LIVING POLLUTANTS: IMPORTING POLLUTION LAW PRINCIPLES TO PUT AQUACULTURE FACILITIES ON THE HOOK FOR ESCAPES

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ABSTRACT

This Essay discusses the need for a comprehensive regulatory framework regarding United States Marine Aquaculture. U.S. based Aquaculture generates many fish products for the American consumer, but the environmental risks the industry generates is equally large. When farmed fish escape, they can destroy their environment through spreading disease, competing with native species, and interbreeding with local fish stocks. Lawmakers should create a new federal law regulating the aquaculture industry in a way that mirrors major pollution acts, like the Clean Air Act and the Comprehensive Environmental Response,

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Compensation, and Liability Act. This law should impose a reporting requirement upon the industry, as no one can react to an escape without knowledge of its occurrence. A flexible technology standard for aquaculture enclosures will leave room for the industry to innovate while requiring them to have a minimum standard for containment. Lastly, violators of this new standard should be held strictly liable for release events due to their catastrophic nature and be required to pay into a new superfund aimed at cleaning up aquaculture escapes.

I. INTRODUCTION

Spending a day fishing on the water is an ideal pastime for many people. Reeling in fish after fish seems like a dream come true, but there is a threat to coastal communities: fish stocks escaping from aquaculture facilities. For the lay fisherman, the existence of excess fish to catch would be excellent. However, the environmental impacts of these escapes will lessen the environmental health and overall fish counts in coastal communities.[1] States generally lead the charge in regulating escapes.[2] However, escaped fish can move between state boundaries.[3] Hence, a federal system is preferable to this disjointed state system to ensure uniform protection from escapes. There is already a federal system of pollution laws regulating facilities that could harm the environment.[4] These pollution laws are a valuable analog for creating a federal aquaculture regulation scheme.

Two pollution laws that can guide this new aquaculture escape legislation are the Clean Air Act (CAA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).[5] Technology standards from the CAA are flexible.[6] The Environmental Protection Agency (EPA) wants to ensure that emitters comply with the performance standards they set rather than ensuring

1. Karen McVeigh, *Thousands of Salmon Escaped an Icelandic Fish Farm. The Impact Could be Deadly*, THE GUARDIAN (Sept. 30, 2023), https://www.theguardian.com/environment/2023/sep/30/thousands-of-salmon-escaped-an-icelandic-fish-farm-the-impact-could-be-deadly [https://perma.cc/PAB8-MS2S].

2. AMANDA NICHOLS, SEA GRANT L. CTR., REGULATING INVASIVE SPECIES IN AQUACULTURE: COMMON STATE APPROACHES AND BEST MANAGEMENT PRACTICES 2 (2018), https://nsglc.olemiss.edu/projects/ag-food-law/files/regulating-invasive-species-in-aquaculture.pdf [https://perma.cc/CPV2-3S2H].

3. *See id.* at 1.

4. *See Environmental Law: A Beginner's Guide*, LIB. OF CONG. (Apr. 15, 2024, 3:28 PM), https://guides.loc.gov/environmental-law/federal-laws [https://perma.cc/CL93-7VZG].

5. *Id.*

6. *Building Flexibility with Accountability into Clean Air Programs*, U.S. ENV'T. PROT. AGENCY (Dec. 19, 2023), https://www.epa.gov/clean-air-act-overview/building-flexibility-accountability-clean-air-programs [https://perma.cc/492G-MSRY].

that facilities or cars use a specific type of pollution control device.[7] These flexible standards allow for the industry to create better pollution control devices and reduce their costs at the same time.[8]

CERCLA creates reporting requirements and stringent liabilities for polluters.[9] Owners of facilities must maintain records of the substances at their facility and report releases to the National Response Center and the EPA whenever their facility discharges a hazardous pollutant into the environment.[10] There are also penalties for failing to comply with these reporting requirements.[11]

CERCLA liability is broad: owners, operators, transporters, and other handlers of hazardous wastes are liable for releases or threatened releases.[12] Defenses to having this liability attach to a responsible party include an act of God, act of war, or act or omission of a third party.[13] All funds collected for violations of CERCLA go to the Superfund, a trust for the cleanup of contaminated sites.[14]

There are striking similarities between hazardous waste and escaped fish from aquaculture. When escaped fish and hazardous waste enter the environment, they can cause massive environmental harm.[15] Both aquaculture and hazardous waste releases can lead to massive economic problems in communities surrounding these facilities.[16] Aquaculture has been escaping liability the same way their fish have fled their nets. New federal legislation that draws from the logic of the CAA and CERCLA is necessary to put aquaculture on the hook for their escapes.

Part II of this Essay discusses the benefits and drawbacks of aquaculture in general. Part III describes the current legal landscape of aquaculture regulations

7. *Setting Emissions Standards Based on Technology Performance*, U.S. ENV'T. PROT. AGENCY (Aug. 8, 2023), https://www.epa.gov/clean-air-act-overview/setting-emissions-standards-based-technology-performance [https://perma.cc/P826-J6XH].

8. *Building Flexibility with Accountability into Clean Air Programs*, *supra* note 6.

9. 42 U.S.C. §§ 9603, 9607.

10. *Id.* § 9603.

11. *Id.*

12. *Id.* § 9607(a).

13. *Id.* § 9607(b).

14. 26 U.S.C. § 9507(b).

15. McVeigh, *supra* note 1; *Health and Ecological Hazards Caused by Hazardous Substances*, U.S. ENV'T. PROT. AGENCY (Dec. 13, 2023), https://www.epa.gov/emergency-response/health-and-ecological-hazards-caused-hazardous-substances [https://perma.cc/Z49U-3CE8].

16. *Farmed Salmon Escapes*, OCEANA (Mar. 1, 2024, 11:25 AM), https://usa.oceana.org/farmed-salmon-escapes/ [https://perma.cc/CM4G-46YK]; Austin Frakt, *How Pollution Can Hurt the Health of the Economy*, N.Y. TIMES (Nov. 27, 2018), https://www.nytimes.com/2018/11/27/upshot/how-pollution-can-hurt-the-health-of-the-economy.html.

and why the Endangered Species Act (ESA) can no longer be the sole source of escape liability. Finally, Part IV, attempts to "close the holes in the net" of the escape problem by describing how Congress must act to solve the problem and the requirements of this new law. Get the fishing tackle ready, it is time to reel in the aquaculture industry.

II. WHAT IS AQUACULTURE?

There is a straightforward solution to prevent aquaculture escape: ban all aquaculture. That view is a simple solution that would serve the goal this Essay advocates for—a reduction of escape events from aquaculture facilities. However, banning aquaculture outright would ignore the plethora of benefits that aquaculture can bring to the environment and the economy. These benefits have their drawbacks, but a proper regulatory scheme can mitigate the risks. This Essay will begin by explaining aquaculture's benefits and drawbacks.

