

REGULATING OFFSHORE WIND POWER AND AQUACULTURE: MESSAGES FROM LAND AND SEA

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INTRODUCTION

Oceans have functioned for centuries as highways of maritime commerce and as fishing grounds. The economic role of oceans has lately expanded to include nonrenewable resource extraction, in particular oil and gas; oceans also support a vibrant tourist economy. More recently, a number of other ocean uses have emerged, including bio-prospecting, wave energy, tidal energy, offshore wind power development, and marine aquaculture. Although some of these uses are still under development, while others have to some degree been brought to fruition, all these new uses share a common problem and raise a common concern—policy regarding their use in U.S. waters is being formulated piecemeal, and they are all developing economically in the absence of a coherent and publicly-vetted policy framework.²

At present in the United States, any attempt to develop the promise of these new uses requires the government to spin together a hodgepodge of laws enacted prior to the development of these technologies and applications without the benefit of having them in mind. Such a regulatory void can be seen in attempts to regulate offshore aquaculture: an entrepreneur must obtain a U.S. Army Corps of Engineers (Army Corps) permit to place a structure in U.S. navigable waters, the U.S. Environmental Protection Agency (EPA) regulates the discharge of effluents from the aquaculture facility, and the National Oceanic and Atmospheric Administration (NOAA) asserts jurisdiction over aquaculture based on the premise that aquaculture operations may negatively impact wild fish stocks,³ yet no agency has the authority to lease ocean space for the pur-

² See, e.g., NAT'L RESEARCH COUNCIL, COMM. ON ASSESSMENT OF TECH. AND OPPORTUNITIES FOR MARINE AQUACULTURE IN THE U.S., MARINE BOARD, COMM'N ON ENG'G AND TECHNICAL SYS., MARINE AQUACULTURE: OPPORTUNITIES FOR GROWTH 7 (National Academy Press, 1992), available at <http://search.nap.edu/books/0309046750/html>.

³ Clean Water Act, 33 U.S.C. §§ 1342 and 1343 (2002); Rivers and Harbors Act (RHA), 33 U.S.C. § 403 (2002); Letter from James W. Brennan, Acting General Counsel, NOAA to Robert Blumberg, Bureau of Oceans and International Environmental and Scientific Affairs, U.S. Department of State, *Re: American Norwegian Fish Farm, Inc.* (1 February

poses of aquaculture.⁴ A similar hodgepodge exists for offshore wind power. While public debate over offshore wind power and aquaculture is likely to be centered on environmental and aesthetic issues, the government's present offshore "framework" places both decisions in the hands of the Army Corps of Engineers—a regulatory agency whose primary foci are navigation and national security, thus mismatching public concerns with regulatory priorities.

"Federal offshore waters" generally extend from 3 to 200 miles from the shore.⁵ The lack of a comprehensive planning and management framework restricts the development of those waters,⁶ impeding ecosystem management and presenting risk to ecological health⁷ as regulators, developers, competing users of ocean space, and civil society try to navigate the present regulatory maze. Indeed, the lack of a regulatory framework prevents the airing and adequate consideration of competing

1993); attached memorandum from Jay S. Johnson, Deputy General Counsel and Margaret F. Hayes, Assistant General Counsel for Fisheries to James W. Brennan, *Regulation of Aquaculture in the EEZ* (1 February 1993). The EEZ (Exclusive Economic Zone) extends from 12 to 200 miles offshore.

⁴ In contrast, Congress, in the Outer Continental Shelf Lands Act (OCSLA), 43 U.S.C. §§ 1331 *et seq.* (2000), vested the Minerals Management Service (MMS)—an agency within the Department of the Interior—with authority to lease ocean space for the purposes of oil and gas exploration.

⁵ Under the Submerged Lands Act (SLA), 43 U.S.C. § 1301 (2000), states have title to the submerged lands extending three nautical miles from the low water mark and control over natural resources within that three-mile belt (Florida's, on its Gulf coast, and Texas' ownership and control extends 3 marine leagues, which is approximately 10 nautical miles). The United States owns and controls the natural resources between three and two hundred miles from shore, and its control over the continental shelf (the seabed) may extend even further. For simplicity, we refer to such waters and the seabed as "federal offshore waters." See Proclamation No. 2667, 3 C.F.R. 67-68, Policy of the United States with Respect to the Natural Resources of the Subsoil and Sea Bed of the Continental Shelf (September, 28, 1945) (asserting U.S. jurisdiction and control over the continental shelf contiguous to the coasts of the United States); Proclamation No. 5030, 48 Fed. Reg. 10,601 (March 11, 1983) (proclaiming an EEZ that extends 200 miles offshore). For the federal government's present view of jurisdictional boundaries, see Dep't of Homeland Security, Coast Guard, Territorial Seas, Navigable Waters, and Jurisdiction, 68 Fed. Reg. 42,595-602 (July 18, 2003). See also United Nations Convention on Law of the Sea (UNCLOS), 21 I.L.M. 1261 (opened for signature, December 10, 1982, in force, November 16, 1994) (specifying similar jurisdictional boundaries and indicating that nations have sovereign rights to living and nonliving resources within their EEZ), available at http://www.un.org/Depts/los/convention_agreements/convention_overview_convention.htm (last updated Sept. 10, 2004). Although the U.S. has yet to ratify UNCLOS, maritime zones are likely binding on the U.S. under customary international law.

