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Maine Aquaculture, Atlantic Salmon, and Inertia: What is the Future for Maine's Net Pen Salmon Industry?

by

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MAINE AQUACULTURE, ATLANTIC SALMON, AND INERTIA: WHAT IS THE FUTURE FOR MAINE'S NET PEN SALMON INDUSTRY?

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Abstract: The Environmental Protection Agency (EPA) has for years failed to create regulations that would govern discharges from aquaculture facilities under the Clean Water Act (CWA). As recent cases from Maine have shown, this failure caused salmon producing aquaculture companies to do very little to reduce the effluent they released directly into the Atlantic. Under the Clean Water Act, however, such polluting is prohibited. Furthermore, under the Endangered Species Act (ESA), additional regulations probably would be imposed on these companies to protect the endangered wild Atlantic salmon that inhabit the rivers and ocean near these facilities. Recent regulations proposed by EPA, however, are probably not stringent enough to meet the statutory requirements of either the CWA or the ESA. While the cleanliness of our waters and the diversity of species should be maintained at the least, these goals can hopefully be reconciled with the growth of an important part of the local and national economy.

INTRODUCTION

On September 12, 2002, the U.S. Environmental Protection Agency (EPA) proposed "effluent limitations guidelines and standards for wastewater discharges from the concentrated aquatic animal production [facility (CAAPF)] industrial point source category."[1] These guidelines would cover both new and existing facilities and would be the first actual technology-based standards promulgated for such facilities.[2]

While "all point sources other than publicly owned treatment works were to have achieved effluent limitations that require applica-

* Managing Editor, BOSTON COLLEGE ENVIRONMENTAL AFFAIRS LAW REVIEW 2003–04.

[1] Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. 57,872, 57,872 (proposed Sept. 12, 2002) (to be codified at 40 C.F.R. pt. 451).

[2] *Id.*

tion of the 'best practicable control technology'" by July 1, 1977,[3] no standards regulating effluent from the aquatic animal production industry had even been proposed before the summer of 2002.[4] EPA contends that in the early 1970s it completed some background work on the issue, but that progress was halted with the 1977 Clean Water Act Amendments and EPA's decision to concentrate on controlling industries where toxic metals and organic chemical compounds were more prevalent.[5] As EPA's early work with aquatic animal production did not show heavy concentrations of these pollutants, it fell by the wayside.[6]

The absence of effluent guidelines for CAAPFs created problems for aquatic animal production facilities.[7] EPA's Region One office received requests for National Pollutant Discharge Elimination System (NPDES) permits—which should have been based on the nonexistent guidelines—but issued very few permits due to the lack of standards on which to base them.[8] A further problem caused by the lack of effluent guidelines is the lack of any national minimum standards with which permit issuers must comply.[9]

Despite this uncertainty in federal regulation, the aquatic animal production industry has grown rapidly: a 1992 study found that $5.6 billion of the U.S. gross domestic product, along with 181,000 jobs, stemmed from aquaculture.[10] Currently, "there are approximately 4,200 commercial aquatic animal production ... facilities in the United States."[11] These are located in all fifty states, and aquaculture is growing faster than any other form of agriculture in the United States.[12]

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[3] Natural Res. Def. Council, Inc. v. Costle, 568 F.2d 1369, 1373 (D.C. Cir. 1977) (citing 33 U.S.C. § 1311(b)(1)(A) (2000)).

[4] Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,875.

[5] *Id.*

[6] *Id.* EPA contends that the earlier work, which created a draft development document for the aquatic animal production industry, did help to guide National Pollution Discharge Elimination System (NPDES) permitting when confronted with a permit application from a CAAPF. *Id.*

[7] *See* REBECCA GOLDBURG & TRACY TRIPLETT, ENVTL. DEF. FUND, MURKY WATERS: ENVIRONMENTAL EFFECTS OF AQUACULTURE IN THE US 108 (1997), http://www.environmentaldefense.org/documents/490_AQUA.pdf (last visited Apr. 20, 2004).

[8] *Id.*

[9] *See id.*

[10] *Id.* at 96.

[11] Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,876 (citing to the 1998 U.S. Department of Agriculture's Census of Aquaculture).

[12] GOLDBURG & TRIPLETT, *supra* note 7, at 21. "[D]omestic aquaculture production still makes up only 10–15% of the total U.S. seafood supply," however; the rest comes from

EPA believes that many of these facilities already have pollution reduction technology in place even without minimum federal effluent guidelines.[13] The new restrictions proposed by EPA are intended to go further and would reduce suspended solids released by all types of CAAPFs "by at least 4.1 million pounds per year," leading to a reduction in the "discharge of biochemical oxygen demand (BOD)[14] and nutrients by at least 8.7 million pounds per year."[15] This reduction comes at a relatively low cost.[16] Furthermore, six states have already cited the aquatic animal production industry as a possible cause of poor water quality, and other states have moved to regulate the facilities.[17]

In its proposed rule, EPA listed multiple aquaculture production systems, including the net pen and open water systems, which produce salmon in the coastal waters of Maine.[18] Net pen systems generally consist of two nets, one on the interior to keep fish in, while the exterior net serves to keep predators at bay.[19] They are anchored to the sea floor and suspended from the surface with a floatation struc-

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wild-caught fish from the United States and imports. *Id.* A more recent study states that the U.S. aquaculture industry is worth about $1 billion per year; it does not, however, state if it is taking into account as many related aspects of the industry as the above study did. REBECCA J. GOLDBURG ET AL., PEW OCEANS COMM'N, MARINE AQUACULTURE IN THE UNITED STATES: ENVIRONMENTAL IMPACTS AND POLICY OPTIONS, at ii (2001), http://www.pewoceans.org/reports/137PEWAquacultureF.pdf (last visited Apr. 20, 2004). Recent concerns with pollutant levels in farmed fish may be slowing this growth, at least with regard to salmon.

[13] Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,876.

[14] Biological oxygen demand (BOD) is a measure of the concentration of organic material in the water that can be broken down by microorganisms. GOLDBURG & TRIPLETT, *supra* note 7, at 36. A high BOD indicates that the microorganisms would consume most of the oxygen present in the water in breaking down the organic material. *Id.* That consumption of available oxygen then stresses or leads to the death of fish and other organisms that require oxygen. *Id.*

[15] Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,872.

[16] *Id.* ("EPA estimates that compliance with this regulation, as proposed . . . would cost industry an estimated $1.5 million and Federal and State permitting authorities an estimated $3,337 on an annual basis.").

[17] *Id.* at 57,876. Illinois, Louisiana, New Hampshire, New Mexico, North Carolina, Ohio, and Virginia see the aquaculture industry as a "potential or contributing source of impairment to water bodies," *Id.* Idaho, Michigan, and Maine are some of the states that "have set water quality based permit requirements for CAAPFs in addition to technology based limits based on" permit writers' best professional judgment. *Id.* While this Note focuses on aquaculture in Maine, state regulation will not feature prominently in the discussion.

[18] *Id.* at 57,878.

[19] *Id.*

ture; the netting continues above the water to a degree to stop fish from jumping out.[20]

Because of their location in open water, net pens contribute to pollution.[21] They

> take advantage of an existing water body's circulation to wash away wastes and bring fresh water to the animals. Presently, the most common species raised in open water systems are molluscan shellfish ... and salmon that are grown to market size in net pens.... There is considerable interest and research being conducted to raise additional species of fish in net pen systems.[22]

EPA's concerns of feed, diseases, and non-native species arising from net pen aquaculture tend to fall outside of what would be considered traditional pollutants.[23] The amount of feed administered is a substantial issue, as open water facilities do not have a chance to treat or remove it before discharge.[24] Diseases are a concern due to the possibility of infecting local populations, drug treatment and its possible effects through eventual human consumption, and the difficulty of controlling drugs once they are placed in the receiving waters.[25] Finally, non-native species pose the threat of becoming an invasive species that could out-compete local species or introduce new diseases with which native species are unable to contend.[26]

In 2000, the above concerns were magnified when the wild species of Atlantic salmon that inhabited eight of Maine's rivers and other waters was listed as endangered.[27] A dramatic reduction in the numbers of wild Atlantic salmon in Maine's waters led to the listing; diseases spread from farmed salmon, combined with increased competition and genetic dilution from net pen escapees, could harm the remaining, endangered Atlantic salmon.[28]

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[20] *Id.* at 57,878–79.

[21] Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,878.

[22] *Id.*

[23] *Id.* at 57,879.

[24] *Id.* But, as "[f]eed is the most expensive production input for most CAAP facilities ... operators have a financial incentive to minimize excess feed, independent of concerns about water quality." *Id.*

[25] *Id.* Only six drugs are currently approved by the FDA for CAAPF use. *Id.*

[26] *Id.* There is national oversight of the introduction of non-native species, and some states conduct similar monitoring. *Id.*

[27] 50 C.F.R. § 17.11(2002); Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. 69,459, 69,464 (Nov. 17, 2000) (codified at 50 C.F.R. pt. 17.11(h)).

[28] Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. at 69,464.

This Note contends that as currently operating, net pen facilities in Maine are in violation of both the Federal Water Pollution Control Act (Clean Water Act or CWA) and the Endangered Species Act (ESA).[29] Furthermore, this Note argues that the recent, proposed CWA federal effluent guidelines briefly set forth above would serve not only as an extremely low baseline for state regulation, but would also contravene the purposes of the CWA while stifling implementation of the ESA as applied to the endangered, wild Atlantic salmon.

Part I examines the background of this problem and the cases that inspired this Note. Part II deals with the application of the CWA to the current situation in Maine. Part III expands the CWA analysis on which the cases were based and examines the extra layer of regulation and protection of endangered Atlantic salmon that should be added through the application of the ESA. Part IV argues that the proposed standards do not accomplish the purposes of either the CWA or the ESA. The conclusion argues that in order to accomplish the relevant statutory purposes, Maine's permitting procedures must be more stringent than the proposed federal guidelines.

I. Atlantic Salmon, Stolt Sea Farm, and the Historic Lack of Federal Regulation of Marine Aquaculture

On June 17, 2002, the U.S. District Court of Maine entered orders holding that two salmon net pen facilities were point sources and were required to obtain NPDES permits under the CWA.[30] This decision was preceded by more than a decade of uncertainty and agency inaction.[31]

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[29] Other potentially applicable federal laws not discussed in this Note are the Rivers and Harbors Appropriation Act of 1899, the Ocean Dumping Act, the Magnuson Fishery Conservation and Management Act, and the Costal Zone Management Act, among others. *See* Goldburg et al., *supra* note 12, at 21; D. Douglas Hopkins et al., *Open Ocean Aquaculture: An Environmental Critique of Government Regulations and Policies for Open Ocean Aquaculture*, 2 Ocean & Coastal L.J. 235, 240–53 (1997); Melissa Schatzberg, Note, *Salmon Aquaculture in Federal Waters: Shaping Offshore Aquaculture Through the Coastal Zone Management Act*, 55 Stan. L. Rev. 249, 257–60 (2002).

[30] U.S. Pub. Interest Research Group v. Atl. Salmon of Me., LLC, 215 F. Supp. 2d 239, 241 (D. Me. 2002) [*Salmon I*]; U.S. Pub. Interest Research Group v. Stolt Sea Farm, Inc., No. CIV.00-1490B0C, 2002 WL 1552165, at *1 (D. Me. June 17, 2002) (order affirming recommended decision of magistrate judge).

[31] *Salmon I*, 215 F. Supp. 2d at 244–45; U.S. Pub. Interest Research Group v. Stolt Sea Farm, Inc., No. CIV.00-149-B-C, 2002 WL 240386, at *4 (D. Me. Feb. 19, 2002) (recommended decision of magistrate judge).

In 1987, Atlantic Salmon of Maine (Atlantic) and Stolt Sea Farm (Stolt) began their salmon net pen facilities off the coast of Maine.[32] Both operations claim that at that point, EPA did not require them to have permits for their activities.[33] In a July 19, 1989 letter from EPA Region One to the Army Corps of Engineers, however, William Lawless, Director of Water Management Division, stated that "'[u]pon re-evaluating the regulations, we have determined that some of these concentrated aquatic animal production facilities may require a permit under the National Pollutant Discharge Elimination System (NPDES) program.'"[34] EPA reiterated this position in an August 1989 response to a letter of intent to sue EPA for not requiring the salmon farming facilities to have NPDES permits.[35]

It was not until over a year later, in October 1990, that EPA notified Atlantic and Stolt that they were required to have NPDES permits.[36] Both companies responded relatively quickly and submitted NPDES permit applications, but EPA never replied or issued permits.[37] In the intervening years, both Atlantic and Stolt contacted federal and state bodies for assurances that their business operations could continue without NPDES permits, but both were rebuffed.[38] In the fall of 2000, the United States Public Interest Research Group (USPIRG) sued to enjoin production at Atlantic, Stolt, and a third facility for violations of the Clean Water Act—specifically, for discharges from a point source without a NPDES permit.[39]

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[32] *Salmon I*, 215 F. Supp. 2d at 260; *Stolt Sea Farm*, 2002 WL 240386, at *16.