The National Ocean Service, an arm of the National Oceanic and Atmospheric Administration (NOAA), defines aquaculture as "the breeding, rearing, and harvesting of fish, shellfish, algae, and other organisms in all types of water environments."[17] There are aquaculture facilities on both coasts of the United States and in the Gulf of Mexico.[18] Aquaculture can be broken down into two main categories; freshwater and marine aquaculture.[19] This Essay largely focuses on marine aquaculture. Marine aquaculture has different technologies that provide varying levels of protection from escape.[20] The escape issue typically centers around open-net farms which interchange water with the surrounding area on a large scale.[21] This free exchange leaves little protection from escapes.[22]

17. *What is Aquaculture*, NAT'L OCEAN SERV. (Oct. 11, 2023), https://oceanservice.noaa.gov/facts/aquaculture.html#:~:text=Aquaculture%20is%20the%20breeding%2C%20rearing,all%20types%20of%20water%20environments [https://perma.cc/W77M-JE6Q]; *NOAA Organization Chart*, NAT'L OCEANIC & ATMOSPHERIC ADMIN. (Feb 16, 2024), https://www.noaa.gov/about/organization/noaa-organization-chart [https://perma.cc/383T-YNXV].

18. Marko Csokasi, *U.S. States with the Largest Aquaculture Industries*, COMMODITY.COM (Nov. 8, 2023), https://commodity.com/blog/aquaculture-production/#:~:text=The%20South%20leads%20the%20U.S.,Mexico%20and%20the%20Atlantic%20Ocean [https://perma.cc/KK9J-KLDW].

19. *What is Aquaculture, supra* note 17.

20. *Aquaculture Methods*, SEACHOICE (Jun. 1, 2024, 9:42 PM), https://www.seachoice.org/info-centre/aquaculture/aquaculture-methods/ [https://perma.cc/BGS5-GJH3].

21. *Id.*

22. *The Great Escape: Risks of Farmed Fish*, FISHBIO (Nov. 13, 2017), https://fishbio.com/great-escape-risks-farmed-fish/ [https://perma.cc/98QP-QD3A].

However, there are benefits to open-net farming.[23] Members of the salmon farming industry report that their fish are healthier because they do not pump the fish with growth hormones in open pens.[24] Additionally, the industry reports that open nets are more humane for the salmon because they get to live in their natural environment.[25] Lastly, open-net farming allows for operations to grow because of the vast open space the ocean provides.[26]

Some states have banned open-net farming to protect their environments from the harms associated with them.[27] This is a win for environmentalists but will cause issues for the aquaculture industry.[28] Overregulation is a fear in the business world.[29] When agencies, even with the best intentions, create too stringent a regulation, it can stall innovation in the regulated industry.[30] Aquaculture is a business. Too strong an action from the regulating authorities could prevent innovative solutions to the escape problem. A flexible approach concerned with the big picture of reducing escapes is preferable so that the industry can innovate on its own.

One may ask, "Why go through all this trouble?" Aquaculture's paramount importance comes from its ability to generate food. In 2020, NOAA found that 24% of the United States seafood production and fish products came from United States-based aquaculture.[31] NOAA reports this market share is worth $1.5 billion

23. *A Brief Overview of Fish Farming Systems*, NOFIMA (Oct. 31, 2023), https://nofima.com/worth-knowing/a-brief-overview-of-fish-farming-systems/#ib-toc-anchor-1 [https://perma.cc/9PWC-FHKC].

24. *See Farmed vs. Wild: Busting Fishy Salmon Myths*, ALLTECH (Sept. 28, 2017), https://www.alltech.com/blog/farmed-vs-wild-busting-fishy-salmon-myths [https://perma.cc/QD5L-8J5F].

25. *See A Brief Overview of Fish Farming Systems*, *supra* note 23.

26. *See* Josh McDaniel, *Farming the Open Ocean—Is Offshore Aquaculture in Hawai'i the Future of Seafood?*, SEA GRANT, UNIV. OF HAWAI'I (Apr. 12, 2024, 2:22 PM), https://seagrant.soest.hawaii.edu/farming-the-open-ocean/ [https://perma.cc/4XFX-B5F2].

27. Brian Owens, *So Long to Open-Net-Pen Salmon Farms?*, HAKAI MAGAZINE (June 22, 2022), https://hakaimagazine.com/news/so-long-to-open-net-pen-salmon-farms/ [https://perma.cc/8M2S-C85M].

28. *See Washington Bans Fish-Farming Net Pens, Citing Salmon Threat*, AP NEWS (Nov. 18, 2022, 5:33 PM), https://apnews.com/article/canada-business-alaska-british-columbia-fish-1d8502d40ce720a9bc747c3313800eee [https://perma.cc/7LUF-PJP5].

29. Benvenuto Marcello Mezzapelle, *A Nation of Absolutes: America's Overregulation Problem*, FORBES (Apr. 26, 2021, 7:00 AM), https://www.forbes.com/sites/forbesfinancecouncil/2021/04/26/a-nation-of-absolutes-americas-overregulation-problem/ [https://perma.cc/5YSX-ZKEW].

30. *Id.*

31. RICHARD CODY, NAT'L MARINE FISHERIES SERV., 2020 FISHERIES OF THE UNITED STATES 17 (Michael Liddel & Melissa Yencho eds., 2022),

and generated 658 million pounds of product.[32] These economic impacts are far reaching, but the environmental benefits reach even further.

Aquaculture can solve many problems that the National Marine Fisheries Service (NMFS), another branch of NOAA, deals with when managing fisheries.[33] A major problem in fish management and production is creating the optimal yield from a fishery.[34] The Regional Fisheries Management Councils (the Councils) must create yields that prevent overfishing.[35] Increasing reliance on aquaculture will allow the Councils to enact tighter fishing regulations, focus on rebuilding fish stocks, and reduce overfishing without significantly reducing the number of fish products on the market.[36]

Another mandate for the Councils is that they must reduce the amount of bycatch in fisheries.[37] Bycatch occurs when members of the fishing community catch marine life (typically fish, turtles, and dolphins) that they *do not* want to keep, either personally or commercially.[38] This definition includes resources that have little economic value or those discarded because of regulations.[39] By increasing reliance on aquaculture, marine species would be less susceptible to bycatch.[40] The aquaculture facilities keep their stock enclosed in a pen, so there is a smaller chance that an undesirable species would be caught.[41] Furthermore, aquaculture facilities have incentives to reduce their regulatory bycatch.[42] When aquaculture facilities pull out fish too small to send to a processing facility, they can put it back in the pen and wait for it to grow. If they just let it die, that cuts into their profit.

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https://media.fisheries.noaa.gov/2022-05/Fisheries-of-the-United-States-2020-Report-FINAL.pdf [https://perma.cc/YG6E-LJD9].

32. *Id.*

33. *See NOAA Organization Chart*, *supra* note 17.

34. *See* JOSH EAGLE & SHI-LING HSU, OCEAN AND COASTAL RESOURCES LAW 86 (3d ed. 2020).