⁶ Not only does the government lack a comprehensive plan, but there is not even a sector-based regulatory framework for emerging uses for federal offshore waters.

⁷ U.S. COMM'N ON OCEAN POLICY, AN OCEAN BLUEPRINT FOR THE 21ST CENTURY, Final Report of the U.S. Commission on Ocean Policy—Pre-Publication Copy, Washington, D.C. (September 20, 2004), ISBN #0-9759462-0-X [*hereinafter* U.S. COMM'N ON OCEAN POLICY], p. 289, available at <http://www.oceancommission.gov/documents/welcome.html#prepub> ("Enhanced coordination is also needed between federal and state aquaculture policies and regulations to provide consistency to the industry and to adequately manage potential impacts that cross jurisdictional lines, such as the spread of disease.").

desires, namely those of potential developers of ocean space to gain exclusive rights to particular ocean areas and the public's expectations as to how publicly- and commonly-owned natural resources and the seascape should be conserved and managed for the benefit of present and future generations. Without a policy framework in place, new uses—even ones that in the abstract hold as much popular appeal as offshore wind power production—will lack full legitimacy and face difficulty negotiating a variety of environmental, social, and political obstacles that are likely to affect both their public perception and economic viability.⁸

Given the potential promise of new uses (offshore wind power, for example, can generate large amounts of “clean” non-greenhouse gas producing energy) the present course is fraught with risk. After making the not-so-bold assumption that some development of U.S. offshore waters is inevitable and recognizing that emerging uses have the potential to raise environmental, aesthetic, and other concerns, two questions come to the fore: In which areas of the ocean should emerging uses develop? And which regulatory framework will protect the public's interest in ocean resources while at the same time providing developers with a viable framework?

To examine these questions, we consider two emerging ocean uses: offshore wind power turbine development (installed in groups sometimes called “wind farms”) and marine aquaculture (also known as mariculture). We chose these as case studies because each has a near-term future and each poses an interesting dilemma or decision trade-off for policymakers and citizens. We assess the present regulatory framework for offshore wind power and marine aquaculture, look to experiences in other countries that have moved more quickly and aggressively than has the United States to develop and regulate these new uses and to more mature regulatory programs in the United States, particularly the onshore wind right-of-way grant program and the offshore oil and gas leasing program, to provide insight into the future of offshore wind and aquaculture.

A. OFFSHORE AQUACULTURE (MARICULTURE)

Aquaculture has been increasing in most parts of the world and now accounts for more than twenty-eight percent of the total global seafood supply.⁹ In North America, the marine aquaculture industry produced

⁸ Jeremy Firestone & Robert Barber, *Fish as Pollutants: Limitations of and Crosscurrents in Law, Science, Management, and Policy*, 78 WASH. L. REV. 693 (2003).

⁹ Sena S. De Silva, *A Global Perspective of Aquaculture in the New Millennium*, in AQUACULTURE IN THE THIRD MILLENIUM: TECHNICAL PROCEEDINGS OF THE CONFERENCE ON AQUACULTURE IN THE THIRD MILLENIUM, BANGKOK, THAILAND, 20-25 FEBRUARY 2000, 431-59 (R.P. Subasinghe et al. eds., Bangkok: NACA and FAO: Rome, 2001), available at <http://>

209,000 metric tons in 1997, an increase of more than 450 percent from 1988 levels.¹⁰ In addition to increasing the seafood supply, the marine aquaculture industry has the potential to produce handsome revenues and support numerous workers. For example, the finfish marine aquaculture industry in Maine, which is “mostly [Atlantic] salmon, but also trout,”¹¹ employs approximately 250 individuals and generates annual direct sales and revenues of approximately \$82 million.¹² Many view marine aquaculture positively as a potential alternative to global fishery resources, which are globally under stress as result of overfishing. However, it also raises concerns over pollution, disease transmission, genetic contamination, the rearing of fish species such as Atlantic salmon that require a diet composed in part of other fish species, and socio-economic impacts (e.g., farmed Atlantic salmon competing with wild Alaskan salmon). In the United States, almost all the efforts to develop marine aquaculture have focused on state jurisdictional waters—those generally within three miles of the shore.¹³

Perhaps as a result of conflicts among users of the ocean space, concerns over escapes of aquaculture specimens, and near-shore environmental impacts, fish farmers are beginning to look further offshore to federal waters. In July 2003, a developer sought permission to conduct a two-year study of the feasibility of culturing cobia, mahi-mahi, greater amberjack, Florida pompano, red snapper, and cubera snapper thirty-three miles off of the Florida coast.¹⁴ Although NOAA/National Marine Fisheries Service (NMFS) ultimately denied the study request,¹⁵ this incident is significant in that it forced the government to consider marine aquaculture in federal offshore waters for the first time.