[33] *Salmon I*, 215 F. Supp. 2d at 260; *Stolt Sea Farm*, 2002 WL 240386, at *16.

[34] *Salmon I*, 215 F. Supp. 2d at 244 (quoting letter).

[35] *Id.* at 244–45.

[36] *Salmon I*, 215 F. Supp. 2d at 245; *Stolt Sea Farm*, 2002 WL 240386, at *4.

[37] *Salmon I*, 215 F. Supp. 2d at 245; *Stolt Sea Farm*, 2002 WL 240386, at *4.

[38] Atlantic contacted EPA in 1993 in this regard but received no response. *Salmon I*, 215 F. Supp. 2d at 245. Stolt and the Maine Department of Marine Resources had the following confused correspondence in 1992: Stolt complied with the Department of Marine Resources's request and stated that they "'intend[] to be covered by and will comply with the terms of the general NPDES permit for offshore net pen facilities in the State of Maine,'" but no such permit existed and, moreover Maine had no role in NPDES permit distribution until control was transferred from EPA in January 2001. *Stolt Sea Farm*, 2002 WL 240386, at *4 (quoting Stolt's letter); *see* 33 U.S.C. § 1342(b) (2000) (detailing the procedure and requirements by which states may administer the NPDES permit program).

[39] *Salmon I*, 215 F. Supp. 2d at 245 n.11; *Stolt Sea Farm*, 2002 WL 240386, at *10 n.10. The third facility was Heritage Salmon, which settled with USPIRG before trial. Consent Decree and Order, U.S. Pub. Interest Research Group v. Heritage Salmon, Inc., (D. Me. 2002) (No. 00-150B-C); U.S. PUB. INTEREST RESEARCH GROUP, SETTLEMENT OF ENVIRONMENTAL LAWSUIT POINTS TO NEW DIRECTION FOR SALMON FARMING (2002), http://uspirg.org/uspirgnewsroom.asp?id2=7087&id3=USPIRGnewsroom (last visited Apr. 20, 2004). The terms of the settlement included: (1) a ban on European

The number of operations developed by Atlantic and Stolt since 1987 is significant: Atlantic owns and operates five salmon net pen facilities in Maine's Machias Bay, two in Pleasant Bay, and it owns others; Stolt owns five net pen facilities in Cobscook Bay, two of which operate under a different name.[40] To give some idea of the scale of production involved, Atlantic states that "[o]n any given day, there are 2.3 million salmon in ASM [Atlantic Salmon of Maine]'s pens."[41] Each of Stolt's net pen facilities can have up to twenty-eight pens, with 5000 to 16,000 salmon in each, allowing for a stock potentially equal to Atlantic's.[42]

II. The Application of the Clean Water Act in the Absence of Permits and Standards

In passing the CWA, Congress set out as its goal "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters,"[43] and recognized that states play a large role in

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and genetically modified salmon; (2) an agreement to take strong measures against fish escapes; (3) compliance with federal fish-marking requirements; (4) fallowing of net pen sites to reduce disease and cumulative pollution impacts; (5) a ban on experimental drug use without review; and (6) a moratorium on expansion into Penobscot Bay. U.S. Pub. Interest Research Group, Settlement of Environmental Lawsuit Points to New Direction for Salmon Farming (2002), http://uspirg.org/uspirgnewsroom.asp?id2=7087&id3=USPIRGnewsroom& (last visited Apr. 20, 2004). Part of Heritage's impetus to settle reportedly stemmed from the fact that they had not put the same effort into obtaining permits that Atlantic and Stolt had, albeit unsuccessfully, and thus did not view its chances at trial as good. Interview with David A. Nicholas, Senior Attorney, and Joseph J. Mann, Staff Attorney, National Environmental Law Center, in Boston, Mass. (Apr. 18, 2003) [hereinafter Interview]. Heritage may have been wiser than the other companies sued, however, as the magistrate judge's recommended decision for Heritage tracked those submitted for Atlantic and Stolt almost word for word. *Compare* U.S. Pub. Interest Research Group v. Heritage Salmon, Inc., No. CIV.00-150-B-C, 2002 WL 240440 *passim* (D. Me. Feb. 19, 2002) (recommended decision of magistrate judge), *with Salmon I*, 215 F. Supp. 2d 239 *passim*, *and Stolt Sea Farm*, 2002 WL 240386 *passim*. The magistrate's recommendation for Stolt was affirmed, while the recommendation for Atlantic appears to have been appended verbatim to the trial judge's decision. *Stolt Sea Farm*, 2002 WL 1552165, at *1. *Compare Salmon I*, 215 F. Supp. 2d *passim*, *with Stolt Sea Farm*, 2002 WL 240386 *passim*. Whether Heritage chose the wiser option is an undercurrent in this Note.

[40] *Salmon I*, 215 F. Supp. 2d at 242; *Stolt Sea Farm*, 2002 WL 240386, at *1.

[41] Atl. Salmon of Me., Salmon Farming and the Environment: Environmental Impact Fact Sheet, *at* http://www.majesticsalmon.com/facts_ei.html (last visited Apr. 20, 2004).

[42] *Stolt Sea Farm*, 2002 WL 240386, at *2.

[43] 33 U.S.C. § 1251(a) (2000).

this.[44] To achieve this goal, the CWA states that "the discharge of any pollutant by any person shall be unlawful."[45] The exemption from the above rule is found in § 1342.[46] Under this section "the Administrator may, after opportunity for public hearing, issue a permit for the discharge of any pollutant, or combination of pollutants, notwithstanding section 1311(a) of this title," and on condition that certain requirements are met.[47] As explained above, however, neither Atlantic nor Stolt ever received a permit to discharge pollutants.[48]

Simply put, "the discharge of any pollutant without an NPDES permit is an unlawful act under § 1311(a)."[49] Without a NPDES permit, liability under the CWA is determined by "the discharge of any pollutant by any person."[50] Discharge of a pollutant is defined in the CWA as "(A) any addition of any pollutant to navigable waters from any point source," or "(B) 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."[51] This definition has been refined to a simple program requiring that "five elements must be present: (1) a *pollutant* must be (2) *added* (3) *to navigable waters* (4) *from* (5) a *point source.*"[52]

A. *A Pollutant Must Be . . .*

In the CWA, a "pollutant" is defined as "dredged soil, 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."[53] While

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[44] *Id.* § 1251(b). Congress set out as its policy to "recognize, preserve, and protect the primary responsibilities and rights of States to prevent, reduce, and eliminate pollution." *Id.*

[45] 33 U.S.C. § 1311(a).

[46] *Id.* § 1342(a) (listing procedures and requirements for meeting NPDES requirements).

[47] *Id.*; *see Salmon I*, 215 F. Supp. 2d 239, 246 (D. Me. 2002) ("Sections 1311(a) and 1342 are understood to mean that the discharge of a pollutant is prohibited unless an NPDES permit has been obtained.").

[48] *See Salmon I*, 215 F. Supp. 2d at 245; *Stolt Sea Farm*, 2002 WL 240386, at *4.

[49] Sierra Club, Lone Star Chapter v. Cedar Point Oil Co., 73 F.3d 546, 559 (5th Cir. 1996).

[50] 33 U.S.C. §§ 1311(a), 1342(a).

[51] *Id.* § 1362(12).

[52] Nat'l Wildlife Fed'n v. Gorsuch, 693 F.2d 156, 165 (D.C. Cir. 1982).

[53] 33 U.S.C. § 1362(6).

certain terms in this definition suggest a broad reading of the term pollutant, others do not.[54] The courts appear to disagree as to the breadth of the definition.[55] In *National Wildlife Federation v. Gorsuch*, the District of Columbia Circuit stated that:

> the wording of § [1362(6)] makes us cautious in adding new terms to the definition. Congress used restrictive phrasing—"[t]he term 'pollutant' *means* dredged soil, [etc.]"—rather than the looser phrase "includes," used elsewhere in the Act. As a general rule, "'[a] definition which declares what a term "means" . . . excludes any meaning that is not stated.'"[56]

Furthermore, the court looked to the legislative history of the CWA and determined that while drafting the definition of pollutant, both the House and the Senate ultimately left out more encompassing language that they had contemplated.[57]

A slightly different result was reached in *Sierra Club, Lone Star Chapter v. Cedar Point Oil Co.*, where the Fifth Circuit stated that "[w]e do not disagree with the D.C. Circuit's assessment that the use of the word 'means' manifests an intent to restrict the definition of pollutant to the terms listed."[58] By way of contrast, however, the Fifth Circuit determined that "the breadth of many of the items in the list of 'pollutants' tends to eviscerate any restrictive effect."[59] After offering a different perspective on the relevant legislative history, the Fifth Circuit determined that a substance can be covered by the definition of pollutant even if not specifically listed, and that the courts have the power to decide whether a discharged substance is a pollutant.[60]

In determining what materials from Atlantic and Stolt fall under the CWA's definition of pollutant, the District Court of Maine relied

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[54] *See id.* (compare the terms "biological materials" and "cellar dirt").

[55] *Compare* Sierra Club, Lone Star Chapter v. Cedar Point Oil Co., 73 F.3d 546, 565–67 (5th Cir. 1996), *with Gorsuch*, 693 F.2d at 171–73.

[56] *Gorsuch*, 693 F.2d at 171–72 (quoting Colautti v. Franklin, 439 U.S. 379, 392 n.10 (1979) (quoting C. SANDS, STATUTES AND STATUTORY CONSTRUCTION § 47.07 (4th ed. Supp. 1978))).

[57] *Id.* at 173.

[58] *Cedar Point Oil*, 73 F.3d at 565.

[59] *Id.* The Fifth Circuit intimates that the *Gorsuch* court recognized this conclusion; however, the footnote that it cites merely states the court's difficulty in squaring the definition in the CWA with the legislative history. *See id.*; *Gorsuch*, 693 F.2d at 173 n.52.

[60] *Cedar Point Oil*, 73 F.3d at 566–67. To be fair, the Fifth Circuit did point out a significant difference between *Cedar Point Oil Co.* and *Gorsuch*—in the latter, the D.C. Circuit was "*reviewing a decision by EPA* not to regulate" certain substances through a permit. *Id.* at 567 (emphasis added).

on *Cedar Point Oil Co.* and similar cases and did not discuss *Gorsuch* in this context.[61] The court held that fish raised by Atlantic and Stolt that are not native to North American waters and that escape from the pens constitute biological material, and thus a pollutant.[62] Feces and urine from the salmon were also deemed biological materials or agricultural wastes, and thus also pollutants.[63] The feed given to the salmon fell under the rubric of biological materials or solid wastes,[64] while the antibiotic, drug, or other pharmaceutical components found in the feed were chemical wastes.[65] The chemicals used to treat the salmon for various diseases, and released to the water, were also found to be chemical wastes, while the copper used as a coating on the net pens is considered a toxic pollutant by EPA, and thus a pollutant as defined by the CWA.[66]

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[61] *Salmon I*, 215 F. Supp. 2d at 246–47 ("Courts have interpreted the definition of pollutant 'to encompass substances not specifically enumerated but subsumed under the broad generic terms' listed in § 1362(6).").

[62] *Id.* at 247; *Stolt Sea Farm*, 2002 WL 240386, at *6. Surprisingly, this holding is not unique; Atlantic salmon were also held to be a pollutant in a case involving escapes from net pens in the Puget Sound. *See* Marine Envtl. Consortium, Inc. v. Wash. Dep't of Ecology, No. 26825-6-II, 2002 WL 1354244, at *1 (Wash. Ct. App. June 21, 2002). This case, however, was dismissed as moot based on permitting issues. *Marine Envtl. Consortium*, 2002 WL 1354244, at *2.

[63] *Salmon I*, 215 F. Supp. 2d at 247; *Stolt Sea Farm*, 2002 WL 240386, at *6.

[64] *Salmon I*, 215 F. Supp. 2d at 247; *Stolt Sea Farm*, 2002 WL 240386, at *6. The feed administered by Stolt could also possibly fit into the definition of pollutant as an agricultural waste, as it contains poultry. *Stolt Sea Farm*, 2002 WL 240386, at *7. The biological portion of Atlantic's feed, on the other hand, is made up solely of fish, removing it from the third category of agricultural waste. *See Salmon I*, 215 F. Supp. 2d at 248. Another concern stemming from the excess feed and feces that can accumulate on the ocean floor is the build up of nutrients, which demand oxygen to break them down, leading to a loss of oxygen in the water and subsequent BOD problems, as mentioned above. Plaintiffs' Motion for Summary Judgment and Memorandum of Law in Support of Motion for Summary Judgment at 10, *Salmon I*, 215 F. Supp. 2d 239 (D. Me. 2002) (No. 00-151B-C).