35. 16 U.S.C. § 1851(a)(1).

36. *Id.* § 1851(a)(8).

37. *Id.* § 1851(a)(9).

38. EAGLE & HSU, *supra* note 34, at 102–03.

39. *Id.* at 104 (regulatory bycatch would be throwing back a dead fish because it is too small or throwing back a turtle because it is illegal to keep).

40. *See* Heidi Moe Føre & Trine Thorvaldsen, *Causal Analysis of Escape of Atlantic Salmon and Rainbow Trout from Norwegian Fish Farms during 2010-2018*, AQUACULTURE, Feb. 15, 2021, at 1.

41. *See generally* Owens, *supra* note 27.

42. *See National Bycatch Reduction Strategy*, NOAA FISHERIES (Feb. 20, 2024), https://www.fisheries.noaa.gov/international/bycatch/national-bycatch-reduction-strategy [https://perma.cc/963H-R34D].

Aquaculture provides benefits without measure, but there are also risks to aquaculture.[43] Mismanagement of these aquaculture facilities can lead to significant environmental harm.[44] Liability and reporting requirements can reduce mismanagement and, in turn, reduce the possibility of escape.

Aquaculture escapes threaten local fish populations with extinction. Local species can interbreed with farmed fish.[45] Interbreeding can be detrimental to local fish populations because the traits that farmers desire for farming may be undesirable in nature.[46] Farmed fish grow faster than wild fish.[47] In pens, rapid growth is desirable because it reduces industry costs in raising the fish.[48] In the wild, scientists link this trait to aggressiveness.[49] This aggressiveness leaves juvenile salmon more susceptible to predators in the wild, leading to an earlier die-off before they can reproduce.[50] The existence of farmed fish threaten local populations in the same way hazardous materials threaten local environments by increasing mortality in local species.[51]

When adequately contained, hazardous materials and farmed fish do not threaten their environment because they cannot interact with it.[52] Legislating standards for containment through a technology standard would ensure that aquaculture facilities properly contain these living pollutants.[53] Additionally, strict liability would encourage proper containment of aquaculture fish because intent does not matter. The only way to avoid liability would be to prevent escapes through proper containment and management of the facility.

43. *Id.*

44. *Id.*

45. Føre & Thorvaldsen, *supra* note 40, at 1.

46. Torbjørn Forseth et al., *The Major Threats to Atlantic Salmon in Norway*, 74 ICES J. OF MARINE SCI. 1496, 1504 (2017).

47. *Id.* at 1507.

48. Harriet R. Goodrich & Timothy D. Clark, *Why Do Some Fish Grow Faster than Others?*, 24 FISH AND FISHERIES 796, 797 (2023) (discussing the reason aquaculture prefers fast-growing fish).

49. Adam Vaughn, *Breeding with Farmed Fish is Changing the Life Cycle of Wild Salmon*, NEW SCIENTIST (Dec. 22, 2021), https://www.newscientist.com/article/2302512-breeding-with-farmed-fish-is-changing-the-life-cycle-of-wild-salmon/ [https://perma.cc/4AUB-VWK6].

50. *Id.*

51. Forseth, et al., *supra* note 46, at 1499 (figure 2(b) shows the similar effect predation and hazardous substances have on development).

52. *Id.*

53. *Id.* at 1507.

Interbreeding is not the only problem.[54] Escaped fish carry disease.[55] Parasites, like sea lice, proliferate in the confined areas of aquaculture.[56] Sea lice infestations render fish stocks unmarketable because of the lesions they cause.[57] There are chemical treatments for sea lice infestation, but they are not always efficacious, largely due to chemical resistance.[58] Compared to sea lice in the wild, aquaculture operations create a densely populated environment, where it is easy for sea lice to thrive.[59] If the infected fish escape, they can infect other fish in the wild, which can lead to mass mortality.[60] Proper regulatory schemes can prevent these diseased fish from escaping into the wild.

Strict liability for the harms from aquaculture escape will encourage proper containment of sick fish. The facilities already take an economic hit for these infections because they cannot sell their stock with lesions.[61] Facilities would not want a second economic impact because they are liable for their sick fish escaping. Money is a powerful motivator, and strict liability will ensure environmental protection through the aquaculture facility's wallet.

In recent years, the number of escapes has not decreased.[62] In August 2023, thousands of salmon escaped from a farm in Iceland.[63] Some advocates argue that a ban on open-pen farming is needed to protect the environment.[64] The complete ban view ignores the health effects granted to the fish from open-net farming.[65] The way to solve the escape problem is through new federal legislation.

A regulatory scheme can mitigate aquaculture's harms, much like how the pollutant regulatory scheme mitigates the harms it contemplates. Facilities regulated under the CAA and CERCLA each provide some benefit to society; otherwise, the processes and substances the facilities control would likely be banned altogether due to their potential to cause vast environmental harm.[66]

54. *Id.* at 1497.

55. *Id.* at 1503.

56. *Id.*

57. Emily Osterloff, *The Problem of Sea Lice in Salmon Farms*, NAT. HIST. MUSEUM (Feb. 23, 2024, 7:28 PM), https://www.nhm.ac.uk/discover/the-problem-of-sea-lice-in-salmon-farms.html [https://perma.cc/FZ2V-SF5T].

58. *Id.*

59. *Id.*

60. *Id.*

61. *Id.*

62. *See* McVeigh, *supra* note 1.

63. *Id.*

64. *Id.*

65. *See* discussion *supra* Part II (discussing the benefits granted to fish stocks in open-net farming).

66. *See generally* 42 U.S.C. §§ 7401, 9601–75.

Imposing pollutant law logic on aquaculture facilities will help them realize these vast societal benefits and lessen the risk of habitat destruction caused by escape events.

III. THE CURRENT NET

The escape problem is at the center of a complex legal net. Federal and state agencies have a complex relationship managing the coastal zones near states.[67] The current way to impose liability upon facilities that let escapes occur under their watch, the ESA, cannot adequately protect the environment from large-scale aquaculture operations.[68] There are too many holes in the net from the causes of action provided within the ESA, and the enforcement mechanisms it provides.[69] While effective in many areas of the law, the ESA cannot act effectively to impose liability on the aquaculture facilities. This Essay will address each of these issues in turn throughout this Part.

A. Who Regulates Aquaculture?

Many federal agencies overlap when it comes to aquaculture regulation.[70] Federal law establishes a joint subcommittee on aquaculture, led by the USDA and has members from at least twelve agencies and interest groups, with the option to add more members at the discretion of the Director of Science and Technology Policy.[71] This collection of experts encourages cooperation in the regulation of aquaculture.[72] Despite this wide range of experts, courts have looked at aquaculture regulations skeptically.[73]

For example, the Fifth Circuit attacked aquaculture regulation in the Gulf of Mexico.[74] The Gulf of Mexico Fishery Management Council (one of the regional Councils within NMFS described above) made a plan to regulate aquaculture in the Gulf through permitting actions and reporting requirements.[75] The court held

67. EAGLE & HSU, *supra* note 34, at 691.

68. *See generally* 16 U.S.C § 1540.