B. OFFSHORE WIND POWER PRODUCTION

Wind power is the fastest growing source of energy in the world today. In an era dominated by concern over climate change and uncertain oil supplies, the growth of wind energy production should not be surprising. But what has taken the country (or at least portions of it) by

www.fao.org/DOCREP/003/AB412E/ab412e27.htm. “Most parts” excludes Africa and the countries of the former Soviet Union. *Id.*

¹⁰ FOOD AND AGRIC. ORG. OF THE UNITED NATIONS (FAO), *Recent Trends and Possible Consequences for World Fisheries and Aquaculture* (Chapter 4), in STATE OF WORLD FISHERIES AND AQUACULTURE (SOFIA) (Rome: FAO, 2000), available at <http://www.fao.org/docrep/003/x8002e/x8002e00.htm>.

¹¹ Frank O’Hara et al., *Economic Impact of Aquaculture in Maine*, 2 (The Maine Aquaculture Innovation Center 3, October 14, 2003).

¹² *Id.*

¹³ See *supra* note 5.

¹⁴ 68 Fed. Reg. 44745 (July 30, 2003).

¹⁵ 68 Fed. Reg. 74217-18 (Dec. 23, 2003). The application was denied due to the applicant’s inexperience and its submission of false material as part of that application. *Id.*

surprise, is the recent discovery that very large offshore wind resources exist in close proximity to populated areas on the eastern seaboard. In addition, turbines can now be manufactured on a larger scale with a lower cost. This combination has led to a number of proposals for large offshore wind projects along the Atlantic coast. When considering wind power in the abstract, the public generally supports generating power from wind energy. However, individual proposals for generating power using offshore wind may face aesthetic and environmental objections.¹⁶ Indeed, Cape Wind Associates proposed to develop a wind farm off the coast of Cape Cod, Massachusetts, which, if approved in its present form, would consist of 130 wind turbines whose blades will extend more than 400 feet above the sea and which will supply ten percent of the entire State of Massachusetts' demand for electricity. This proposal has been met with considerable opposition from local environmental organizations, politicians, business interests, property owners, and fishing interests.¹⁷ A dilemma is that, although offshore wind power facilities would decrease U.S. dependence on fossil fuels and thus, may help alleviate sea level rise and related coastal impacts brought about by climate change, in the near term, offshore wind power development may impair the local environment, fishing and other current operations, and the aesthetics of the seascape.¹⁸

Wind power also makes an interesting offshore case study because, if the generated power will be consumed on land, cables transmitting that power must run from the wind farm along the submerged lands, including the submerged lands of the bordering state. While this generally would not require a separate federal permitting process, as a given permit

¹⁶ William Kempton et al., *The Offshore Wind Power Debate: Views from Cape Cod*, forthcoming 33(2) COASTAL MGMT. __ (March 2005).

¹⁷ *Id.* Thomas Arthur Utzinger, *Federal Permitting Issues Related to Offshore Wind Energy, Using the Cape Wind Project in Massachusetts as an Illustration*, 34 ENVTL. L. REP. 10794-10807 (September 2004). Some portions of these communities support the project as well. *Id.* Other active proposals to develop offshore wind power include efforts by the Long Island Power Authority, available at <http://www.lioffshorewindenergy.org> (last visited June 15, 2004), and Bald Eagle Power Company (an offshore wind power project proposal off Long Island that would convert wind power to hydrogen), available at <http://www.baldeaglepower.org/003.html> (last visited June 15, 2004), and Winergy LLC, (proposing facilities at a number of offshore locations), available at <http://www.winergyllc.com/index.shtml> (last visited June 15, 2004).

¹⁸ In an early legal skirmish over the Cape Cod development, the district court in *Alliance to Protect Nantucket Sound v. U.S. Department of the Army*, 288 F. Supp. 2d 64 (D. Mass. 2003), upheld the issuance of a permit by the Army Corps of Engineers to Cape Wind Associates to construct a data tower to gather data relevant to the construction of the offshore wind power facility. *See also* *Ten Taxpayers Citizen Group v. Cape Wind Associates, Ltd. Liability Corp.*, 278 F. Supp. 2d 98 (D. Mass. 2003) (dismissing the lawsuit and holding that the federal government's grant of jurisdiction over portions of Nantucket Sound to the Commonwealth of Massachusetts under 16 U.S.C. § 1856(a)(2) was limited to the regulation of fishing activities).

could cover both the wind towers and cables, it does enhance the state's role in the regulatory process as compared to its role in aquaculture.

