Point Sources and Pollutants: Using the Clean Water Act to Regulate Offshore Aquaculture Discharges

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SEMINAR SUMMARY

Aquaculture has become increasingly important as a source of seafood, and presently accounts for approximately 50 percent of all seafood consumed worldwide. Currently, offshore aquaculture makes up a small but growing sector of the industry, and it is anticipated that the industry will invest more heavily in offshore facilities in the coming years. In light of this projected growth, a better understanding of the environmental impacts of the practice is essential, as is knowledge of the regulatory framework and the federal laws that govern U.S. ocean waters.

The webinar panel featured experts from the U.S. Environmental Protection Agency (EPA) and distinguished academics specializing in water law and policy. The panelists laid out the regulatory structure that governs pollutant discharges from offshore aquaculture facilities as well as the known and plausible environmental impacts of those discharges, which range from excess feed and fish waste to escapes of the cultured fish themselves.

Panelists:

- **Jeremy M. Firestone,** Professor of Marine Policy and Legal Studies, School of Marine Science and Policy at the University of Delaware and Director of the Center for Carbon Free Power Integration
- **Robin Kundis Craig,** William H. Leary Professor of Law, University of Utah S.J. Quinney College of Law
- **Janet Goodwin,** Chief of Technology and Statistics Branch, Office of Science & Technology, U.S. EPA
- **Eric P. Nelson,** U.S. EPA Region I, Oceans and Coastal Protection Unit, and EPA Diver and Unit Dive Officer

Moderator:

- **Read Porter,** Senior Attorney, Environmental Law Institute

Read Porter began the webinar with a brief introduction. Mr. Porter said the aquaculture industry currently supplies about 50 percent of all seafood consumed worldwide. The development of the industry has moved more slowly in the U.S. than in other countries, causing some to speculate that the American industry is poised to develop rapidly in the near future. Mr. Porter explained that this webinar would focus on offshore aquaculture and on the applicable provisions of the Clean Water Act (CWA), namely Section 301 (effluent limitations), Section 402 (National Pollution Discharge Elimination System (NPDES) Permits) and Section 403 (Ocean Discharge Criteria).

A NPDES Permit is required for the addition of a pollutant from a point source into, in the context of this webinar, federal ocean waters. Most discharges from aquaculture facilities – excess food, waste, fecal matter, escaped organisms – constitute the "addition of a pollutant" for the purposes of Section 402. Aquaculture facilities qualify as "point sources" if they exceed certain size thresholds that would qualify them as Concentrated Aquatic Animal Production (CAAP) Facilities. Aquaculture permits are based on Effluent Limitation Guidelines (ELGs) and must comply with Ocean Discharge Criteria (ODC). The ELGs are narrative guidelines that require creation of a best management plan and the ODCs call on EPA to determine if the discharge will cause "unreasonable degradation of the marine environment" before a permit will be issued.

Professor Firestone led off the panelist presentations by discussing the known and potential impacts of escaped fish from aquaculture facilities on marine environments and what can be done to lower the risk and incidence of escapes. One of the primary issues related to escapes is the uncertainty surrounding the effect of cultured fish comingling with native populations. Native populations of Atlantic salmon in Maine are listed under the Endangered Species Act, and the release of cultured fish may be a barrier to recovery efforts. Given the incomplete understanding of the broad impacts of escapes, Professor Firestone suggested that the focus should be on what can be done to avoid them in the first place. The possibility of escapes is a cause for concern because there is documented evidence of their occurrence in the past, including from aquaculture facilities in the Gulf of Maine. In December of 2000, approximately 170,000 salmon of non-North American origin escaped off of Stone Island and in November 2003 around 2000 farmed salmon escaped at Birch Point.

Professor Firestone suggested that escaped fish from CAAP facilities fit the definition of "pollutant" in the Clean Water Act, a position supported by recent case law. Under the CWA, the definition of "pollutant" includes "biological materials,"[1] which courts have held to include escaped cultured fish. A series of cases brought before the U.S. District Court for the District of Maine in the early 2000s identified materials that can be regulated under the CWA, namely "conventional pollutants," such as feces, uneaten feed, and pesticides among other things, and escaped fish.[2] The court reasoned that

[1] 33 U.S.C. §1362(6) (emphasis supplied).

[2] United States Public Interest Research Group v. Stolt Sea Farm, Inc., No. 00-149-B-C, 2002 U.S. Dist. LEXIS 2757, at *20 (D. Me. Feb. 19, 2002); United States Public Interest Research Group v. Heritage Salmon, Inc., No. 00-150-B-C,

escaped fish can also be pollutants based on their origin and because they are distinguishable from wild stocks. For example, any fish raised in an offshore aquaculture facility that do not exist in that region naturally could be regulated, and farmed fish with blunt fins (caused by stress associated with crowded pens) and deformities can be regulated because they are distinguishable from the native population. The court did not, however, rely on the potential for genetic contamination of the native population in holding that escaped fish are pollutants.

