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Cured Salmon?: An EPA Proposal to Regulate Pollution Produced by Salmon Farms

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COMMENT

CURED SALMON?:

AN EPA PROPOSAL TO REGULATE POLLUTION PRODUCED BY SALMON FARMS

INTRODUCTION

The United States (hereinafter "U.S.") government aggressively promotes the salmon farming industry, yet the industry is not uniformly environmentally regulated.[1] Salmon farms discharge chemical and organic waste into coastal and offshore waters that can result in severe environmental degradation.[2] Specifically, the harm inflicted on the seafloor can be extensive.[3] Although a patchwork of state and federal regulations apply to aquaculture, few, if any, were passed specifically for aquaculture.[4] The Environmental Protection Agency (hereinafter "EPA") has recently proposed a new federal regulation, under the Clean Water Act (hereinafter "CWA"), that would establish national effluent limitations for the concentrated aquatic animal production point source category.[5] If finalized,

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[1] Rebecca J. Goldburg, Matthew S. Elliot, Rosamond L. Naylor, PEW Oceans Commission, *Marine Aquaculture in the United States: Environmental Impacts and Policy Options*, at 2-4, 20-22 (1999) [hereinafter PEW Report].

[2] *Id.* at 12-17.

[3] *Id.* at 13.

[4] *Id.* at 22.

[5] Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category, 67 Fed. Reg. 57,872 (proposed Sept. 12, 2002) (to be codified at 40 C.F.R. pt. 451).

"Effluent limitation means any restriction established by a State or the Administrator on quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters,

the regulation would mark the first time the federal government placed uniform limitations on salmon farms.[6]

This Comment discusses the growth of net pen salmon farming and the ability of the CWA to keep up with this rapidly expanding industry. This Comment also examines the EPA's proposal to establish national effluent limits for salmon net pen farms and strategies that can be used to ensure that these farms do not cause harm to the fragile environment of the coastal seafloor. Part I provides a snapshot of the current state of the world's fisheries and the modern history of aquaculture.[7] This part also examines the growth of the industry in the U.S. and Europe, as well as government programs that have led to the dramatic rise in total aquaculture production.[8] Additionally, this part looks at whether governments have given priority to the economic growth of aquaculture over the protection of the environment.[9] This part also discusses the modern development and growth of salmon farming, its methods and practices, and environmental impacts.[10] Part II tracks the progress of environmental enforcement actions.[11] This part outlines a brief history of common law remedies to abate pollution from industries.[12] Part II further discusses the CWA, specifically

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the waters of the contiguous zone, or the ocean, including schedules of compliance." 33 U.S.C. § 1362 (11) (2000).

"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." 40 C.F.R. § 122 App. C (2003).

[6] Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category, 67 Fed. Reg. 57,872.

[7] *See infra* notes 18-27.

[8] *See infra* notes 28-48.

[9] *See infra* notes 49-63.

[10] *See infra* notes 64-108.

[11] *See infra* notes 109-121.

[12] *See infra* notes 108-122.

section 402, the National Pollution Discharge Elimination System (hereinafter "NPDES"), and its use to control pollution at animal production farms.[13] Part III analyzes section 403 of the CWA and its possible use in controlling the discharge of pollution into U.S. waters.[14] Furthermore, Part III examines the current regulations and agencies that influence salmon net pen farms.[15] The focus of this section, however, is on the EPA's new effluent guideline proposal for concentrated aquatic animal production facilities.[16] Lastly, Part IV dissects the EPA's reasons for possibly not finalizing the proposed guidelines and concludes that the guidelines should be finalized.[17]

I. BACKGROUND

A. DECLINE OF WILD FISH STOCKS AND THE RISE OF AQUACULTURE

The world's demand for fish has grown steadily for many years, and the pressure placed on fish populations has resulted in devastating losses of wild fish.[18] Currently, the Coho, Chinook, Chin, and Sockeye species of salmon are on either the EPA's threatened species list or its endangered species list.[19] Over sixty-five percent of the world's fish stocks are either over-exploited or fully exploited, while another ten percent are considered depleted or recovering from depletion.[20] The contributing factors to the depletion of wild fish population are

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[13] *See infra* notes 127-164.

[14] *See infra* notes 165-184.

[15] *See infra* notes 185-188.

[16] *See infra* notes 198-209.

[17] *See infra* notes 210-240.

[18] *See generally,* United Nations Food and Agriculture Organization, *State of the World Fisheries and Aquaculture 2002*, *available at* http://www.fao.org/docrep/005/y7300e/y7300e04.htm#P3_47 (last visited Mar. 12, 2004) [hereinafter UNFAO, *World Fisheries*]. "[F]ishing overcapacity and the global reach of fishing operations continue to have deleterious effects on fish stocks." *Id.*

[19] 50 C.F.R. § 17.11 (2003).
"Endangered species" is "any species which is in danger of extinction throughout all or a significant portion of its range..." 16 U.S.C. § 1532 (6) (2000).
"Threatened species" is "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." 16 U.S.C. § 1532 (20) (2000).

[20] *See* UNFAO, *World Fisheries*, *supra* note 18.

overfishing, pollution, and habitat destruction.[21] The development of aquaculture sought to ease the burden on fish stocks while satisfying our ever-growing appetite for fish.[22]

Modern aquaculture began in Germany in 1733.[23] A farmer gathered and fertilized trout eggs and raised the fish until they reached adult stage.[24] As technology advanced, people were able to cultivate larger fish with more complex life cycles.[25] Today, aquaculture includes the cultivation of everything from seaweed to salmon.[26] Despite these early advancements, the U.S. did not participate in aquaculture on any significant level until catfish farming began in the 1950's.[27]

1. *The Growth of Aquaculture in the United States and Europe*

Since the 1950's, U.S. aquaculture has grown exponentially.[28] In 1985, total aquaculture production was approximately 193,430 tons of fish and shellfish, worth over $300 million.[29] Just fourteen years later, in 1999, the figures rose to 420,999 tons of fish and shellfish production, worth over $987 million.[30] With these huge and rapid gains, U.S. aquaculture production has grown to represent ten to fifteen percent of the total domestic seafood supply.[31]

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[21] David Suzuki Foundation, *Oceans and Fishing: Sustainable Fishing*, *available at* http://www.davidsuzuki.org/Oceans/Fishing/ (last visited Mar. 12, 2003) [hereinafter DSF, *Sustainable Fishing*].

[22] *See* World Aquaculture, *What is Aquaculture?*, *available at* http://www.newmex.com/platinum/data/light/whatis/whatis.html (last visited Mar 12, 2004).

Aquaculture is the cultivation of the natural produce of the water (as fish or shellfish). *Id.*

[23] *Id.*

[24] *Id.*

[25] *Id.*

[26] *See* Rebecca Goldburg, Tracy Triplett, *Murky Waters: Environmental Effects of Aquaculture in the U.S.* 19 (Environmental Defense Fund) (1997), *available at* http://www.environmentaldefense.org/documents/490_AQUA.PDF (last visited Mar. 12, 2004) [hereinafter Goldburg & Tripplett].

[27] *Id.* at 21.