C. POTENTIAL CONNECTIONS AMONG OFFSHORE WIND POWER, MARINE AQUACULTURE, AND OFFSHORE OIL

Several recent proposals suggest possible synergies between installation of offshore wind power, offshore aquaculture, and existing infrastructure such as oil rigs. A recent study of aquaculture and offshore wind farms in Germany suggests reducing user conflicts in the nearshore zone by combining the two ocean uses. Interest in both aquaculture and offshore wind farming has been growing in Germany, and engineers have been successful in designing offshore wind structures that can withstand the harsh North Sea conditions. Although the technical capacity to implement offshore aquaculture in Germany exists, the industry has faced a number of constraints, namely (1) many conflicting interests within the coastal zone, including tourism, shipping/boating, gravel mining, military areas, fisheries, and marine protected areas;¹⁹ (2) an absence of a supportive legal framework;²⁰ and (3) a harsh sea environment with complex hydrodynamic conditions requiring specific engineering knowledge;²¹ and limited suitable ocean space. In Germany's case, teaming aquaculture with offshore wind power would facilitate the implementation of both fledgling industries through reduced costs and infrastructure requirements.²²

Additionally, Louisiana's Public Service Commission is currently studying the feasibility of utilizing oil rigs set for decommission as platforms for wind turbines. This would save oil companies money; over 1,000 oil rigs have been removed from the State's waters within the last ten years,²³ and removal costs between \$400,000 to \$5 million, depend-

¹⁹ Bela Hieronymus Buck et al., *Extensive Open Ocean Aquaculture Development Within Wind Farms in Germany: The Prospect of Offshore Co-management and Legal Constraints*, 47 OCEANS & COASTAL MGMT. 95, 97, 101, 111-112. See also Bela Hieronymus Buck, *Open Ocean Aquaculture und Offshore-Windparks: Eine Machbarkeitsstudie über die Multifunktionale Nutzung von Offshore-Windparks und Offshore-Marikultur im Raum Nordsee*, (abstract in English), Reports on Polar Research, Alfred Wegener Institute for Polar and Marine Research, Bremerhaven (2002), available at http://www.awi-bremerhaven.de/Publications/Buc2002a_abstract.html.

²⁰ Buck et al., *supra* note 19, at 101.

²¹ *Id.*

²² *Id.*

²³ Richard Burgess, *Turbines May Offer Option for Oil Rigs*, LAYFAYETTE DAILY ADVERTISER, December 29, 2003, available at <http://www.theadvertiser.com/news/html/192BCA47-3856-4019-ABE7-8957FD5F6FA5.shtml>.

ing on factors such as the depth of the water where the structure exists and its size and location.²⁴

II. PRESENT REGULATORY FRAMEWORK: A PATCHWORK IN THE OCEANS

A. THE FEDERAL REGULATORY REGIME

Table 1 describes the principle federal laws that are potentially applicable to the regulation of offshore wind power and/or offshore aquaculture. As set forth in Table 1,²⁵ and as described in more detail below, whenever a proposal is put forward to develop marine aquaculture or wind power in federal offshore waters, the federal government must sew together disparate threads of federal legislation due to the lack of a coherent offshore policy. The U.S. Commission on Ocean Policy recognizes that, as a result, “the nation runs the risk of unresolved conflicts, unnecessary delays, and uncertain procedures,”²⁶ not to mention confusion. Moreover, because a Congressional grant of authority to lease ocean space is conspicuously absent from the framework, developers lack security of legal tenure, while the public receives no compensation for the use of public ocean space. We focus our primary attention on permitting issues that arise in the existing regulatory scheme with less attention devoted to consultation requirements, although we summarize both in Table 1.

The inadequacy of this piecemeal regulatory regime perhaps is most apparent when one considers that, at present, it is the Army Corps of Engineers that is the lead agency, through a Rivers and Harbors Act (RHA)²⁷/Outer Continental Shelf Lands Act (OCSLA)²⁸ permit, Table 1, item 1 (perhaps in conjunction with an Army Corps’ dredge and fill permit, Table 1, item 1a, rather than an agency charged with managing and

²⁴ Susan Langenhennig, *Gulf Sanctuary: Should Oil Rigs Be Left in Place?*, CYBER DIVER NEWS NETWORK (June 29, 2003), available at <http://www.cdn.info/eco/e030701/e030701.html>.

²⁵ Items 1a through 1k in Table 1 are labeled as such because certification, evaluation, and consultation requirements contained therein will take place in conjunction with the Army Corps of Engineers’ review and consideration of an application under a Rivers and Harbors Appropriations Act of 1899, 33 U.S.C. § 403 (2001), permit application (Item 1).

²⁶ U.S. COMM’N ON OCEAN POLICY, *supra* note 7, at 320.

²⁷ 33 U.S.C. § 403.

²⁸ Outer Continental Shelf Lands Act, 43 U.S.C. § 1333 (extending the Army Corps’ Rivers and Harbors Appropriation Act jurisdiction to the outer continental shelf); see *Alliance to Protect Nantucket Sound*, 288 F. Supp. 2d at 72–74 (regarding permit of an offshore wind data tower and holding that the Army Corps of Engineers’ jurisdiction extends to any structure in the outer continental shelf that may impede navigation irrespective of whether the project is intended to extract resources). See also Utzinger, *supra* note 17, at 10799-10803.

