OFFSHORE AQUACULTURE REGULATION UNDER THE CLEAN WATER ACT

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Harvard Law School
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The Emmett Environmental Law and Policy Clinic at Harvard Law School is directed by Wendy B. Jacobs and is dedicated to addressing major environmental issues in the United States and abroad and to providing its students an opportunity to do meaningful, hands-on environmental legal and policy work. Students and clinic staff work on issues such as climate change, pollution reduction, renewable energy, water protection, and smart growth. Students who participated in the preparation of this paper include Sara Bartel, Russell Feit, and Turner Smith.

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Cover Image: Kona Blue aquaculture in Hawaii (NOAA photo), available on the NOAA website, http://www.noaanews.noaa.gov/stories2007/s2815.htm.

Back Cover Image: Moi swim near the surface inside the SeaStation offshore aquaculture cage (NOAA photo), available on the Woods Hole Oceanagraphic Institute Oceanus website, http://www.whoi.edu/oceanus/viewImage.do?id=13840&aid=6680.

OFFSHORE AQUACULTURE REGULATION UNDER THE CLEAN WATER ACT

The objective of the CWA "is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[1] To achieve this goal, the Clean Water Act (CWA) makes unlawful "any discharge of any pollutant" without a permit[2] and confers broad authority on the Environmental Protection Agency (EPA) to protect water quality by regulating discharges of pollutants into the nation's waters. The goals and framework set forth by the CWA thus lay an adequate foundation for controlling the water quality impacts of aquaculture. While offshore aquaculture is still a nascent industry, EPA can—and should—develop appropriate tools to establish adequate oversight of these facilities in federal ocean waters ("ocean").[3] Specifically, we recommend that EPA:

1. ensure that all offshore facilities that discharge into the ocean—and particularly facilities using novel or untested technologies—are considered point sources and must obtain a discharge permit;

2. improve the standards for offshore aquaculture facility permits to set numeric limits for all types of discharges, including escapes of cultivated fish; and

3. identify data needs and develop requirements for monitoring and reporting for all facilities in the ocean, regardless of the facility's size or output, to allow determination of whether a proposed facility may cause undue degradation of the ocean.

Aquaculture Facilities Are Point Sources

EPA administers the National Pollutant Discharge Elimination System (NPDES), which is the relevant permitting program under the CWA for discharges into federal ocean waters. "Discharge" is limited to, in relevant part, "any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft."[4] Thus, aquaculture facilities in federal ocean waters must obtain a NPDES permit to discharge pollutants, but only if they are "point sources" and not

1 33 U.S.C. § 1251(a). This includes broad coverage of activities involving the "propagation of fish, shellfish, and wildlife."

2 33 U.S.C. § 1311(a).

3 Waters under exclusive federal jurisdiction include the contiguous zone, extending from the seaward state boundary to 12 miles from shore, and the exclusive economic zone (EEZ), which extends to 200 miles from shore. In this study, "ocean" refers to *all* federal ocean waters. This definition differs from the CWA, under which the "ocean" includes only all high seas waters more than 12 miles from shore. 33 U.S.C. § 1362(10).

4 33 U.S.C. § 1362(12)(B).

a "vessel or other floating craft."[5]

The CWA defines "point sources" to include "any discernible, confined and discrete conveyance, including but not limited to any . . . concentrated animal feeding operation, or vessel or other floating craft, . . . from which pollutants are or may be discharged."[6] Aquaculture facilities undoubtedly fall within this definition. They are also ineligible for the permitting exclusion available to "vessels and floating craft," which applies only when a vessel or floating craft is used for transportation.[7] Thus, even if aquaculture facilities in the ocean involve floating, towed, or self-propelled net-pens, they are point sources subject to NPDES permitting requirements.

At present, EPA regulates an aquaculture facility as a point source only if it qualifies as a Concentrated Aquatic Animal Production Facility (CAAP facility).[8] CAAP facilities include cold-water facilities that discharge at least 30 days per year, produce more than 20,000 pounds of fish per year, and use 5,000 pounds or more of feed per month, as well as warm-water facilities that discharge at least 30 days per year and produce at least 100,000 pounds of fish annually (not including closed ponds that discharge only during periods of excess runoff).[9] Facilities may also be designated as CAAP facilities on a case-by-case basis if EPA determines that they are "significant contributor[s] of pollution to waters of the