[28] *Id.*

[29] United States Joint Subcommittee on Aquaculture, *U.S. Private Aquaculture Production for 1985-1999* (2001), *available at* http://ag.ansc.purdue.edu/aquanic/jsa/aquaprod.htm (last visited Mar. 12, 2004) [hereinafter USJSA].

[30] *Id.*

[31] Goldburg & Triplett, *supra* note 26, at 21.

Much of this growth can be attributed to the National Aquaculture Act (hereinafter "NAA") of 1980.[32] The purpose of the NAA is to increase aquaculture production through the coordination of "aquaculture efforts," both in the public and private sector.[33] The NAA created the Joint Subcommittee on Aquaculture (hereinafter "JSA"), which coordinated the roles of the United StatesDepartments of Agriculture (hereinafter "USDA"), Interior (hereinafter "DOI"), and Commerce (hereinafter "DOC").[34] The USDA, DOC, and DOI established an interagency Memorandum of Understanding to promote and encourage aquaculture.[35]

One program promulgated as a result of the Memorandum of Understanding was the Fisheries Finance Assistance Program (hereinafter "FFAP").[36] This program distributed $6 million in aquaculture guarantees during the 1994 fiscal year.[37] At the time, it was estimated that the majority of this program's twenty-five million dollar fiscal year 1995 loan authority was going to be used on aquaculture production.[38] Overall, the aquaculture industry received at least sixty million dollars in assistance from the government in 1994.[39] The DOC's vision for U.S. aquaculture is to help create a "highly competitive" industry in an "environmentally friendly manner" and with "maximum opportunity for profitability in all sectors of the industry."[40] By 2025, the DOC wants aquaculture production to generate five billion dollars annually and increase the number of jobs in the industry from the present figure of 180,000 to 600,000.[41] Production and economic data indicate the DOC is successfully implementing its strategy.[42]

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[32] 16 U.S.C. § 2801-2810 (2000).

[33] 16 U.S.C. § 2801(b)(2000).

[34] 16 U.S.C. § 2805 (2000).

[35] National Marine Fisheries Service, *NOAA's Aquaculture Policy*, *available at* http://swr.nmfs.noaa.gov/fmd/bill/aquapol.htm (last visited Mar. 12, 2004).

[36] *Id.*

[37] *Id.*

[38] *Id.*

[39] *See* Goldburg & Triplett, *supra* note 26, at 25.

[40] United States Department of Commerce, *U.S. Department of Commerce Aquaculture Policy*, *available at* http://www.lib.noaa.gov/docaqua/docaquapolicy.htm (last visited Mar. 12, 2004).

[41] *Id.*

[42] *See* USJSA, *supra* note 29. Aquaculture production more than doubled in weight between 1985 and 1999. *Id.*

Worldwide statistics of aquaculture growth are striking.[43] Globally, aquaculture's contribution to supplies of fish, crustaceans, and mollusks has increased from 3.9% of total production by weight in 1970 to 27.3% of total production by weight in 2000.[44] Aquaculture is increasing more rapidly than any other animal food-producing sector.[45] In the European Union (hereinafter "EU"), aquaculture production has increased from 642,000 tons in 1980 to 1,315,000 tons in 2000.[46] Like the U.S., the EU is promoting aquaculture with the hope of providing jobs.[47] The EU strategy calls for an increase of 8,000 to 10,000 jobs between the years 2003 and 2008.[48] To accomplish this increase, the EU is looking to boost production four percent a year, develop new markets, improve control over aquaculture, and resolve conflicts over space.[49]

2. *U.S. and EU Attitude Toward Salmon Farming: Economics over Environment?*

Salmon, for both Europe and the U.S., has been the species of fish that has led the latest boom in aquaculture.[50] Astonishingly, between 1984 and 1995 farmed Atlantic salmon production in Europe increased 1,236%.[51] Atlantic salmon production in the U.S. has grown from nothing in 1985 to more than 14,000 metric tons in 1999.[52] The total value for U.S. Atlantic salmon in 1999 was $75 million.[53] One reason for the huge rise

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[43] *See* UNFAO, *World Fish*eries, *supra* note 18.

[44] *Id.*

[45] *Id.*

[46] *A Strategy for the Sustainable Development of European Aquaculture*: Communication from the Commission to the Council and the European Parliament, COM (02)511(2002) final at 3 *available at* http://europa.eu.int/eur-lex/en/com/cnc/2002/com2002_0511en01.pdf (last visited Mar. 12, 2003). [hereinafter *Sustainable Development of European Aquaculture*]

[47] *Id.*

[48] *Id.*

[49] *Id.*

[50] *See* United Nations Food and Agriculture Organization, *Fisheries Department Review of the State of World Aquaculture, Europe, available at* http://www.fao.org/docrep/003/w7499e/w7499e15.htm (last visited Mar. 14, 2004) [hereinafter UNFAO, *Fisheries Department*]. *See also*, Goldburg & Triplett, *supra* note 26, at 22.

[51] *See* UNFAO, *Fisheries Department*, *supra* note 50.

[52] *See* Goldburg & Triplett, *supra* note 26, at 22.

[53] *Id.*

in Atlantic salmon production is its price per pound.[54] In 1997, farmed Atlantic salmon was thirteenth in the world in terms of production, but it was fifth in the world in terms of value.[55]

In shaping its aquaculture policy, the U.S. government appears to favor encouraging positive economic impacts rather than minimizing harmful environmental impacts.[56] The JSA's vision for U.S. aquaculture is to make it competitive on a worldwide scale.[57] Of the eleven "Goals and Opportunities" enumerated by JSA, only one addresses "responsible environmental stewardship."[58] The remaining goals of the JSA refer to increasing production, marketing, and profitability of the aquaculture industry.[59] The U.S. is not alone in placing economic values over environmental values.[60] Objectives such as ensuring safe products and addressing the negative environmental impacts of aquaculture are arguably lower priorities for the EU than job creation and economic benefit.[61] The Commission of European Communities, in its Strategy for the Sustainable Development of European Aquaculture, sets lofty goals for increasing employment and production for aquaculture, but contemplates only voluntary procedures to protect the environment.[62] The report notes that a directive is in place to study pollution associated with eutrophication, but it does not mandate inclusion of "intensive fish farming" in the study.[63]

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[54] *Id.* at 25.

[55] *Id.*

[56] *See* JSA National Science and Technology Council Health, Safety, and Food Committee, *Aquaculture Research and Development Strategic Plan*, *available at* http://ag.ansc.purdue.edu/aquanic/jsa/Strategicplan.htm (last visited Mar. 13, 2004) [hereinafter JSA, *Aquaculture Research*].

[57] *Id.*

[58] *Id.* Stewardship means the individual's responsibility to manage his life and property with proper regard to the rights of others. WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY (1984).

[59] JSA, *Aquaculture Research*, *supra* note 56.

[60] *See Sustainable Development of European Aquaculture*, *supra* note 46.

[61] *Id.*

[62] *Id.* at 11.

[63] *Id.* at 18. Eutrophication is the process by which a body of water becomes either naturally or by pollution rich in dissolved nutrients (as phosphates) and often shallow with a seasonal deficiency in dissolved oxygen. WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY (1984).