TABLE 1: FEDERAL LAWS AND REGULATIONS POTENTIALLY APPLICABLE TO OFFSHORE WIND POWER AND AQUACULTURE

Law or Regulation	Agency	Action	Subject Jurisdiction	Potential Applicability
1. Rivers and Harbors Act (RHA), 33 U.S.C. § 403 and Outer Continental Shelf Lands Act (OCSLA), 43 U.S.C. § 1333	Army Corps of Engineers	Analyze compatibility w/ other uses; consult/ coordinate w/other agencies (e.g., NOAA, MMS, and EPA) and make “public interest” determination	Obstructions in navigable water	Both
1a. Clean Water Act (CWA), 33 U.S.C. § 1344	Army Corps of Engineers (Lead) & U.S. EPA (Veto)	Permit	Dredging and filling	Both if within 3 miles of shore, but depends on action (concurrently with RHA permit)
1b. National Environmental Policy Act (NEPA), 42 U.S.C. § 4332	Lead Agency - Army Corps of Engineers	Environmental evaluations (EAs and EISs)	Major federal actions significantly affecting the environment	Both (as part of RHA permit)
1c. Fish and Wildlife Coordination Act, 16 U.S.C. §§ 661-666c	U.S. FWS	Formal consultation	Fish and wildlife consultation	Both (part of RHA permit process)
1d. Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. § 1855	NOAA/NMFS	Formal consultation	Essential fish habitat consultation	Both (part of RHA permit process)

TABLE 1, CONTINUED

Law or Regulation	Agency	Action	Subject Jurisdiction	Potential Applicability
1e. Endangered Species Act (ESA), 16 U.S.C. § 1536	NMFS and/or U.S. FWS	Formal consultation	Species jeopardy or adverse critical habitat modification consultation	Both (part of RHA permit process)
1f. MPRSA, 16 U.S.C. § 1434	NOAA	Formal consultation	Marine sanctuary consultation	Both (part of RHA permit process); presently three on Atlantic coast.
1g. Marine Mammal Protection Act (MMPA), 16 U.S.C. §§ 1361 et seq.	NMFS and/or U.S. FWS	Coordination	Marine mammal takes prohibited	Potentially applicable to both (part of RHA permit process)
1h. Migratory Bird Treaty Act, 16 U.S.C. §§ 703 et seq.; Migratory Bird Conservation Act, 16 U.S.C. §§ 715 et seq.	U.S. FWS	Coordination	Migratory birds takes prohibited	Wind (part of RHA permit process)
1i. National Historic Preservation Act (NHPA), 16 U.S.C. § 470f	State Historic Preservation Officer; Advisory Council on Historic Preservation	Formal consultation	Historic shipwrecks; archaeological sites; views from historic districts	Both, but jurisdiction limited to state waters and land (part of RHA permit process)
1j. Coastal Zone Management Act (CZMA), 16 U.S.C. § 1456	Affected States	Certification	Actions affecting land, water use of natural resources of coastal zone	Both, but only if "affects"

TABLE 1, CONTINUED

Law or Regulation	Agency	Action	Subject Jurisdiction	Potential Applicability
1k. CWA, 33 U.S.C. § 1341	State	Water quality certificate	State water quality standards	Both, if within 3 miles of shore
2. 14 U.S.C. § 83, 85 and 33 C.F.R. Parts 66 and 67	Coast Guard	Authorization	Private aids to navigation	Both (also generally part of RHA permit)
3. Federal Aviation Act of 1958, as amended, 49 U.S.C. § 44701; 14 C.F.R. Part 77	FAA	Notice, marking, and lighting	Notice if over 200 feet high or near runway. If greater than 500 feet (or under other conditions), considered an obstruction.	Wind (address potential impacts by type/direction of lights)
4. CWA, 33 U.S.C. §§ 1342 and 1343	U.S. EPA	Permit	Pollutant discharge in territorial sea, contiguous zone or ocean	Possibly both, but greater consequence for aquaculture
5. Federal Power Act, 16 U.S.C. §§ 824, 824d.	FERC	Rate setting (does not involve environmental issues)	Sale and transmission of electricity between producer and wholesaler	Wind (no authority over wind farm permitting/operation)
6. Marine Protection, Research and Sanctuaries Act (MPRSA), 33 U.S.C. § 1412	U.S. EPA	Permit	Ocean dumping	Probably neither (definitely not needed if CWA 402 permit)
7. MPRSA, 33 U.S.C. § 1413	Army Corps of Engineers	Permit	Transportation for ocean dumping	Probably neither

conserving the ocean's biodiversity.²⁹ While it is true that the Army Corps of Engineers makes its determinations based on what it perceives to be the "public interest," its public interest standard is so infused with competing considerations and value judgments as to give the Corps almost unbridled discretion. Indeed, the Corps states in its regulations that it will consider "conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish, and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and, in general, the needs and welfare of the people,"³⁰ not to mention the areas that the Army Corps of Engineers holds most dear—navigation and national security—and that "how important a factor is and how much consideration it deserves will vary with each proposal."³¹ Moreover, given that concerns expressed regarding the development of offshore wind power and marine aquaculture are likely to involve environmental and aesthetic impacts that will be aired as part of the environmental evaluation process,³² having an agency whose focal point and expertise are grounded in navigation results in a regulatory mismatch.³³

The present hodgepodge of legislation and jurisdiction also creates the potential for competition, when coordination is needed, among federal agencies such as the Army Corps of Engineers; the Minerals Management Service (MMS), which regulates offshore oil and gas and the use of sand and gravel found on the outer continental shelf; the NOAA,

²⁹ See generally Guy R. Martin & Odin A. Smith, *The World's Largest Wind Energy Facility in Nantucket Sound? Deficiencies in the Current Regulatory Process for Offshore Wind Energy Development*, 31 B.C. ENVTL. AFF. L. REV. 285 (2004) (noting the imprecision of the Rivers and Harbors Appropriation Act and the Army Corps of Engineers' lack of expertise in the areas of land use and energy policy).