69. *See id.*

70. NAT'L. OCEANIC & ATMOSPHERIC ADMIN., OFFICE OF AQUACULTURE, FACT SHEET 2022: REGULATION OF MARINE AQUACULTURE 1 (2022) [hereinafter FACT SHEET], https://media.fisheries.noaa.gov/2022-03/Fact-Sheet-Regulation-of-Marine-Aquaculture.pdf [https://perma.cc/G5YV-P9CE].

71. 16 U.S.C. § 2805(a).

72. *Id.* § 2805(b)(5).

73. *See, e.g.,* Gulf Fishermen's Ass'n v. Nat'l. Marine Fisheries Serv., 968 F.3d 454, 456 (5th Cir. 2020).

74. *Id.*

75. *Id.* at 458.

that NMFS cannot regulate aquaculture under the Magnuson-Stevens Fishery Conservation and Management Act.[76] The case stands for the proposition that courts will react cautiously, if not hostilely, to any rulemaking initiative that a council undertakes without explicit congressional authorization, and that no such authorization exists at this time.[77] This principle is especially salient considering the crackdown from the Supreme Court on environmental regulations in general without explicit congressional authorization.[78] Federal agencies cannot act without this legislation because of the judiciary's take on their actions.[79] States, however, also get a bite at the aquaculture regulation apple.[80]

Coastal states retain the right to manage their coastal zones, so long as they have a Coastal Zone Management Act (CZMA) compliant plan.[81] Once the program meets federal requirements, states are entitled to consistency review.[82] Consistency review allows states to check any federal activities that may affect their coastal zones and ensure that the entity proposing the action follows their approved plan.[83] There is an avenue for some federal actions to get an exemption from consistency review.[84] The President may request an exemption if the action is "in the paramount interest of the United States."[85]

Too many cooks in the kitchen can spoil the broth. Any meaningful attempt at imposing new aquaculture regulations must come from one clear source because of all the actors at play in aquaculture regulation. This new legislation is also necessary because of the ESA's shortcomings when applied to aquaculture escape.

B. The Endangered Species Act

The provisions of the ESA can be powerful tools for groups, such as the federal government, firms, or private citizens, to prevent an action that would harm an endangered or threatened species.[86] This Essay will discuss how the ESA works and why it cannot adequately impose liability on fish farmers.

76. *Id.* at 456.

77. *See generally id.*

78. *See generally* Sackett v. EPA, 598 U.S. 651 (2023); *see also* Kevin Griffin, *Atoll for the Ocean: Can Federal Action Protect the Rainforest of the Seas?*, FLA. BAR ENV'T L. & LAND USE SECTION, June 2024, at 6.

79. *See generally id.*

80. *Id.* at 683.

81. EAGLE & HSU, *supra* note 34, at 691, 696.

82. *Id.* at 711–13.

83. *Id.* at 713; 16 U.S.C. § 1456.

84. 16 U.S.C. § 1456(c)(1)(B).

85. *Id.*

86. EAGLE & HSU, *supra* note 34, at 150.

One legal guard the ESA creates is section seven of the Act.[87] Section seven requires that before a federal agency may act, it must consult with the Secretary to see if their action would interfere with an endangered species, threatened species, or critical habitat.[88] Section seven only applies against the federal government.[89] If the agency accused of a section seven violation fails to consult, the courts can enjoin the parties.[90]

Section nine imposes liability on those who "take" an endangered or threatened species.[91] Federal regulations define a "take" as harming or harassing an endangered or threatened species in a way that significantly affects how the species breed, feed, or maintain their habitat.[92] Section nine applies to all individuals subject to jurisdiction within the United States.[93] Criminal and civil penalties are the ESA's main enforcement mechanisms.[94]

Sections seven and nine provide some measures to create liability for escape, but a better option is using strict liability.[95] Section seven would enjoin the process too early by ending the construction of a facility through attack of its federal permits.[96] Banning aquaculture prevents environmental harms, however proper regulations can mitigate the harms presented by aquaculture while maintaining its benefits.[97]

Section nine should be the solution to the escape problem. Bringing disease into a species' critical habitat has been grounds for a "take" in the past.[98] The sea lice infestations that follow escape events could be sufficient to sustain a section nine cause of action.[99] Sadly, there is also a hole in this net as well; the Secretary is allowed to permit incidental takes if an applicant applies for a permit and meets the criteria in the ESA.[100] This permit would absolve aquaculture facilities of liability if their fish escape.[101] No matter the administrative hoops a facility jumps

87. 16 U.S.C. §§ 1532, 1536.

88. *Id.* §§ 1536(a)(2), 2802 (the "Secretary" in question is the same as the ones listed for the aquaculture statute, Commerce, Agriculture, and Interior).

89. *See id.*

90. *See generally* Tenn. Valley Auth. v. Hill, 437 U.S. 153, 153 (1978).

91. 16 U.S.C. § 1538 (a)(1)(B)–(C), (G).

92. *Id.* § 1532(19); 50 C.F.R. § 17.3 (2024).

93. 16 U.S.C. § 1538(a)(1).

94. *See id.* § 1540(a)–(b).

95. *See generally id.* §§ 1536(a), 1538(c).

96. *Id.* § 1536(a)(3).

97. *See* discussion *supra* Part II.

98. *See* Greenpeace Found v. Mineta, 122 F. Supp. 2d 1123, 1136 (D. Haw. 2000).

99. Osterloff, *supra* note 57.

100. 16 U.S.C. § 1539(a).

101. *See generally id*.

through, their operation poses environmental risks, so this hole in the liability net cannot remain open.

Enforcement provisions in the ESA are insufficient as well. Civil penalties are discretionary under the ESA.[102] The strict liability standard is better than a discretionary civil penalty because no matter an aquaculture operator's intentions, the release of invasive or disease-carrying fish will harm the environment.[103] Criminal penalties, while not discretionary, open operators up to being put in jail for a year for violating the ESA.[104] One year in jail is way too harsh a punishment. The goal of the punishments suggested by this Essay is to make people liable for the escapes that occur under their watch and have them clean up their messes.

The ESA is also enforceable through citizen suits.[105] Sadly, ESA citizen suits occur very infrequently; therefore, they would not be a viable protection in this context.[106] There were 76 citizen suits under the ESA from 2001–2016.[107] Citizen suits can be a valuable tool to protect the environment, but they cannot stand alone against aquaculture escape. Imposing strict liability on escape events would hold facilities liable for escapes absent the whim of a citizen who decides that they will bring suit. Reliance on the public to enforce environmental protection is not a sound policy.

While a beneficial tool for establishing some liability, the ESA leaves too many holes in the aquaculture escape regulation net. All the regulating agencies must work together to close those holes under a clear legislative directive. This Essay will now demonstrate how regulators can mend these holes.