5 *See* 33 U.S.C. § 1362(10) (defining "ocean" as "any portion of the high seas beyond the contiguous zone"); Proclamation No. 5030, 48 Fed. Reg. 10,605 (Mar. 10, 1983) (proclaiming U.S. authority over the EEZ). Many scholars have noted that the CWA applies in the EEZ. *See, e.g.*, Jeremy Firestone & Robert Barber, *Fish as Pollutants: Limitations and Crosscurrents in Law, Science, Management, and Policy*, 78 Wash. L. Rev. 693, 752-53 (2003); Robin Kundis Craig & Sarah Miller, *Ocean Discharge Criteria and Marine Protected Areas: Ocean Water Quality Protection Under the Clean Water Act*, 29 B.C. Envt'l Aff. L. Rev. 1 (2001); D. Douglas Hopkins, et al., *An Environmental Critique of Government Regulations and Policies for Open Ocean Aquaculture*, 2 Ocean & Coastal L.J. 235, 243 n.41 (1997); George A. Gould, *Agriculture, Nonpoint Source Pollution, and Federal Law*, 23 U.C. Davis L. Rev. 461, 474-75 (1990).

6 33 U.S.C. § 1362(14).

7 40 C.F.R. § 122.2 (defining discharge of a pollutant to mean "any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft that is *being used as a means of transportation.*") (emphasis added); *id*. § 122.3(a) (providing that a permitting exclusion for certain discharges "incidental to the normal operation of a vessel" does not apply when a "vessel is operating in a capacity other than as a means of transportation such as when used as [. . .] a storage facility or a seafood processing facility"); Nw. Envtl. Advocates v. EPA, 537 F.3d 1006, 1023-24 (9th Cir. 2008) (overturning section 122.3(a) because EPA cannot exempt an entire class of discharges from NPDES requirements, but noting that Congress had subsequently "approved of the EPA's decision *not* to exempt from the permitting process marine discharges from nontransportation vessels"); *see also* Hopkins et al., *supra* note 5, at 244-45 (discussing EPA and DOJ's long-standing practice of applying the vessel exemption only to vessels used for transportation).

8 40 C.F.R. § 122.24(a).

9 *Id*. § 122.24 app. C(b)(1-2).

United States."[10] EPA has made limited use of this authority, however. Any aquaculture facility not regulated as a CAAP facility is not regulated as a point source by EPA.

Given the capital-intensive nature of offshore aquaculture, large production volumes are likely to be required if facilities are to be economically sustainable over long time frames.[11] Accordingly, many commercial-scale offshore aquaculture facilities are likely to trigger the NPDES permitting requirement. However, pilot-scale facilities and facilities producing small volumes of very high-value species will likely escape CWA coverage. For example, the Kona Blue "towed, floating pen," which received a permit from NOAA under the Magnuson-Stevens Fishery Conservation and Management Act for use in federal waters off Hawaii, fell below the CAAP facility size threshold and therefore was not subject to NPDES requirements.[12] As discussed below, such pilot facilities may be important sources of information on the water quality impacts of offshore aquaculture. As a result, they warrant application of EPA's case-by-case regulatory authority to require monitoring and reporting of data that can enhance understanding of discharges and how they impact the ocean environment.

Most Aquaculture Facility Discharges Constitute Additions of Pollutants

A discharge from a point source in the ocean is only unlawful if it is an "addition" of a "pollutant" to the ocean. The CWA defines "pollutant" broadly to cover a range of substances, including "solid waste, . . . sewage, garbage, . . . chemical wastes, biological materials, . . . wrecked or discarded equipment, . . . and industrial . . . and agricultural waste."[13] As a byproduct of production, or when net pens decay or fail, aquaculture facilities in the ocean will discharge various materials,[14] including hormones,[15] antibiotics,

10 *Id*. § 122.24(c). A district court has upheld EPA's definition of CAAP facility in part due to the case-by-case regulatory authority. *See* Wild Fish Conservancy v. Quilcene Nat'l Fish Hatchery, No. C08-5585BHS, 2009 WL 3380655 (W.D. Wash. Oct. 19, 2009) (holding that EPA can exclude a fish hatchery not meeting the CAAP limits from regulation as a point source because it retained the ability to designate a CAAP below the size threshold as a point source on a case-by-case basis); *cf*. Ass'n to Protect Hammersley, Eld, & Totten Inlets v. Taylor Resources, Inc., 299 F.3d 1007, 1018-19 (9th Cir. 2002) (upholding EPA's determination that mussel-harvesting rafts below the CAAP threshold were not point sources).

11 *See generally* Offshore Aquaculture in the United States: Economic Considerations, Implications & Opportunities (Michael Rubino ed., 2008).

12 NOAA, Finding of No Significant Impact, Issuance of a Permit to Authorize the Culture and Harvest of a Managed Coral Reef Fish Species (*Seriola rivoliana*) in Federal Waters off the West Coast of the Island of Hawaii, State of Hawaii 47 (2011), *available at* http://www.fpir.noaa.gov/SFD/pdfs/EA%20&%20FONSI%20Kona%20Blue%20%282011-07-06%29.pdf.