B. NET PEN METHOD OF SALMON FARMING

1. Designs and Structure of Net Pens

Salmon farming is a complex and time-consuming aquaculture practice.[64] Once the eggs are harvested and fertilized, they are kept under strictly monitored conditions for approximately eighteen months, during which time they develop into smolts.[65] The smolt stage of a salmon's lifecycle is the stage at which it migrates from fresh water to the sea.[66] The smolts are then placed in saltwater pens, sometimes called floating net pens, which are usually located in coastal waters.[67] The pens are made of either poly vinyl chloride (commonly called "PVC") pipe or steel and are on average thirty meters by thirty meters and twenty meters deep.[68] Nets are stretched around the frame to confine the fish to the cage and to keep marine mammals from eating the fish.[69] Farmers also occasionally cover the tops of the pens with nets to keep birds from raiding their livestock.[70] The cages are secured to the bottom of the ocean and are usually arranged in groups of eight, twelve, or twenty to form one site.[71] Platforms are then built around the cages to store the feed and allow access to the fish for feeding.[72] Five days before the fish are slaughtered (which is approximately two years after the smolts entered the net pens), they are starved in order to reduce their fat and firm up their flesh.[73]

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[64] *See* Michael L. Weber, *Farming Salmon: A Briefing Book* (1997), *available at* http://www.seaweb.org/resources/sac/farm.html (last visited Mar. 13, 2004) [hereinafter Weber, *Farming Salmon*].

[65] *Id.*

[66] WEBSTER'S NEW WORLD DICTIONARY (3rd college ed. 1991).

[67] *See* Weber, *Farming Salmon*, *supra* note 64.

[68] *Id.* However, a British Columbia farm recently created a pen that was fifty meters square. *Id.*

[69] *Id.*

[70] *Id.*

[71] *Id.*

[72] *Id.*

[73] *Id.*

2. *Environmental Impact of Salmon Farming*

Large areas of the coastal seafloor, or benthos, are being devastated due to net pen salmon farming.[74] The damage caused to the seafloor by salmon farms is the result of two types of pollutants, organic waste material and human-introduced chemicals.[75] Organic pollution results from feces and uneaten feed that fall to the seafloor and accumulate.[76] The type of feed given to salmon raised in these farms is unique to the aquaculture industry and is very harmful to the seafloor.[77] Salmon are carnivores that require feed with high quantities of fish oil and fishmeal.[78] Fifteen to twenty percent of this nutrient-rich feed goes uneaten and accumulates on the seafloor underneath and near the net pens.[79] This is significant, given that most farms use over 5,000 pounds of food per month.[80] The feces produced by the salmon also contribute to the organic matter in the water.[81] One study conducted in Scotland estimated that the total sewage waste discharged from

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[74] *See* PEW Report, *supra* note 1, at 13.
Benthos is the bottom of a sea or lake and the organisms living on sea or lake bottoms. WEBSTER'S II NEW RIVERSIDE UNIVERSITY DICTIONARY (1994).

[75] *See* David Suzuki Foundation, *Oceans and Fishing: Salmon Farm Pollution*, *available at* http://www.davidsuzuki.org/Oceans/Fish_Farming/Salmon/Pollution.asp (last visited Mar. 12, 2003) [hereinafter DSF, *Salmon Farm Pollution*].

[76] Michael L. Weber, *What Price Farmed Fish? A Review of the Environmental and Social Costs of Farming Carnivorous Fish* 20-21 (2003), *available at* http://www.seaweb.org/resources/sac/pdf/WhatPriceFarmedFish_high.pdf (last visited Mar. 13, 2004) [hereinafter Weber, *What Price Farmed Fish?*].

[77] *See* DSF, *Salmon Farm Pollution*, *supra* note 75.

[78] *Id.* Consequently, the salmon cannot be fed plants or feed derived from plants, unlike the feed given to nearly eighty-five percent of farmed fish around the world, which are herbivorous. *Id.*

[79] Weber, *What Price Farmed Fish?*, *supra* note 76, at 20-21.

[80] *See generally* Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category, 67 Fed. Reg. 57,900. A farm that produces cold water fish and feeds less than 5,000 pounds per month is not considered a Concentrated Aquatic Animal Production Facility and would therefore not have to meet the proposed standards. 40 C.F.R. § 122.24 (2003). EPA did not find any net pen system farms that were below this threshold. Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category, 67 Fed. Reg. 57,900

[81] *See* Don Staniford, *Sea Cage Fish Farming: An Evaluation of Environmental and Public Health Aspects (The Five Fundamental Flaws of Sea Cage Fish Farming)* (2002), *available at* http://www.eurocbc.org/Staniford_Flaws_SeaCage.pdf (last visited Mar. 13, 2004) [hereinafter Staniford].

Scottish salmon farms was equivalent to the sewage discharge of over nine million people.[82]

Problems that occur as a result of the high levels of organic matter on the seafloor are anoxia (oxygen depletion), the injection of high levels of nitrogen and phosphorus into the water, and toxic algal blooms.[83] Anoxia occurs as the organic waste decays and consumes oxygen in the water.[84] Anoxia also occurs in the water column when suspended waste decomposes and does not reach the seafloor.[85] The more organic material there is in the water, the more oxygen the microorganisms use.[86] This process can become so severe that all of the oxygen is removed from the water, killing any other organisms that need oxygen for their survival.[87] Additionally, salmon farms introduce high amounts of nitrogen and phosphorous, mostly through the feeding process.[88] Excess nitrogen in the water leads to phytoplankton (aquatic plant) growth, and as the phytoplankton bloom and then die, they remove oxygen from the water.[89] This process is called eutrophication and can lead to the death of all oxygen-dependent organisms in the affected area.[90] Discharges from salmon farms can lead to more than environmental harm.[91] For instance, shellfish poisoned from the effect of effluent discharge can subsequently poison anyone who eats them.[92] Mussels collected and eaten from a salmon farm cage in Scotland led to nearly fifty people becoming ill.[93]

Organic wastes are not the only type of pollution that enters the water from salmon farms.[94] Salmon farms also use a variety of chemicals for various reasons, and these chemicals

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[82] *Id.* Scotland's population is only 5.1 million. *Id.*
[83] Id. *See also,* DSF, *Salmon Farm Pollution*, *supra* note 75.
[84] *See* DSF, *Salmon Farm Pollution*, *supra* note 75.
[85] *Id.*
[86] *See* Goldburg & Triplett, *supra* note 26, at 36.
[87] *Id.*
[88] *See* DSF, *Salmon Farm Pollution*, *supra* note 75.
[89] *Id.*
[90] *See* Weber, *What Price Farmed Fish?*, *supra* note 76, at 20-21.
[91] *See* Staniford, *supra* note 81.
[92] *See generally*, *Id.*
[93] *Id.*
[94] *See* DSF, *Salmon Farm Pollution*, *supra* note 75.