Professor Firestone contrasted the Maine decisions with *Association to Protect Hammersley, Eld, and Totten Inlets v. Taylor Resources, Inc.*,[3] in which the Ninth Circuit Court of Appeals held that "biological materials" are limited to the waste products of some human or industrial process and that mussel shells and other byproducts from the farm are the result of "natural growth and development of mussels" rather than from a "waste product of a transformative human process." That said, the court implied that "biological materials" includes the discharge of "live fish, dead fish, and fish remains."[4]

In conclusion, Professor Firestone provided some practical solutions for addressing the escape of cultured fish from aquaculture facilities. As a preliminary matter (in the context of North Atlantic salmon), he suggests moving facilities farther offshore and away from rivers where native populations return each year to spawn. Cultured salmon are not imprinted with the same biological markers as the endangered wild populations, and increasing the distance between aquaculture sites and spawning locations will make it less likely that escaped and native fish will interbreed. Furthermore, the relevant stakeholders should reconsider whether to phase out the practice of offshore cage aquaculture unless bio-security can be ensured. Third, he recommended that Congress consider new legislation to address the intentional or unintentional introduction of fish into U.S. waters. Finally, stakeholders should focus on addressing water quality to help native wild populations recover.

Professor Robin Craig then discussed the Clean Water Act Ocean Discharge Criteria (ODC). The Ocean Discharge Criteria are mandated by §403 of the CWA and apply whenever a point source is discharging a pollutant into marine waters. These waters include the "territorial seas" (the first three miles of ocean) and the "oceans," which have been defined by EPA as including the U.S. Exclusive Economic Zone (claimed under customary international law and extending 200 miles out from the coastal baseline established under international law). The ODC apply to all discharges into these waters that require NPDES permits, and EPA cannot waive its ability to review state-issued permits for discharges into the territorial seas (in most cases, the states have assumed authority to issue NPDES permits) for the Act's "navigable waters," which the Act explicitly defines to include the territorial seas.

2002 U.S. Dist. LEXIS 2706, at *23, (D. Me. Feb. 19, 2002); United States Public Interest Research Group, Stephen E. Crawford and Charles Fitzgerald v. Atlantic Salmon of Maine, LLC, 215 F. Supp. 2d 239, 247 (D. Me. 2002).

[3] 299 F.3d 1007 (9th Cir. 2002).

[4] Relying on Consumers Power v. NWF (6th Cir. 1988).

Professor Craig described the requirements that apply to ocean discharges as going beyond technology-based effluent limitations and water quality standards. The ODC call on the EPA or state to evaluate the impact of discharge activity on the relevant marine ecosystem, and EPA refers to the ODC as "a framework for an ecological risk assessment." The permitting authority (generally states in the territorial seas and the EPA in waters beyond) must ensure that the discharge does not cause an unreasonable degradation of the marine environment and must protect sensitive ecological communities.

After providing historical background to the Ocean Discharge Criteria, Professor Craig called attention to the importance of the term "unreasonable degradation." Discharges may result in unreasonable degradation and could result in permit denial in three scenarios. First, permits will be denied if the discharge will significantly adversely affect the ecosystem in the area of the discharge. Secondly, unreasonable degradation will be found if the discharge poses a threat to human health, either through direct exposure or through consumption of an exposed aquatic organism (for example, mercury contamination of fish). Finally, the loss of aesthetic, recreational, scientific or economic values that are unreasonable in relationship to the benefit derived from the discharge will constitute an unreasonable degradation (essentially a cost-benefit analysis). Professor Craig then discussed the ten factors that the permitting agency will consider in its analysis of unreasonable degradation, including whether the pollutants in question will persist in the ecosystem, whether any specialized or vulnerable marine communities will be negatively impacted, and whether any special aquatic sites will be impacted.

Professor Craig concluded her presentation with a discussion of new technologies being used in open waters off the coast of Hawaii. Since 2011, Hawaii Ocean Technology has been using "ocean spheres" to farm tuna. Hawaii Ocean Technology and Ocean Blue have permits for 12 of these spheres and can use them to raise about 6,000 pounds of tuna per year. These new facilities provide industry the opportunity to move facilities further offshore, outside of the territorial seas and into the U.S. Exclusive Economic Zone, at which point EPA would have sole regulatory oversight. There are a number of challenges to sole federal oversight of these facilities, however. For example, as the sole permitting authority, the EPA will have to be concerned with being consistent with the relevant state's coastal zone management plan. Additionally, in the federal ocean waters the water quality standards set by states do not apply, so the ODCs will be increasingly important as they relate to offshore aquaculture facilities in protecting the basic water quality of federal waters.