13 33 U.S.C. § 1362(6).

14 *See generally* Brandee Ketchum, *Splitting Scales: Conflicting National and Regional Attempts to Manage Commercial Aquaculture in the Exclusive Economic Zone*, 6 J. Food L. & Pol'y 1, 12-16 (2010).

15 *Id*. at 13-14.

fecal matter, excess feed (often comprised of animal processing byproducts from other industries),[16] pesticides, parasites, cultured species, and antifoulants (such as copper).[17]

While most types of discharges from aquaculture facilities clearly involve the addition of "pollutants,"[18] the regulatory status of cultured species and their byproducts—and particularly of native species—is less certain; discharges of these materials may or may not be considered an addition of pollutants. Living organisms may also be "pollutants" when they fall within the statutory definition of "biological materials," and their release has the potential to affect the quality and health of surrounding waters and ecosystems. When farmed species escape from cultivation—as they inevitably do—cultivated individuals can compete with wild populations for food and habitat, adversely alter ecosystem dynamics, and dilute the genetic stock of the wild population.[19]

At least three courts have held that living organisms, including fish, are "biological materials" within

16 Lynne D. Davies, *Revising the National Aquaculture Act of 2007: Using State of Maine Aquaculture Laws, Regulations, and Policy Recommendations as a Prototype for the Proposed Framework*, 13 Ocean & Coastal L.J. 95, 99-100 (2007).

17 Ann Powers, *Farming the Ocean*, 22 Nat. Resources & Env't 45, 46 (2007); Jansen Anderman-Hahn, *Net Pens with Adaptive Management: How to Manage the Expansion of Aquaculture Using the Clean Water Act*, 30 Vt. L. Rev. 1007, 1016-1019 (2006). Pursuant to Section 318 of the CWA and associated regulations, EPA may permit the discharge of certain pollutants in association with approved aquaculture projects. 33 U.S.C. § 1328; 40 C.F.R. § 125.10(a), (b). EPA has clarified, based on the legislative history, that:

> [t]hese regulations do not apply to those aquaculture facilities such as fish hatcheries, fish farms and similar projects which do not use the discharges of wastes from a separate industrial or municipal point source for the maintenance, propagation and/or production of harvestable freshwater, marine, or estuarine organisms. Such projects are regulated directly as aquatic animal production facilities under section 402 [the NPDES section] of the Act.

Revisions to the Water Quality Planning and Management Regulation and Revisions to the National Pollutant Discharge Elimination System Program in Support of Revisions to the Water Quality Planning and Management Regulation, 65 Fed. Reg. 43,586, 43,649 (July 13, 2000). Thus section 318 generally will not apply to offshore aquaculture facilities. *See* Robin Kundis Craig, *The Other Side of Sustainable Aquaculture: Mariculture and Nonpoint Source Pollution*, 9 Wash. U. J. L. & Pol'y 163, 182 (2002) (discussing the limited relevance of this section). EPA representatives have also confirmed that this section is narrow and almost never used. Telephone Interviews with Stephen Sweeney, U.S. EPA, Office of General Counsel (Oct. 31, 2011) and Janet Goodwin, U.S. EPA, Office of Science & Technology (Oct. 18, 2011).

18 In 2006, EPA issued a rule excluding application of pesticides to waters of the United States from the Clean Water Act if performed in compliance with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). One commentator has argued that this rule would apply to offshore aquaculture facilities. Ketchum, *supra* note 14, at 20. Regardless of whether this argument was correct, EPA's rule has been overturned and such discharges are pollutant discharges and subject to the Clean Water Act. Nat'l Cotton Council v. EPA, 553 F.3d 927 (6th Cir. 2009).

19 Firestone & Barber, *supra* note 5, at 711-714, 731.

the definition of pollutants in the CWA.[20] For example, in U.S. PIRG v. Atlantic Salmon of Maine, LLC, a district court in Maine held that the release of non-native salmon from net pens constituted the addition of a pollutant.[21] The court emphasized that the type of salmon being farmed did not naturally occur in the area.[22] In 2008, the Ninth Circuit, in a case involving ballast water discharges, determined that the term "biological materials" in the definition of "pollutant" includes invasive species.[23]

By contrast, in an earlier case the Ninth Circuit held that the term "biological materials" did not include excrement from mussels suspended from rafts in Puget Sound.[24] As described in a later decision, the Court

> distinguished between biological materials that naturally occur in receiving waters, such as mussel feces, and biological materials that result from human activity, such as the "heads, tails, and internal residuals" of fish dumped back into the waters after processing. Because one purpose of the CWA is to protect shellfish, [the court] concluded that shellfish are not pollutants under the CWA unless human activity transforms them.[25]

The question of whether cultured species—native or not—are pollutants has become a fact-based determination considering differences between cultured and native stocks. In general, however, cultured finfish are likely to be considered pollutants because they are distinct from wild stocks.