inevitably end up in the water.[95] Chemical pollution occurs through the use of antifouling paint to keep organisms from growing on the cages and from additives found in feed.[96] Studies show that these chemicals can produce damaging effects on sea life.[97] In addition, antibiotics and pesticides are used to treat the salmon for parasites.[98] In order to rid their stock of sea lice, farmers use combinations of different pesticides.[99] Most of the combinations are toxic to aquatic invertebrates or fish.[100] Antibiotics present greater long-term problems.[101] Accumulations of antibiotics can remain for over a year on the seafloor and have been found in the tissue of other creatures such as crabs and mussels.[102] Copper, zinc, and mercury are just some of the metals that are added to the water from salmon farms.[103] Studies show that concentrations of these metals would likely damage worms and clams living beneath the net pens.[104]

Although the size, location, and operational life of the net pens influence the impact on the benthos, the damage can be extensive.[105] Impacts on the sea floor have been reported as far away as 150 meters from the net pens.[106] Once the cages are removed from the water, the recovery time of the surrounding benthos varies from a few months to as long as five years.[107] As the demand for higher salmon production increases and salmon farms grow in size, the need for detailed effluent reporting, monitoring, and reduction is required to prevent mass deroga-

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[95] *Id.* Some of these chemicals include mercury, copper and zinc. *See* Weber, *What Price Farmed Fish?, supra* note 76, at 23.

[96] *See* Florida Museum of Natural History, *Maine Salmon Farms Closed to Benefit Wild Salmon* (2003), *available at* http://www.flmnh.ufl.edu/fish/InNews/wildsalmon2003.htm (last visited Mar. 13, 2004).

[97] *See* DSF, *Salmon Farm Pollution*, *supra* note 75.

[98] *Id.*

[99] Weber, *What Price Farmed Fish?, supra* note 76, at 22.

[100] *Id.*

[101] *Id.* at 23.

[102] *Id.*

[103] *Id.*

[104] *Id.*

[105] Goldburg & Triplett, *supra* note 26, at 40.

[106] *Id.*

[107] Weber, *What Price Farmed Fish?, supra* note 76, at 20.

tion of the seafloor.[108] Although some of the regulatory and common-law pollution oversight controls are in place, the ability to challenge the salmon farmers for the damage caused to the seafloor requires a combination of old methods, current statutes, and forward thinking.

II. DISCUSSION

A. COMMON-LAW HISTORY OF ENVIRONMENTAL PROTECTION

Environmental activists have regulations and statutes to assist them in the policing and protection of the environment.[109] Although statutory schemes for environmental protection are relatively new, common-law actions against polluters have existed for many years.[110] For example, one of the first methods by which concerned citizens attempted to protect the environment was through nuisance lawsuits.[111] Private nuisances are nontrespassory invasions that affect the private enjoyment and use of one's land.[112] In a private nuisance action, the plaintiff must show that the invasion was intentional, unreasonable, and produced significant harm.[113] Due to these limiting criteria and the reality that most pollution problems are not confined to one individual, actions for private nuisance proved ineffective for controlling polluters.[114]

Another common-law action used with limited success against polluters is public nuisance.[115] In contrast with private nuisance, which is reserved to the interference with an individual's right, public nuisance is concerned with the unreasonable interference of a common right of the public.[116] An individ-

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[108] *Environmental Defense Concerning Marine Aquaculture: Before the U.S. Commission on Ocean Policy* (2002), *available at* http://oceancommission.gov/meetings/jul23_24_02/goldburg_testimony.pdf (last visited Mar. 13, 2004) [hereinafter *Commission Hearing*] (testimony of Rebecca Goldburg, Ph.D.).

[109] *See* 33 U.S.C. § 1365 (2000).

[110] PERCIVAL, ET AL., ENVIRONMENTAL LAW AND REGULATION: LAW, SCIENCE, AND POLICY 60 (4th ed. 2003).

[111] *Id.*

[112] *Id.* at 61.

[113] *Id.*

[114] *Id.* at 72.

[115] Denise Antolini, *Modernizing Public Nuisance: Solving the Paradox of the Special Injury Rule*, 28 ECOLOGY L.Q. 755, 776 (2001).

[116] *Id.* at 766.

ual who is theoretically representing the public can bring a public-nuisance action.[117] To have standing, however, the plaintiff must show that he or she is harmed in a way that the general public is not.[118] This is the so-called "different-in-kind" rule.[119] This paradoxical rule is difficult to prove and ineffective in stopping big polluters because the more expansive the injury, the less likely an individual will suffer a unique injury.[120] At least one commentator believes there is still a place for public nuisance law in environmental lawsuits.[121] Yet, the threshold showing of an injury "different-in-kind" is often unattainable.[122]

B. THE CLEAN WATER ACT

In the 1970's, Congress enacted regulations to rehabilitate and prevent further harm to the environment.[123] The Federal Water Pollution Control Act, or Clean Water Act, was enacted in 1972 and produced a very powerful anti-pollution tool, the citizen suit.[124] The citizen-suit provision in the CWA, Section 505, provides that any citizen may bring a civil action on his or her own behalf against any person, including companies and the government, that is violating the effluent standards set forth in the CWA.[125] The enactment of the CWA began the shift from both federal and state common law to statutory remedies for citizens seeking redress from polluters.[126]

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[117] *Id.* at 765.
[118] *Id.* at 766.
[119] *Id.* at 759.
[120] *Id.* at 761.
[121] *Id.*
[122] *Id.* at 776-781.
[123] Federal Water Pollution Control Act Amendments of 1972, Pub. L. No. 92-500, 86 Stat. 816 (codified as amended at 33 U.S.C. §§ 1251-1376 (1976)).
[124] 33 U.S.C. § 1365 (2000).
[125] *Id.*
[126] *See* City of Milwaukee v. Ill. and Mich., 451 U.S. 304 (1981); *See also*, Int'l Paper v. Ouellette, 479 U.S. 481 (1987).

1. *Clean Water Act Section 402: The National Pollution Discharge Elimination System*

The National Pollution Discharge Elimination System (hereinafter "NPDES"), part of the CWA enacted in 1972,[127] is a permitting system that controls the direct discharge of pollutants into navigable waters.[128] The NPDES permit program was established to regulate the discharge of pollutants from point sources to the waters of the U.S.[129] A point source is defined as any discernable and discrete conveyance, including but not limited to any pipe, ditch, container, or concentrated animal feeding operation.[130] The NPDES is administered either by the state or the EPA.[131] Only those states meeting the minimum federal requirements may assume the responsibility of issuing permits.[132] For a state that is unable or unwilling to meet the minimum requirements, EPA administers the NPDES permit program.[133] The NPDES program mandates that the permits contain industry-specific technology-based limits, and the program establishes pollutant monitoring and reporting requirements.[134]

The NPDES permit provides two levels of control.[135] First are technology-based limits that are based on the ability of other dischargers in the same industrial category to treat

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[127] Federal Water Pollution Control Act Amendments of 1972, Pub. L. No. 92-500, 86 Stat. 816 (codified as amended at 33 U.S.C. §§ 1251-1376 (1976)).

[128] 33 U.S.C. § 1342 (2000). Pollutant is defined in 33 U.S.C. § 1362 (6) (2000). It includes "agricultural waste."*Id.* Navigable waters means the waters of the United States, including the territorial seas. 33 U.S.C. § 1362 (7) (2000).