IV. CLOSING THE HOLES IN THE NET

None of the goals proposed in this Essay are achievable without explicit congressional authorization. Legislation of this nature must create an exemption from consistency review under the CZMA to ensure the agencies tasked with enacting this legislation can operate through a uniform policy without state interference. The CAA and CERCLA should be the models for this new aquaculture escape legislation for several reasons. First, CERCLA has mandatory reporting requirements.[108] These requirements are necessary for aquaculture

102. *Id.* § 1540(a)(1) ("Any person who knowingly violates . . . *may* be assessed a civil penalty by the Secretary . . . .") (emphasis added).

103. *See* discussion *infra* Section IV.D.

104. 16 U.S.C. § 1540(b)(1).

105. *Id.* § 1540(g).

106. David E. Adelman & Robert L. Glicksman, *The Limits of Citizen Environmental Litigation*, NAT. RES. & ENV'T., Spring 2019, at 17, 19.

107. *Id.*

108. 42 U.S.C. § 9603.

because the agencies charged with protecting the marine environment can only begin remediating releases if they know they occur. Second, the technology standards of the CAA would help prevent aquaculture escape.[109] Imposing enforceable technology standards against aquaculture facilities would require them to maintain their facilities, ideally stopping releases before they happen. Third, the strict liability framework from CERCLA would hold facilities accountable for the damage they cause to the environment.[110] Finally, a nondiscretionary civil penalty for violations of this new act would be proportional to the harm caused by aquaculture escape. Imposing these four programs in the aquaculture industry will reduce escapes and create a trust for cleanup efforts. This Essay will examine each of these concepts in turn.

A. Congressional Action

Congressional action can guard against court crack-down on regulations and can guide all the actors that enforce aquaculture escape. Courts are starting to reign in agency power.[111] Putting aside arguments of whether *Chevron* deference should exist, the government must take decisive action to mitigate the harms caused by aquaculture escape.[112] This program must start at a higher level than the agencies. Congress needs to adhere to the doctrines laid out by the court and play ball.[113] Explicit congressional action implementing an aquaculture regulation scheme that is modeled from pollution laws is necessary to survive this shift in jurisprudence and protect the environment. For this plan to work, one of the requirements of this legislation will be a carve-out from the CZMA's consistency review.[114]

The CZMA's consistency review would make administering one cohesive aquaculture scheme quite tricky. Aquaculture will affect state coastal zones through fisheries management and commercial development of the zone.[115] Aquaculture pens are developed as a part of a business model to grow and sell fish commercially.[116] Additionally, the escape problem could affect local fisheries as

109. *See Summary of the Clean Air Act*, U.S. ENV'T. PROT. AGENCY (Sept. 6, 2023), https://www.epa.gov/laws-regulations/summary-clean-air-act [https://perma.cc/9XFR-3D7N].

110. *See* 42 U.S.C. § 9603.

111. Nathan D. Richardson, *Deference is Dead, Long Live Chevron,* 73 RUTGERS U. L. REV. 441, 453 (2021) (discussing how the courts are eroding the *Chevron* doctrine); Gulf Fishermen's Ass'n v. Nat'l. Marine Fisheries Serv., 968 F.3d 454, 460 (5th Cir. 2020).

112. *Farmed Salmon Escapes*, *supra* note 16.

113. *See Gulf Fishermen's Ass'n.*, 968 F.3d at 460; *see also* Griffin, *supra* note 78.

114. *See* 16 U.S.C. § 1456.

115. 16 U.S.C. § 1452(2)(D) (congress made a finding stating the CZMA contemplates fisheries management and commercial development).

116. *See* McVeigh, *supra* note 1.

well due to the environmental harm the escaped fish can cause.[117] Under current law, the CZMA would require that permitting or other agency action taken in furtherance of an aquaculture program be consistent with the state's coastal zone management plan for the state in which each facility resides.[118]

While consistency review is important to protect a state's right to manage its coastal zone, escaped fish will not stop at state lines. If aquaculture regulators must undertake multiple consistency reviews for each state with an aquaculture program, they cannot operate one cohesive program. The program would undergo 29 consistency reviews, each of which could come out differently.[119] This could leave regulators left to manage almost 30 different aquaculture schemes.[120]

Alternatively, aquaculture regulators could decide their program is consistent with all the state programs, or the President could declare aquaculture escape prevention to be in the paramount interest of the United States.[121] Both actions could trigger the Administrative Procedure Act's arbitrary and capricious review if a state challenges these actions.[122] Putting these actions through a court hearing will only delay its implementation with no finite timeline for a solution.[123] Also, remember that courts are growing more skeptical of agency actions.[124] Federal overrides will be another point where the judiciary can strike down actions taken to prevent escape.[125] Federal legislation that exempts consistency review is

117. *Id.*

118. EAGLE & HSU, *supra* note 34, at 691 (29 states are participating in the CMZA, including all of the coastal states except Alaska).

119. *See id.*

120. *See id.* at 691, 699.

121. *See* REGUL. EFFICIENCY TASK FORCE, NAT'L SCI. & TECH. COUNCIL SUBCOMM. ON AQUACULTURE, PROGRESS TOWARDS THE NAT'L STRATEGIC PLAN TO ENHANCE REGUL. EFFICIENCY IN AQUACULTURE 14 (2023), https://www.ars.usda.gov/sca/Task%20Forces%20and%20Working%20Groups/Regulatory/2023%20NSTC%20Subcomittee%20on%20Aquaculture%20Reg%20Efficiency%20Plan%20Progress%20Report_2022.pdf [https://perma.cc/MLN6-ZPSF].

122. *See* 16 U.S.C. § 1456(c); 5 U.S.C. § 706.

123. *See* Paul M. Coppola, *Why Does a Lawsuit Take So Long*, THE NAT'L LAW REV. (Jan. 11, 2023), https://natlawreview.com/article/why-does-lawsuit-take-so-long [https://perma.cc/7FB9-AGLM] ("There is simply no way to accurately calculate the amount of time it takes for a civil lawsuit to ultimately resolve . . . . The system isn't perfect. But it does afford citizens a chance for justice – even if it is delayed.").

124. Eric Katz, *Supreme Court Appears Ready to End Deference to Federal Agency Expertise*, GOV'T EXEC. (Jan. 17, 2024), https://www.govexec.com/management/2024/01/supreme-court-appears-ready-end-deference-federal-agency-expertise/393404/ [https://perma.cc/34TR-ANGV].

