THE CENTER FOR
FOOD SAFETY

May 7, 2002

Attention: Marta Jordan
Christie Whitman
Administrator
Environmental Protection Agency
1200 Pennsylvania Ave, NW
Washington, DC 20460

RE: THE ENVIRONMENTAL PROTECTION AGENCY'S DRAFTING OF NATIONAL EFFLUENT STANDARDS FOR FISH ESCAPEMENT

Dear Administrator Whitman:

In response to the Environmental Protection Agency's ("EPA's") decision, announced January 21, 2000, to promulgate national effluent standards for aquaculture operations[1], The Center For Food Safety ("CFS") submits the following comments for including national effluent standards for escaped farmed fish.[2] CFS is a 501(c)(3), non-profit membership organization working to address the impacts of the nation's food production system on human health, animal welfare, and the environment.

Fish farming is the fastest growing sector of U.S. agriculture[3] and poses severe threats to the biological integrity of aquatic ecosystems and the health of seafood consumers if left unregulated. CFS urges the EPA to conduct a comprehensive review of the pollutants discharged from aquaculture facilities and then draft standards that will ensure that aquaculture is conducted in an environmentally sustainable manner. Although aquaculture facilities discharge numerous types of pollutants that need be addressed in drafting these standards, including the over use of antibiotics and pesticides and the significant discharge of solid waste, this set of comments will only focus on the problem of fish escapes. [4]

There is no dispute that farmed fish are escaping from net pens. Indeed, the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (hereinafter "Services") warn that farmed fish are escaping from U.S. offshore

---

[1] JSA, Aquaculture Effluents Task Force, at, http://ag.ansc.purdue.edu/aquanic/jsa/effluents/Background.htm (last visited March 27, 2002).
[2] This comment addresses the escape of non-native fish species into the marine environment.
[3] 65 Fed. Reg. 37783, 37786 (2000).
[4] CFS is also concerned about these effluents and will file additional comments at a later date.

aquaculture facilities and interacting with native fish.[5] The rampant escapes of farmed fish from net pens results in (1) competition with wild stocks for food, habitat, and mates, (2) genetic modification of wild stocks through inter-breeding, and (3) transfer of deadly diseases and parasites to wild stocks. If allowed to continue on its present course, offshore aquaculture could lead to the extinction of wild fish, including the endangered Atlantic and Pacific salmon and irrevocably alter the balance of the marine ecosystem. To prevent irreversible damage to the biological diversity of marine fish, EPA must comply with its statutory authority under the Clean Water Act ("CWA") by developing national effluent standards for the escape of farmed fish. In the final section of these comments, CFS provides specific recommendations for effluent standards that contain strong containment measures for farmed fish in order to protect wild fish populations.

I. Farmed Fish Repeatedly Escape And Survive In The Marine Environment

The problem of fish escaping from net pens cannot be overstated. In fact, in addition to the Services' warning about the escape of farmed fish, the Council on Environmental Quality recently concluded that "it must be assumed that escapes will occur" from net pens.[6] In fact, on average, nearly 15% of all farmed fish escape.[7]

Between 1987 and 1997, over a half-million Atlantic salmon escaped off the West Coast of North America.[8] On the East Coast, the largest known escape of aquaculture fish occurred after a storm in Maine last year that resulted in the escape of over 100,000 farmed raised salmon from a net pen.[9] Alarmingly, this catastrophic release was not reported to federal officials until over a month later, thus effectively eliminating opportunities to recover the fish.[10]

---

[5] Letter from Michael Bartlett, Supervisor, New England Office, FWS, and Patricia Kurkul, Regional Administrator, Northeast Region, NMFS, to Stephen Silva, Maine State Program, EPA, 17 (January 12, 2001)(discussing Final Biological Opinion Concerning the EPA's Proposed Approval of Maine's Application to Administer the NPDES Permit Program, and its Effects on the Endangered Gulf of Maine Distinct Population Segment of Atlantic Salmon) [hereinafter Services Final Biological Opinion].

[6] Council on Environmental Quality & Office of Science and Technology Policy, Case Study No. 1: Growth Enhanced Salmon, 9 (2001), at http://www.ostp.gov/html/012201.html (last visited Nov. 30, 2001).

[7] Eric M. Hallermann & Anne R. Kapuscinski, Ecological Implications of Using Transgenic Fishes in Aquaculture, 194 ICES Mar. Sci. Symp. 56, 59 (1992).

[8] Rosamond L. Naylor, Susan L. Williams, & Donald R. Strong, Aquaculture--A Gateway for Exotic Species, 294 Science 1655, 1656 (Nov. 2001)[hereinafter "Gateway for Exotic Species]

[9] Beth Daley, Escaped Farm Salmon Raise Alarm in Maine, Boston Globe, at http:www.biotech-info.net/escape.html (February 23, 2001) (noting that the incident was not reported to federal officials until more than one month after it occurred. It was also reported that another subsequent 3,000 to 5,000 fish escaped from a different net pen facility in Eastport, Maine).

[10] Id. More recently, in January of this year, about 8,000 farmed raised salmon escaped into the waters off the west coast after a heavy storm dragged net cages onto rocks. Carla Wilson, Farm Salmon Escape Damaged Net Pens, Victoria Times (Jan. 4, 2002) at

Present practice demonstrates that there are many opportunities for farmed fish to escape. Escapement is linked to:

- Severe storms to which offshore facilities are highly vulnerable
- Net tears caused by propeller or boat collisions
- Net tears ripped by common predators such as seals, sea lions, or dogfish
- Net tears that result from poor or inadequate maintenance including chafing of nets due to contact with abrasive equipment, failure to repair small holes, and deterioration of nets with age
- Vandalism
- Human error during fish handling activities such as fish transfer, net changes, towing, sorting, grading, and harvesting.[11]

In addition to accidental escapes, aquaculture facilities are known to deliberately release smaller slow-growing fish.[12] In order to eliminate escapement, these known types of releases need to be prevented.