To trigger the CWA prohibition of discharges, a pollutant must also be "added" to the water.

20 *See* Nw. Envtl. Advocates v. U.S. EPA, 537 F.3d 1006, 1021 (9th Cir. 2008) (holding that in the context of ballast water discharged from ships, "the term 'biological materials' includes invasive species"); Nat'l Wildlife Fed'n v. Consumers Power Co., 862 F.2d 580, 583, 586 (6th Cir. 1988) (holding entrained fish redistributed from a dam's turbine system in Lake Michigan were biological materials within the Act's definition of pollutants, but were not added to Lake Michigan since they came from the Lake originally and were merely being "redistributed" by the turbine system); U.S. PIRG v. Atlantic Salmon of Maine, LLC, 215 F. Supp. 2d 239, 247 (D. Maine 2002) (holding that the release of non-native salmon constitutes the addition of a pollutant).

21 215 F. Supp. 2d at 247.

22 *Id*. ("Fish that do not naturally occur in the water, such as non-North American salmon, fall with the term 'biological material' and are therefore pollutants under the Act.").

23 *Nw. Envtl. Advocates*, 537 F.3d at 1021. EPA did not challenge characterization of invasive species as pollutants in this case; as a result, the court did not decide the question directly.

24 Ass'n to Protect Hammersley, Eld, & Totten Inlets v. Taylor Res., Inc., 299 F.3d 1007, 1009 (9th Cir. 2002).

25 N. Plains Res. Council v. Fid. Exploration & Dev. Co., 325 F.3d 1155, 1162-63 (9th Cir. 2003) (emphasis added) (quoting Ass'n to Protect Hammersley, Eld, & Totten Inlets, 299 F.3d at 1009). It has been argued, however, that cultivated mussels (i.e., larvae grown in a hatchery and then transplanted to farms) have been transformed by humans, even if they are native species, and thus they and their byproducts should be considered biological materials. Corinna Spencer-Scheurich, Association to Protect Hammersly, Eld, and Totten Inlets: *Taking the "Mussel" Out of the Clean Water Act*, 33 Envtl. L. 787, 792-93 (2003).

Like the definition of pollutants, this issue is fact-dependent for cultured organisms. Discharge of organisms that can be characterized as "redistribution" may not constitute an addition,[26] but movement of pollutants from one body of water to another—particularly to a location where the pollutant would not otherwise exist—is an addition.[27] Most cultured species—with the possible exception of "ocean ranching" facilities that use wild-sourced stock—are produced through controlled life cycles and cannot reasonably be considered to be "redistributed:" escaped organisms would not be present in the water without the offshore facility. As a result, escapes of cultured species from offshore facilities should be considered an "addition."

Taken together, these precedents indicate that escapes of aquatic species from cultivation in a CAAP facility as a result of storm damage, predation, equipment failure, or other causes may well constitute an addition of a pollutant requiring a valid NPDES permit.[28]

26 Nat'l Wildlife Fed'n v. Consumers Power Co., 862 F.2d 580, 583, 586 (6th Cir. 1988) (holding that entrained fish from a dam's turbine system in Lake Michigan were biological materials but were not "added" to Lake Michigan because they originally came from the Lake and were merely "redistributed" by the turbine system); Friends of the Everglades v. S. Florida Water Mgmt. Dist., 570 F.3d 1210, 1217 (11th Cir. 2009) ("The unitary waters theory holds that it is not an 'addition . . . to navigable waters' to move existing pollutants from one navigable water to another. An addition occurs, under this theory, only when pollutants first enter navigable waters from a point source, not when they are moved between navigable waters.").

27 Catskill Mountains Chapter of Trout Unlimited, Inc. v. City of New York, 273 F.3d 481, 491 (2d Cir. 2001) (concluding that a pollutant transfer from "any place outside the particular water body to which pollutants are introduced," including to a different watershed, "is plainly an addition and thus a 'discharge'" that demands a permit). The *Catskill* Court explained that the *Consumers Power* Court had afforded too much deference to the agency's interpretation of "addition," and that the agency's position that the transfer of pollutants between watersheds was not an addition "from the outside world" was not persuasive. *Id*.; *see also* N. Plains Res. Council v. Fid. Exploration & Dev. Co., 325 F.3d 1155, 1163 (9th Cir. 2003) (holding that transport of water from a deep aquifer and discharge of that (unaltered) water into the surface water of a river was an "addition"); Dubois v. U.S. Dept. of Agric., 102 F.3d 1273, 1298 (1st Cir. 1996) (holding that the transfer of water from a downstream river to an upstream pond was an "addition").