[65] *Salmon I*, 215 F. Supp. 2d at 248; *Stolt Sea Farm*, 2002 WL 240386, at *7. Both Atlantic and Stolt used pigments or chemical dyes in their feed mixtures to give salmon flesh a pink hue; both also occasionally added an antibiotic, and Stolt would add an extra drug. *Salmon I*, 215 F. Supp. 2d at 248; *Stolt Sea Farm*, 2002 WL 240386, at *7. "Because farmed salmon do not eat the crustaceans that wild salmon normally eat, the farmed salmon's flesh does not turn pink unless a pigment is added to their food." Plaintiffs' Motion for Summary Judgment and Memorandum of Law in Support of Motion for Summary Judgment at 6, *Salmon I*, 215 F. Supp. 2d 239 (D. Me. 2002) (No. 00-151B-C). The dyes, canthaxanthin and astaxanthin, are made from petrochemicals and salmon farmers are offered "the SalmoFan, a sort of paint wheel with assorted shades of pink, to help them create the color they think their customers will want." Marian Burros, *Issues of Purity and Pollution Leave Farmed Salmon Looking Less Rosy*, N.Y. TIMES, May 28, 2003, at F1.

[66] *Salmon I*, 215 F. Supp. 2d at 248; *Stolt Sea Farm*, 2002 WL 240386, at *7.

B. *Added . . .*

As stated by the Second Circuit, "[t]he EPA's position, upheld by the *Gorsuch* and *Consumers Power* courts, is that for there to be an 'addition,' a 'point source must *introduce* the pollutant into navigable water from the outside world.'"[67] All of the materials listed above as pollutants were considered to be added as they do not naturally occur in the bays where the net pens are located.[68]

C. *To Navigable Waters . . .*

Under the CWA, navigable waters are defined as "the waters of the United States, including the territorial seas."[69] A territorial sea is "the belt of the seas measured from the line of ordinary low water along that portion of the coast which is in direct contact with the open sea and the line marking the seaward limit of inland waters, and extending seaward a distance of three miles."[70] As Atlantic's and Stolt's net pen farms are in Maine's Cobscook, Machias, and Pleasant Bays, they fall well within the definition of navigable waters.[71]

D. *From . . .*

Neither Atlantic nor Stolt disputed that any of the material determined to be a pollutant above came from its farms.[72]

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[67] Catskill Mountains Chapter of Trout Unlimited v. City of New York, 273 F.3d 481, 491 (2d Cir. 2001) (quoting Nat'l Wildlife Fed'n v. Gorsuch, 693 F.2d 156, 165, 175 (D.C. Cir. 1982), which held that EPA probably has the discretion to define the term "addition," and following that definition, determined that low-oxygen, super-saturated, and cold water flowing from one side of a dam to another does not constitute an addition (citing Nat'l Wildlife Fed'n v. Consumers Power Co., 862 F.2d 580, 585 (6th Cir. 1988), which held that an electric generating plant on Lake Michigan did not add dead fish to the water, but merely changed live fish to "a mixture of live and dead fish in the process of generating electricity" and that under the CWA "live fish would be just as much a pollutant as a mixture of live and dead fish" as both are biological materials)).

[68] *Salmon I*, 215 F. Supp. 2d at 248 (listing a possible exception for the feed used by Atlantic, as the court considered the possibility that if the fish material came from where the pens were located, it would not technically be an addition); *Stolt Sea Farm*, 2002 WL 240386, at *7.

[69] 33 U.S.C. § 1362(7) (2000).

[70] *Id.* § 1362(8).

[71] *Salmon I*, 215 F. Supp. 2d at 249; *Stolt Sea Farm*, 2002 WL 240386, at *8.

[72] *Salmon I*, 215 F. Supp. 2d at 249; *Stolt Sea Farm*, 2002 WL 240386, at *8.

E. *A Point Source.*

The CWA defines point source as "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged."[73] On the face of this definition there is no clear fit for the net pen facilities of Atlantic and Stolt.[74]

It has been held, however, that EPA has the power to define point and nonpoint sources.[75] For net pen facilities, the line between point and nonpoint sources is found with the distinction between a concentrated aquatic animal production facility (CAAPF) and an aquatic animal production facility (AAPF).[76] CAAPFs, as defined by regulations, are point sources for NPDES permit purposes.[77] A facility can become a CAAPF by meeting the following criteria:

> A hatchery, fish farm, or other facility is a concentrated aquatic animal production facility for purposes of § 122.24 if it contains, grows, or holds aquatic animals in either of the following categories:
>
> (a) Cold water fish species or other cold water aquatic animals in ponds, raceways, or other similar structures which discharge at least 30 days per year but does not include:
>
> (1) Facilities which produce less than 9,090 harvest weight kilograms (approximately 20,000 pounds) of aquatic animals per year; and
>
> (2) Facilities which feed less than 2,272 kilograms (approximately 5,000 pounds) of food during the calendar month of maximum feeding . . . .[78]

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[73] 33 U.S.C. § 1362(14). This definition goes on to exempt "agricultural stormwater discharges and return flows from irrigated agriculture." *Id.*

[74] *See id.*

[75] Natural Res. Def. Council, Inc. v. Costle, 568 F.2d 1369, 1382 (D.C. Cir. 1977).

[76] *See* Revision of NPDES Regulations, 44 Fed. Reg. 32,854, 32,870 (June 7, 1979) (codified at 40 C.F.R. pt. 122.43). The distinction, however, is not so clear as the elision of the term "concentrated" makes it appear; AAPFs can be determined to be CAAPFs on a case-by-case basis, as will be explained below. *See id.*

[77] 40 C.F.R. § 122.24(a) (2002).

[78] *Id.* § 122 app. C. A similar definition for warm water fish species has a much higher weight limit on the amount of fish allowed to be harvested, and does not include any information about the maximum amount of feed that may be given to avoid the CAAPF designation. *Id.* The regulation also defines cold water aquatic animals, which "include,

Even if a facility would be considered only an AAPF under the definition above, the EPA Director could still designate it as a CAAPF "upon determining that it is a significant contributor of pollution to the waters of the United States."[79] Factors for the Director to consider before making such a determination are the "location and quality of the receiving waters . . . [t]he holding, feeding, and production capabilities of the facility; [t]he quantity and nature of the pollutants . . . and [o]ther relevant factors."[80] Nonpoint sources, such as AAPFs, do not require NPDES permits.[81]

While neither Atlantic nor Stolt were designated as CAAPFs under the Director's discretionary power, USPIRG alleged that they were CAAPFs as defined in the regulations.[82] Atlantic and Stolt admitted that each of its net pen facilities produces at least 9090 harvest weight kilograms per year.[83] Both also admitted that they fed the salmon at each site at least 2272 kilograms of food during the calendar month of maximum feeding.[84] Neither company disputed that it raised cold water fish, or that it was discharging at the rate defined in the regulations.[85]

Atlantic and Stolt did contest the applicability of the definition of point source to their net pen facilities, based on the argument that they did not use "ponds, raceways, or other similar structures."[86] They construed the above terms to imply that the facilities had to be in

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but are not limited to, the Salmonidae family of fish; e.g., trout and salmon." *Id.* Thus, Atlantic and Stolt fall into the cold water fish section. *See id.*

[79] *Id.* § 122.24(c).

[80] *Id.* § 122.24(c)(1)(i)–(iv). While a designation under § 122.24(c) could possibly be surprising for the facility on the receiving end, the regulation slightly softens the blow by stating that a NPDES permit application is not required under this section "until the Director has conducted on-site inspection of the facility and has determined that the facility should and could be regulated under the permit program." *Id.* § 122.24(c)(2).

[81] *See id.* § 122.3(e).

[82] *Salmon I*, 215 F. Supp. 2d at 251; *Stolt Sea Farm*, 2002 WL 240386, at *10; *see* 40 C.F.R. § 122 app. C.

[83] *Salmon I*, 215 F. Supp. 2d at 243 (excepting one of Atlantic's sites); *Stolt Sea Farm*, 2002 WL 240386, at *2; *see* 40 C.F.R. § 122 app. C.

[84] *Salmon I*, 215 F. Supp. 2d at 243 (excepting one of Atlantic's sites); *Stolt Sea Farm*, 2002 WL 240386, at *2; *see* 40 C.F.R. § 122 app. C.

[85] *See Salmon I*, 215 F. Supp. 2d at 244, 251; *Stolt Sea Farm*, 2002 WL 240386, at *3, 10; 40 C.F.R. § 122 app. C (setting the discharge rate to at least thirty days per year).

[86] *Salmon I*, 215 F. Supp. 2d at 251; *Stolt Sea Farm*, 2002 WL 240386, at *10; *see* 40 C.F.R. § 122(a) app. C. They also incorporated an argument that contended that their facilities could not be point sources as they did not have a "'discrete, confined and direct conveyance'" or "'discrete discharge pipes.'" *Salmon I*, 215 F. Supp. 2d at 251; *Stolt Sea Farm*, 2002 WL 240386, at *10.

some way connected to land.[87] These arguments were not successful, as the court found that EPA's communications in 1989 indicated that EPA did not regard the use of such language as prohibiting the application of the CAAPF definition to the defendants' net pen facilities.[88]

Reasoning that EPA's letters addressed Atlantic and Stolt as CAAPFs, and the Director did not conduct an on-site inspection, the court found that EPA could not have been then referring to the facilities as CAAPFs under anything other than the definition including the terms "ponds, raceways, or other similar structures."[89] Delving further into the regulations, the court also offered that "[t]here is no indication in the proposed rule or the final rule for § 122.24 that suggests that the EPA was intending to narrowly focus on land based fish farms."[90]

Neither the proposed nor the final rule contains a detailed discussion of the phrase in question. Under the proposed rule, however, a facility could be a CAAPF without the presence of "ponds, raceways, or other similar structures," a phrase that was added to the final rule.[91] A later final regulation promulgated by EPA clarified the possi-

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[87] *Salmon I*, 215 F. Supp. 2d at 251; *Stolt Sea Farm*, 2002 WL 240386, at *10.

[88] *Salmon I*, 215 F. Supp. 2d at 251; *Stolt Sea Farm*, 2002 WL 240386, at *10 (quoting another letter from EPA stating that "facilities operating in waters off the coast of Maine" which meet the definition of 40 C.F.R. § 122.24 are required to have NPDES permits).

[89] *See Salmon I*, 215 F. Supp. 2d at 252; *Stolt Sea Farm*, 2002 WL 240386, at *10; 40 C.F.R. §§ 122.24, 122 app. C.

[90] *Salmon I*, 215 F. Supp. 2d at 252–53; *Stolt Sea Farm*, 2002 WL 240386, at *11 (citing 44 Fed. Reg. 32,854, 32,870 (June 7, 1979) (codified at 40 C.F.R. pt. 122)); Revision of NPDES Regulations, 43 Fed. Reg. 37,078, 37,082, 37,100 (proposed Aug. 21, 1978) (codified at 40 C.F.R. pt. 122).

[91] *See* Revision of NPDES Regulations, 43 Fed. Reg. at 37,100. The proposed rule stated:

> (a) Aquatic animal production facilities, as defined in this section, are point sources subject to the NPDES permit program. Concentrated aquatic animal production facilities are subject to the individual permit program. Other animal production facilities are subject to the general permit program. (§ 122.48.)
>
> (b) Definitions. "Aquatic animal production facility" means a hatchery, fish farm, or other facility which contains:
>
> (1) Any species of fish or other aquatic animal [other than carp (Cyprinus carpio), goldfish (Carassius auratus), or brown trout (Salmo trutta)] nonnative of the United States and from which there is a discharge at any time; *or*
>
> (2) Fish or other aquatic animals in ponds, raceways or other similar structures for purposes of production, which are not closed ponds discharging only during periods of excess runoff, and which discharge at least 30 days per year. . . .

ble confusion and clearly indicated that EPA considers net pens to be CAAPFs.[92]

The court further reasoned that it would be against the purposes of the CWA if land-based fish farms were required to have permits while those located in bays were not.[93] Finally, the District Court of Maine stated that EPA's definition was applicable to Atlantic and Stolt because of "the lack of judicial support to indicate otherwise," allowing net pen facilities to fall within the realm of similar structures.[94]

In a similar attempt to avoid the determination that their net pen facilities were point sources, Atlantic and Stolt argued that as ponds,

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> (3) "Concentrated aquatic animal production facility" means any aquatic animal production facility, as defined in subparagraph (1) of this paragraph which:
>
> (i) Produces more than 20,000 pounds of aquatic animals per year; or
>
> (ii) Is designated by the Enforcement Division Director as a significant contributor of pollution to the waters of the United States in accordance with paragraph (c).
>
> (c) Case-by-case designation of concentrated aquatic animal production facilities.