Once farmed fish escape, any doubt about whether these fish survive in the marine environment is refuted by the large numbers of farmed fish documented in the wild. For example, off the coast of Maine, "farmed escapees vastly outnumber wild salmon in some spawning rivers."[13] Nearly 40% of Atlantic salmon caught in the North Atlantic and more than 90% caught in the Baltic Sea are of farmed origin."[14] Off the west coast, Pacific fishermen regularly catch Atlantic salmon that escaped from aquaculture operations in Washington State and British Columbia.[15] The Alaska Department of Fish & Game estimates that "[t]ens of thousands of these exotics of all life stages are regularly liberated into the North Pacific Ocean."[16] In 1988, researchers discovered that Atlantic salmon actually spawned in the Tsitika River on Vancouver Island and later, Atlantic salmon were found in 77 British Columbia rivers and streams.[17]

Farmed Atlantic salmon are also found in waters as far north as Alaska. In 1991, the first farmed Atlantic salmon was discovered in Southeast Alaska and "since then almost 600 Alaskan recoveries have been documented by the Alaska

---

http://www.salmoninfo.org/news/escapenets.htm (last visited Mar. 29, 2002) (noting that 29,975 fish were reported to have escaped B.C. farms in 2001).

[11] Government of British Columbia, Ministry of Agriculture, Food & Fisheries, Summary of Marine Escape Reports: 1989-2000, at http://www.agf.gov.bc.ca/fisheries/escape/_reports.htm (last visited Mar. 29, 2002).

[12] Alaska Department of Fish & Game, Atlantic Salmon: A White Paper 4 (March 5, 2002), at http://www.ak.gov/adfg/ (last visited April 14, 2002) [hereinafter "Alaska White Paper"].

[13] Gateway for Exotic Species, supra note 8, at 1656.

[14] Id.

[15] Rebecca J. Goldburg, et al., Marine Aquaculture in the U.S.: Environmental Impacts and Policy Options., Pew Oceans Commission 6 (2001)[hereinafter, "Marine Aquaculture in the U.S."]

[16] Alaska White Paper, supra note 12, at 2.

[17] Bruce Barcott, Aquaculture's Troubled Harvest; Fish Farming's Environmental Costs, 26 Mother Jones 38 (Nov. 1, 2001)[hereinafter "Mother Jones"]

Department of Fish and Game and the National Marine Fisheries Service."[18] It is now estimated "that the total number of Atlantic salmon annually in Southeast Alaskan waters has increased in recent years from several hundred to a few thousand."[19] Alaskan state officials are concerned that these "invasive" farmed fish escapees are threatening its wild fish populations.[20]

Without intervention from appropriate regulatory agencies such as the EPA, the problem of escapement is projected to only get worse due to the rapidly growing aquaculture sector. Even the Services concludes that "escapement . . . [is] expected to increase given the continued operation of fish farms and growth of the industry under current practices."[21]

II. Environmental Impacts Resulting From the Escape Of Farmed Fish

Concomitant with the decline of wild fish populations and deteriorating health of the ocean environment has been the rise of open-water aquaculture. Farmed fish are not only escaping, but they are wreaking serious ecological and biological havoc. Once farmed fish escape, the result is the introduction of exotic species that compete for resources, threaten the genetic integrity of wild fish, and transfer diseases and parasites to wild fish.

A. Farmed Fish Are Harmful Exotic Species

Aquaculture is described as a "*gateway for exotic species*."[22] Worldwide, "aquaculture has become a leading vector of aquatic invasive species."[23] In the United States, "**almost every major aquatic species farmed . . . is either non-native or is farmed outside of its native range**."[24] Escapes of these species create "biological pollution" which results in irreversible and unpredictable impacts to the ecosystem.[25] Over the years, aquaculture has caused numerous injurious introductions of pests, including seaweed that smother Hawaii's coral reefs, bighead and silver carps from Asia that compete with native fish in rivers throughout the Mississippi Basin, and Japanese cultured oysters that are now established on almost all Northern Hemisphere coasts.[26] Exotic species are implicated as one of the causes for the listing of 42 percent of the species on the Endangered Species Act.[27] Also, it is estimated that the introduction of exotic species costs the U.S. an estimated hundreds of millions of dollars every year.[28]

---

[18] Alaska White Paper, supra note 12, at 4.
[19] Id.
[20] See Id. at 1.
[21] Services Final Biological Opinion, supra note 5, at 17.
[22] Gateway for Exotic Species, supra note 8, at 1655(emphasis added).
[23] Id.
[24] Marine Aquaculture in the U.S, supra note 15, at 6(emphasis added).
[25] Gateway for Exotic Species, supra note 8, at 1655.
[26] Id.
[27] Alaska White Paper, supra note 12, at 6.
[28] James T. Carlton, Introduced Species In U.S. Coastal Waters, Pew Oceans Commission 3 (2001)[hereinafter, "Introduced Species"].

Even the National Research Council has ranked invasive species as one of the most serious threats to native marine biodiversity.[29]

B. Farmed Fish Compete With Wild Stocks

The scientific evidence shows that escaped farmed fish are competing with wild fish. When farmed fish escape, they seek habitat, food, and mates to satisfy their biological drive to survive, resulting in competition with wild stocks that require the same increasingly scarce resources. Competition between farmed fish and wild stocks has been observed, for example, in the streams of British Columbia where Atlantic juveniles are successfully competing with wild steelhead trout.[30] The Services recognize that "there is substantial documentation that escaped farmed salmon . . . compete with wild fish for food and habitat [and], interbreed with wild salmon."[31] Moreover, escaped fish are directly threatening the survival of wild stocks by disrupting the depressions where they deposit their eggs, or redds.[32] Escaped fish are now competing with wild stocks at every turn of their life cycle, beginning with the delicate hatching stage.

As a result of farmed fish entering the marine environment, these fish are reducing levels of biodiversity and even causing the displacement/extinction of native populations.[33] This effect is already occurring with Atlantic salmon in Maine. The Services warn that Atlantic salmon that escape from net pens in Maine threaten the survival of native Atlantic salmon populations.[34]

In addition to escaped farmed fish competing with wild fish for scarce resources, farmed fish have an unfair competitive advantage over wild fish due to their selective breeding. For example, research shows that there are large differences in aggressive behavior between aquaculture fish and wild fish.[35] Studies show that domesticated Atlantic salmon and brook trout have increased aggression and highly selected strains of farmed fish may be larger and exhibit more aggressive feeding behaviors.[36]

---

[29] Gateway for Exotic Species, supra note 8, at 1656; See also Introduced Species, supra note 28, at 3,6 (explaining that the rate of introduced species has continually risen over the years and shows no signs of slowing).

[30] Hal Bernton, Bumper Crops of Farmed Salmon Sinks Prices, Threatens Wild Fishery, Seattle Times (Sept. 12, 2001), at http://www.salmoninfo.org/news/farmedcost.html (last visited Apr. 19, 2002) (explaining that in testimony to a Canadian Parliament committee, biologist and aquaculture expert John Volpe stated, "Atlantic salmon spawn . . . and produce viable offspring. Once the genie is out of the bottle, there is no turning back." The committee found that the ability of Atlantics to colonize is much greater than earlier assessments suggested.).