28 EPA has not directly addressed live species escapes in its aquaculture ELGs. The ELGs require net pen operators to implement BMPs to "minimize any discharge associated with the transport or harvesting of aquatic animals," but this discharge provision does not include "any requirements specifically addressing the release of non-native species." Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category, 69 Fed. Reg. 51,892, 51,912 (Aug. 23, 2004). However, the requirements for proper maintenance, routine inspections, and limitations on discharges during the transport of species will "aid in preventing the release of other materials including live fish." *Id*. Elsewhere in the rulemaking process, EPA seemed to express concern only with non-native escapes. *Id*. at 51,913 (narrowing its discussion to the release of non-native species); *see* Firestone & Barber, *supra* note 5, at 731 (suggesting that EPA intended to regulate the escape of only non-natives). Thus, although EPA did not include language specifically prohibiting the release of fish—native or non-native—it has the discretion to regulate the release of native and non-native fish. EPA should provide more certainty to aquaculture facilities in the open ocean by clarifying ELGs to specifically address the release of cultivated species.

NPDES Permitting Guidelines for Aquaculture Can—and Should—Be Strengthened

NPDES permits ensure that point sources comply with technology-based and water quality-based effluent limitations. EPA may create these effluent limitations for a point source in federal ocean waters by reference to three types of standards. First, effluent limitation guidelines (ELGs) set out allowable pollutant discharges for a variety of industries, including aquaculture, based on technological standards. In addition, effluent limitations must be modified where needed to meet water quality standards (WQS) and ocean discharge criteria (ODC).[29] EPA has not issued WQS that apply to federal ocean waters to date, however, and the current ODCs provide little guidance for discharges. As a result, ELGs—or for some facilities, the permit writer's best professional judgment—currently provide the basis for NPDES permit terms and conditions governing effluent limitations from CAAP facilities in federal ocean waters.

CAAP facility ELGs do not include numeric limitations and apply only to large facilities.

In 2004, EPA established ELGs for aquaculture facilities. These ELGs apply to most flow-through, recirculating, and net-pen facilities that produce at least 100,000 pounds of fish per year.[30] If a CAAP facility is not covered by the ELGs, it must acquire a NPDES permit with effluent limitations based on the best professional judgment of the permit writer.[31]

ELGs can include numeric and/or narrative limitations—including best management practices—to control discharges from point sources. Although the ELGs for many categories of sources include numeric limitations,[32] the CAAP ELGs include only "narrative effluent limitations requiring implementation of effective operational measures to achieve reduced discharges of solids and other materials" and "narrative limitations that will address a number of other pollutants potentially present in CAAP wastewater."[33] For example, the CAAP ELGs require:

- the employment of "efficient feed management and feeding strategies that limit feed input to the minimum amount reasonably necessary to achieve production

29 33 U.S.C. § 1343(c); 40 C.F.R. § 125.122 (the "director shall determine whether a discharge will cause unreasonable degradation of the marine environment").

30 40 C.F.R. § 451.20 ("Except for net pen facilities rearing native species released after a growing period of no longer than 4 months to supplement commercial and sport fisheries").

31 69 Fed. Reg. at 51,906.

32 *See* EPA, *Industrial Regulations*, http://water.epa.gov/scitech/wastetech/guide/industry.cfm (last visited Oct. 17, 2012).

33 69 Fed. Reg. at 51,899.

goals and sustain targeted rates of aquatic animal growth;"[34]

- that operators "[e]nsure proper storage of drugs, pesticides, and feed in a manner designed to prevent spills that may result in the discharge of drugs, pesticides or feed to waters of the U.S;"[35] and
- that the production system be inspected "on a routine basis in order to identify and promptly repair any damage" and regular maintenance be employed "in order to ensure" that it "is properly functioning."[36]

Facilities subject to the ELGs are required to develop and maintain a best management practices (BMP) plan describing how they will achieve these and other requirements. The ELGs do not, however, explicitly address fish escapes.[37]

Although the CAAP ELGs do not impose numeric standards and limitations, they also do not "restrict a permit writer's authority to impose site-specific permit numeric effluent limits on the discharge" of pollutants from CAAP facilities "in appropriate circumstances."[38] In promulgating the regulations, EPA recognized that a number of states had already established "numeric limits tailored to the specific production systems, species raised, and environmental conditions in the state."[39] Permit writers can use these numeric limits to establish permit conditions and, of course, tighten them as appropriate.