Id. (emphasis added).

[92] Revisions to the NPDES Program, 65 Fed. Reg. 43,586, 43,649 (July 13, 2000) (codified at 40 C.F.R. pt. 122.24).

> Most commercial fish husbandry that the layperson refers to as "aquaculture," including fish farms located in waters of the U.S., is subject to NPDES regulation under the rubric "concentrated aquatic animal production facility." As with feedlots, an "aquatic animal production facility" is subject to regulation under the NPDES permitting program only if the facility is "concentrated" according to the NPDES regulations.

Id.

[93] *Salmon I*, 215 F. Supp. 2d at 253; *Stolt Sea Farm*, 2002 WL 240386, at *11 (repeating that "[t]he goal of the Clean Water Act is to restore and maintain the integrity of the nation's waters"); *see* 33 U.S.C. § 1251(a) (2000).

[94] *Salmon I*, 215 F. Supp. 2d at 253; *Stolt Sea Farm*, 2002 WL 240386, at *11. Just as Atlantic and Stolt had no judicial opinions to weigh in on their side that net pen facilities do not comport with the phrase "ponds, raceways, or other similar structures," the District Court of Maine lacked any guidance in interpreting this definition and applying it to the defendants. *Salmon I*, 215 F. Supp. 2d at 253; *Stolt Sea Farm*, 2002 WL 240386, at *11. The most compelling evidence cited by the court is the 1990 NPDES application, which required the applicant to check a box indicating whether its facilities constitute ponds, raceways, or similar structures. *Salmon I*, 215 F. Supp. 2d at 253; *Stolt Sea Farm*, 2002 WL 240386, at *11. If the box denoting "other" was marked, the application asked for "a descriptive name of any structure which is not a pond or raceway but which results in discharge to waters of the United States." *Salmon I*, 215 F. Supp. 2d at 253 n.12; *Stolt Sea Farm*, 2002 WL 240386, at *11 n.11. This fortifies the broad reading of the definition also evidenced in EPA's letters to the defendants. *See Salmon I*, 215 F. Supp. 2d at 251; *Stolt Sea Farm*, 2002 WL 240386, at *10.

raceways, and similar structures are all land based structures, they require some sort of conduit or pipe to gather and channel water.[95] Thus, Atlantic and Stolt contended that as net pens do not function in a similar manner, due to their location in the sea and the flow of water through their entirety, and not a conduit, they could not be point sources.[96] Citing the definition of a point source[97] and EPA's interpretation of that definition,[98] the court listed a range of examples to show that point sources have been found to exist in many situations lacking the characteristics suggested by Atlantic and Stolt.[99]

F. *An Impossibility Excuse*

Finally, the court refused to apply an exception recognized by the Eleventh Circuit to the requirement that a discharger have a NPDES permit.[100] In *Hughey v. JMS Development Corp.*, the district court enjoined a developer from construction, due to stormwater runoff from the property under development that muddied a stream and a downstream river.[101] The injunction was granted even though no permit existed for the discharge.[102]

In overturning the district court's injunction, the Eleventh Circuit created an exception, stating:

> Congress did not intend (surely could not have intended) for the zero discharge standard to apply when: (1) compliance with such a standard is factually impossible; (2) no NPDES permit covering such discharge exists; (3) the discharger was in good-faith compliance with local pollution control requirements that substantially mirrored the pro-

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[95] *Salmon I*, 215 F. Supp. 2d at 253–54; *Stolt Sea Farm*, 2002 WL 240386, at *11.

[96] *Salmon I*, 215 F. Supp. 2d at 253–54; *Stolt Sea Farm*, 2002 WL 240386, at *11. The defendants also made use of affirmative defenses, which are not of much interest here, save for the impossibility excuse discussed later. *Salmon I*, 215 F. Supp. 2d at 257–60; *Stolt Sea Farm*, 2002 WL 240386, at *13–17; *see* discussion *infra* Part II.F.

[97] 33 U.S.C. § 1362(14); *see supra* text accompanying note 73.

[98] Revisions to the NPDES Program, 65 Fed. Reg. 43,586, 43,649 (July 13, 2000) ("The CWA does not specifically address 'concentrated aquatic animal production facilities.' The latter [CAAPFs] are a type of 'concentrated animal feeding operation,' which the CWA explicitly identifies as a 'point source.'").

[99] *Salmon I*, 215 F. Supp. 2d at 254–55; *Stolt Sea Farm*, 2002 WL 240386, at *12.

[100] Hughey v. JMS Dev. Corp., 78 F.3d 1523, 1530 (11th Cir. 1996); *Salmon I*, 215 F. Supp. 2d at 257; *Stolt Sea Farm*, 2002 WL 240386, at *14.

[101] *Hughey*, 78 F.3d at 1527.

[102] *Id.* at 1524.

posed NPDES discharge standards; and (4) the discharges were minimal.[103]

In holding the exception inapplicable to Atlantic and Stolt, the court covered old ground, stating that "[s]ince 1979, the EPA has had a permit procedure for CAAPFs in place."[104] The court was unconcerned that both defendants apparently followed the permitting procedures and applied for NPDES permits, and that EPA did not react.[105] The court found nothing to demonstrate that EPA could not have issued a permit, and held that EPA's administrative failure to issue a permit does not allow the defendants to violate the zero-discharge standard.[106] Also, unlike in *Hughey*, a zero-discharge level could be achieved.[107] Here, Atlantic and Stolt could simply cease operations and end the discharges.[108]

G. *Clean Water Act Outcome*

Thus, because Atlantic and Stolt were discharging pollutants without a NPDES permit, they were in violation of the CWA.[109] Based on this violation, both Atlantic and Stolt were instructed to: (1) each pay $50,000; (2) "scrupulously follow and strictly comply with all existing regulatory requirements" regarding net pens currently stocked with fish; (3) finish harvesting fish currently in the water as soon as

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[103] *Id.* at 1530.

[104] *Salmon I*, 215 F. Supp. 2d at 257; *Stolt Sea Farm*, 2002 WL 240386, at *14 (citing 40 C.F.R. § 122.24; Revision of NPDES Regulations, 44 Fed. Reg. 32,854, 32,870 (June 7, 1979) (codified at 40 C.F.R. pt. 122.43) ("requiring permits for CAAPFs and allowing case-by-case determination for AAPFs")).

[105] *Salmon I*, 215 F. Supp. 2d at 257; *Stolt Sea Farm*, 2002 WL 240386, at *14. While not cited by the District Court of Maine, a NPDES permit was granted to a potential net pen facility in Acadia, Maine. LINDA M. MURPHY, ENVTL. PROT. AGENCY, PERMIT NO. ME0036234, AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (2002) (on file with author).

[106] *Salmon I*, 215 F. Supp. 2d at 257; *Stolt Sea Farm*, 2002 WL 240386, at *14; *see* Beartooth Alliance v. Crown Butte Mines, 904 F. Supp. 1168, 1174 (D. Mont. 1995) ("To be in compliance with the CWA, it is necessary to not only apply for, but also to have a permit.").

[107] *Salmon I*, 215 F. Supp. 2d at 258; *Stolt Sea Farm*, 2002 WL 240386, at *14. As *Hughey* dealt with storm water, the Eleventh Circuit stated: "[p]ractically speaking, rain water will run downhill, and not even a law passed by the Congress of the United States can stop that." *Hughey*, 78 F.3d at 1530.

[108] *Salmon I*, 215 F. Supp. 2d at 258; *Stolt Sea Farm*, 2002 WL 240386, at *14; *see Hughey*, 78 F.3d at 1530 ("This was not a case of a manufacturing facility that could abate the discharge of pollutants by ceasing operations.").

[109] *Salmon I*, 215 F. Supp. 2d at 241; U.S. Pub. Interest Research Group v. Stolt Sea Farm, Inc., No. CIV.00-1490B0C, 2002 WL 1552165, at *1 (D. Me. June 17, 2002).

possible, and fallow all net pen sites for at least twenty-four months; (4) not restock any pens until a Maine or NPDES permit is issued; (5) only stock a one year class of fish at a time; and (6) only stock native, North American fish, despite what any permit later issued may allow.[110]

III. The Endangered Species Act as an Added Layer of Regulation[111]

Concurrent with concern stemming from pollutants and the CWA was contentious litigation over whether Atlantic salmon should be listed as an endangered species.[112] Listing would possibly result in profound effects on the system of net pen aquaculture as it would increase concerns regarding escapees from, and general aquatic health in, CAAPFs.[113]

The basic purpose of the listing of species and the Endangered Species Act (ESA) is to conserve endangered and threatened species along with the ecosystems on which they depend.[114] To do this, the Secretary of the Interior can promulgate a regulation determining a species is endangered or threatened because of: "disease or predation; . . . the inadequacy of existing regulatory mechanisms; or . . . other natural or manmade factors affecting its continued existence."[115] Such a decision can be made only on the basis of "the best

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[110] U.S. Pub. Interest Research Group v. Atl. Salmon of Me., LLC, 257 F. Supp. 2d 407 (D. Me.) [*Salmon III*], *aff'd*, 339 F.3d 23 (1st Cir. 2003) [*Salmon IV*].

[111] While the listing of the Atlantic salmon as endangered was quite controversial in Maine and could easily be examined in equal or greater depth than the CWA, those arguments will not be considered. This section gives a basic statutory background, and the history and reasons for the listing.

[112] *See* Maine v. U.S. Dep't of the Interior, 298 F.3d 60, 63 (1st Cir. 2002); Maine v. Norton, 203 F.R.D. 22, 24 (D. Me. 2001), *aff'd*, 262 F.3d 13 (1st Cir. 2001).

[113] Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. 69,459, 69,464 (Nov. 17, 2000) (codified at 50 C.F.R. pt. 17.11(h)).

[114] 16 U.S.C. § 1531(b) (2000). "Endangered" is defined as "any species which is in danger of extinction throughout all or a significant portion of its range." *Id.* § 1532(6). "Threatened" is defined as "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." *Id.* § 1532(20).

[115] *Id.* § 1533(a)(1)(C)–(E). The above listing is only those factors found to be important concerning the Atlantic salmon; the others include "the present or threatened destruction, modification, or curtailment of its habitat or range . . . [and] overutilization for commercial, recreational, scientific, or educational purposes." *Id.* § 1533(a)(1)(A)–(B); Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. at 69,479. There is, however, no critical habitat designated for the Atlantic salmon. Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. at 69,475.

scientific and commercial data available," following a review of the species's status, and an inquiry into conservation efforts undertaken by local, state, or foreign governments.[116]

Once a species is listed as endangered, it is "unlawful for any person . . . to . . . take any such species."[117] "Take" is broadly defined under the ESA, as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."[118] To ensure the broad application of the ESA, "person" is defined in breadth equal to "take."[119] The ESA also requires cooperation with the states to the extent practicable in conserving species.[120]

The background of the debate over the listing of Atlantic salmon as an endangered species has been widely covered.[121] In 1991, the U.S. Fish and Wildlife Service (FWS) named the Atlantic salmon in Maine rivers as a candidate species under the ESA.[122] While deciding that Atlantic salmon throughout the United States did not require listing as an endangered species, by 1995 the FWS determined that those in Maine were "'a distinct population segment,'[123] eligible for protection under the ESA and in danger of extinction."[124]

Maine, in order to keep greater control at the state level, responded to an option in the proposed listing and put forth a conser-

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[116] 16 U.S.C. § 1533(b)(1)(A).

[117] *Id.* § 1538(a)(1)(B) (listing many other prohibited acts, such as importing, possessing, selling, and delivering).

[118] *Id.* § 1532(19). While the definition of "take" is broad, "harm" extends further, because it "means an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering." 50 C.F.R. § 17.3 (2002). This definition has been upheld as quite broad and a reasonable construction of congressional intent. Babbitt v. Sweet Home Chapter of Cmtys. for a Great Or., 515 U.S. 687, 708 (1995).

[119] 16 U.S.C. § 1532(13) (defining "person" as "an individual, corporation, partnership, trust, association, or any other private entity," and encompassing all levels of government in a similar manner).

[120] *Id.* § 1535(a).

[121] Maine v. U.S. Dep't of the Interior, 298 F.3d 60, 63 (1st Cir. 2002); Maine v. Norton, 203 F.R.D. 22, 25 (D. Me. 2001), *aff'd*, 262 F.3d 13 (1st Cir. 2001); Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. 69,459, 69,462 (Nov. 17, 2000) (codified at 50 C.F.R. pt. 17.11(h)).

[122] *Maine*, 298 F.3d at 63.