[31] Services Final Biological Opinion, supra note 5, at 17.

[32] Id.

[33] See Marine Aquaculture in the U.S., supra note 15, at 6.

[34] Services Final Biological Opinion, supra note 5, at 17.

[35] A.R. Kapuscinski & D.J. Brister, Genetic Impacts of Aquaculture, Environmental Impacts of Aquaculture 128,142 (Black, ed. 2001)[hereinafter "Genetic Impacts of Aquaculture"].

[36] Id; Marine Aquaculture in the U.S., supra note 15, at 7.

C. Farmed Fish Threaten The Genetic Integrity Of Wild Fish

As for the interbreeding of farmed and wild fish, the scientific evidence consistently shows that the interbreeding is occurring and is jeopardizing the mean survival and reproductive fitness among the offspring. This result is called "genetic pollution" and is occurring in U.S. waters.

Examples of Interbreeding

Off the coast of Maine, there is now "substantial evidence that escaped farmed salmon . . . interbreed with wild salmon."[37] In fact, a primary factor that compelled the recent decision to list the remaining runs of Atlantic salmon in Maine as endangered was the "continued use of non-native American salmon and detection of aquaculture escapes in Maine rivers, with the potential for interbreeding . . ."[38] Atlantic salmon populations in Maine are "particularly susceptible to genetic perturbations because of their very low abundance levels."[39] To illustrate, the 100,000 salmon that escaped from a single aquaculture facility in Maine in December 2000, was "more than 1,000 times the number of documented wild adult salmon."[40]

In the Pacific Northwest, the tens of thousands of Atlantic salmon that are released into the Pacific Coast ecosystem annually pose an enormous threat to wild Pacific salmon."[41] As a result of these frequent farmed fish escapes, "the number of Atlantic salmon seen returning to rivers and streams on the west coast is increasing, and Atlantic salmon are now successfully reproducing in British Columbia rivers."[42] The possibility of interbreeding between Atlantic and Pacific salmon also remains a serious threat since research demonstrates that it is possible for Atlantic and Pacific salmon to produce hybrid progeny.[43]

Genetic-variability of wild fish must be maintained to preserve biological diversity

In order to ensure the long-term sustainability and evolutionary potential of fish, the maintenance of sufficient levels of genetic variation, both within and between populations, is essential.[44] It is crucial that wild populations be protected

---

[37] Services Final Biological Opinion, supra note 5, at 17.
[38] USFWS/NMFS, Guide to the Listing of a Distinct Population Segment of Atlantic Salmon as Endangered (Nov. 2000).
[39] Marine Aquaculture in the U.S., supra note 15, at 7.
[40] Id., citing B. Daley, Escaped Farm Salmon Raise Alarm in Maine, Boston Globe (Feb. 23, 2001).
[41] Alaska White Paper, supra note 12, at 2 (explaining that these introductions "have frequently resulted in unexpected and often catastrophic consequences from habitat destruction, disease or parasites, hybridization, reproductive proliferation, and predation and competition."). See also Marine Aquaculture in the U.S., supra note 15, at 7 (noting that escaped Atlantic salmon are "compet[ing] with wild Pacific salmon stocks for food, habitat, and spawning grounds").
[42] Marine Aquaculture in the United States, supra note 15, at 7.
[43] See Canada Environmental Assessment Office, Impacts of Farmed Salmon Escaping Net Pens, at http://www.eao.gov.bc.ca/project/aquacult/salmon/escape.htm (last updated Feb. 25, 1997).
[44] See Genetic Impacts of Aquaculture, supra note 35, at 128.

"because they harbor coevolved gene complexes capable of continually responding to evolutionary forces on the planet."[45]

"Don't put all your eggs in one basket" is an old adage that rings true with the evolutionary "bet-hedging" strategy of maintaining genetic differences between naturally reproducing populations of a species.[46] "The 'eggs' are the different alleles (total genetic variation) harbored within each species. The 'basket' is each distinct population."[47] In other words, "as initially distinct populations become genetically homogenized, they develop the same vulnerability to stressful environmental conditions."[48] If a new disease is introduced, for example, to which most genetically homogenized members of a species is susceptible, "the disease would jeopardize all populations and therefore the entire species."[49] However, if the species is permitted to maintain genetic differences between local populations, then "it is likely that some populations would have a higher frequency of genetically resistant individuals and thus would be relatively unaffected by the disease."[50]

Interbreeding will disrupt the genetic-variability of wild fish

The continued escapement of farmed fish will lead to decreased production and fitness of wild populations due to outbreeding depression. Outbreeding depression is "a loss of fitness in the offspring produced as a result of interbreeding between two groups because the parents are too distantly related."[51] If enough wild and escaped farmed fish mate, "outbreeding depression could cause a decline in abundance of the wild population. . ." in a relatively short amount of time.[52]

Some argue that natural selection can purge wild populations of maladaptive genetic traits introduced by farmed escapees, but the evidence indicates that this is unlikely due to the significant and reoccurring fish escapes. The Services confirm that "regularly-occurring interaction between aquaculture fish and wild salmon makes [the ability of natural selection to purge maladaptive genetic traits] considerably less likely."[53] In addition, because "virtually no aquacultural broodstocks have become so intensely domesticated as to assure a high death rate in the wild," there can be no guarantee of "rapid purging of maladaptive genes."[54] The research shows that the number of generations required for the process of natural selection is very large.[55] The process, therefore, cannot be

[45] Id.
[46] Id at 138-9.
[47] Id. at 139.
[48] Id.
[49] Genetic Impacts of Aquaculture, supra note 35, at 139.
[50] Id.
[51] Id. at 139.
[52] Id. at 140.
[53] Services Final Biological Opinion, supra note 5, at 22.
[54] Genetic Impacts of Aquaculture, supra note 35, at 143.
[55] Id.

relied upon to protect endangered species such as Atlantic salmon that do not have generations to spare. In sum, the argument that natural selection can purge wild populations of maladaptive genetic traits introduced by farmed escapees should not be relied upon to protect wild fish populations.