³⁰ 33 C.F.R. § 320.4(a)(1) (2003).

³¹ *Id.* § 320.4(a).

³² Kempton et al., *supra* note 16; Jeremy Firestone, *Offshore Marine Aquaculture in U.S. Federal Waters: Picking Up the Pieces and Painting a Picture*, in AQUACULTURE LAW AND POLICY: TOWARDS PRINCIPLED ACCESS AND OPERATIONS (D. VanderZwaag and G. Chao, eds., forthcoming 2004).

³³ As the lead agency, the Army Corps would prepare an Environmental Assessment (EA) or an Environmental Impact Statement (EIS), as appropriate under the National Environmental Policy Act (NEPA), 42 U.S.C. § 4332. See *infra* Table 1, item 1b. In *Natural Res. Def. Council v. U.S. Dep't of the Navy*, No. 01-07781 (C.D. Cal. Sept. 17, 2002), the court held that despite the presumption against extraterritoriality, NEPA applies in the Exclusive Economic Zone. For a discussion of the implications of NEPA for offshore wind power development, see generally Dorothy W. Bisbee, *NEPA Review of Offshore Wind Farms: Ensuring Emission Reduction Benefits Outweigh Visual Impacts*, 31 B.C. ENVTL. AFF. L. REV. 349 (2004); see also Jay Wickersham, *Sacred Landscapes and Profane Structures: How Offshore Wind Power Challenges the Environmental Impact Review Process*, 31 B.C. ENVTL. AFF. L. REV. 325 (2004).

which regulates ocean fisheries, marine mammals, marine sanctuaries, and endangered ocean plants and animals, and oversees the coastal zone management program; and the EPA, which regulates pollutant discharge and ocean disposal (Table 1, items 1c-1h). While each of these agencies, along with others such as the Federal Aviation Agency (FAA) and the Coast Guard, would retain a role in an overall oceans regulatory framework, or, alternatively, in sector-based regulatory regimes for wind and marine aquaculture, respectively, considerations of project economics, biodiversity impacts, ecosystem management, and precaution can most readily be considered in a systematic, rational, and transparent manner through the creation of just such a framework.

As noted above, a dredge-and-fill permit under the Clean Water Act (CWA)³⁴ also may be needed (Table 1, item 1a). The decision to grant such a permit would depend on whether or not the action occurred within three miles of the shore, such as the cable running from a wind tower through state waters to the shore, and whether or not the action is considered to be dredging or filling. Some methods of laying cable or sinking wind towers (piles) would not trigger agency jurisdiction, although placing rip-rap around the pile base would. In the event such a permit was needed, it presumably would be handled together with the RHA permit, as the Army Corps of Engineers serves as the lead agency on both permitting processes.

Several processes that arise out of the RHA permit bear particular mention because they each raise interesting jurisdictional questions: historic preservation consultation, state Coastal Zone Management Act (CZMA) consistency certification, and state water quality certification (Table 1, items 1i-1j). In addition to considering any effects to historic or cultural resources on the seabed within state waters, the lead agency also may need to engage in consultation regarding a project that, although physically in federal waters, affects the view-shed of a historic district.³⁵ State consistency under the CZMA also is likely to play a role in states that ban finfish marine aquaculture in state waters³⁶ and in most, if not all, states in the wind power context, to the extent those states have

³⁴ 33 U.S.C. § 402 (2000).

³⁵ This is more than a hypothetical consideration as just such a scenario may arise in the context of the Cape Wind project proposal. See U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT, CULTURAL RESOURCES / VISUAL ASSESSMENTS (November 2002) (discussing the impact of the Nantucket offshore wind power project on the cultural resources of Nantucket and the surrounding area) [hereinafter U.S. CORPS OF ENGINEERS].

³⁶ See, e.g., ALASKA STAT. § 16.40.210 (2003) ("A person may not grow or cultivate finfish in captivity or under positive control for commercial purposes."); CAL. FISH & GAME CODE § 15007 (2004) (prohibiting the spawning, incubation, or cultivation of any species of finfish belonging to the family Salmonidae as well as of transgenic fish species and any exotic species of finfish).

plans that address the issue of energy facilities in state coastal zones.³⁷ Finally, state water quality certification is triggered for those projects that take place within three miles of the shore.³⁸

A few additional federal authorities might participate in either wind power or marine aquaculture developments or both. To begin with, both the Coast Guard and the FAA require the marking and lighting of structures to aid aircraft and navigational vessels (Table 1, items 2 and 3). While important from a view-shed or a safety standpoint, these requirements should in most instances be addressed to the satisfaction of all concerned. For example, lighting's potential impact on views can be considered when selecting the type of lighting fixture and the direction in which the light will face.