The imposition of effluent limitations on CAAP facilities can be improved in at least two ways. First, EPA should develop guidance or rules for permit writers that include numeric limitations for a defined set of pollutants for aquaculture facilities in the ocean. The guidance or rules could also include requirements for water quality testing and prohibitions of discharges of certain substances (e.g., floating solids, oil and grease, etc.). Given that some pollutants—notably, species under cultivation—may have permanent and serious impacts if discharged even from small facilities, and that some areas of the ocean may warrant special protection, the ELGs and numeric guidance should be expanded beyond the current scope of the ELGs to incorporate all pollutants that may be discharged from aquaculture facilities and to adequately protect special ocean areas.

34 40 C.F.R. § 451.11(a)(1).

35 *Id*. § 451.11(b)(1).

36 *Id*. § 451.11(c).

37 EPA's proposed aquaculture ELG rule did address escapes of non-native species. *See* Firestone & Barber, *supra* note 5, at 730-32 (discussing proposed ELGs for escape). However, the final rule eliminated all explicit related requirements. 69 Fed. Reg. at 51,913.

38 69 Fed. Reg. at 51,899.

39 *Id*.

Second, permit writers should also impose effluent limitations on all CAAP facilities, including those that do not meet the minimum size for imposition of the ELGs. In promulgating the ELGs, EPA justified the ELG size threshold by arguing that facilities falling below the threshold would experience significant adverse economic impacts if subject to the ELGs while only accounting for a small percentage of discharges.[40] While smaller facilities still need a NPDES permit, the limitations in their permits may not contain adequate monitoring or effluent limitations. As a result, the individual and cumulative discharges of these facilities may be greater than anticipated, and EPA must rely on expanding facilities to self-report when they are exceeding regulated levels of production. In addition to CAAP facilities potentially operating at levels exceeding the ELG threshold without EPA's knowledge, variable rates of production may also make facilities alternately subject to, then exempt from, the ELGs, complicating the regulatory status of such facilities.[41] The same issues may arise with facilities near the CAAP threshold. Creation of minimum limits for all CAAP facilities, regardless of whether they meet the threshold, could ensure that EPA has the information it needs to adequately understand impacts of aquaculture facilities and draft effective NPDES permits.

EPA Has Not Adopted Water Quality Standards for the Ocean

Water quality-based effluent limitations are required when technology-based limitations are insufficient to maintain water quality.[42] Water quality-based limitations derive from WQS, which identify designated uses of a waterbody, establish criteria to protect those uses, and include antidegradation provisions.[43] States and tribes (or, if they fail to act, EPA) must create WQS for intrastate waters, including coastal waters.[44] However, the CWA does not require that EPA develop WQS for waters more than three miles from shore, and it has not done so to date.[45] Unless and until EPA issues WQS for ocean waters, the

40 *Id*. at 51,906; *see also* M. Patrick Williams, *Cured Salmon?: An EPA Proposal to Regulate Pollution Produced by Salmon Farms*, 34 Golden Gate U. L. Rev. 715, 737-38 (2004).

41 Telephone Interview with Carla Fromm, EPA Region 10, Operations Office for NPDES Permitting (Nov. 3, 2011).

42 33 U.S.C. § 1312(a) (granting EPA authority to impose more stringent effluent limitations when existing effluent limitations are insufficient to ensure "the attainment or maintenance of that water quality . . . which shall assure protection of public health, public water supplies, agricultural and industrial uses, and the protection and propagation of a balanced population of shellfish, fish and wildlife, and allow recreational activities in and on the water").

43 *See* EPA, *Water Quality Standards History*, http://water.epa.gov/scitech/swguidance/standards/history.cfm (last visited Oct. 17, 2012).

44 33 U.S.C. § 1313. The CWA requires that states adopt water quality criteria and standards for coastal recreation waters for pathogens and pathogen indicators for which EPA has published criteria. *Id*. § 1313(i).

45 The requirement to develop WQS applies to water quality attainment and maintenance in "navigable waters," which includes "territorial seas" (in turn defined as waters up to three miles from shore) but not the "contiguous

ODCs provide the sole water quality-based limitation on effluents from offshore aquaculture facilities, as discussed in the following section.