The Aquaculture Industry's Interest in preventing genetic-erosion

It is within the aquaculture industry's own interest to prevent genetic erosion and loss among wild fish populations. Aquaculture "depends on [the] critical role of genetic variation to sustain productivity, prevent inbreeding depression and keep the door open for new products and increased yields."[56] If the aquaculture industry fails to take immediate measures to prevent genetic erosion, then this inaction is tantamount to shooting itself in the foot. Strict effluent standards and guidelines aimed to prevent farmed fish escapes cannot possibly be overly burdensome for an industry that depends on their implementation. In short, as stated by fishery biologists Anne Kapuscinski and D.J. Brister, "making the genetic conservation of wild aquatic populations a primary goal of sustainable aquaculture would be an act of enlightened self-interest and of responsible global citizenship" for the industry.[57]

D. Farmed Fish Transfer Diseases and Parasites To Wild Fish

Escaped farmed fish transfer to wild fish stocks many diseases and parasites. This is a notorious and persistent problem for the aquaculture industry. The Services report, "the threats of major loss due to disease [in wild Atlantic salmon] are generally associated with salmon culture."[58] Since farmed fish are raised in dense concentrations, disease and parasite transfer occurs much faster than in the wild.[59]

There are numerous diseases and parasites that can spread between farmed and wild fish.[60] In particular, the threat of sea lice and infectious salmon anemia (ISA) are serious problems for wild fish populations. Sea lice are parasites that eat salmon flesh and can even kill fish.[61] Outbreaks of sea lice occur in wild salmon throughout all the major salmon-farming countries.[62] It is therefore widely recognized that "lice on farmed salmon contribute to lice populations of local wild salmonid stocks."[63] The evidence shows that wild smolts near fish farms carry far more lice than smolts caught away from the facilities.[64] As if the threat of sea

---

[56] Id. at 128.
[57] Id. at 129.
[58] Services Final Biological Opinion, supra note 5, at 16.
[59] Mother Jones, supra note 17, at 6.
[60] Marine Aquaculture in the U.S., supra note 15, at 9
[61] Id. at 9.
[62] Id.
[63] Department of Fisheries and Oceans, Interaction Between Wild and Farmed Atlantic Salmon in the Maritime Provinces, DFO Maritime Region Habitat Status Report 99/1 E, 15 (Feb. 1999).
[64] Mother Jones, supra note 17, at 38 (findings based on a sampling taken by Alexandra Morton, a marine biologist).

lice alone is not serious enough, "sea lice may also serve as a host for other lethal diseases, such as Infectious Salmon Anemia (ISA)."[65]

ISA is an equally serious disease, risking the survival of native fish stocks, including the highly vulnerable and endangered Atlantic salmon. The incurable ISA virus is similar to members of the "flu" family, causing lethargy, swelling and hemorrhaging in the kidney and other organs, fluid in the body cavity, and severe anemia.[66] The USDA explains that "[m]ortality is highly variable and ranges from 2-50 percent over one production cycle and can affect an entire farm in the matter of months."[67] In addition, the USDA warns that, "ISA can be transmitted and spread between and through wild and farmed fish populations and geographic areas from direct contact between infected and uninfected fish" and "fish handlers and equipment contaminated with the ISA virus can introduce the disease to uninfected sites and fish."[68]

This lethal and contagious disease was detected for the first time in the United States at a Maine salmon farm in January of 2001.[69] It then quickly spread to two other farms and "now appears to be moving south from New Brunswick, where it made its first North American appearance in 1996."[70] The Services confirm that "[t]he European ISA virus has become established in North American aquaculture fish in proximity to Atlantic salmon in the DPS."[71] The ISA threat was a persuasive factor in the decision to list Atlantic salmon as endangered,[72] and the disease continues to jeopardize other native fish.

III. EPA is Legally Required To Establish National Effluent Standards For Farmed Fish

The fact that fish are escaping offshore aquaculture facilities is now beyond dispute, and the associated impacts are already evident. The magnitude of the problem now demands that the EPA comply with its statutory and regulatory requirements by developing national effluent standards for farmed fish.

---

[65] Marine Aquaculture in the U.S., supra note 15, at 10.
[66] USDA, Infectious Salmon Anemia (Jan. 2002), at http://www.aphis.usda.gov/oa/pubs/tnisa.htm (last visited Apr. 12, 2002).
[67] Id.
[68] Id.
[69] Marine Aquaculture in the U.S., supra note 15, at 10.
[70] Id.
[71] Services Final Biological Opinion, supra note 5, at 17.
[72] Id. at 11.

A. The Clean Water Act Requires EPA To Establish National Effluent Limitations for Escaped Fish

Congress specifically delineated that the primary purpose of the Clean Water Act ("CWA") is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[73] In order to achieve this purpose, the discharge of "any pollutant" into navigable waters is prohibited.[74] The only exemption is for facilities that obtain a national pollutant discharge elimination system ("NPDES") permit from EPA. A NPDES permit limits the amount of pollutants that can be discharged from a facility and imposes other conditions such as monitoring and best management practices to protect the water quality.[75]

As a result of the numerous pollutants discharged from aquaculture facilities, EPA is now in the process of drafting national effluent limitations for aquaculture facilities. [76] Because escaped farmed fish qualify as a "pollutant" under the CWA, EPA is responsible for drafting effluent standards for fish that escape from aquaculture facilities.

Escaped Fish are "Pollutants"

The CWA defines a pollutant to include "biological materials . . . discharged into the water."[77] Although the statute is silent on the definition of "biological materials," courts have interpreted the term to include "live fish, dead fish, and fish remains."[78] Recently, in the case of U.S. PIRG v. Atlantic Salmon of Maine, the U.S. District Court of Maine confirmed this interpretation by stating that "[f]ish that do not naturally occur in the water, such as non-North American salmon, fall within the term 'biological material' and are therefore pollutants under the Act."[79]

Moreover, farmed fish escapes constitutes "an addition of pollutants" invoking the NPDES requirement of the statute.[80] Courts have repeatedly upheld the EPA's position regarding what constitutes "an addition of pollutants" by stating that a "point source must introduce the pollutant into navigable water from the outside

---

[73] 33 U.S.C. § 1251(a).
[74] 33 U.S.C. § 1311(a).
[75] See 33 U.S.C. § 1342(a)(1)(2); U.S. Public Interest Research Group v. Atlantic Salmon of Maine, 2002 U.S. Dist. LEXIS 2822, *14-15 (D. Maine 2002), citing EPA v. Cal. Ex rel. State Water Res. Control Bd., 426 U.S. 200, 205, n.14 (1976); Int'l Paper Co. v. Ouellette, 479 U.S. 481, 489 (1987).
[76] EPA's regulations require that certain aquaculture facilities that meet the definition of "concentrated aquatic animal production facilities" receive an NPDES permit before discharging pollutants. 40 C.F.R. § 122.24(b).
[77] 33 U.S.C. § 1362(6).
[78] Nat'l Wildlife Fed'n v. Consumers Power Co., 862 F.2d 580, 583 (6th Cir. 1988). See also Ass'n of Pacific Fisheries v. EPA, 615 F.2d 794 (9th Cir. 1980) (determining that fish residuals in water discharged from seafood processing plants are pollutants).
[79] 2002 U.S. Dist. LEXIS 2822, at *19.
[80] 33 U.S.C. § 1362(12) (defining "discharge of a pollutant" as "any addition of any pollutant to navigable waters from any point source.").

world."[81] Fish that escape aquaculture facilities are "added" to navigable water since they are the foreign biological material of fish farms and do not originate from the navigable water in which they are discharged. The Atlantic Salmon of Maine Court concurs with this analysis, stating that because "[non-North American origin salmon] are put in the water by [Atlantic Salmon of Maine] as part of its [aquaculture] operation, they do not naturally occur in the bay and therefore are 'additions' to the water."[82] Therefore, EPA is responsible under the CWA for developing national effluent guidelines for the escape of farmed fish.