125. *See generally* Sackett v. EPA, 598 U.S. 651 (2023).

necessary to implement a clear, consistent program for aquaculture regulation without evoking the ire of the states or courts.[126]

In sum, the many actors in play during modern-day aquaculture governance make regulation in this area tricky.[127] That issue, coupled with the court system's desire to reduce the deference given to agencies, will make any direct agency action impossible without federal legislation.[128] There is one thing that the *Gulf Fisherman Association* case got right: "[i]f anyone is to . . . reach aquaculture for the first time, it must be Congress."[129] Congress should start this program with a reporting requirement for facilities that release their fish into the environment.[130]

B. Mandatory Reporting

These escaped fish can kill native species, compete with them for the same resources, and introduce new diseases to the area.[131] If the environmental impact is not bad enough, releases also generally lead to severe economic impacts.[132] The first step in instituting this regulation scheme is a mandatory reporting requirement. A mandatory aquaculture escape reporting requirement is necessary for the same reasons the CERCLA reporting requirements are necessary.[133] The government can only begin mitigating a release if it has knowledge of when they occur, and the public has a right to know about releases.[134] This Essay will demonstrate the similarities between the Scottish aquaculture reporting requirements and the CERCLA reporting system to demonstrate how effective an American aquaculture reporting requirement can be.

126. *See* AQUAA Act, H.R. 4013, 118th Cong. § 101 (2023).

127. *See id.* § 406(b).

128. Katz, *supra* note 124.

129. Gulf Fishermen's Ass'n v. Nat'l. Marine Fisheries Serv., 968 F.3d 454, 456 (5th Cir. 2020).

130. *See id.*

131. *What is an Invasive Species?,* NAT'L OCEAN SERV. (Jan. 18, 2024), https://oceanservice.noaa.gov/facts/invasive.html#:~:text=Invasive%20species%20are%20capable%20of,coastal%20and%20Great%20Lakes%20ecosystems [https://perma.cc/7PYY-56YU]; McVeigh, *supra* note 1.

132. McVeigh, *supra* note 1.

133. *See* 42 U.S.C. § 9603.

134. *Emergency Release Notifications*, U.S. ENV'T. PROT. AGENCY (Nov. 13, 2023), https://www.epa.gov/epcra/emergency-release-notifications [https://perma.cc/Q4VX-DX8M]; *Emergency Planning and Community Right to Know Act (EPCRA)*, U.S. ENV'T. PROT. AGENCY (June 4, 2024) [hereinafter *EPCRA*], https://www.epa.gov/epcra [https://perma.cc/5NYZ-9SDB] (the Emergency Planning and Community Right to Know Act was enacted concurrent with a CERCLA amendment in 1986, so the two statutes work together).

The Scottish government created a guidance document for their fish farms on reporting escapes.[135] They assert that reporting escapes is necessary so they can assist with recovery efforts and inform local fisheries of the escape.[136] Both the Scottish and the CERCLA schemes contemplate the importance of response action taken from the relevant government authority and the necessity of having this information to respond adequately.[137] In both the pollution response and the aquaculture escape context, the relevant regulatory body cannot fix the problems caused by a release without adequate information. How can we expect the EPA to clean up a site they do not know exists? How could NMFS or Marine Scotland start monitoring and mitigating aquaculture escape without knowing an escape has happened?

Mandatory reporting is essential in the United States' aquaculture regulation scheme. The massive coordination between all the federal and state entities that the USDA undertakes cannot function if the federal government does not know about aquaculture escapes. Information is king in the regulatory space, and a mandatory reporting requirement for aquaculture escapes will give all the relevant agencies the knowledge necessary to rule the aquaculture space and protect the marine environment from escapes.

The EPA's and Scottish reporting requirements also contemplate the affected community's right to know about these potential hazards.[138] In the pollution context, the reason communities need to know about hazardous waste spills is apparent: there is a significant risk of people getting sick or dying from these releases.[139] In the aquaculture context, their livelihoods would suffer.

Sea lice are a common problem in aquaculture facilities that can result in fish die-offs or render fish stock unmarketable.[140] When infected fish escape, the facilities cannot treat for sea lice anymore, leading to the spread of sea lice to local fisheries.[141] Rendering local fish unmarketable due to lesions and massive fish die-offs will limit the amount of fish local fishermen can catch and sell at market.[142] Without a reporting requirement, a sea lice plague from an aquaculture escape will

135. *See* MARINE SCOTLAND, WHAT TO DO IN THE EVENT OF AN ESCAPE OF FISH FROM A FISH FARM (2018) [https://perma.cc/C64H-9QEB].

136. *Id.* at 3.

137. *Id.*; *Emergency Release Notifications*, *supra* note 134.

138. *EPCRA*, *supra* note 134.

139. *What is EPCRA?*, U.S. ENV'T. PROT. AGENCY (Mar. 19, 2024), https://www.epa.gov/epcra/what-epcra [https://perma.cc/RC3S-ARPR] (discussing the disaster in India that killed or injured 2,000 people).

140. Osterloff, *supra* note 57.

141. McVeigh, *supra* note 1.

142. *Id.*

blindside these local industries.[143] The local communities would be able to prepare to weather this plague, and they would suffer less than they otherwise would, if they received notice from an agency or the aquaculture industry.[144] Creating a reporting requirement that mirrors the CERCLA scheme will allow these communities to improvise, adapt, and overcome the adverse effects of aquaculture escape. Ideally, there would be no need to have a reporting requirement because the fish would stay in their pens. Alas, the technology is not up to par with that goal yet, but it could be with a proper technological standard.

C. Technology Standards

CAA technology standards do not impose a required technology, but instead require major sources of pollution to use the best available control technology.[145] The beauty of the CAA's standards is its flexibility.[146] This flexibility allows the industry to determine how best to achieve their reductions in air pollution, which allows them to reduce the cost of compliance.[147] EPA reports that its imposition of technology standards caused innovations in the pollution control devices used in facilities regulated by the CAA.[148] They also report that these standards created thousands of jobs in the environmental protection industry.[149] This Essay will now advocate for the implementation of these standards in the aquaculture context, and tackle the cost-benefit analysis problem.

Imposing technology standards upon aquaculture facilities would go a long way in preventing environmental catastrophes through escapes. Studies have shown that most escapes are traceable to technological factors, like the net going under the water or holes remaining in the net.[150] Furthermore, public complaints about aquaculture facilities stem from the types of enclosures used for fish pens.[151] Imposition of a technology standard on aquaculture facilities will directly regulate

143. *See id.*

144. *See id.*

145. *Summary of the Clean Air Act*, *supra* note 109.

146. *Building Flexibility with Accountability into Clean Air Programs*, *supra* note 6.

147. *Id.*

148. *Progress Cleaning the Air and Improving People's Health*, U.S. ENV'T. PROT. AGENCY (Apr. 30, 2024), https://www.epa.gov/clean-air-act-overview/progress-cleaning-air-and-improving-peoples-health#clean [https://perma.cc/2NX4-GEV5].

149. *The Clean Air Act and the Economy*, U.S. ENV'T. PROT. AGENCY (Jan. 16, 2024) [hereinafter *CAA & Economy*], https://www.epa.gov/clean-air-act-overview/clean-air-act-and-economy#safeguard [https://perma.cc/C794-GTMU].