[129] Federal Water Pollution Control Act Amendments of 1972, Pub. L. No. 92-500, § 402 86 Stat. 816 (codified as amended at 33 U.S.C. §§ 1251-1376 (1976)).

[130] 33 U.S.C. § 1362 (14) (2000). "The term point source means 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. This term does not include agricultural stormwater discharges and return flows from irrigated agriculture." *Id.*

[131] 33 U.S.C. § 1342(b)(2000).

[132] 33 U.S.C. § 1342(b)(2000).

[133] 33 U.S.C. § 1342(c)(2000).

[134] 40 C.F.R. § 122.48(2003).

[135] *See generally* 33 U.S.C. § 1342 (a) (2000). This section requires that no permit shall be issued unless the discharge meets all applicable requirements under §§ 1311, 1312, 1316, 1317, 1318 and 1343 of this title. *Id.* Section 1311 provides for technology-based limitations. 33 U.S.C. § 1311 (2000). Section 1312 provides for water quality-based limitations. 33 U.S.C. § 1312 (2000).

wastewater.[136] Second are water quality-based standards.[137] Water quality-based standards are used if the technology-based limits are not sufficient to attain water quality designated to a body of water.[138] Aside from establishing effluent limitations for a facility, once an NPDES permit is issued to a source, the facility can then be sued by any citizen if it violates the effluent limitations or standard.[139] The citizen-suit provision of the CWA is an invaluable tool to police polluting industries, facilities, and even governments. Section 505 gives any citizen the right to commence a civil action on his or her own behalf against anyone who is in violation of an effluent standard or an order issued by the EPA Administrator or a state concerning a limitation.[140] Additionally, any citizen may also bring suit against the Administrator if the Administrator fails to perform any non-discretionary duty.[141]

2. *Courts' Interpretation of CWA Section 402 for Pollution from Aquaculture*

One case in particular, *Ass'n to Protect Hammersly, Eld and Totten Inlets v. Taylor Resources, Inc.*, demonstrates the importance of the citizen suit provision.[142] A citizen group in Washington brought suit against a farmer who grew mussels in Puget Sound, a body of water near Seattle.[143] The citizen group claimed that the mussel producer was discharging pollutants from his farm without an NPDES permit.[144] The group argued that the "particulate matter, feces and pseudo-feces" produced by the mussels as a byproduct of their metabolism was the "addition" of pollutants to waters of the U.S. within the meaning of the CWA, requiring an NPDES permit.[145] The owner of the mussel farm had applied for an NPDES permit from the state

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[136] 33 U.S.C. § 1311(b)(2)(A) (2000).
[137] 33 U.S.C. § 1312(a) (2000).
[138] *Id.*
[139] 33 U.S.C. § 1365(a)(1)(2000).
[140] *Id.*
[141] 33 U.S.C. § 1365 a)(2)(2003).
[142] Ass'n to Protect Hammersly, Eld and Totten Inlets v. Taylor Resources, Inc., 299 F.3d 1007 (9th Cir. 2002).
[143] *Id.* at 1009.
[144] *Id.*
[145] *Id.* at 1010.

permitting authority but was told that his operation did not require one.[146] The citizen group filed a citizen suit, despite the fact the state agency charged with administering the NPDES permit had determined that a permit was not required.[147] The court allowed the citizen group to proceed with the action.[148]

As this case makes clear, while the EPA or a state agency may be charged with the enforcement of the CWA, they do not have the exclusive authority to decide whether the release of a substance into U.S. waters is a violation of the CWA.[149] That the EPA or state agency declines to use its enforcement capabilities under the Act does not give it the right to veto a citizen suit.[150] To allow the permitting authority to effectively block legitimate citizen suits would "frustrate the purposes of the Clean Water Act's empowerment of citizen suits."[151] This ruling is important for controlling pollution from net pen salmon farms, because, as discussed below, many such facilities lack NPDES permits.[152]

C. NPDES REGULATION OF POLLUTION FROM ANIMAL PRODUCTION FARMS

A concentrated animal feeding operation (hereinafter "CAFO") is a subset of an animal feeding operation.[153] An animal feeding operation (hereinafter "AFO") is defined as a lot or facility where animals have been or are confined, fed, and maintained for a total of forty-five days or more in a twelve month period.[154] An AFO is not considered a point source and is therefore outside the regulatory reach of the NPDES permit program.[155]

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[146] *Id.* at 1011.
[147] *Id.* at 1009.
[148] *Id.* at 1011-1012.
[149] *Id.* at 1012.
[150] *Id.*
[151] *Id.*
[152] Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category, 67 Fed. Reg. at 57,883.
[153] 40 C.F.R. § 122.23 (2003).
[154] 40 C.F.R. § 122.23(b)(1)(i) (2003).
[155] 40 C.F.R. § 122.23 (2003).

Once a facility meets the criteria as an AFO, it can then be classified as a CAFO based upon the number of animals confined in the facility.[156] This is an extremely important classification because a CAFO is considered a point source, and a citizen suit is permitted against a facility that is required to have an NPDES permit - i.e., a facility considered a point source.[157] Regulation of aquatic animal production facilities dates back to 1972, when Congress added the NPDES permit application requirements for aquaculture facilities.[158] Under current regulations, for a cold water aquatic animal farm to qualify as a CAFO, the facility must discharge pollutants at least thirty days per year, produce more than 20,000 pounds of harvest weight per year and use more than 5,000 pounds of feed during the calendar month of maximum feeding.[159] As of 1999, every salmon farm in the U.S. met these threshold limitations.[160] Accordingly, several salmon farms in Maine applied to the EPA for NPDES permits, but very few have received them because the EPA has no relevant policy for setting standards for salmon farms.[161]

For facilities that might not meet these requirements, the state can make a "case-by-case" designation of concentrated aquatic animal production facilities if it determines that the aquatic animal production facility is a significant contributor of pollution to U.S. waters.[162] Factors that the state is required to rely upon in making its decision include the location and quality of the receiving waters, the holding, feeding, and production capabilities of the facility, and the quantity and nature of the pollutants.[163] The state must first conduct an on-site visit of the

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[156] *See* Environmental Protection Agency, *Guidance Manual and Sample NPDES Permit for Concentrated Animal Feeding Operations* 5 (2000), *available at* http://www.epa.gov/npdes/pubs/dman_afo-2000.pdf (last visited Mar. 13, 2004).

[157] 33 U.S.C. § 1365(a)(1)(2000).

[158] 33 U.S.C. § 1328 (2000).

[159] 40 C.F.R. § 122.24 App. C (a)(1)-(2) (2003).

[160] Mary Liz Brenninkmeyer, Comment, *The Ones that Got Away: Regulating Escaped Fish and Other Pollutants from Salmon Fish Farms*, 27 B.C. L. Rev. 1, 94 (1999).

[161] *Id.*

[162] 40 C.F.R. § 122.24(c)(1)(2003).