[123] *Id.* The term species is defined in the Endangered Species Act (ESA) as including "any subspecies of fish or wildlife or plants, and any distinct population segment [DPS] of any species of vertebrate fish or wildlife which interbreeds when mature." 16 U.S.C. § 1532(16). Thus, the entire species of Atlantic salmon need not be listed for those in designated areas of Maine to be protected. *See id.*; Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. at 69,459.

[124] *Maine*, 298 F.3d at 63.

vation plan of its own.[125] The FWS approved Maine's plan and in 1997 removed the proposal to list Atlantic salmon as endangered.[126] The conservation plan allowed Maine "to define the manner in which certain activities could be conducted without violating the ESA," but the FWS maintained Atlantic salmon as a candidate species for listing.[127]

In 1999, Defenders of Wildlife and Trout Unlimited filed separate suits in the District Court of the District of Columbia to force the FWS to reinstate its listing of Atlantic salmon as endangered; Maine threatened to sue the FWS if any such listing was made.[128] At this time, the FWS was conducting a status review of the Atlantic salmon, and, based on the results, decided to list the Atlantic salmon as endangered in eight rivers in Maine.[129] The final rule was issued in November of 2000, becoming effective a month later.[130] Maine sued, challenging the final rule in December of 2000.[131]

The FWS decided to list Atlantic salmon as endangered in part because of the net pen aquaculture facilities in Maine and those a very short distance away in Canada.[132] The following seven major factors were stated as reasons for the listing: "new disease and genetic threats, continuing concerns about threats posed by aquaculture escapees, lack of progress in resolving concerns over existing aquacul-

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[125] *Id.*; *Norton*, 203 F.R.D. at 25. It is interesting to note the parties in the *Norton* case, which began in 2000 as a challenge to the Fish and Wildlife Service's (FWS) listing of Atlantic salmon as endangered. *Id.* at 24. The conservation groups Defenders of Wildlife, Biodiversity Legal Foundation, Conservation Action Project, Forest Ecology Network, Coastal Waters Project, along with four individuals, sought to intervene on behalf of Gale Norton and other defendants, on behalf of the listing of Atlantic salmon as endangered. *Id.* The plaintiffs in that case opposing the endangered listing were the State of Maine, Atlantic, Stolt, Maine Aquaculture Association, and paper and blueberry groups, both of which require the use of rivers, the breeding grounds of salmon. *Id.* at 22.

[126] *Maine*, 298 F.3d at 63. In doing so, the FWS "redefined the species under analysis as the Gulf of Maine DPS to acknowledge the possibility that other populations of Atlantic salmon could be added to the DPS if they were found to be naturally reproducing and to have wild stock characteristics." Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. at 69,462.

[127] 65 Fed. Reg. at 69,462.

[128] *Maine*, 298 F.3d at 64. These groups, the former a wildlife and conservation advocate and the latter a sportsmen's association, stated that the FWS's retraction of the listing of Atlantic salmon violated the ESA and the Administrative Procedures Act (APA). *Id.*

[129] *Id.* This action ended the efficacy of Maine's conservation plan. *Id.*

[130] Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. at 69,459.

[131] *Maine*, 298 F.3d at 64 n.3. Maine also later challenged the decision to list Atlantic salmon as endangered under the APA. Maine v. Norton, 257 F. Supp. 2d 357, 361–62 (D. Me. 2003). The state's challenge was heard despite procedural flaws in Maine's suit, but summary judgment was granted to the Department of the Interior. *Id.* at 372–76, 407.

[132] Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. at 69,464.

ture practices, low juvenile in-river survival levels, continuing decline in adult returns, and the lack of sufficient progress in dealing with sport fishing (at that time) and water withdrawals."[133] The first three factors relate directly to the CAAPFs in Maine.[134]

A. *The Possibilities of Disease*

The primary disease that is a potential threat to Atlantic salmon is known as the infectious salmon anemia (ISA) virus.[135] The ISA virus is presently without a cure and is "extremely destructive to maturing salmon."[136] Previously, the virus was only "known to cause disease in situations where fish were artificially confined." Recently, however, it has been found in wild salmon and other wild fish.[137]

At the time of the writing of the final rule, the ISA virus had infected salmon in Canadian net pen facilities.[138] The Canadian facilities were deemed "close enough to U.S. aquaculture sites in Cobscook Bay, the location of Maine's greatest concentration of salmon aquaculture pens, to create a significant risk of the introduction of the virus to U.S. aquaculture stocks."[139] At this point, the only wild fish that had been infected were those exposed to the infected Canadian facilities.[140] Despite that, the potential magnifying effect of high concentrations of fish—such as those in net pens—on the virus was viewed as a serious risk to the Atlantic salmon located nearby.[141] The FWS felt that Maine's regulations "may not fully ensure testing, reporting, and depopulation of diseased fish," making possible the spread of the ISA virus from salmon in net pen facilities to Atlantic salmon.[142]

The fears expressed in the Federal Register were justified.[143] In 2001, an outbreak of the ISA virus in Cobscook Bay forced operators

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[133] *Id.*

[134] *See id.*

[135] *Id.* at 69,464, 69,469. Another virus of concern for wild and farmed salmon is salmon swimbladder sarcoma virus (SSSV). *Id.* at 69,461.

[136] *Id.* at 69,469.

[137] *Id.* ISA has been found in wild fish in Canada, Norway, and Scotland. *Id.*; GOLDBURG ET AL., *supra* note 12, at 9.

[138] Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. at 69,469.

[139] *Id.* The ISA virus is known to be "transmissible laterally between fish pens within 5 kilometers (km) of each other, and by the discharge of slaughter wastes." *Id.*

[140] *Id.*

[141] *Id.*

[142] *Id.* at 69,477.

[143] *See id.* at 69,469; Bridget M. Kuehn, *Officials Fine-tune Salmon Virus Response*, J. AM. VETERINARY MED. ASS'N, July 1, 2002, http://www.avma.org/onlnews/javma/jul02/020701e.asp (last visited Apr. 20, 2004).

of net pen facilities to destroy approximately 2.6 million fish, costing the industry around $24 million.[144] Prior to the outbreak, USPIRG included claims in its complaints that the ISA virus had infected fish at one of Atlantic's net pen facilities, as well as salmon at one of Stolt's Canadian sites in close proximity to Stolt's Cobscook Bay facilities.[145]

B. *The Genetic Threats Posed by Net Pen Escapees*

The endangered Atlantic salmon in Maine are subject to genetic threats as a large percentage of the salmon raised in net pen facilities are of European origin and genetically different from Atlantic salmon.[146] Even when the aquaculture facilities do use domestic Atlantic salmon in their net pens, the fish are still genetically separate from the wild, endangered Atlantic salmon.[147] Unlike the Atlantic salmon native to Maine's rivers that have adapted to those habitats and are genetically distinct, domesticated Atlantic salmon used in net pen aquaculture have been bred to maximize traits beneficial to production: fast growth, docility, and disease resistance.[148]

Studies in Maine have shown that these genetically separate, captive salmon have managed to not only escape net pen facilities, but survive in the wild.[149] The escaped salmon are present in some of the rivers populated by Atlantic salmon.[150] As the CAAPFs in Maine multiply, so do the escapees.[151] Based on available data, the FWS determined that the use of non-North American salmon in CAAPFs was actually increasing.[152]

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[144] Kuehn, *supra* note 144.

[145] *Salmon I*, 215 F. Supp. 2d 239, 243 (D. Me. 2002); U.S. Pub. Interest Research Group v. Stolt Sea Farm, Inc., No. CIV.00-149-B-C, 2002 WL 240386, at *3 (D. Me. Feb. 19, 2002).

[146] Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. at 69,471.

[147] *Id.* The genetic difference comes from "changes introduced through domestication. The industry selects fish best suited to grow in captivity, which would likely select for different traits and characteristics than those most suited for survival in the wild." *Id.*

[148] GOLDBURG & TRIPLETT, *supra* note 7, at 53.

[149] Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. at 69,471. Studies of interactions between escaped and wild salmon in Ireland have demonstrated the ability for the escaped salmon to survive and interbreed with the wild population. *Id.*

[150] *Id.* at 69,471–72 ("Genetic studies . . . have shown the rare occurrence in wild . . . fish [Atlantic salmon] collected in Maine of alleles that are common in European stocks. This strongly suggests that some level of introgression of European alleles may have already occurred.").

[151] *Id.* at 69,472 (noting that this trend continues, despite wide compliance with voluntary containment procedures).

[152] *Id.* at 69,477 (citing both a loophole in ME. REV. STAT. ANN. tit. 12, § 6071 (West 2000), which "restricts importing fish and eggs, but fails to restrict importing European

The main fear arising from the continued use, escape, and survival of captive salmon, North American or European, is the dilution of the genetic material, or the out-competition, of wild Atlantic salmon.[153] "There is substantial documentation that escaped farmed salmon disrupt the redds[154] of wild salmon, compete with wild salmon for food and habitat, interbreed with wild salmon, transfer disease or parasites to wild salmon, []or degrade benthic habitat."[155] Because of the relatively small number of Atlantic salmon left in the wild, even small numbers of escaped farmed salmon in Maine's rivers are a concern as they can become a significant percentage of the fish overall.[156] This leads to the threat of loss of genetic integrity of the endangered Atlantic salmon.[157]

IV. Discussion: the Convergence of the Clean Water Act, the Endangered Species Act, and the Sustainability of Salmon Net Pen Aquaculture in Marine Maine

While listing the Atlantic salmon as endangered, the Fish and Wildlife Service (FWS) determined that net pen aquaculture could continue under the regulation.[158] The FWS, however, believed that the following could constitute a "take" under the ESA: the escape of non-North American salmon from net pen facilities that can reproduce; the escape of domesticated salmon from net pen facilities if they are found within the eight river range of the Atlantic salmon; failure to adopt proper anti-disease fish health standards; the discharge of pollutants into waters that support the Atlantic salmon; and locating net pen facilities in a way that harms water quality.[159]

While the potential violations above appeared quite restrictive on CAAPFs, Atlantic received a greater setback. In January of 2003, Atlantic returned to the District Court of Maine and set out its intention

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milt, thus enabling expansion of the use of hybrids," and state permittees' failure to abide by their commitment to not use European strains and the EPA's failure to issue CWA permits). Milt is salmon sperm. Goldburg et al., *supra* note 12, at 7.

[153] Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. at 69,477.

[154] Redds are defined as "nests in the beds of rivers" where adult salmon deposit their eggs. Maine v. Norton, 257 F. Supp. 2d 357, 363 (D. Me. 2003).

[155] Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. at 69,477. Benthic is defined as "bottom." Goldburg & Triplett, *supra* note 7, at 35.

[156] Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. at 69,478.

[157] *Id.* (citing the lack of success in removing European salmon, including strains or hybrids thereof, from Maine aquaculture facilities).

[158] *Id.* at 69,479.

[159] *Id.*

to continue its aquaculture business with the introduction of new fish to its facility.[160] The court put a damper on any such plans, stating that:

> Having found that Atlantic Salmon of Maine is in violation of the Clean Water Act, the Court ORDERS that Defendant Atlantic Salmon of Maine, LLC not introduce any new class of fish into its net pens until further order of this Court in order to afford the Court the opportunity to adjudicate the remedial issues that remain outstanding for decision before further action is taken by Defendant.[161]

The court found Atlantic's violations of the CWA to be serious enough to warrant injunctive relief;[162] however, this finding appears to be in direct opposition to regulatory options currently under consideration by EPA.[163] Moreover, this holding did not stop Atlantic from trying to stock another class of salmon.[164]

A. *The Apparent Incompatibility of the Proposed Effluent Guidelines, the Clean Water Act, and the District Court of Maine Decision*

In the proposed effluent guidelines for CAAPFs, EPA's main concerns were listed as feed management, health management, control of non-native species escapes, drug and chemical use, production unit water quality monitoring, primary solids control, disinfection, and additional solids removal.[165] Most of these concerns were also raised in the Atlantic and Stolt hearings on CWA violations.[166]

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[160] U.S. Pub. Interest Research Group v. Atl. Salmon of Me., LLC, 243 F. Supp. 2d 2, 2 (D. Me. 2003).

[161] *Id.* No corresponding decision was entered for Stolt, since it decided not to introduce a class of fish for the season. Interview, *supra* note 39.

[162] *Atl. Salmon of Me.*, 243 F. Supp. 2d at 2.

[163] *See* Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. 57,872, 57,887 (proposed Sept. 12, 2002) (to be codified at 40 C.F.R. pt. 451).