Janet Goodwin of the U.S. EPA concluded the presentations and gave listeners an overview of the CWA and the Effluent Limitations Guidelines and then provided some insight as to how those regulations impact Concentrated Aquatic Animal Production facilities.

Before delving into the substantive requirements of the ELGs, Ms. Goodwin pointed out that not all offshore aquaculture facilities will be considered CAAPs, which are point sources to which the ELGs

apply. In order to be considered a CAAP, a facility must meet certain threshold requirements that vary for warm water and cold water species.[5]

The CAAP ELGs are a technology-based approach to controlling water pollution. ELGs take cost and practicability into account when setting limits on pollution, and are not based on the water quality of the receiving water body. In developing the ELGs, EPA looked at what techniques were being used in the industry because the goal was to establish a uniform, baseline approach. The CAAP ELGs were published in 2004 and require management practices and record keeping activities rather than numerical limits.[6] The rule applies both to flow through and recirculating facilities and to net pen facilities.

Ms. Goodwin focused on the net pen elements of the 2004 ELG requirements in her presentation. Net pens are a particular type of CAAP that rely on natural water movements to remove excess feed and waste and provide freshwater to the animals in culture. Net pens are unique as a point source because they are entirely open to the surrounding environment and you cannot point to where the actual outfall is. Discharge from net pens has a variety of environmental consequences that merit preventive measures, such as the discharge of excess feed and feces causing benthic smothering, escape of cultured species interfering and competing with native species, and the spread of disease to native species.

The net pen ELG requirements are aimed directly at these types of problems. To control the discharge of excess feed, facilities must employ active feed monitoring and collect and return to shore all feed production materials. To control escapes, operators must report failure or damage to containment facilities. The permitting authority decides what constitutes reportable damage, and operators must provide an oral report of the damage within 24 hours of the discovery and a written report within seven days. The net pen ELGs also include reporting requirements for the use of drugs. There are very few approved drugs for the treatment of diseases in fish, therefore the drugs used to treat fish in aquaculture are typically going to be experimental drugs or drugs approved for use in contexts besides aquaculture ("extra-label" use). If an operator agrees to participate in a study of Investigational New Animal Drugs, they must make an oral report of that agreement within seven days and provide a written report within 30 days of beginning use of the drug. Good housekeeping provisions of the ELGs require that materials be stored in a manner to prevent spills as well as routine inspections to identify and repair any damage to the storage facility. Additionally, there are recordkeeping requirements imposed on operators that require maintaining records documenting feed amounts and estimates of the number and weight of the aquatic animals in order to calculate representative feed conversion ratios.

Following the presentations of the panelists, Eric Nelson added some concluding comments based on his experience working with permitting authorities and industry operators in implementing the permitting

[5] Definition of CAAP at 40 CFR 122.24

[6] CAAP ELGs can be found at 40 C.F.R. 451

program. Mr. Nelson's comments focused on the development of a Region I aquaculture permit in Blue Hill Bay, Maine. The permit was developed just before Maine assumed NPDES permit responsibilities and before the ELGs for CAAPs were promulgated. During permit development, Region I based its work on states' water quality standards (both numeric and narrative standards) to develop a permit that would address concerns such as the addition of nutrients to the environment and the recent listing of Atlantic salmon under the Endangered Species Act. EPA worked closely with NOAA and the U.S. Fish and Wildlife Service in developing restrictions on allowable species, requiring that facilities mark all smolts, and imposing reporting requirements in the event of an escape. In the case of drugs and other chemicals, some were prohibited outright and specific reporting requirements were imposed for others.

Mr. Nelson suggested that Maine poses an interesting case because, while at first glance it may seem that there are many areas off the coast that would be considered open ocean, the nature of the state's coastal geography causes much of the ocean area to fall within the state's territorial boundary. As a result many net pens fall within the baseline and therefore are not subject to ODC. Mr. Nelson also mentioned an offshore aquaculture project developed by University of New Hampshire. This demonstration project in the Gulf of Maine was intended to test the suitability of growing fish in a high energy environment. The draft permit relied largely on state water quality standards to ensure that they were not going to have an impact on the benthic environment. Since its inception, the project has lost a lot of its funding, and although it still exists it is well below the threshold level that would necessitate a discharge permit.