[163] 40 C.F.R. § 122.24(c)(1)(i)-(iii)(2003).

facility before designating the facility as a concentrated aquatic animal production facility.[164]

III. CRITIQUE OF THE CURRENT SALMON FARM REGULATIONS

Section 402 of the CWA is just one statutory provision with the potential to limit marine pollution from salmon net pen farming.[165] Section 403 of the CWA places limitations on discharges into the waters of the U.S.[166] Section 403 also strengthens the restrictions on pollution discharge into ocean waters by establishing criteria that permit writers must consider.[167] Other laws also govern salmon farm operations.[168] Yet these regulations have served only to confuse the permitting process and have done little to limit effluent from salmon farms.[169] Thus, the EPA has proposed establishing national industry effluent standards for aquatic animal production facilities.[170] Proposed national effluent guidelines and current CWA regulations must be analyzed to understand the likely framework of future regulation.

A. CLEAN WATER ACT SECTION 403: OCEAN DISCHARGE

A separate regulatory regime found in the CWA can be a supplement to section 402 in assuring that the seafloor and coast remain as unpolluted as possible. Section 403 of the CWA regulates the discharge of pollutants into the territorial sea, the waters of the contiguous zone, or the oceans.[171] As

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[164] 40 C.F.R. § 122.24(c)(2)(2003).

[165] 33 U.S.C. § 1342 (2000).

[166] 33 U.S.C. § 1343 (2000).

[167] Ocean Discharge Criteria, 45 Fed. Reg. 65942 (1980).

[168] PEW Report, *supra* note 1, at 21.

[169] *Id.* at 22.

[170] Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category, 67 Fed. Reg. 57,872.

[171] 33 U.S.C. § 1343 (2000). The term "territorial seas" means 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. 33 U.S.C. § 1362 (8) (2000). The term "contiguous zone" means the entire zone established or to be established by the United States under article 24 of the Convention of the Territorial Sea and the Contiguous Zone. 33 U.S.C. § 1362 (9) (2000). The term "ocean" means any portion of the high seas beyond the contiguous zone. 33 U.S.C. § 1362 (10) (2000).

mentioned above, the NPDES permitting program established in Section 402 contains both technology-based requirements and, if they are not sufficient to meet state water quality standards, more stringent water quality-based limitations.[172] Section 403, however, establishes additional guidelines for sources that discharge into the ocean.[173] Specifically, Section 403 requires an evaluation of ocean discharges that goes beyond the potential for water quality degradation.[174] Section 403 allows for the evaluation of the ecological risks associated with the discharge of pollutants.[175] These additional evaluation criteria mean that point sources that discharge into the ocean are subject to a more stringent review process.[176] No NPDES permit shall be issued for anyone discharging into the ocean, territorial sea, or contiguous zone unless it is in compliance with these guidelines.[177] Specifically, under regulations promulgated to implement Section 403, no permit can be issued for any "aquaculture project located in the territorial sea, the waters of the contiguous zone, or the oceans, except in conformity with guidelines issued under section 403(c) of the Act."[178]

In October 1980, the EPA released guidelines that detail the factors to be used by permit writers to evaluate the discharge of pollutants into a marine system.[179] Ten ocean discharge guidelines must be considered when determining whether unreasonable degradation will occur.[180] Among them is the potential transport of pollutants by "biological, physical, or chemical processes" and the "composition and vulnerability of biological" communities exposed to the pollution.[181] The vast majority of facilities that are subject to section 403 requirements are offshore oil and gas exploration facilities.[182] Only

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[172] 33 U.S.C. § 1342(2000).

[173] 33 U.S.C. § 1343(c)(2000).

[174] *Id.*

[175] *Id.*

[176] *Id.*

[177] 33 U.S.C. § 1343(2000).

[178] 40 C.F.R. pt. 125.11(c)(2003).

[179] 40 C.F.R. pt. 125 (2003).

[180] 40 C.F.R. pt. 125 sub. M (2003).

[181] *Id.*

[182] *See* Environmental Protection Agency, Office of Water: *Clean Water Act Section 403 a Framework for Ecological Risk Assessment available at* http://www.epa.gov/owow/oceans/regulatory/403.html (last visited Mar. 11, 2004).

fourteen facilities that fall under the requirements of section 403 permit, are listed as aquaculture facilities.[183] These include marine net pens, shellfish racks, and aquariums.[184]

B. TOO MANY AGENCIES, TOO LITTLE REGULATION

At least six different federal regulations govern aquaculture in one way or another.[185] Apart from the Clean Water Act, there are the Rivers and Harbors Act of 1898; the Migratory Bird Treaty Act; the Marine Mammal Protection Act; the Endangered Species Act; the Federal Insecticide, Fungicide, and Rodenticide Act; and the Food, Drug, and Cosmetic Act.[186] The effects that these separate and distinct regulations exert over aquaculture range from requiring a salmon net pen farmer to get a permit from the Army Corps of Engineers for a floating pen, to determining what methods may be used by a salmon farmer to keep seals from preying on salmon.[187] This patchwork of federal oversight has led to uncertainty, confusion, and delay in the application of federal laws to offshore aquaculture facilities.[188]

1. Washington as a Case Study

The state of Washington's problem regulating salmon farms is illustrative of the larger federal problem. Commercial salmon farms have operated in the State of Washington since the 1970's.[189] It was not until 1989, however, when the EPA was threatened with a lawsuit for not regulating salmon net

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[183] *See* Environmental Protection Agency, *Ocean Regulatory Programs, Table 1 Types of NPDES Permitted Ocean Dischargers* (2004), *available at* http://www.epa.gov/owow/oceans/regulatory/criteriatable1.html (last visited Mar. 11, 2004).

[184] *Id.*

[185] PEW Report, *supra* note 1.

[186] *Id.* (The Rivers and Harbors Act of 1899, 33 U.S.C. § 403 (2000); The Migratory Bird Treaty Act, 16 U.S.C. § 703-712 (2000); The Endangered Species Act, 16 U.S.C. § 1531-1544 (2000); The Marine Mammal Protection Act, 16 U.S.C. § 1361-1407 (2000); The Federal Insecticide, Fungicide, and Rodenticide Act, 7 U.S.C. § 136-136(y)(2000); The Food, Drug and Cosmetic Act, 21 U.S.C. § 301-394 (2000)).

[187] 33 U.S.C. § 403 (2000); 16 U.S.C. § 1361 (2000).

[188] *Commission Hearing*, *supra* note 108 (testimony of Rebecca Goldburg, Ph.D.).