Ocean Discharge Criteria Contain Important Limitations But Little Specific Guidance on Implementation

The CWA requires that EPA establish ODCs "for determining the degradation of the . . . oceans."[46] EPA must include in ODCs a variety of specific considerations, including but not limited to the effect of pollutants on "human health or welfare" (including on fish, shellfish, and wildlife), "marine life" (including "changes in marine ecosystem diversity, productivity, and stability; and species and community population changes"), and "other possible locations and methods of disposal or recycling of pollutants including land-based alternatives."[47] All NPDES permits for the discharge of pollutants into the oceans must comply with the ODCs.[48]

EPA's current ODCs date to 1980[49] and require the relevant EPA regional administrator to determine whether a pollutant discharge in federal ocean waters "will cause unreasonable degradation of the marine environment"—a standard that means, in part, "significant adverse changes in ecosystem diversity, productivity and stability of the biological community within the area of discharge and surrounding biological communities."[50] To determine whether unreasonable harm exists, the administrator must consider ten factors, including but not limited to the quantities, composition, bioaccumulation, and persistence of pollutants, potential transport of pollutants, and composition and vulnerability of biological communities that will be exposed to the discharge.[51]

The EPA administrator may issue a NPDES permit only upon a determination that the discharge will not

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zone." 33 U.S.C. § 1362 (7)-(9). Thus the mandate to apply effluent limitations to protect water quality does not apply to the contiguous zone (or the EEZ—which was expanded to 200 miles after the CWA was enacted). *See* Environmental Law Institute & Ocean Conservancy, *Marine Spatial Planning in U.S. Waters* 46 (2009) (discussing application of WQS in federal ocean waters). However, although the CWA does not require water quality-based effluent limitations in the contiguous zone and EEZ, the CWA probably authorizes EPA to do so. Kundis Craig & Miller, *supra* note 5, at 34 (arguing that although the CWA's WQS provisions refer to states, other statutory language, congressional intent, and the structure of the CWA indicate that the CWA did not intend to exclude EPA from issuing WQS for federal waters).

46 33 U.S.C. § 1343(c)(1).

47 *Id*. (emphasis added).

48 *Id*. § 1343(a).

49 Ocean Discharge Criteria, Final Rule, 45 Fed. Reg. 65,942 (Oct. 3, 1980).

50 40 C.F.R. §§ 125.122(a), 125.121(e)(1).

51 *Id*. § 125.122(a).

cause unreasonable degradation.[52] The administrator can request information from a permit applicant to aid in making this determination, including chemical and biological information, information on available process modifications that would reduce discharges, locational information, "[e]valuation of available alternatives to the discharge of the pollutants including an evaluation of the possibility of land-based disposal or disposal in an approved ocean dumping site," and any other pertinent information.[53] If insufficient evidence is available to determine whether a discharge will cause unreasonable degradation, no discharges can occur absent a determination that the discharge will not cause irreparable harm to the marine environment during monitoring, that there are no reasonable alternatives to on-site disposal, and that the discharges will comply with all permit conditions.[54] In addition to other specific conditions, all permits must require compliance with ocean dumping criteria (created pursuant to the Ocean Dumping Act), specify a monitoring program, and provide that the permit shall be modified or revoked if, based on new data, the administrator determines that continued discharge may cause unreasonable degradation.[55]

The ODCs provide some important limits on permit conditions for ocean discharges, including conditions applicable to offshore CAAP facilities. In particular, the ODCs require an explicit EPA determination as to whether a facility will cause undue degradation, require that determination to be based on information about the effects of the proposed pollutant discharges, and require monitoring as a condition to any NPDES permit in the ocean.[56] The ODCs, however, include few specifics on how EPA will use its discretion in implementing these requirements; because the ODCs do not include numeric standards, it is difficult to determine in advance what information EPA will require, what constitutes "undue" degradation, and what level of monitoring must be included. While EPA has proposed updating and strengthening the ODCs,[57] no such proposals are currently active and offshore aquaculture permitting thus will depend on the ODCs as currently written.

52 *Id*. § 125.123(b).

53 *Id*. § 125.124.

54 *Id*. § 125.123(c).

55 *Id*. § 125.123(d).

56 *See* Kundis Craig & Miller, *supra* note 5, at 13-14.

57 In 2000, EPA released draft ODCs analogous to WQS that specified more detailed limitations on discharges of pollutants into the ocean. *Id*. at 6. These proposed criteria were subsequently withdrawn. The draft ODCs would have defined the designated use of all ocean waters to be "healthy ocean waters" and created discharge criteria based on that use. *Id*. at 26. The draft ODCs also would have established "special ocean sites" where new discharges would be limited, and they would have encouraged development of "no discharge zones." *Id*. at 28-29. EPA should promulgate new ODCs that include similar provisions to improve the regulation of all uses of the ocean, including aquaculture facilities.

Analysis and Recommendations

The CWA is a crucial link in the regulation of offshore aquaculture facilities, but its provisions and implementation could–and should–be improved in several critical respects to ensure that its coverage encompasses all such facilities, generates needed information on the nature and effects of water pollution from such facilities, and requires effluent limitations—including the use of pollution control technology— adequate to prevent ocean degradation. This paper focuses on several near-term solutions. We recognize, however, that longer-term potential avenues to strengthen NPDES permitting in the ocean also include EPA's adoption of WQS for the ocean and/or amendment of the ODCs.