[164] U.S. Pub. Interest Research Group v. Atl. Salmon of Me., LLC, 261 F. Supp. 2d 17, 24 (D. Me. 2003) [*Salmon II*]. Atlantic attempted to circumvent the district court's order by stocking fish in the net pens of its wholly owned subsidiary, Island Aquaculture Company (IAC). *Id.* The court held that any transaction between IAC and Atlantic was a sham, and that the parent/subsidiary relationship was only maintained "to protect the integrity of IAC's leases of aquaculture sites . . . ." *Id.* at 27. Atlantic was ordered to remove the fish it stocked. *Id.* at 34.

[165] Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,887–88.

[166] *Salmon I*, 215 F. Supp. 2d 239, 246–48 (D. Me. 2002); U.S. Pub. Interest Research Group v. Stolt Sea Farm, Inc., No. CIV.00-149-B-C, 2002 WL 240386, at *6–7 (D. Me. Feb. 19, 2002).

Under the "options evaluated and selected for proposal" section of the proposed rule, however, EPA's concerns seem rather limited.[167] EPA tested and selected two options for net pen systems: "Option 1 considered feed management and the BMP [best management practices] plan based on the HACCP [hazard analysis critical control point] approach. Option 2 considered reducing pollutant loads associated with feeding through the use of an active feed monitoring system."[168] EPA considered other technologies, but determined they were too expensive or impractical.[169] One approach, disinfection, was eliminated because "to be applied nationally would be cost prohibitive and would have imposed a severe adverse economic impact on this industry."[170]

From the options above, the effluent guidelines for net pens proposed by EPA were "BPT [best practicable control technology, currently available] limits on the basis of active feed monitoring (*i.e.*, additional solids removal) and the development of a BMP plan, and general reporting requirements for use of certain drugs and chemicals."[171] These standards would apply for "facilities that produce more than 100,000 pounds per year as the technology basis for the effluent limitations guidelines for existing sources in the proposed rule."[172]

EPA put forth this option as it believed that the cost of such measures is reasonable and it "represents the best performance that is economically achievable" for net pen operations in this category.[173] EPA limited the application of the rule to facilities producing over 100,000 pounds of aquatic animals per year because it found no net pen operations that produce less than that amount per year.[174] "If any facilities exist between the 20,000 and 100,000 pounds per year threshold, the facilities would be subject to existing NPDES regulations, and would be subject to permit limits based on the permit

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[167] *See* Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,895.

[168] *Id.* BMP stands for best management practices, while HACCP is shorthand for the hazard analysis critical control point approach. The HACCP aspect seems to translate, for net pen facilities, to "feed management and BMP plan development for solids control." *Id.*

[169] *Id.*

[170] *Id.* This elimination was not for net pen aquaculture facilities only, but was also cost prohibitive for other types of aquaculture systems. *See id.*

[171] *Id.* at 57,900.

[172] *Id.*

[173] Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,900.

[174] *Id.*

writer's 'best professional judgment' if the facility is a [CAAPF] under the regulations."[175]

Another benefit of the proposed rule not relating to water quality is that monitoring feed use can be used to reduce feed costs.[176] Indeed, "[s]almon feed is one of the most expensive elements in operating a salmon farm so aquaculturists continually search for ways to reduce the amount of feed used."[177] Thus, the combined goals of increased water quality and lower production costs can work to reduce the amount of excess feed present in the receiving waters.[178]

Due to the nature of the receiving waters of net pen facilities, EPA could find no better option for solids control than active feed monitoring,[179] leading to EPA's proposal of active feed monitoring as the most effective and cost reasonable technology for solids control.[180] EPA is, however, also considering the option of non-regulation for net pen facilities nationwide.[181] Even when considering that net pens are generally located in tidal areas that tend to flush out the system, non-regulation does not seem like an adequate solution because tides flow in as well as out.[182]

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[175] *Id.*

[176] *Id.* EPA recognizes the mutual benefit present here, as it has acknowledged that "[f]eed is the most expensive production input for most CAAP facilities." *Id.* at 57,879.

[177] ATL. SALMON OF ME., SALMON FARMING AND THE ENVIRONMENT, http://www.majesticsalmon.com/facts_ei.html (last visited Apr. 20, 2004).

[178] Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,879 ("Open water facilities offer little, if any, opportunity for treatment and removal of pollutants, such as excess feed, prior to discharge, thus feed management is a very important component of pollution control at net pen facilities.").

[179] *See id.* at 57,900–01. When compared to ponds, flow-through systems, and recirculating systems, net pen facilities offer even less in terms of opportunities to filter or otherwise remove solids once they are released into the open waters. *See id.* at 57,896–902. Ponds, flow-through systems, and recirculating systems allow a greater range of possible treatments for receiving waters as those waters are contained or channeled through a conduit of some sort, unlike net pens. *See id.*

[180] *Id.* at 57,900.

[181] *Id.* at 57,901.

[182] *See id.* at 57,900–01. The non-regulation option was not unique to net pen facilities; it was also considered as an option for flow through, recirculating, and pond system types of CAAPFs discussed in the proposed rule. *Id.* at 57,896–902. In relation to pond-based aquaculture production, however, the only option proposed was non-regulation, as no effluent guidelines were put forth. *Id.* at 57,902. This recommendation was "[b]ased on the information provided by the industry and permits issued to pond facilities" and the following factors: (1) very few pond systems meet the CAAPF definitions; (2) they "must have high water quality to produce aquatic animals;" and (3) surface runoff would then be of high quality. *Id.*

The option of non-regulation for net pen facilities may have been offered primarily to keep EPA's avenues for regulation open.[183] Due to possible "significant regional and facility-specific variations," EPA may decide it is best to continue to rely on the best professional judgment of permit writers.[184] Also, further study may reveal that the proposed measures are either too expensive or not effective enough, leading to the selection of the no national regulation option.[185] For these reasons, this option is preferred by the Joint Subcommittee on Aquaculture.[186]

These newly proposed rules are separate from the former definitions of what constitutes a CAAPF.[187] The proposed rules are intended to function as the effluent limitations guidelines and standards that were never proposed for CAAPFs, but only for those over a threshold of production higher than that originally established for the CAAPF point source category.[188] Currently, a CAAPF, as defined by regulation, is designated either at the discretion of the Administrator,[189] or based on its status of holding cold water species and producing over approximately 20,000 pounds of aquatic animals per year and feeding over approximately 5000 pounds of food during the month of maximum feeding.[190] The proposed rule, by way of contrast, takes effect only when the facility produces over 100,000 pounds of aquatic animals a year.[191] Thus, a significant gap exists between 20,000 and 100,000 pounds of aquatic animals per year where a facility could be a CAAPF/point source and not be covered by the proposed

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[183] *See id.* at 57,901.

[184] Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,901.

[185] *Id.* Again, these are *proposed* rules for which EPA is soliciting comments; they are also soliciting comments for the proposed best management practices (BMPs) relating to drug and chemical use, and the possible application of similar BMPs to pathogens and non-native species. *Id.*

[186] NORMANDEAU ASSOCS. & BATTELLE, ME. DEP'T OF MARINE RES., MAINE AQUACULTURE REVIEW 4 (2003), http://www.maine.gov/dmr/aquaculture/reports/MaineAquacultureReview.pdf (last visited Apr. 20, 2004).

[187] Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,875. "EPA does not propose to revise the NPDES regulation by today's action." *Id.* (citing 40 C.F.R. §§ 122.24, 122 app.C (2002)).

[188] *Id.*

[189] 40 C.F.R. § 122.24(c) (2002).

[190] *Id.* § 122 app. C. A similar definition for warm water fish species has higher weight limits. *Id; see supra* note 79.

[191] *See* Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,900.

effluent limitations.[192] While the proposed rule would act as guidance for permit writers regarding facilities below the new limits, this concern may be academic, because no known facilities currently exist in that range.[193]

Accordingly, the proposed rules for net pen facilities seem to call for very little to actually be done.[194] As "[e]xcess feed is the primary

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[192] *See* 40 C.F.R. § 122 app. C; Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,900.

[193] Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,900. Of the eight net pen facilities identified by EPA that fall under the CAAPF definition, none produces fewer than 100,000 pounds of aquatic animals; in fact, none produces fewer than 475,000 pounds of aquatic animals per year. *Id.* at 57,905. This probably explains, in part, why the proposed effluent guidelines would only take effect when a facility produces over 100,000 pounds. *See id.* at 57,900, 57,905. Another explanation may be that the costs of following the new regulations may become prohibitive if a facility produces aquatic animals at a level below the proposed threshold. Interview, *supra* note 39.

[194] *See* Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,889, 57,900–01. The proposed text of the regulations is as follows:

> Subpart C—Net Pen Systems
>
> § 451.30 Applicability.
>
> This subpart applies to the discharge of pollutants from a concentrated aquatic animal production facility that produces 100,000 pounds or more per year in net pen systems, except for net pen facilities located in the State of Alaska producing native species of salmon.
>
> § 451.31 Effluent limitations attainable by the application of the best practicable control technology currently available (BPT).
>
> Except as provided in 40 CFR 125.30 through 125.32, discharges from a net pen system subject to this subpart must achieve the following best management practice representing the application of BPT:
>
> (a) The permittee must maintain a real-time monitoring system to monitor the rate of feed consumption. The system must be designed to allow detection or observation of uneaten feed passing through the bottom of the net pens and to prevent accumulation.
>
> . . .
>
> § 451.35 Best Management Practices (BMPs).
>
> Any net pen system subject to this subpart must develop and implement a Best Management Practices (BMP) plan to achieve the following specific requirements:
>
> (a) The permittee must operate the facility so as to minimize the concentration of net-fouling organisms that are discharged, for example, changing and cleaning nets and screens onshore.
>
> (b) The following discharges into waters of the United States should be avoided to the maximum extent feasible:
>
> (1) Blood, viscera, fish carcasses, or transport water containing blood associated with the transport or harvesting of fish;
>
> (2) Substances associated with in-place pressure washing nets. The use of air-drying, mechanical, and other non-chemical procedures to control net fouling are strongly encouraged.

source of solids accumulation beneath net pens, which can have an adverse effect on the benthic community,"[195] the bottom line of the proposed rule of "active feed monitoring (*i.e.*, additional solids removal)" is that net pen facilities install underwater cameras or video monitoring devices to determine when uneaten food is falling to the sea floor.[196] This would be coupled with reporting requirements for certain drugs and chemicals used.[197] None of these options does anything to regulate the massive quantities of waste produced directly by the salmon.[198]

On examination, a great disparity exists between the violations of the CWA identified by the District Court of Maine and EPA's proposed rules.[199] The proposed rules were issued after the primary decisions against Atlantic and Stolt and before the injunction preventing Atlantic from introducing a new class of fish to its net pen facilities.[200] Atlantic and Stolt were determined to have violated the CWA because of the release of the following pollutants: (1) escaped fish; (2) salmon feces and urine; (3) feed and the chemicals added to it; (4) chemicals used to kill parasites; and (5) copper from the nets.[201]

The primary concern indicated in EPA's proposed rules, however, was excess feed, to be regulated by increased monitoring, and certain drugs and chemicals, covered by best management practices

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(c) The permittee must develop and implement practices to minimize the potential escape of non-native species.

(d) The following discharges from a net pen system into waters of the United States are prohibited:

(1) Feed bags and other solid wastes;

(2) Chemicals used to clean nets, boats or gear; and

(3) Materials containing or treated with tributyltin compounds.

Id. at 57,928.

[195] *Id.* at 57,889.

[196] *Id.* at 57,900; *see id.* at 57,889.

[197] *Id.* at 57,900.

[198] *See id.*

[199] *Compare Salmon I*, 215 F. Supp. 2d 239, 243–44, 246–49 (D. Me. 2002), *and* U.S. Pub. Interest Research Group v. Stolt Sea Farm, Inc., No. CIV.00-149-B-C, 2002 WL 240386, at *2–4, *6–7 (D. Me. Feb. 19, 2002), *with* Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,900–01.

[200] The first decisions against Atlantic and Stolt were issued on June 17, 2002. *Salmon I*, 215 F. Supp. 2d at 239; U.S. Pub. Interest Research Group v. Stolt Sea Farm, Inc., No. CIV.00-1490B0C, 2002 WL 1552165, at *1 (D. Me. June 17, 2002). The injunction was issued against Atlantic on February 13, 2003. U.S. Pub. Interest Research Group v. Atl. Salmon of Me., LLC, 243 F. Supp. 2d 2, 2 (D. Me. 2003). EPA's proposed rules for net pen facilities were issued on September 12, 2002. Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,872.