[189] *See* Goldburg & Triplett, *supra* note 26, at 106.

pen pollutants, that it finally took action.[190] As a result, the EPA compelled Washington to issue discharge permits.[191] The state issued three permits in 1990; however, some environmental associations found the permits to be deficient, so they appealed their issuance.[192] As a result of the appeal, the state agreed to create a scientific net pen panel to produce a report, which would then become the basis for the permits.[193] The report was never completed.[194] It was not until 1993 that the Washington legislature passed regulations mandating the State Department of Ecology to set standards concerning marine net pen pollution.[195] As of 1997, there were forty-five net pen salmon facilities operating in Washington, fifteen of which required discharge permits.[196] The EPA is now attempting to bring order to the federal regulation of salmon farms.[197]

C. PROPOSAL FOR NATIONAL EFFLUENT LIMITATIONS FOR CONCENTRATED AQUATIC ANIMAL PRODUCTION POINT SOURCES

In the early 1970's, the EPA evaluated fish farms to see if it should propose national industry effluent guidelines.[198] The EPA, however, never produced any effluent limitations.[199] The 1977 CWA amendments diverted the Agency's attention to creating effluent limitations guidelines for industries that discharged toxic metals and organics.[200] Recently, the EPA has taken action, proposing for the first time effluent limitation guidelines and standards for discharges from concentrated aquatic animal production facilities.[201] The EPA estimates that the newly proposed effluent limitation rule will reduce the dis-

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[190] *Id.*
[191] *Id.*
[192] *Id.*
[193] *Id.*
[194] *Id.*
[195] *Id.*
[196] *Id.*
[197] Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category, 67 Fed. Reg. 57,872, supra note 2.
[198] *Id.* at 57,875.
[199] *Id.*
[200] *Id.*
[201] *Id.* at 57,872.

charge of total suspended solids by at least 4.1 million pounds per year.[202] This reduction in total suspended solids would in turn reduce the discharge of biochemical oxygen demand (hereinafter "BOD") and nutrients by at least 8.7 million pounds per year.[203] The total cost to industry to implement the new limitations is estimated to be $1.5 million and would cost federal and state permitting authorities an estimated $3,337 yearly.[204] The annual quantifiable benefits of the proposed rule are estimated at approximately $22,000 to $113,000.[205] This quantifiable benefit range does not include water quality and ecological responses to pollutant loading reductions at net pen systems and other coastal facilities.[206]

The EPA promulgated these new regulations because commercial aquaculture is one of the fastest-growing agricultural sectors. Moreover, aquaculture produces and discharges a variety of pollutants. At present, the EPA has no comprehensive national effluent standard to address the problem.[207] The 1998 USDA Census of Aquaculture estimated that there are 4,200 commercial aquatic animal production facilities in the U.S.[208] The EPA's own estimates, however, indicate that only 377 facilities have active permits.[209]

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[202] *Id.* This number is for the entire CAAP industry and therefore includes more than just salmon farms. *Id.*

[203] *Id.* BOD is "the amount of oxygen used for biochemical oxidation by a unit volume of water at a given temperature and for a given time. BOD is an index of the degree of organic pollution in water" *European Environment Agency*, definition *available at* http://glossary.eea.eu.int/EEAGlossary/B/biochemical_oxygen_demand. (last visited Jan. 14, 2004).

[204] Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category, 67 Fed. Reg. 57,872, supra note 2, 197. This number is for the entire CAAP industry and therefore includes more than just salmon farms. *Id.*

[205] *Id.* Monetized benefits are based on incremental changes in water quality use-support (boating, fishing, swimming). *Id.* at 57,871, 57913.

[206] *Id.* at 57,912.

[207] *Id.* at 57,875.

[208] *Id.* at 57,876.

[209] *Id.* at 57,833.

IV. PROPOSAL

A. THE LIMITS OF THE PROPOSED EFFLUENT LIMITATION GUIDELINES

Although the proposed regulations would create better pollution management of salmon farms, the EPA's new regulations are limited in their reach. The proposed rule will impose effluent limitation guidelines on the concentrated aquatic animal production (hereinafter "CAAP") industry.[210] The proposed regulation will only cover three subcategories of the industry: flow-through systems, re-circulating systems, and net pens.[211] The EPA limits the scope even further by refusing to establish effluent limits for CAAP facilities in any of these categories that produce cold-water fish with annual production less than 100,000 pounds per year.[212]

The EPA excludes smaller CAAP facilities from the proposed rule for several reasons.[213] First, the EPA states that small CAAP facilities, as a whole, discharge less than eighteen percent of the nutrients and BOD per year when compared with all discharges from the entire industry.[214] Second, the EPA estimates that a limited amount of loadings removal would be accomplished by improving treatment by the Best Practical Technology /Best Available Technology.[215] Lastly, the EPA concludes that the cost of compliance for the smaller facilities would exceed five percent of their revenues, which is higher than for larger facilities.[216]

If a facility does not meet the minimum threshold requirement of this proposed effluent limitation and is still considered a CAAP facility under NPDES regulations, it would receive a permit with effluent limits based on the "best professional judgment" of the permit writer.[217] For net pen systems, the EPA did not identify any facilities that were below the

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[210] *Id.* at 57,872.
[211] *Id.* at 57,877.
[212] *Id.* at 57,884.
[213] *Id.*
[214] *Id.*
[215] *Id.*
[216] *Id.*
[217] *Id.*

100,000 pounds per year threshold.[218] This would theoretically make all salmon farms subject to the proposed effluent guidelines. The EPA subsequently stated that it is considering the alternative of not establishing national effluent limitations for net pen systems.[219]

B. EPA'S REASONING FOR POSSIBLY NOT IMPLEMENTING THE NEW LIMITATIONS

The EPA lists several issues that could prevent the establishment of effluent guidelines for net pen systems. First, the EPA claims that the baseline pollutant discharges from these facilities are not large enough to warrant national regulations.[220] The EPA, however, fails to give any support for this claim. In the proposed rule, the EPA states that smaller facilities should not be included because they produce, as a group, less than eighteen percent of the nutrients and BOD per year in comparison with all discharges from the entire industry.[221] This statement suggests that larger facilities are responsible for the vast majority of nutrients and BOD discharged per year. As mentioned above, however, virtually all salmon farms in the U.S. are considered large.[222] Some estimates show that BOD loading produced by a single salmon facility is over four million pounds per year.[223] The equivalent BOD loading for a city would be that of a city with 65,000 residents.[224]

Additionally, the EPA may decide that significant regional and facility-specific variations might make "best professional judgment" a more appropriate limitation standard.[225] Regional

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

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

[220] *Id.*

[221] *Id.* at 57,884.

[222] Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category, 67 Fed. Reg. at 57,900. A salmon farm is considered large if it produces over 100,000 pounds of salmon per year. *Id.*

[223] *See* Environmental Protection Agency, *Environmental Impacts of the AAP Industry in the United States* 9-7 (2001), *available at* http://epa.gov/guide/aquaculture/ea/ch9.pdf (last visited Mar. 13, 2004).

[224] *Id.*

[225] Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category, 67 Fed. Reg. at 57,901.

and facility-specific standards, however, are the same standards that have been ineffective in producing appropriate effluent limitations on salmon farms to date.[226] The EPA may also decide that available technology is either too expensive or would provide little reduction in discharges relative to current practices.[227] The EPA's own estimates, however, show that if net pen systems instituted the Best Practical Technology ("BPT"), not one of the model facilities would incur compliance costs greater than three percent of revenues for any regulatory option.[228] The EPA concludes by stating, "[it] projects limited economic impacts associated with the BPT requirements. . . ."[229] In fact, the EPA later states in a response to a concern of the cost effectiveness of the proposed regulations for net pen systems that it "considers the proposed net pen system requirements (BMPs [Best Management Practices], reporting, and active feed monitoring) to be cost effective and economically achievable."[230] The EPA has sufficient data, both environmental and economic, to make the proposed effluent limitations a final rule.