Considerably more important and controversial is the regulation of the discharge of pollutants under the Clean Water Act, particularly in the aquaculture context. Unlike sections 401 (state water quality certification) and 404 (dredge and fill permitting) of the CWA, which do not apply beyond three miles of the shore, section 402 of the CWA, which requires permits for the discharge of pollutants, applies by virtue of Section 403 of the CWA (Table 1, item 4). Although the EPA has a long history of issuing permits for offshore oil and gas facilities, it has not been fully engaged in new offshore uses such as marine aquaculture. However, two judicial opinions issued in 2002 suggest an enhanced EPA role and explore some of the issues likely to have relevance at marine aquaculture facilities.

First, a federal district court in Maine found that various materials added by Atlantic salmon marine aquaculture operations to the waters of the United States were "pollutants" within the meaning of the CWA.³⁹ Under the CWA, the term "pollutant" includes dredged spoils, solid waste, chemical wastes, biological materials, and agricultural waste.⁴⁰ Specifically, the court held that salmon feces and urine are "biological materials" or "agricultural wastes"; uneaten pigments, antibiotics, a substance used to kill sea lice, and other substances that flow from the marine aquaculture facility after their use are "chemical wastes"; materials applied to nets constitute toxic pollutants; and Atlantic salmon not

³⁷ See, e.g., MASSACHUSETTS OFFICE OF COASTAL ZONE MANAGEMENT, MASSACHUSETTS COASTAL ZONE MANAGEMENT PLAN (March 2002) ("encouraging . . . the use of alternative sources such as solar and wind power"). See also Rusty Russell, *Neither Out Far nor in Deep: The Prospects for Utility-Scale Wind Power in the Coastal Zone*, 31 B.C. ENVTL. AFF. L. REV. 221 (2004) (noting that individual state programs may not adequately account for the benefits of offshore wind power, which are diffuse).

³⁸ See *Natural Res. Def. Council v. EPA*, 863 F.2d 1420, 1435 (9th Cir. 1988).

³⁹ *U.S. Pub. Interest Research Group v. Atlantic Salmon, Inc.*, 215 F. Supp. 2d 239, 248 (D. Me. 2002). The court made similar findings involving different pollutants in two unpublished companion cases.

⁴⁰ 33 U.S.C. § 1362(6) (2001).

native to North America that escape from their net pens are “biological materials” within the meaning of the CWA.⁴¹ Because the facility operator did not have a CWA permit (which could in theory have authorized the discharge of some or all of those pollutants), the court held that the operator had violated the CWA. The second case, however, suggests that not all marine aquaculture operations will be subject to CWA permitting.⁴² Specifically, the Ninth Circuit Court of Appeals held that, although mussel shells, feces, and other byproducts released into the environment are not regulated by the CWA because they “come from the natural growth and development of mussels” rather than from the “waste product of a transformative human process.”⁴³ Nevertheless, the court, by reference to other cases, did imply that the escape of live fish from marine aquaculture facilities is a regulated CWA discharge.⁴⁴ In sum, at least as to marine aquaculture, EPA regulation under Section 402 of the CWA is likely to assume a more prominent role in offshore development.

Turning to one last area of federal regulation—to the extent an offshore wind power producer sells its power to a wholesaler such as a public utility—the Federal Energy Regulatory Commission (FERC) will set rates governing the sale and transmission of the electricity generated (Table 1, item 5). FERC, however, neither has jurisdiction over wind power projects nor conducts environmental reviews as part of its rate setting process, and is thus only tangentially involved in the core issues considered here.⁴⁵

B. STATE REQUIREMENTS

Finally, although a comprehensive analysis of state laws is beyond the scope of the article, we do wish to draw some attention to the issue of regulation pursuant to state law because various state laws could apply even when marine aquaculture facilities or wind farms are located outside state jurisdictional waters. For example, in the marine aquaculture context, states may require a permit to transport live fish through state jurisdictional waters.⁴⁶ States’ roles are likely to be even more cen-

⁴¹ *U.S. Pub. Interest Research Group*, 215 F. Supp. 2d at 243-244, 247-248. For an extended discussion of this case and an argument that marine aquaculture escapees, regardless of origin, are “pollutants,” see Firestone & Barber, *supra* note 8.

⁴² See *Ass’n to Protect Hammersley v. Taylor Res., Inc.*, 299 F.3d 1007 (9th Cir. 2002). For an extended discussion of this case, see Firestone & Barber, *supra* note 8.

⁴³ *Ass’n to Protect Hammersley*, 299 F.3d at 1016-19 (limiting the statutory term “biological materials” in the Clean Water Act to “waste products of some human or industrial process”).

⁴⁴ See *id.* at 1017 (citing *Nat’l Wildlife Fed’n Consumers Power Co.*, 862 F.2d 580, 583 (6th Cir. 1998)).