1. ***Reduce CAAP facility production limits or apply case-by-case discretion to ensure that all aquaculture facilities in federal ocean waters—and particularly those projects using novel or untested technologies—are subject to effective NPDES permitting.***

Currently, facilities too small to qualify as CAAP facilities are not considered point sources and are not required to obtain NPDES permits. These facilities are not required to monitor discharges or submit data to EPA, need not submit or generate information needed to determine whether pollutant discharges will result in undue degradation, and are not required to follow best management practices or comply with other effluent limitations.

Facilities not meeting the CAAP threshold may nonetheless cause substantial harm; the effects of some pollutants from aquaculture facilities—notably, genetic harm or increased competition with native populations caused by escapes of cultivated species—are not dependent on the size of the facility. Regulating these facilities as point sources (and requiring them to comply with technology-based measures to prevent such escapes, such as through the use of closed-containment facilities rather than net pens) is necessary to address and avoid these environmental harms.

Offshore pilot projects have already escaped NPDES permitting due to their low production levels,[58] and future projects will likely continue to do so for the foreseeable future. Moreover, even if they qualify as CAAP facilities, they may not meet the minimum level for application of the ELGs. EPA needs the data on discharges from these facilities to understand their effects on ocean waters and develop permitting requirements to address facility-specific and cumulative impacts of offshore aquaculture both now and in the future.

58 *See* NOAA, *supra* note 12, at 47. In addition, two un-stocked floating net pens were lost during a pilot project that preceded the NMFS-permitted pilot. Complaint for Injunctive and Declaratory Relief at 12-13, Kahea v. Nat'l Marine Fisheries Serv., No. 11-474 (D. Haw. 2011). Similar loss of facilities when stocked with fish could result in release of substantial numbers of fish.

EPA would be justified in expanding its regulatory definition of CAAP facilities to include smaller aquaculture facilities and those in federal ocean waters, and should initiate rulemaking for this purpose. In the interim, the agency can address the special risks and uncertainties associated with offshore aquaculture by using its existing authority to designate aquaculture facilities as point sources on a case-by-case basis. Designation of all proposed offshore aquaculture facilities as point sources would reduce the uncertainty surrounding the environmental impacts of these facilities. This action would not only increase protection for the ocean environment, but would also serve an important information-generating function by requiring that all offshore aquaculture facilities obtain NPDES permits and undertake monitoring.

2. ***Revise the aquaculture ELGs to set numeric standards for facilities located in federal waters.***

EPA limited its aquaculture ELGs to narrative standards in part because some states had already created or were considering development of numeric standards for aquaculture facilities.[59] EPA's decision was a reasonable approach to regulating state waters, but the same reasoning does not apply in federal ocean waters, where state regulations are inapplicable. To the contrary, EPA can and should determine what the best practicable control technology is for offshore aquaculture facilities and establish numeric ELGs based on that technology for each category of pollutants.

3. ***Identify information needed for undue degradation determinations for offshore aquaculture facilities and develop guidelines for data generation and submission, as well as default monitoring requirements, for offshore aquaculture NPDES permits.***

For offshore aquaculture facilities that are point sources, the current ODCs require that EPA determine whether they may cause undue degradation, based on information that the agency may request from the permit applicant. Given the novelty of the offshore aquaculture industry, substantial uncertainty surrounds the pollutants that may be discharged and their effects on the environment. EPA has an opportunity to substantially improve understanding of the potential environmental impacts of offshore aquaculture by identifying what information is needed, requiring its generation and disclosure prior to permitting, and ensuring that permits require ongoing monitoring to verify assumptions and support subsequent permitting decisions and effluent limitations for similar facilities.

EPA has ample authority to take these actions under the existing ODCs and bears a nondiscretionary duty to make undue degradation determinations and require monitoring for ocean discharge permits for point sources. While these determinations are currently made on a case-by-case basis, EPA would

59 69 Fed. Reg. at 51,899.

reduce uncertainty for potential aquaculture operators and strengthen its decision-making process by developing guidance on the information required to make an undue degradation determination and the types of monitoring expected to be required. In addition, providing advance notice of this approach would enable EPA to obtain input from the regulated community and the public to ensure that it is prepared to implement its permitting responsibilities for these facilities.

EPA has broad discretion to regulate aquaculture facilities in federal ocean waters, but has not to date taken specific actions to address pollutant discharges from these facilities. Undertaking the three actions outlined above will substantially improve water quality protections without requiring substantial changes to EPA regulations.

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