C. AN ALTERNATIVE TO FURTHER GOVERNMENT REGULATION

A proposed solution for easing the environmental impact on the coast and near-shore seafloor, while avoiding further regulations, is to locate net pens in the U.S. Exclusive Economic Zone (hereinafter "EEZ").[231] The EEZ comprises federal waters usually between two miles to three hundred miles off-

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[226] *See generally* Goldburg & Triplett, *supra* note 26, at 111. This article notes that Washington only requires best management practices (mainly achieved by using different size feed) for marine net pens while requiring upland facilities to meet stricter standards. *Id.* The author argues that because net pen farms do not have to treat their wastes they can externalize more of their environmental costs than aquaculture farms inland.

[227] Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category, 67 Fed. Reg. at 57,901.

[228] *Id.* at 57,907.

[229] *Id.*

[230] *Id.* at 57,918.

[231] *See* National Marine Fisheries Services, *A Code of Conduct for Responsible Aquaculture Development in the U.S. Exclusive Economic Zone* 7 (2002), *available at* http://www.nmfs.noaa.gov/trade/AQ/AQCode.pdf (last visited Mar. 13, 2004) [hereinafter *Code*].

shore.[232] The National Marine Fisheries Service was given the mandate by organizations within the DOC and the National Oceanic and Atmospheric Administration to develop a marine aquaculture Code of Conduct (hereinafter "Code") as a guide to development in the EEZ.[233] The Code was developed by a group of stakeholders from various fields, including science and research, industry, and government.[234] Although it is not a legally binding document, and its recommendations are merely voluntary, it has the backing of several government agencies and heads of the industry.[235]

The Code calls on the federal government to provide and maintain legal guidelines for aquaculture production in the EEZ.[236] Although it does not provide great detail, the Code outlines the legal and administrative framework to promote aquaculture in the EEZ.[237] Interestingly, the Code recognizes the difficulty that regulating agencies would have in assuring compliance with facilities that are located far from shore.[238] The proposed solution to this problem, however, is more favorable to the industry than to the environment.[239] The Code proposes a cooperative state and federal approach of "voluntary compliance through self-regulation and a fiscal environment to encourage investment in sustainable technologies and operational practices."[240] Moving net pens to the EEZ may ease the environmental burden on coastlines and near shore seafloors, but it would not address the real problem, which is the addition of pollutants by the salmon farms. Having salmon farms farther from shore would make them more difficult to monitor, and it would require more stringent and standardized effluent limitations, not voluntary compliance. The potential harm to the seafloor is too great to leave in the total control of the salmon farm

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[232] PEW Report, *supra* note 1, at 4.

[233] *See Code*, *supra* note 231, at 6-7.

[234] *Id.* at 10.

[235] *Id.* Some of the represented agencies and industries are the EPA, U.S. Coast Guard, U.S. Department of Agriculture, Florida State University, Alabama Farmers Federation, Connors Aquaculture, East Coast Fish Farms, and Swans Island Salmon, Ltd. *See Id.* at 35.

[236] *See Code*, *supra* 231, at 13.

[237] *Id.* at 14.

[238] *Id.* at 20.

[239] *Id.*

[240] *Id.*

industry. For these reasons, it is imperative that the effluent standards proposed for salmon net pen farms by the EPA be adopted.

V. CONCLUSION

Aquaculture is by far the fastest-growing sector of global agriculture, growing at an average rate of ten percent a year between 1984 and 1996.[241] In contrast, capture fisheries' production increase was just over one percent per year during the same time.[242] The U.S. has established a clear and aggressive goal of making aquaculture a viable and profitable industry.[243] The positive economic and production results of this policy are already evident.[244] Yet, the U.S. has not previously pushed for more stringent environmental protection to accompany the industry expansion.[245] Salmon farming has the potential to be very profitable but also very polluting.[246] Pollution discharges from salmon farms can and often do result in immediate and long-term harm to the seafloor.[247]

It is evident that the current patchwork of regulations has only confused and delayed the permitting process for salmon farms.[248] Only a few of the multitude of regulations concern environmental degradation of the seafloor.[249] The time is now, while the salmon industry is still relatively small, for the government to establish national industry effluent guidelines that assure marine environmental protection. The U.S. may create a successful and environmentally responsible salmon farming industry; however, the environmental regulations must be as aggressively pursued as the economic benefits.

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[241] *See* United Nations Food and Agriculture Organization, Fisheries Department, *Trends in Global Aquaculture Production 1984-1996* (2003), *available at* http://www.fao.org/fi/trends/aqtrends/aqtrend.asp (last visited Mar. 13, 2004).

[242] *Id.*

[243] *See* USJSA, *supra* note 29.

[244] *Id. See also*, Goldburg & Triplett, *supra* note 26, at 25.

[245] *See* JSA, *Aquaculture Research*, *supra* note 56; *See also, Commission Hearing*, *supra* note 108 (testimony of Rebecca Goldburg, Ph.D.)

[246] *See* Goldburg & Triplett, *supra* note 26, at 22, 35.

[247] *See* DSF, *Salmon Farm Pollution*, *supra* note 75; *See also*, Staniford, *supra* note 81.

[248] *See Commission Hearing*, *supra* note 108 (testimony of Rebecca Goldburg, Ph.D.).

[249] *See* PEW Report, *supra* note 1, at 21.

Solutions apart from further government regulation have been proposed.[250] The Code of Conduct in the EEZ seeks to alleviate coastal environmental pressure caused by salmon farms by moving them farther away from the shore.[251] In regard to environmental protection, the Code calls for "voluntary compliance through self-regulation."[252] With self-regulation, however, there is great concern that industry leaders would favor economic policies over environmental policies.[253] Corporations are interested in maximizing profits, not benefiting the environment.[254] Additionally, companies view environmental harms as "externalities," which are not factored into a corporation's daily operating expenses.[255] Simply moving salmon farms away from the coasts and into the EEZ with only voluntary compliance in place is not an environmentally healthy solution. Merely transferring pollution from one location to another does not solve the problem.

The proposed effluent limitations are a good start toward assuring environmentally responsible growth for net pen salmon farms. The national effluent limitation guidelines proposed by the EPA are estimated to reduce the discharge of BOD and nutrients by at least 8.7 million pounds per year.[256] This is a significant amount of pollution to remove from U.S. water. In the EPA's calculations of benefits, the ecological responses to pollutant discharge reductions at net pens and improvement of water quality at net pens systems are not included.[257] This means the negative impact on the seafloor

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[250] *See Code*, *supra* note 231.

[251] *Id.* at 7.

[252] *Id.*

[253] David A. Farber, Essay, *Triangulating the Future of Reinvention: Three Emerging Models of Environmental Protection*, 2000 U. Ill. L. Rev. 61, 70 (2000).

[254] *Id.* at 71.

[255] *Id.* at 70.

[256] Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category, 67 Fed. Reg. 57,872.

[257] *Id.* at 57,912.

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caused by salmon farms were not considered as a quantifiable benefit. The protection of the fragile seafloor environment should be "incalculable," and its continued protection should be assured by finalization of the EPA's proposed guidelines.

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allowed to pursue my dreams. Finally, I must thank my beautiful and brilliant wife Debbie, whose dedication and pursuit of her own academic goals is a constant source of inspiration.