B. EPA Is Bound By A Settlement Agreement To Review The Impacts Of Escaped Farmed Fish

Far from discretionary, the obligation of the EPA to address the issue of escapement is required in the case of NRDC v. Browner, Civil Action No. 89-2980 (D. D.C.). Pursuant to the settlement agreement that the agency entered into with the plaintiffs on January 31, 1992, EPA agreed to develop regulatory standards that apply to aquaculture. On February 23, 2000, EPA stipulated in an amended settlement agreement to the following:

> In connection with proposing effluent limitations guidelines and standards for the Aquaculture point source category, EPA agrees to consider nutrients, total suspended solids, human and non-human pathogens, antibiotics, pesticides, and *biological impairments due to the introduction of non-native species.*[83]

Consistent with the requirements of the Clean Water Act and the settlement agreement, EPA is directed to develop national effluent standards for aquaculture facilities, including specific standards for the discharge of farmed fish.

C. The Development Of Effluent Standards For The Escape Of Farmed Fish Is Consistent With The EPA's And Services' Own Prior Actions.

The development of national effluent standards for escaped farmed fish is consistent with prior statements and actions by the EPA and the Services. First, in 1974, EPA developed a draft effluent limitations document for aquaculture

---

[81] Nat'l Wildlife Fed'n v. Gorsuch, 693 F.2d. 156, 165 (D.C. Cir. 1982) and Consumers Power Co., 862 F.2d at 586.

[82] Atlantic Salmon of Maine, 2002 U.S. Dist. LEXIS at 23, citing Catskill Mountains Chapter of Trout Unlimited v. City of N.Y., 273 F.3d 481, 491 (2nd Cir. 2001) (stating that the "EPA's position, upheld by the Gorsuch and Consumers Power courts, is that for there to be 'addition,' a 'point source must introduce the pollutant into navigable water from the outside world.")

[83] NRDC v. Browner, Civil Action No. 89-2980 (renamed NRDC v. Browner) (emphasis added).

facilities that discussed the issue of fish escapement. In this document, the agency recognizes that escaped farmed fish are biological pollutants because they compete with native species and degrade habitat.[84] However, rather than promulgating these standards, EPA chose to defer to the states. Twenty-eight years later, there is a disarray of standards among the states, including in some states a complete lack of standards, regarding the regulation of aquaculture.[85] Because of the failure of the states to adopt consistent standards, it is essential for EPA to develop national standards.

Next, both EPA and the Services recognize the importance of having effluent standards for the escape of farmed fish. In the final biological opinion reviewing the affects on the endangered Atlantic salmon as a result of EPA's delegation of the NPDES program to the State of Maine, the issue of escaped fish from aquaculture facilities was addressed.[86] In consultation with the Services and consistent with the ESA, EPA committed to objecting to any permit that does not do the following:

(1) Prohibit the use of transgenic salmonids;
(2) Prohibit the use of reproductively viable non-North Atlantic salmon stocks for new facilities or expansion of existing facilities;
(3) Require an integrated loss control plan, which includes a schedule for preventive maintenance and inspection of the marine containment system and address methods for predator deterrence, site husbandry practices, contingency escape recovery protocols, loss reporting requirement, and storm preparedness measures;
(4) Require a facility design or modification to achieve zero escaped salmon in any Maine river;
(5) Require the marking of each Atlantic salmon juvenile placed into a pen that will identify it with a specific site.[87]

These conditions are important steps to protecting wild fish species. However, rather than applying them on an ad hoc basis as is the current practice, the EPA must act consistently with its interpretation of the CWA by incorporating these commitments into national effluent limitations for industry-wide application.[88]

---

[84] See Mary Liz Brenninkmeyer, The Ones that Got Away: Regulating Escaped Fish and Other Pollutants From Salmon Fish Farms, 27 B.C. Envtl. Aff. L. Rev. 75, 106, citing EPA, Office of Enforcement, Development Document for Proposed Effluent Limitations Guidelines and New Source Performance Standards for the Fish Hatcheries and Farms Point Source Category (1974).

[85] Id. at 103-105 (explaining that Washington state does not require salmon net pen operators to collect their waste and only has vague standards for operators of fish farms and identifies Mississippi and Arkansas as states that do not regulate catfish aquaculture operators).

[86] The biological opinion was conducted in accordance with the Section 7 requirement in the Endangered Species Act. 16 U.S.C. § 1531 et seq.

[87] Services Final Biological Opinion, supra note 5, at 9.

[88] CFS notes that the EPA has previously established effluent limitations for the discharge of biological materials associated with seafood processors. These limitations cover the effluent of unused fish residuals, including heads, tails, and internal residuals of processed fish. 40 C.F.R. §§ 408.10 et seq.

D. The Development Of National Effluent Standards Is Consistent With U.S. International Agreements

The EPA must also not overlook the commitments of the United States under international agreements. For example, the United States is a member of the North Atlantic Salmon Conservation Organization ("NASCO"), which was established under the Convention for the Conservation of Salmon in the North Atlantic Ocean. Members of NASCO are responsible for conserving, restoring, enhancing, and managing salmon stocks and have agreed to specific measures to limit the impacts aquaculture has on wild salmon stocks.[89]

Each member of NASCO has agreed to minimize the escape of farmed salmon. In particular, members have agreed to:

- Use fish containment technology that will eliminate fish escapement and routinely inspect, maintain, and upgrade the technology;
- Provide sufficient security and monitoring of the aquaculture facility;
- Recapture escaped farmed fish and develop site-specific contingency plans to handle large fish escapes;
- Treat and remove diseased farmed fish and take precautions to prevent the escape of diseased farmed fish;
- Confine transgenic salmon to secure, land based facilities; and
- Research the use of all-female triploid fish, tagging/marking of farmed fish, land-based systems, local stocks for broodstock, and focus on research to prevent fish diseases and parasites and interactions between farmed and wild fish.[90]

In addition, the Code of Conduct for Responsible Fisheries is directed toward all members of the Food and Agriculture Organization of the United Nations. Within this code, there is a section on aquaculture. This section directs members to conserve genetic diversity by taking steps to "minimize adverse genetic, disease, and other effects of escaped farmed fish on wild stocks."[91] In addition, this

[89] NASCO, Convention for the Conservation of Salmon in the North Atlantic Ocean, at http://www.nasco.org.uk/html/the_convention.htm (last visited Apr. 24, 2002)[hereinafter "NASCO"].