[201] *Salmon I*, 215 F. Supp. 2d at 247–48; *Stolt Sea Farm*, 2002 WL 240386, at *6–7.

and reporting requirements.[202] In outlining the other possible option for net pen systems, namely no regulation, EPA mentioned best management practices for non-native or escaped fish and pathogens.[203]

The apparent differences between these two approaches can be easily reconciled. The District Court of Maine was operating in a system where no NPDES or Maine Pollutant Discharge Elimination System (MEPDES) permits were distributed, and where no effluent limitations existed on which to base those permits.[204] Without any permits or applicable effluent limitations, Atlantic and Stolt could not discharge a pollutant while in compliance with the CWA.[205] Thus, under the CWA, the court had to determine what aspects of the facilities' discharges would be a pollutant.[206] This is not to say that EPA could not have drafted NPDES permits for Atlantic, Stolt, and other net pen facilities before effluent limitations were in place.[207] National effluent limitations would simply act as uniform guidelines for permit writers to follow.[208]

The effluent limitations proposed under the CWA seem rather easy to meet, if they have not been met already by CAAPFs in Maine.[209] Federal effluent limitations would simply serve as a floor to be respected by state permit programs.[210] Even so, these guidelines are only *proposed*, and permitting under the CWA is no longer administered by the federal government in Maine, but has been taken over by the state.[211] But, even in the absence of minimum federal effluent

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[202] Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. at 57,900.

[203] *Id.* at 57,901.

[204] *Salmon I*, 215 F. Supp. 2d at 245–46; *Stolt Sea Farm*, 2002 WL 240386, at *5.

[205] 33 U.S.C. §§ 1311(a), 1342(a)(1), (k) (2000); *Salmon I*, 215 F. Supp. 2d at 246; *Stolt Sea Farm*, 2002 WL 240386, at *5.

[206] *Salmon I*, 215 F. Supp. 2d at 246–49; *Stolt Sea Farm*, 2002 WL 240386, at *5–7.

[207] Natural Res. Def. Council, Inc. v. Costle, 568 F.2d 1369, 1379 (D.C. Cir. 1977) "In sum, we conclude that the existence of uniform national effluent limitations is not a necessary precondition for incorporating into the NPDES program pollution from agricultural, silvicultural, and storm water runoff point sources." *Id.* In fact, a permit was issued for a salmon net pen facility to be cited in Maine's coastal waters. LINDA M. MURPHY, ENVTL. PROT. AGENCY, PERMIT NO. ME0036234, AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (2002) (on file with author). While the facility in Acadia was never operational, the federal permit set effluent limitations, monitoring requirements, feed and sediment requirements, requirements for notice regarding certain discharges, and other impact limitations. *See id.*

[208] *Costle*, 568 F.2d at 1378–79.

[209] *See supra* notes 193–200 and accompanying text.

[210] *Costle*, 568 F.2d at 1378.

[211] *Salmon I*, 215 F. Supp. 2d at 260 n.25 ("In January 2001, the EPA granted the State of Maine the authority to issue NPDES permits in the state."); Final Approval of the Maine

guidelines, Maine's permitting authority is not supreme, as EPA can object to permits issued and, if the problem is not fixed, reassume its role as the issuer of permits.[212]

It would seem that if the Maine Department of Environmental Protection (DEP) issued a permit for Atlantic's discharges, and EPA did not object, an injunction against Atlantic would likely be moot.[213] The District Court of Maine and the First Circuit did not agree with this assessment.[214] Surprisingly, the First Circuit upheld the injunctive relief granted by the district court, despite the fact that it was more stringent than the permit issued by the DEP.[215]

If enforcement of the CWA in Maine was still under federal authority, and the proposed regulations were final, it is very likely that Atlantic would be in compliance.[216] Atlantic already monitors feeding by video cameras, and stops or adjusts feeding when uneaten pellets are viewed.[217] Also, Stolt and Atlantic were both part of a monitoring program headed by the Maine Department of Marine Resources, with which EPA was involved.[218]

The DEP has developed a "general permit that could cover many of the State's existing and new aquaculture facilities to bring them into compliance with federal statutes."[219] This permit, even if it followed proposed regulations described above, would not be in line with the intent of the CWA, because the large disposal of pollutants by

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Pollutant Discharge Elimination System Under CWA, 66 Fed. Reg. 12,791, 12,792 (Feb. 28, 2001) (calling the Maine issued permits MEPDES permits).

[212] Final Approval of the Maine Pollutant Discharge Elimination System Under CWA, 66 Fed. Reg. at 12,792.

[213] *See* 33 U.S.C. §§ 1311(a), 1342(b) (2000).

[214] *Salmon III*, 257 F. Supp. 2d 407 (D. Me.), *aff'd*, 339 F.3d 23 (1st Cir. 2003).

[215] *Salmon IV*, 339 F.3d at 35; *see* discussion *supra* Part II.G. The First Circuit held that as "the companies have violated the statute . . . nothing in the shield provision's language directly addresses the question whether and when in such a situation the district court's authority gives way to the agency's." *Salmon IV*, 339 F.3d at 31. As the district court's injunction was issued before the general permit, remedied harm for past violations, and did not reduce the environmental protection provided by the permit, the injunctive relief could stand despite the conflicts between the general permit and the injunctive relief. *Id.*

[216] Effluent Limitation Guidelines for CAAPFs, 67 Fed. Reg. 57,872, 57,889, 57,900 (proposed Sept. 12, 2002) (to be codified at 40 C.F.R. pt. 451).

[217] ATL. SALMON OF ME., *supra* note 178. Stolt may also operate in a similar manner, however, information as to its feeding practices was limited to descriptions in the available caselaw.

[218] *Salmon I*, 215 F. Supp. 2d 239, 260 n.24 (D. Me. 2002); U.S. Public Interest Research Group v. Stolt Sea Farm, Inc., No. CIV.00-149-B-C, 2002 WL 240386, at *16 n.23 (D. Me. Feb. 19, 2002).

[219] NORMANDEAU ASSOCS. & BATTELLE, *supra* note 187, at 3.

net pen facilities allowed by this permit is contrary to the vision of restoring and maintaining the integrity of waters of the U.S.[220]

A study conducted to demonstrate the amount of nitrogen, phosphorus, and biological oxygen demand (or sewage) created by a salmon net pen facility proves this point.[221] In this study, the director of the University of Idaho's Hagerman Fish Culture Experiment Station determined that a fish farm of 200,000 salmon would produce an amount of nitrogen, phosphorus, and biological oxygen demand (or fecal matter) equal to that produced by 15,000, 26,667, and 62,505 people, respectively, per day.[222] This "nutrient loading" stems from organic wastes that "may include uneaten food, feces, urine, mucus, and dead fish."[223]

"[C]urrently there are 26 active pen sites and 45 permitted pen sites, and on average, the number of fish per site is 350,000."[224] Judging by those numbers, Maine had approximately 9.1 million salmon in its marine net pen sites.[225] Based on the above calculation for salmon waste, 9.1 million fish would yield a release of: nitrogen equal to the untreated sewage of 682,500 people; phosphorus equal to the untreated sewage of more than 1.2 million people; and fecal matter equal to the untreated sewage of over 2.8 million people.[226]

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[220] *See* 33 U.S.C. § 1251(a) (2000). This is assuming that the option of no regulation is not selected; the no regulation option would, obviously, follow the CWA's intent to an even lesser degree. *See id.*

[221] Ronald W. Hardy, *Fish Feeds and Nutrition—Urban Legends and Fish Nutrition*, AQUACULTURE MAG., Nov.–Dec. 2000, at 47, 47–50, http://www.aquaculturemag.com/siteenglish/printed/archives/issues00/00articles/ND2000Urban.pdf (last visited Apr. 20, 2004). This article was actually written to argue against the "urban legend" that a *single* salmon farm produces "the same amount of sewage, meaning nitrogen, phosphorus, and biological oxygen demand" as *1.5 million people. Id.* (emphasis added). For the source of this "urban legend," see GOLDBURG & TRIPLETT, *supra* note 7, at 38. These authors actually state that "[d]ischarges from *the many salmon farms* along the coast of British Columbia are a significant pollution source, estimated to be equivalent to raw human sewage from a city of *500,000 people.*" *Id.* (emphasis added).

[222] Hardy, *supra* note 223, at 48–50. The amount of nitrogen was actually calculated to be equivalent to that produced by 19,800 people per day, but was rounded down to exclude other sources of nitrogen. *Id.*

[223] GOLDBURG ET AL., *supra* note 12, at 13. The District Court of Maine termed fish, feces, urine, feed, and other matters leaving the net pens and entering the waters pollutants. *Salmon I*, 215 F. Supp. 2d at 247–48; *Stolt Sea Farm*, 2002 WL 240386, at *6–7.

[224] Indemnity for Infectious Salmon Anemia, 67 Fed. Reg. 17,605, 17,608 (proposed Apr. 11, 2002) (interim rule). This was the most recent, and the highest, estimate for the number of salmon in Maine. *See id.*

[225] *See id.*

[226] *See id.*; Hardy, *supra* note 223, at 48–50. This calculation assumes that the sewage released by salmon increases at a consistent rate corresponding with the increasing number of salmon, e.g., a farm of 400,000 salmon would release double the amounts of nitrogen,

These numbers are quite staggering, especially when compared to Maine's 2001 population of less than 1.3 million people.[227] The numbers are also deceiving, because nearly all of Maine's salmon farms are nestled in Washington and Hancock counties at the eastern end of the state.[228] The total population of these two counties was estimated to be 85,909 in 2001.[229] Based on these statistics, Washington and Hancock counties could dispose all of their human waste directly into the sea and it would be a small addition to the waste currently being disposed in these counties by net pen facilities without any treatment.[230] Monitoring excess feed alone, even "actively," does not seem to be enough.

B. *A Potential Lack of Focus on the Tenets of the Endangered Species Act*

While the FWS seemed to set out more strict regulations concerning escaped fish and pollutants under the ESA,[231] in delegating NPDES permitting authority to Maine, EPA did not see its action as "likely to jeopardize the continued existence of the wild Atlantic salmon."[232] Whether that is the case, EPA has a duty to ensure that Maine will maintain conditions that protect Atlantic salmon in its permitting under the CWA, and must object if Maine fails to meet that requirement in distributing permits.[233]

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phosphorus, and biological oxygen demand calculated by Dr. Hardy. *See supra* note 217 and accompanying text.

[227] U.S. CENSUS BUREAU, STATE & COUNTY QUICK FACTS, MAINE (2000), http://quickfacts.census.gov/qfd/states/23000.html (last visited Apr. 20, 2004).

[228] Indemnity for Infectious Salmon Anemia, 67 Fed. Reg. at 17,608.

[229] *See* U.S. CENSUS BUREAU, STATE & COUNTY QUICK FACTS, MAINE (2000), http://quickfacts.census.gov/qfd/states/23/23029.html (last visited Apr. 20, 2004) (setting out 33,573 as the estimated 2001 population of Washington County); U.S. CENSUS BUREAU, STATE & COUNTY QUICK FACTS, MAINE (2000), http://quickfacts.census.gov/qfd/states/23/23009.html (last visited Apr. 20, 2004) (setting out 52,336 as the estimated 2001 population of Hancock County).

[230] *See* U.S. CENSUS BUREAU, STATE & COUNTY QUICK FACTS, MAINE (2000), http://quickfacts.census.gov/qfd/states/23/23029.html (last visited Apr. 20, 2004); U.S. CENSUS BUREAU, STATE & COUNTY QUICK FACTS, MAINE (2000), http://quickfacts.census.gov/qfd/states/23/23009.html (last visited Apr. 20, 2004); Hardy, *supra* note 223, at 48–50.

[231] Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. 69,459, 69,479 (Nov. 17, 2000) (codified at 50 C.F.R. pt. 17).

[232] Final Approval of the Maine Pollutant Discharge Elimination System Under CWA, 66 Fed. Reg. 12,791, 12,793 (Feb. 28, 2001).

[233] *Id.* at 12,794 (noting, however, that "[n]o critical habitat has been designated for this species, therefore none will be affected").

At this point the issues become difficult to reconcile. The U.S. aquaculture industry has experienced rapid growth:

> Maine production increased from less than 500,000 smolt stocked and 2,000 metric tons produced annually before 1990 to over four million smolt stocked and up to 15,000 metric tons . . . produced annually by 1998. There is a standing crop of about six million sub-adult salmon in pens in eastern Maine.[234]

This production takes place through "12 companies . . . with 773 cages covering 800 leased acres of water."[235] As of 2001, Maine's production of salmon was valued at $101 million, and in excess of 32.6 million pounds per year.[236] Nearly 1000 people are directly employed by this industry, with 2500 others in employment that directly depend on it.[237]

To help preserve this aspect of Maine's, and the U.S., economy, and because Maine did not have sufficient funding or staff, the federal government stepped in to help maintain net pen aquaculture against the ISA virus which struck in 2001.[238] The primary reason for the federal intervention was to encourage salmon producers to follow an ISA control program by indemnifying salmon producers for destroyed fish.[239] The following additional reasons for intervention cited

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[234] Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. at 69,471.

[235] *Id.* at 69,477. These numbers lead to a total of 9.1 million salmon in Maine, higher than the six million figure given above, and were used in calculations earlier in this Note. *See id*; *see supra* text accompanying notes 217–224.