150. Føre & Thorvaldsen, *supra* note 40, at 4.

151. McVeigh, *supra* note 1.

a significant cause of fish escape, while simultaneously addressing public outcry against certain types of aquaculture.[152]

Aquaculture facilities would reap the same benefits as major sources of air pollution by instituting this flexible technology program.[153] Facilities could determine what works best for them while creating jobs to implement their new technology. Furthermore, by not locking the facilities into a specific type of technology, the aquaculture industry will have incentives to increase the quality of the technology while reducing its costs.

Granted, comparing air pollutants to fish is like comparing apples to airplanes, but the human factor remains the same. Businesses must comply with these technological standards. Forced compliance on a best available control technology or other enforceable standard allows facilities that want to keep their costs down to innovate. Innovation will create new jobs in the maintenance and creation of these new technologies.[154] The human factors of ingenuity and creativity, bolstered by the desire to reduce costs, do not change. Technology standards will improve the aquaculture industry by creating jobs, improving the enclosures, and generating better control technologies.

Many of the technology standards endorsed by the CAA undergo a cost-benefit analysis.[155] Scholars fear that analyses of this nature result in amorphous inferences by analysts.[156] The scholars then argue inferences of this nature can lead to overregulation.[157] In this context, though, overregulation will not be the case. Consider this example: there is a new cutting-edge technology that would improve aquaculture containment by a considerable amount; however, it would not fall within current aquaculture technology standards. A stringent technology standard that cannot undertake this cost-benefit analysis would lead to a more substantial overregulation problem. Anytime the industry innovates, it will have to wait for the agency to catch up before it can implement this new technology. What industry would want to spend time and money on researching better alternatives for their problems if they cannot implement them?[158] Forgoing an analysis on whether a

152. *Id.*

153. *See Building Flexibility with Accountability into Clean Air Programs*, *supra* note 6.

154. *CAA & Economy*, *supra* note 149 (discussing the U.S. Environmental Economy industry).

155. JAMES E. MCCARTHY & RICHARD K. LATTANZINO, CONG. RSCH. SERV., R44840, COST AND BENEFIT CONSIDERATIONS IN CLEAN AIR ACT REGULATIONS 2 (2017), https://crsreports.congress.gov/product/pdf/R/R44840/4 [https://perma.cc/TYD8-KQ7V].

156. Sidney A. Shapiro & Christopher H. Schroeder, *Beyond Cost-Benefit Analysis: A Pragmatic Reorientation*, 32 HARV. ENV'T L. REV. 433, 446 (2008) (discussing malleability in cost-benefit analyses).

157. *Id.* at 452.

158. *See generally* Mezzapelle, *supra* note 29.

new technology can be a cost-effective standard for the industry would lead to overregulation of aquaculture, reduce incentives to innovate, and prevent escape-reducing technologies from developing.[159]

Even the best technology can grow old. For example, an iPhone has more computing power than the Apollo 11 rocket.[160] A flexible technology standard will allow the escape-prevention technology to evolve over time. However, the risk of escape will never be zero. How should this new federal legislation handle the inevitable escape of fish? The best way to close this hole in the net is strict liability. Harm will always follow escapes, and someone must pay for it; as discussed below, the facilities themselves should pay for the escapes that happen under their watch.

D. Strict Liability

A simple way to sum up the logic of CERCLA is an adage most people heard when they were little: clean up your toys when you finish playing with them. CERCLA's purpose of requiring polluters to clean up after themselves aligns nicely with the requirements this Essay proposes be placed on aquaculture.[161] When aquaculture facilities are involved with a release, they should help clean up their toys (the fish). This Essay will explore the value of a strict liability system applied to aquaculture escapes and why the aquaculture context escapes the pitfalls associated with the CERCLA strict liability scheme.

"Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 . . . in response to a growing desire for the federal government to ensure the cleanup of the nation's most contaminated sites to protect the public from potential harm."[162] This logic is the same across pollution and aquaculture. No matter the intent behind a release or the actions of someone responsible for maintaining proper containment of hazardous substances or fish pens, once they get out into the environment, they will wreak havoc upon that ecosystem and endanger people.[163] People, corporations, or whoever is

159. *See generally* Shapiro & Schroeder, *supra* note 156, at 480–81.

160. Tibi Puiu, *Your Smartphone is Millions of Times More Powerful than the Apollo 11 Guidance Computers*, ZME SCI. (May 11, 2023), https://www.zmescience.com/feature-post/technology-articles/computer-science/smartphone-power-compared-to-apollo-432/ [https://perma.cc/5LZ4-WEFA].

161. *See generally* DAVID M. BEARDEN, CONG. RSCH. SERV., R41039, COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT: A SUMMARY OF SUPERFUND CLEANUP AUTHORITIES AND RELATED PROVISIONS OF THE ACT i (2012), https://crsreports.congress.gov/product/pdf/R/R41039 [https://perma.cc/5Q2V-HLHX].

162. *Id.*

163. *See generally* Ted Scouten, *First Identified 30 Years Ago, Concern Grows Over Contaminated Soil at Broward School*, CBS NEWS MIAMI (Mar. 30, 2023, 5:21 PM),

responsible for releasing harm into the environment should also be required to clean it up.

By regulating the human factor, a strict liability scheme can act where technological standards cannot. Studies have found that organizational and human factors also led to many escapes.[164] These factors generally include insufficient training, poor planning, and incompetence.[165] Strict liability will incentivize operators to address these systemic issues in aquaculture operation.[166] Meeting the minimum duty of care would not protect operators from paying for escapes as they would be on the hook no matter what.[167] Properly training their staff would reduce the chance they have to pay for these escape incidents and protect the environment at the same time.

Strict liability can cause unease; congressional representatives debated the level of liability that CERCLA should have between the Senate and House Bills.[168] The House wanted to attribute liability to those who caused or contributed to the pollution event, while the Senate elected to identify responsible parties who would be liable immediately upon release.[169] Some scholars discredit CERCLA's liability scheme by saying that the concepts of responsibility and causation are too connected to be readily separated.[170]

CERCLA's causation factor comes in with its defenses, allocation, and definitions of the responsible parties themselves.[171] CERCLA does not wholly disregard the idea of causation; this liability scheme recognizes that someone must be responsible for cleaning up messes caused by releases.[172] Who is better to be responsible than the people using and storing these chemicals? Polluters played with their toys, and now, when it comes to cleanup time, they cannot escape their responsibility to do so.

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https://www.cbsnews.com/miami/news/first-identified-30-years-ago-concern-grows-over-contaminated-soil-at-broward-school/ [https://perma.cc/8VSY-4M5T]; McVeigh, *supra* note 1.

164. Føre & Thorvaldsen, *supra* note 40, at 6.

165. *Id.*

166. Roy Andrew Partain, *The Application of Civil Liability for the Risks of Offshore Methane Hydrates*, 26 FORDHAM ENV'T. L. REV. 219, 311 (2015).

167. *See id.*

168. John Copeland Nagle, *CERCLA, Causation and Responsibility*, 78 MINN. L. REV. 1493, 1493–94 (1994).

169. *Id.*

170. *Id.* at 1525.