[90] Id; See Agreement for the Implementation of the United Nations Convention of the Law of the Sea at 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, Dec. 4, 1995, S. Treaty Doc. No. 104-24 (stating that the U.S. has an obligation to conform to the precautionary approach).

[91] FAO, Code of Conduct for Responsible Fisheries, Art. 9 at http://www.fao.org/fi/agreem/codecond/ficonde.asp (last visited June 27, 2001)

section directs members to decrease the harmful effects of genetically engineered fish, particularly when these fish can escape and swim into the jurisdiction of a neighboring member country.[92]

National effluent standards for escaped farmed fish would implement the United States' commitments under these international agreements. Therefore, the EPA's national effluent standards should focus on minimizing the negative impacts on vulnerable wild stocks from farmed fish escaping from open-water aquaculture operations.

IV. Recommended National Effluent Standards For Escaped Farmed Fish

A. Escaped Farmed Fish Should Be Regulated As A Nonconventional Pollutant

Under the CWA, a pollutant falls into one of three categories, toxic, conventional, or nonconventional. Congress specifically defined toxic and conventional pollutants. A toxic pollutant includes disease-causing agents that will cause such effects as death, disease or physical deformities in organisms.[93] A conventional pollutant includes "pollutants classified as biological oxygen demanding, suspended solids, fecal coliform and pH."[94] A pollutant that does not fit within the toxic or conventional definition falls within the nonconventional pollutant definition.[95] Escaped farmed fish do not fall within either the toxic or conventional pollutant meaning and therefore, should be regulated as a nonconventional pollutant. In setting effluent standards for nonconventional pollutants, EPA is to set standards based upon the best available technology (BAT).[96] This means that EPA is to look at the most recent technology and scientific research for devising standards to limit the discharge of farmed fish.

B. Model National Effluent Standards For Escaped Farmed Fish

The EPA established important groundwork for industry-wide effluent standards in issuing an NPDES permit on February 21, 2002, to the Acadia Aquaculture facility in Blue Hill Bay within the Maine coastal waters.[97] CFS recommends that many of the conditions stipulated in the permit be incorporated into national

---

[92] Id. See United Nations Convention on Biological Diversity, June 5, 1992, 31 I.L.M. 318 (1992) (entered into force Dec. 29, 1993) (stating that parties are required to ensure the conservation and sustainable use of biological resources).
[93] 33 U.S.C. § 1362(12).
[94] Id. § 1314(a)(4).
[95] Natural Resources Defense Council v. EPA, 822 F.2d 104, 110 n.5 (D.C. Cir. 1987).
[96] 33 U.S.C. § 1311(b)(2)(A).
[97] Letter from Steph J. Silva, Director, EPA's Maine Program to Erick Swanson, Acadia Aquaculture LLC, (Feb. 21, 2002)(approving NPDES Permit No. ME0036234)[hereinafter "Acadia permit"].

effluent standards for aquaculture operations. In order to protect the marine environment against farmed fish escapement, the EPA should use these standards in requiring NPDES permits for all open-water facilities and fish species, not just for the Acadia facility in Maine.

Recommendations (1) through (6) listed below are the "special conditions" contained within the Acadia permit relating to farmed fish escapement, along with CFS' recommendations for expanding these conditions to further protect wild fish populations. Recommendations (7) and (8) are additional measures necessary to fully counteract the problem of farmed fish escapement.

1. Prohibition on the farming of reproductively viable non-North American Atlantic salmon stocks.

To prevent disruption of the genetic integrity of wild fish populations, the prohibition in the Acadia permit on the use of reproductively viable non-North American Atlantic salmon stocks, consistent with the recommendations of the Services,[98] is a step in the right direction. However, it does not guard against the adverse genetic impacts of breeding between farmed and wild fish entirely. Genetic impacts can also result from the breeding of farmed and wild fish of the same genetic strains,[99] since farmed fish are selectively bred for the genetic traits that are best suited to meet the aquatic conditions of the facility in which they are introduced. Farmed fish therefore lack the genetic variation that is found among wild stocks, regardless of their genetic strain.

CFS Recommendation: All farmed raised fish in net pens, regardless of whether they are from the same genetic strain, must be reproductively sterile. The EPA should refuse to issue a permit to a net pen facility if the fish are not sterile.

CFS notes that technology already exists to produce reproductively sterile farmed fish through the use of triploidy.[100] It must be kept in mind, however, that this method is not 100% effective in inducing sterility.[101] Additionally, even if a perfect rate of sterility is achieved, this will not alleviate all the impacts associated with escapement. Reproductively sterile farmed fish can still compete for food and habitat, transfer diseases and parasites, and "wild males' attempts to

[98] Joint Recommendations of the Northeast Regions of the USFWS and the NMFS Related to Corps of Engineers Permits for Marine Aquaculture Facilities (May 15, 2000). On the Pacific coast, CFS recommends the use of local stocks instead of raising nonnative Atlantic salmon in Pacific waters.

[99] Marine Aquaculture in the U.S., supra note 15, at 8 (stating that "[e]scapes of native species of farmed fish can also harm wild stocks, particularly when substantial genetic differences exist between the farmed and wild populations.").

[100] Genetic Impacts of Aquaculture, supra note 35, at 134.

[101] Id. at 135 (explaining that "[u]nder experienced hands, one can expect rates of successful triploidy in the 90th percentile in large-scale production but this will vary with fish strain, egg quality, age of spawners and induction conditions."). The EPA should require aquaculture operations to screen every individual smolt to ensure sterilization.

reproduce with escaped sterile females may depress reproduction rates."[102] Accordingly, sole reliance upon sterilization to decrease adverse impacts on wild fish populations is not appropriate. Other barriers, as discussed below, need to be put in place.