[236] Declaration of Emergency Because of Infectious Salmon Anemia, 66 Fed. Reg. 65,679, 65,679 (Dec. 20, 2001). The total value of *all* Maine's aquaculture production in 1998 was $66.6 million, with salmon supplying $64.1 million of the total; in 1997, it was second only to lobster in terms of value for marine harvests. GOLDBURG ET AL., *supra* note 12, at 3; GOLDBURG & TRIPLETT, *supra* note 7, at 155. Unfortunately, EPA did not update these figures. *See generally* Declaration of Emergency Because of Infectious Salmon Anemia, 66 Fed. Reg. at 65,679 (failing to update the value of the salmon harvest as compared to that of lobsters).

[237] Indemnity for Infectious Salmon Anemia, 67 Fed. Reg. 17,605, 17,608 (proposed Apr. 11, 2002) (interim rule).

[238] Declaration of Emergency Because of Infectious Salmon Anemia, 66 Fed. Reg. at 65,679.

[239] Indemnity for Infectious Salmon Anemia, 67 Fed. Reg. at 17,605. This was in response to the concern that net pen producers would be less likely to report the virus and destroy infected fish if the incentive of partial indemnification was not offered; and, if ISA went unreported, this would jeopardize the success of the control program, and net pen aquaculture in Maine. *Id.*; Declaration of Emergency Because of Infectious Salmon Anemia, 66 Fed. Reg. at 65,679. The number of fish destroyed or "depopulated" was 1.42 million, and the preliminary amount of the indemnity was nearly $4.5 million; "depopulation"

by the Department of Agriculture were related to competition: Canada indemnified its salmon farmers and greatly reduced incidents of the ISA virus over a three-year period through a "comprehensive program"; and Chile and the European Union had banned the import of salmon eggs from anywhere in the United States.[240]

The control program required disease surveillance, site-specific action plans, a provision of fish inventory, and a control program for sea lice—a type of parasite which is "generally regarded as capable of transmitting ISA."[241] When fish are crowded together in high densities, with net pen conditions being a prime example, it is an ideal situation for rapid transmission of parasites such as sea lice.[242] Studies in Norway have demonstrated that *wild* salmon become infected with sea lice during migration, "with the highest infection levels occurring in salmon-farming areas."[243] Even though sea lice are common, epidemics have developed in wild salmon in every country that produces significant amounts of farmed salmon.[244]

Harm to the endangered Atlantic salmon, illegal under the ESA, is likely to occur under current conditions in net pen aquaculture. Combined with the potential for salmon in net pen facilities to spread the ISA virus to endangered Atlantic salmon through sea lice is the constant, but more subtle, danger posed by escaped salmon.[245] Limitations set by the ESA to protect Atlantic salmon become relatively worthless—and lead to competition with and dilution of the endangered Atlantic salmon—if they are: (1) unable to be enforced, as demonstrated by the continued escapes of farmed salmon and outbreaks of disease, both harmful to endangered Atlantic salmon; and (2) subsumed by the current Maine permitting process that could easily result in weak effluent guidelines, as evinced by the possibility of

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is viewed as the "single most effective way to eliminate ISA." Indemnity for Infectious Salmon Anemia, 67 Fed. Reg. at 17,608–09.

[240] Declaration of Emergency Because of Infectious Salmon Anemia, 66 Fed. Reg. at 65,679.

[241] Indemnity for Infectious Salmon Anemia, 67 Fed. Reg. at 17,607. There are actually two species of sea lice; both "infest Atlantic salmon and live in the mucus layer, where they attach and suck blood or cause sores." *Id.* It is the larger species that is believed to transmit the ISA virus. *Id.*

[242] *See* GOLDBURG & TRIPLETT, *supra* note 7, at 163 (stating, however, that Atlantic salmon are generally quite healthy, and migrate past the net pens at times when it is likely that the sea lice problem is at a very low level).

[243] GOLDBURG ET AL., *supra* note 12, at 9.

[244] *Id.*

[245] Final Endangered Status for Anadromous Atlantic Salmon, 65 Fed. Reg. 69,459, 69,479 (Nov. 17, 2000) (codified at 50 C.F.R. pt. 17).

meaningless federal effluent guidelines, leading to the more indirect harm through a polluted habitat.[246]

By enforcing the district court's injunctive relief and denying Atlantic and Stolt's claim that they should only be governed by the MPDES general permit, the First Circuit's actions were in harmony with the purpose of the ESA.[247] The general permit issued by the DEP does very little to protect the endangered Atlantic salmon.[248] According to the DEP's general permit, "non-native salmon can be re-stocked until July 31, 2004; thereafter the stocking must be of native salmon unless the permit holder proves that native stock is not available in sufficient quantities to match the farm's prior stocking level based on historical data."[249] The injunctive relief, clearly more protective of the endangered Atlantic salmon, bans the stocking of non-native salmon, bans any future stocking immediately, requires a greater period of fallowing for net pens, and allows only a single year class of salmon to be in a pen at a time.[250] Because of the weakness of the DEP's permit regarding non-native species, the ESA would likely forbid it.

Atlantic argued that a rule as stringent as that of the district court would put it out of business.[251] Because of its reliance on European salmon, "[i]t would take four years for [Atlantic] to grow a new brood stock of North American salmon to replace" its current stock.[252] If Atlantic was lost as an employer, the local community would feel the effects: "[s]almon farms make up 15 percent of the city's property-tax base, and many of the industry's 1,200 jobs belong to Eastport citizens."[253] Despite considering Atlantic's financial woes and the pendency of the general permit, the district court had no sympathy for Atlantic, stating that "[i]t is the Court's perception that [Atlantic]'s

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[246] *See* Final Approval of the Maine Pollutant Discharge Elimination System Under CWA, 66 Fed. Reg. 12,791, 12,793 (Feb. 28, 2001); Beth Daley, *Escaped Farm Salmon Raise Alarm in Maine*, BOSTON GLOBE, Feb. 23, 2001, at A1 (citing the escape of 100,000 salmon from Atlantic's pens during a winter storm, along with other escapes). Both the FWS and EPA, however, are demanding the marking or tagging of net pen fish to allow tracing of escapees and the phasing out of European or European-hybrid salmon. Interview, *supra* note 39.

[247] *See Salmon IV*, 339 F.3d 23, 34–35 (1st Cir. 2003); discussion *supra* Part II.G.

[248] *See Salmon IV*, 339 F.3d at 30.

[249] *Id.*

[250] *Id.* at 29–30. The general permit covers all Maine salmon farming operations. *Id.* at 27. USPIRG has challenged this general permit, but it is unlikely that the trial will begin until the spring of 2004. *Id.*

[251] *Salmon II*, 261 F. Supp. 2d 17, 23 (D. Me. 2003).

[252] John Richardson, *Impact of Ruling on Hybrid Fish Assessed*, PORTLAND PRESS HERALD, May 30, 2003, at 1B.

[253] *Id.*

leadership has single-mindedly pursued a policy, in the interests of the company's economic well being and future profitability, of frustrating the fruition of all efforts by the regulatory authorities, such as they have been, and by this Court to secure its compliance."[254]

C. *Other Significant Aspects of Aquaculture*

Combined with concerns stemming from excess feed given to net pen salmon are the concerns associated with the source of that food. Because salmon are carnivorous fish, current feeding patterns rely heavily on protein from fish meal and fish oil.[255] The fish meal and fish oil comes from small, wild-caught fish.[256] Producing one pound of salmon requires 2.44 pounds of fish meal and fish oil.[257] Thus, the production of farmed salmon does not reduce the pressure on wild fisheries, which is a significant problem.[258]

Due to the shrinking resources of wild fisheries and despite the rapid expansion of aquaculture, the United States still does not produce all of the seafood that it consumes.[259] Between 1989 and 1998, the production of Atlantic salmon by facilities in the United States increased 468%.[260] The federal government has invested heavily in aquaculture, both through indemnifying CAAPFs for the salmon that had to be destroyed due to ISA,[261] and funding aquaculture through

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[254] U.S. Pub. Interest Research Group v. Atl. Salmon of Me., LLC, 262 F. Supp. 2d 1, 3 n.1 (D. Me. 2003).

[255] GOLDBURG & TRIPLETT, *supra* note 7, at 8. For salmon, from fifty to seventy percent of feed is made from fish meal and fish oil. *Id.* at 27.

[256] *Id.* at 8.

[257] *Id.* at 11.

[258] *Id.* at 8. "Twenty-seven percent . . . of the world's total wild fisheries production is now converted to animal feeds." Fifteen percent of this is used for feeding fish. *Id.* As of 2002, pressure on worldwide wild fish stocks continued to increase: 25% of major marine fish stocks were under, or moderately, exploited; 47% were at maximum sustainable limits; 18% were overexploited; and 10% were significantly depleted. UNITED NATIONS, FOOD AND AGRICULTURE ORGANIZATION, THE STATE OF WORLD FISHERIES AND AQUACULTURE 22–23 (2002), http://www.fao.org/docrep/005/y7300e/y7300e00.htm (last visited Apr. 20, 2004). "More than 70 percent of commercial fish stocks are now considered fully exploited, overfished or collapsed." William J. Broad & Andrew C. Revkin, *Has the Sea Given up its Bounty?*, N.Y. TIMES, July 29, 2003, at F1. "Recent studies estimate that stocks of many fishes are now a tenth of what they were 50 years ago . . . . Industry calls it 'biomass extraction' and turns the harvest into everything from fish sticks to protein concentrates for livestock or pellets to feed cage-raised salmon." *Id.*

[259] GOLDBURG & TRIPLETT, *supra* note 7, at 8.

[260] GOLDBURG ET AL., *supra* note 12, at 2.

[261] Indemnity for Infectious Salmon Anemia, 67 Fed. Reg. 17,605, 17,608–09 (proposed Apr. 11, 2002) (interim rule).

the U.S. Department of Agriculture and the National Oceanic and Atmospheric Administration.[262] Despite this, the trade deficit for United States in seafood is $6.2 billion.[263]

CONCLUSION

The proposed national effluent guidelines and the DEP's general permit are too weak to accomplish the purposes of the CWA or the ESA. While the national guidelines could serve as a baseline, allowing the real regulation of Maine's net pen aquaculture facilities to be determined by Maine, effective regulation needs to take more into account than EPA has considered. While Atlantic and Stolt have been enjoined from introducing a new class of salmon[264] and Heritage can farm salmon in accordance with a settlement, the DEP's general permit will allow other salmon facilities to operate under ineffectual standards. While these practices do not conform with the purposes of the CWA, discharges in accordance with a MEPDES permit are allowed. Since these net pen facilities are arguably worth the environmental costs, the focus should be on aspects of production that can be beneficially altered.

The massive quantity of waste produced by the salmon in Maine's waters is the least likely aspect of salmon production to be changeable. If this untreated effluent is determined to be a minor harm, regulation should instead focus on practices that would be worthwhile to change. In order to better protect the endangered Atlantic salmon, only Atlantic salmon should be raised in net pens, and greater care should be placed on ensuring that escapes are minimized. To increase water quality and reduce harm to the ocean floor under the net pens, sites should be fallowed more often and excess nutrient loading, such as excess feed and dead fish, should be removed. For overall benefits to water quality and endangered Atlantic salmon, the densities of stocked net pens should be reduced. This could reduce the spread and occurrence of disease, minimize the need for the addition of antibiotics and drugs to the receiving waters, and diminish the harm to the benthos through a decreased concentration of the wastes it absorbs.

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[262] GOLDBURG ET AL., *supra* note 12, at 22. The U.S. Department of Agriculture has $50 million budgeted for aquaculture, while the National Oceanic and Atmospheric Administration has budgeted "roughly 12 million to 14 million dollars." *Id.*

[263] *Id.* at 2.

[264] Stolt decided against introducing a new class of salmon and did not require the contempt proceedings that were initiated against Atlantic.

A complete halt to the net pen industry would be an undesirable outcome to this situation. If the facilities are simply permitted as they now exist, however, and continue the same aquaculture practices, a successful suit under the ESA is possible. Such a suit could lead to a complete shut down of net pen aquaculture in Maine, especially when considering that the ESA explicitly does not contemplate a balancing of the equities for injunctions, which the District Court of Maine contemplated before granting the injunction under the CWA. Thus, not surprisingly, Maine, along with Atlantic, Stolt, and others, fought the listing of Atlantic salmon as an endangered species.

The growing demand for farmed fish, along with increased employment opportunities and revenue produced by aquaculture in Maine should be encouraged and developed in the United States without dismissing environmental concerns. Otherwise, the United States will continue to import the majority of farmed fish from other nations that lack environmental regulation. That would be an unwanted outcome, environmentally and economically.