Mr. Nelson concluded by briefly mentioning shellfish aquaculture in federal waters in New England. There have been a number of attempts to grow shellfish in the region, but EPA has not been very involved with regulating those efforts under the Clean Water Act because EPA has taken the position that there is not a distinct discharge from shellfish aquaculture because there is no addition of feed. EPA will, however, look at the locations that operators intend to use to see if there are any special sites or unique habitats that may be affected by the placement of these facilities.

QUESTIONS & ANSWERS

Since native populations of salmon are quite low, might the salmon escapes not be so bad if they can aid in restoring populations in New England? What do you think about intentional releases in order to help bolster populations in the region?

Professor Firestone began his response by noting that in the context of the Endangered Species Act, we consider sub-species and discrete population segments which are genetically distinct. By releasing large numbers of hatchery fish into native populations you are not necessarily rehabilitating what you initially decimated, and as we learn more about genetic diversity this becomes more apparent. Professor Firestone suggested that we need to clean up degraded ecosystems, adjust how we get our electric

power, and make accommodations for fish populations that were already there. Professor Firestone also noted that historically, attempts at repopulating native populations through hatchery operations have not been very successful.

The Maine Aquaculture Association Containment Management System requires that farmers aggressively minimize factors that lead to escapes. Adherence to these requirements, namely mandatory reporting of escape events, has been required by discharge permits since 2003. Are you aware of this and has it had any impact on the bio-security issues that were discussed earlier in the webinar?

Professor Firestone said that despite these efforts, facilities were still experiencing escapes and additional requirements have not prevented them. The state of Maine should be commended for taking some actions, but there aren't firm regulations mandating double netting, or any specific practices that have made an impact.

Under the EPA framework, ocean discharges would be subject to NPDES criteria, is EPA using any of their available tools to set water quality criteria for federal ocean waters?

Mr. Nelson said that there are national recommended water quality criteria that are applied to federal waters that have been used on occasion in New England but that EPA is sensitive, depending on where a proposed project were to occur, to the idea of implementing state criteria if it were to be placed in a boundary area. EPA has established national criteria for a number of pollutants of concern to finfish aquaculture, for example copper and zinc.

Does the panel have any recommendations for how federal agencies can coordinate on environmental issues associated with marine aquaculture?

Ms. Goodwin said that there is a joint subcommittee on aquaculture that includes a number of federal agencies (the National Oceanic and Atmospheric Administration, the U.S. Department of Agriculture and the U.S. Department of the Interior, among others) that gave EPA advice as the Effluent Limitation Guidelines were developed and participated actively in the development of the rule. EPA has on occasion worked with the National Oceanic and Atmospheric Administration when they developed their licensing program for offshore aquaculture.

Professor Craig said that coordination of activities in the context of oceans has long been a cause for concern. One of the problems with regulating anything in the ocean is that there is no overarching set of priorities that binds all federal agencies. There are a number of agencies that have authority over what happens in oceans, but no definitive means of coordination. One of the things that could come out of the pending national ocean policy would be some aspect of marine spatial planning.

Professor Firestone added that there are a number of marine spatial planning efforts at the state and regional levels.

Some have suggested that the permitting process is particularly burdensome and has discouraged industry from exploring new technology such as ocean spheres. Is there any way that the permitting process can be more streamlined?

Mr. Nelson noted that if industry wanted to use new technologies as part of a feasibility study, they could employ new technologies such as ocean spheres at levels that would not trigger the need for a discharge permit. Later in the discussion, he added that there are really no provisions in the CWA that come under the guise of "experimental permits."

Ms. Goodwin noted that NPDES permits are rarely the biggest hurdle for companies engaged in offshore aquaculture.

Professor Craig sees this as another variation on the question about agency coordination. She also suggested that the accelerated, multi-agency permitting process for offshore energy facilities could provide a model for experimental aquaculture facilities.

Earlier in the webinar there was some discussion of sightings of escaped farm stocks in rivers. Is there any evidence of cross-breeding with native populations?

Professor Firestone was not aware of any cross-breeding, but noted that there is not enough evidence to definitively say whether or not that is encouraging. The populations of the native stocks are so low that the presence of cultured stocks alone was discouraging in that by merely being there, they are competing with the native population for food and favorable space, thereby making it more difficult for the native stocks to be rehabilitated.

Does the lack of interbreeding and proliferation of farm stocks despite large, significant numbers of escapes suggest that perhaps the wild genome is more robust than that of the farm-raised animals?

Professor Firestone responded by noting that genetic competition is just one of many concerns we should have about the escape of farm stocks. In river populations we have seen large viral outbreaks. Professor Firestone also reiterated the point that the ocean is a big place, and we should consider placing more physical space between the offshore aquaculture facilities and rivers.

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