In sum, the genetic impacts of interbreeding between farmed and wild fish must be avoided to protect against the endangerment /extinction of wild fish stocks. The use of only reproductively sterile fish in open-water aquaculture is a critical measure to meet this goal.[103]

2. Prohibition on the farming of transgenic salmonids and transgenic fish..

To prevent severe disruption to the marine ecosystem and consistent with the Services recommendations, the Acadia permit prohibits the use of transgenic salmonids.[104] The risks associated with the escape of non-transgenic fish are great enough without adding transgenic fish to the mix. The scientific research community has "barely begun to conduct the appropriate studies to test for ecological risks of aquatic GEOs."[105] The research that has been conducted shows that transgenic fish are more aggressive, eat more food, and attract more mates than wild fish.[106] In addition, these studies show that although transgenic fish will attract more mates, their offspring will be less fit and less likely to survive.[107]

CFS Recommendation: The EPA should incorporate this special condition prohibiting the farming of transgenic salmonids in all NPDES permits for aquaculture. In addition, the agency should refuse to permit the use of ***any*** transgenic organism in the nation's waters as requested by CFS in its petition to FDA and the other agencies seeking a ban on allowing transgenic fish in open waters.[108] Because the research shows that transgenic fish are likely to disrupt the ecosystem, the agency should not risk allowing these fish to be raised in open waters.

---

[102] Marine Aquaculture in the U.S., supra note 15, at 9.
[103] CFS also supports the conditions in the Acadia permit for the marking/tagging of each farmed fish that is recorded with EPA, the requirement that the aquaculture operator certify that the conditions in the permit are being followed, records of the containment system (repairs, inspections etc.), and allowing inspection by EPA, USACE, and the Services. See Acadia Permit, supra note 97, at 20-1.
[104] Id. at 20.
[105] Id.
[106] See attachment, CFS submitted comments (in the form of a legal petition to USDA) on transgenic fish to the EPA docket in May 2001 [hereinafter "CFS Petition"]. These comments are available at www.gefish.org
[107] William M. Muir and Richard D. Howard, Possible ecological risks of transgenic organism release when transgenes affect mating success; Sexual selection and the Trojan gene hypothesis, 96 PNAS 13853-13856 (Nov. 23, 1999); Philip W. Hedrick , Invasion of transgenes from salmon or other genetically modified organisms into natural populations, 58 Can. J. Fish Aquatic Science, 841-844.
[108] See CFS Petition, supra note, 106.

3. Marine Containment System

To prevent the harmful interaction between farmed and wild fish, the Acadia permit requires the facility to use a marine containment system that will allow zero fish escapes. All fish will be required to be marked and any escapes that are documented in a river where the distinct population segment of the endangered Atlantic salmon are located will be a violation of the permit.[109] If fish do escape, the permittee must report to EPA the efforts that were conducted to recapture the fish. To eliminate future escapes the permittee must do the following:

(1) the permittee shall conduct an independent assessment of his/her containment system through the use of an experienced contractor;
(2) based on the results of this assessment, the permittee shall implement modifications necessary to correct the situation; and
(3) if the permittee does not implement these modifications, pens must be removed from the water within six months of the contractor's assessment.[110]

CFS Recommendation: National effluent standards should require all applicants to employ a fully functional marine containment system as described in the Acadia permit to ensure zero fish escapes.[111] A strict record-keeping requirement, documenting all escapes and equipment failures, should also be required, with the provision that records must be made available for review by the EPA, the U.S. Corps of Engineers, and the Services. Furthermore, CFS recommends that EPA seek civil penalties for any fish escapes reported or detected. This action is consistent with EPA's authority to impose penalties for violations of NPDES permit conditions.[112] Requiring documentation of escaped farmed fish in the same rivers as endangered Atlantic salmon or other endangered fish will require a significant amount of time and luck. Imposing a violation on an aquaculture operator only if the escaped fish is documented in a river is weak provision that will not encourage aquaculture operators to decrease fish escapes and will not protect endangered species. Therefore, any fish that escape from net pens should constitute a violation of the NPDES permit.

To achieve zero escapement of farmed fish, EPA should encourage aquaculture facilities to phase out the use of net pens. In setting effluent limits for aquaculture facilities, EPA should look to effluent limitations achieved by the

---

[109] Acadia Permit, supra note 97, at 20.
[110] Id.
[111] Because escapement is possible during transfer, this requirement must cover all stages of production, including transferring activities.
[112] 33 U.S.C. § 1319(b)(d).

most optimally operating members of the industry, operators of enclosed land based recirculating systems.[113] These systems are highly controllable and because these systems are enclosed and on land, the concerns that aquaculture fish will escape and cause damage to the ecosystem is virtually eliminated. In addition, rather than discharging the water after one use, recirculating systems continuously treats and returns the water. Along with conserving water and discharging less pollutants into the environment, these systems reduce parasites and diseases.[114] Aquaculture operators will benefit from the improvements in the health of farmed fish, including increased survival and growth.[115] Already, several aquaculture companies are successfully using this type of system for a variety of fish. [116] By requiring strict containment measures, the industry will be forced to switch to enclosed land based systems, which is the most effective method to protect wild populations of fish.

4. *Integrated Loss Control Plan*

To prevent and foresee potential damage to containment facilities, the Acadia permit requires the permittee to submit to EPA for review and approval an integrated loss control plan, at least 45 days prior to transferring fish to the facility. The plan must include a schedule for preventive maintenance and inspection of the containment system. It must also address (1) methods of predator deterrence, (2) contingency escape recovery protocols, (3) storm preparedness measures, and (4) facility husbandry practices (including the removal of dead fish and fish transfer procedures during stocking and grading).[117]

CFS Recommendation: National effluents standards should require an integrated loss control plan for all offshore aquaculture facilities as required of the Acadia facility. Additionally, the EPA should require each facility to annually certify that it has reviewed its plan, and made revisions as needed. [118]

5. *Inventory Tracking System*

---

[113] Kennecott v. EPA, 780 F.2d 445, 448 (4th Cir. 1985).

[114] Rebecca Goldburg & Tracy Triplett, Murky Waters: Environmental Effects of Aquaculture in the U.S., Environmental Defense Fund 83(1997)[hereinafter "Murky Waters"]. As for the discharge of waste containing high concentrations of nutrients, this waste must be disposed of properly. Facilities currently using these systems are treating the effluent and using the sludge to fertilize farms. Id.

[115] Fisheries and Aquaculture, New Technologies, Government of British Columbia, Ministry of Agriculture, Food & Fisheries, at http://www.agf.gov.bc.ca/fisheries/technology/new_tech.html (last visited April 19, 2002).

