be ineffective at ensuring adequate water quality for any organisms within the area. These WQS will, in turn, help guide the numeric effluent limitations in the permitting process for that area.

EPA's current ODCs do not provide specific information as to when the agency will exercise its discretion because they do not include numeric standards defining "unreasonable degradation" or the extent and type of monitoring requirements. The national regulatory framework for offshore aquaculture should include a requirement for the EPA to update its ODCs at certain intervals, such as every ten or 15 years, and include specific monitoring requirements. Finally, the framework should include a requirement that the EPA define "unreasonable degradation" with numeric criteria, based on the WQS set for the area, so that a facility will automatically lose its permit if testing of the effluent limitations or water quality exceeds such a level.

## CONCLUSION

With NOAA's recent move authorizing and regulating aquaculture within the US EEZ, it has never been so important to implement a national framework. The CWA and the MSA are clearly inadequate for ensuring that proper environmental safeguards apply to any proposed facility. Because NOAA implemented its 2016 regulations with no national framework in place, the US will be forced to—like China—deal with environmental issues as they arise instead of before they happen. Because of these recent developments, now is the time for a renewed push by Congress to implement a strong national framework, with a focus on research and environmental precautions. If Congress does not act now, the environmental consequences of NOAA allowing private enterprise to move into the Gulf of Mexico could



be devastating. Aquaculture has already wrought tremendous havoc in China because of the focus on economic expansion at the cost of environmental safeguards. The US needs to heed this lesson if it wants to develop and ensure sustainable aquaculture in the US EEZ, both economically and environmentally.