171. *Id.* at 1525–26.

172. *Id.* at 1509.

Scholars also suggest that there are too many actors to assert responsibility accurately for a release in many instances.[173] They suggest that the joint and several liability concept articulated in *Summers v. Tice* cannot adequately cover CERCLA releases because of the sheer number of actors that can be responsible for a release.[174] This is a blatant mischaracterization of *Summers.* The whole point of that case is to let tortfeasors solve the causation problem on their own without preventing redress for the plaintiff.[175]

> The real reason for the rule that each joint tortfeasor is responsible for the whole damage is the practical unfairness of denying the injured person redress simply because he cannot prove how much damage each did, when it is certain that between them they did all; *let them be the ones to apportion it among themselves*.[176]

CERCLA's strict liability and this new aquaculture escape liability go together.[177] Someone must be immediately liable for releasing farmed fish into the environment. Finger-pointing between all the potentially responsible parties will not clean up the fish quickly. Letting potentially responsible parties spend time debating who pays for what percentage of the escape before a payout occurs will only delay the response units from remediating these harmful releases. Alternatively, holding all actors instantly liable will provide the capital to start cleaning up their toys that are destroying the environment. Let violators figure out who owes who after the responsible parties address the environmental harm they caused.[178]

Strict liability will hold people accountable no matter their intent, but what does liability look like in this context?[179] A new superfund aimed at aquaculture cleanup would be the most helpful way to use the funds acquired from these strictly liable parties.

173. *Id.* at 1500.

174. *See generally* Summers v. Tice, 199 P.2d 1 (Cal. 1948) (discussing the classic tort case where two hunters shot at a plaintiff simultaneously. No one could identify who struck the plaintiff, so both defendants were held jointly and severally liable absent a showing of which one of them caused the injury at issue).

175. *Id.* at 3–4.

176. *Id.* (emphasis added).

177. *See* 42 U.S.C. § 9607(a).

178. *See Summers*, 199 P.2d at 1, 3–4.

179. *See* 42 U.S.C. § 9607(b).

E. A New Superfund

In a perfect world, technology standards and strict liability will drive the industry to never let an escape happen, and the living pollutant will never pose a risk to the environment again. However, our society is not a perfect world, and there remains one final question: what punishment should violators face when an escape happens under their watch? In the final chapter of the fishy business of aquaculture regulation, this Essay will discuss why a nondiscretionary monetary penalty for escape incidents should be a punishment.

Utilitarianism means a punishment should be forward-looking and centered around providing a societal benefit.[180] A civil penalty matches this punishment philosophy perfectly. The new superfund aims to ensure these penalties result in communities having shores free of invasive species without those communities shelling out funds because of someone else's operations. Utilitarian theorists advocate for punishments to be proportional to the offense.[181] Minimum and maximum punishments are often suggested as necessary requirements of the proportionality principle.[182] The minimum should be enough to deter actors from committing an act.[183] Maximum punishments should fall considerably short of torture.[184]

Tailoring aquaculture escape punishments like this will hold people accountable for the messes they cause without scaring away new aquaculture operations. Criminal law can allow some leeway in determining the most appropriate penalties. Criminal law penalties are designed to deter all crime.[185] This Essay aims to reduce escapes, not stop United States aquaculture altogether. Erring on the side of a minimum punishment would reduce the risk of escapes without stopping aquaculture in the United States. A minimum punishment cannot be less than the cleanup costs.[186] Otherwise, deterrence from escapes would not be effective as it would be cheaper to pay the fine than clean up the mess.

Charging aquaculture facilities the amount it takes to remediate their harm is not enough alone. The government must hold the funds collected in trust for the cleanup efforts. The CERCLA Superfund specifically requires money collected for

180. JENS DAVID OHLIN, CRIMINAL LAW: DOCTRINE, APPLICATION, AND PRACTICE 25 (2d ed. 2018).

181. Alice Ristroph, *Proportionality as a Principle of Limited Government*, 55 DUKE L. J. 263, 272 (2005).

182. *Id.* at 271

183. *Id.* at 273.

184. *Id.*

185. OHLIN, *supra* note 180, at 25.

186. *See* Ristroph, *supra* note 181, at 273.

violations of CERCLA to go into the fund.[187] Granting agencies the discretion to use the funds as they see fit would not match a utilitarian principle as nicely as a requirement to use it for cleanup. Indeed, no matter where agencies spend the money, it would benefit society somehow, but a requirement to spend it on cleanup would provide maximum societal benefit. Any funds paid by violators would go directly to fixing the harm they caused; therefore, it is a proportional punishment.

Calculating the cost of environmental harm can be an arduous task. There is no market value for a specific endangered species or critical habitat.[188] Economists can calculate these costs through a process called "contingent valuation."[189] The process involves a series of hypothetical scenarios where participants answer how much money they would pay to protect or repair the environment.[190] Opponents argue this method is not empirical enough to ascertain a correct evaluation.[191] The method is not perfect, granted; however, it is flexible.[192] A rigid, empirical penalty would not adequately compensate for the difference between an escape near Key West and Washington state, the environments are simply too different. Environmental regulations need to be flexible to account for the different environments they need to protect.[193] In a similar vein, the penalties assessed need to be flexible as well, and the best way to do that is through contingent valuation. A new superfund, funded by strictly liable aquaculture facilities that must comply with reporting and technology requirements, is necessary to help realize the benefits aquaculture brings without incurring the harms they could cause.

V. CONCLUSION

Congress needs to take decisive action to prevent aquaculture escape. All the state and federal actors need clear direction when implementing their anti-escape policies, and federal legislation will provide that direction. Reliance on the ESA is not feasible because of the holes it leaves in the net through its enforcement procedures and incidental take permits. Mandatory reporting requirements are a must because communities have a right to know when harmful species invade their

187. 26 U.S.C. § 9507(b).

188. *See generally* Pamela C. Jones, *Contingent Valuation*, BRITANNICA MONEY (Mar. 29, 2024, 7:35 AM), https://www.britannica.com/money/contingent-valuation [https://perma.cc/2LN7-UV2H].

189. *Id.*

190. *Id.*

191. *Id.*

192. *Id.*

193. EAGLE & HSU, *supra* note 34, at 175 (citing Babbit v. Sweet Home Chapter of Comtys. for a Great Or., 515 U.S. 687 (1995)) (discussing the need for broad environmental regulations in the context of the ESA).

coastal lands, and the agencies in charge of cleanup can only start to do so once they know there has been an escape. A malleable technology standard will ensure that the aquaculture industry increases its security while allowing room for the industry to innovate. No matter the intentions of an aquaculture facility, once their fish escape, there will be environmental devastation, so they must clean up their mess. Lastly, directing the penalties assessed for violating this new act to a superfund would be the most utilitarian punishment for the industry. The living pollutant is straining against its nets to escape into the environment. Congress can turn the tide by implementing pollution law logic in the context of aquaculture escape.