[116] Rebecca Goldburg & Tracy Triplett, Murky Waters: Environmental Effects of Aquaculture in the U.S., Environmental Defense Fund 83 (1997). Although these systems are more expensive, the more environmental restrictions placed upon aquaculture will encourage the use and development of cost-effective enclosed recirculating systems.

[117] Acadia permit, supra note 97, at 21.

[118] The EPA should work with NMFS, Regional Fishery Management Councils, and the aquaculture industry to develop regional recovery strategies to recover large fish escapes.

To sufficiently monitor the number of farmed fish within the net pens and those escaping, the Acadia permit requires the permittee to maintain an inventory tracking system that provides an inventory tracking of all size classes (i.e. average weight and age) of Atlantic salmon, including documentation of escapes. Each month and on a "per-pen basis," the permittee must provide this information to the EPA in tabular form, clearly identifying (1) the total number of fish; (2) number of smolts transferred; (3) fish harvested; (4) mortalities; (5) and escapes.[119]

CFS Recommendation: In order to monitor escapes and ascertain where and how farmed fish are escaping, it is essential that all facilities are required to track each fish at all stages of production, from hatching to final processing. The EPA should therefore require all applicants to maintain an inventory tracking system similar to the Acadia permit. In addition, the aquaculture facility should track losses by category: (1) predation, (2) disease, (3) faulty equipment or human error, (5) storms, (6) vandalism, and (4) unexplained losses (chronic leakage). Monthly reports should be generated by each facility, and sent to the EPA, the Services, and appropriate state authorities. Additionally, each facility's inventory documentation should be subject to government inspection at any time by the EPA and the Services and be available to the public under the Freedom of Information Act.[120]

6. *Reporting of Escaped Fish*

To ensure that federal authorities are aware of farmed fish escapes, the Acadia permit requires the permittee to report any known or suspected escapes within twenty-four hours. Escapes must be reported to the EPA Office of Environmental Stewardship, the NMFS and USFWS Endangered Species Coordinators, USFWS Maine Rivers Coordinators, the Corps, and relevant state authorities.[121]

CFS Recommendation: National effluents standards should include the twenty-four hour reporting requirements contained within the Acadia permit. At a minimum, an escape report should contain information regarding: (1) the location of the accident site, (2) date and time of occurrence, (3) species/strain of fish involved, (4) the average size/weight/age of the fish, (5) the cause of the

---

[119] Acadia permit, supra note 97, at 21.

[120] The CFS notes that computerized inventory-tracking systems have been developed and are in use in a number of commercial salmon farms in British Columbia. The British Columbia Environmental Assessment Office explained that "[e]stablishing a standardized, computer-based system to be used industry-wide would ensure consistency and make review and auditing easier and more effective." Canada Environmental Assessment Office, Salmon Aquaculture Review, at http://www.eao.gov.bc.ca/PROJECT/AQUACULT/SALMON/Report/final/vol1/V1chp5 (last updated Mar. 3, 2002). This information should be shared between U.S. and Canada to further protect wild fish populations.

[121] See supra at pp. 2-4 (explaining that federal authorities did not discover until over a month later that over 100,000 fish escaped from an aquaculture facility in Maine). Acadia permit, supra note 97, at 21.

accidental escape, (6) number of fish lost, (7) details of any parasites or diseases, (8) the last known location of the escaped fish, and (9) a description of recapture attempts.[122]

7. *Measures to Protect Wild Fish Populations from Diseases and Parasites*

Although the Acadia permit does not identify specific requirements for preventing diseased escaped farmed fish from transferring diseases and parasites to wild fish, CFS recommends that national effluent guidelines contain this provision. The transfer of disease and parasites from farmed fish to wild fish populations is a serious threat requiring the adoption of national effluent standards.

Efforts to protect wild fish populations from diseased farmed fish must work on two levels. First, precautionary measures must be taken to prevent outbreaks of diseases and parasites among fish farms. The stocking of only certified pathogen-free fish is one precautionary measure that national effluent standards should require. CFS also recommends that facilities be required to report to the EPA, USDA, the Services, and appropriate state authorities when disease and parasite outbreaks occur among their stocks. First, if disease or parasites are detected among the facility, then appropriate actions should be taken to treat or remove these diseased fish from the marine environment. Moreover, if an outbreak presents a threat to wild fish populations, then the facility should be required to intensify its containment efforts to prevent any escapes of infected fish or remove the fish from the site. Second, if the escapes do occur, then facilities should be required to report whether any of the escapees are known or suspected to be infected with diseases or parasites, such as sea lice and ISA.

8. Placement of Net Pens

Another requirement that needs to be identified in NPDES permits is the placement of net pens.[123] If net pens are poorly placed, escaped farmed fish may gain access to sensitive marine areas. For example, farmed fish that escape from net pens placed near spawning grounds may affect the breeding of wild fish. Poorly placed net pens may also obstruct wild fish by impeding their migration route. Finally, placing net pens near the habitat of predators will lure these

[122] CFS notes that the "Escape Reporting Form" attached to the Acadia permit (ATTACHMENT C) states "the permittee is required to report any escape of more than 500 fish within 24 hours . . .." However, the relevant special condition suggests and the *Response to Comments* section dated February 21, 2002, clarifies that the permittee is to report *any* known or suspected escapes, not just those over 500. Acadia permit, supra note 97, at 20-1.

[123] EPA should work in conjunction with the USACE, who is responsible for issuing permits under the Rivers and Harbors Act, 33 U.S.C. § 403, and the Services, authority under the ESA, in determining the appropriate placement of net pens.

animals to the pens, which will lead to massive fish escapes.[124] Therefore, it is essential that net pens are placed in an area that will not provoke fish escapes or harm marine life if fish do escape.

CONCLUSION

The regular discharge of farmed fish from aquaculture facilities operating in the nation's waters is a serious threat to the stability of the marine ecosystem. In developing national effluent standards for aquaculture operations, the EPA is legally required to include standards for escaped fish. CFS encourages EPA to adopt a combination of standards from the Acadia permit along with CFS' recommendations. Without these provisions, the biological diversity of marine fish is at risk.

Respectfully Submitted,

_____

Tracie Letterman
Fish Program Director
Center for Food Safety
660 Pennsylvania Ave, SE
Suite 302
Washington, DC 20003
(202) 547-9359 (ph)
(202) 547-9429 (fx)

Derek Howard
Law Clerk

[124] See Marine Aquaculture in the U.S., supra note 15, at 17.