⁴⁵ See 16 U.S.C. §§ 824 and 824d.

⁴⁶ See 5 ALASKA ADMIN. CODE § 41.005 (1993); see also CONN. GEN. STAT. § 26-57 (1958).

tral in the wind power context because in any instance where a developer proposes to transmit electrical power generated at sea to land, the developer will also need approval from the state to place transmission cables on the submerged lands that are under its jurisdiction.⁴⁷

No consolidated regulatory regime exists for either offshore wind power or aquaculture; therefore, each proposal must be examined individually to determine which state permits apply. Whether the state or federal government has permitting jurisdiction, projects may be subject to both local and state environmental policy acts. Generally, a developer proposing a project in a given state's waters must meet the requirements for permitting and licensing under that state's laws and regulations in addition to any applicable federal requirements.⁴⁸ Moreover, even in those instances in which a project is proposed to be placed in federal waters, if it requires land support facilities or cables that would run across state coastal waters or lands, that project also would be subject to any applicable state laws. Although the federal consistency certification process under the CZMA mentioned in the previous section occurs concurrently with federal permitting review, having to obtain additional state permits to complete projects necessitates a coordinated federal-state process to avoid becoming unduly cumbersome and unnecessarily hindering project development.

Development plans raising environmental questions often fall under the jurisdiction of a state's environmental or natural resource agency. Depending on the location and nature of the offshore wind or aquaculture project at issue, developers would not only have to be concerned with a state's coastal zone management plan, but would also have to address a host of state licensing fees or permits, including wetlands permits, building permits, zoning ordinances, subaqueous permits, state National Pollutant Discharge Elimination System (NPDES) permits for designated states under the CWA, and any other applicable state regulations. In Delaware, for example, projects entering state waters would likely be subject not only to the state's CZMA consistency requirements,⁴⁹ but also would require a Delaware Subaqueous Lands Act permit⁵⁰ and a

⁴⁷ See U.S. CORPS OF ENGINEERS, *supra* note 35.

⁴⁸ See *id.*

⁴⁹ See DIVISION OF SOIL AND WATER CONSERVATION, DELAWARE COASTAL PROGRAMS (describing Delaware's Coastal Management Program, which operates under the direction of the Delaware Department of Natural Resources and Environmental Control), available at <http://www.dnrec.state.de.us/DNREC2000/Divisions/Soil/dcmp/fedcon.htm>.

⁵⁰ DEL. CODE ANN. tit. 7, § 7205 (1974) ("No person shall deposit material upon or remove or extract materials from, or construct, modify, repair or reconstruct, or occupy any structure or facility upon submerged lands or tidelands without first having obtained a permit, lease, or letter of approval from the Department.").

state wetlands permit,⁵¹ among others. Other coastal states have similar laws protecting the coastal environment.⁵² Virginia's Marine Resources Commission, for example, issues subaqueous⁵³ and tidal wetlands permits⁵⁴ in accordance with Virginia's Wetlands and Subaqueous Laws. Although many coastal states may have similar laws protecting the environment, subtle differences in state code and permitting procedures could add conflict, confusion, and inconsistency to the general process of siting offshore projects.

III. ON-LAND WIND DEVELOPMENT AND REGULATION IN THE UNITED STATES

Onshore wind energy plays an important, yet small, role in meeting the United States' rising energy demands. As of January 2004, thirty states were operating utility-scale wind energy projects for a total installed capacity of 6,374 megawatts (MW)—enough to supply over one and a half million households.⁵⁵ Although this represents only about one percent of total domestic electricity generation, it is estimated that U.S. land-based wind resources are large enough to produce more than the total U.S. electricity needs.⁵⁶

Typically, wind project developers are required to obtain permits from one or more governmental agencies at the local, state or federal level. The number of agencies involved and the level of jurisdiction depend on a number of factors such as size of the wind farm, ownership of the land, ownership of the project, and existing laws and regulations.⁵⁷ At the local level, regulation is often in the form of zoning ordinances or building permit codes.⁵⁸ For those projects permitted by a state, the lead state agency typically coordinates review along with local authorities,

⁵¹ *Id.* § 6604(a) (1974) (“Any activity in the wetlands requires a permit from the Department. . . and no permit may be granted unless the county or municipality having jurisdiction has first approved the activity in question by zoning procedures provided by law.”).

⁵² For a discussion of Massachusetts requirements for offshore wind power, see Christine Santora et al., *Managing Offshore Wind Developments in the United States: Legal, Environmental and Social Considerations Using a Case Study in Nantucket Sound, Massachusetts*, 47 *OCEANS & COASTAL MGMT.* 141 (2004).

⁵³ VA. CODE ANN. § 28.2-1203 (1950).

⁵⁴ *Id.* § 28.2-1306.

⁵⁵ The land-based installed capacity generates approximately 16.7 billion kilowatt hours (kWh) of electricity annually. See American Wind Energy Association (updated information on installed U.S. wind power capacity and current operational projects), available at <http://www.awea.org>.

⁵⁶ M.J. Grubb & N.I. Meyer, *Wind Energy: Resources, Systems and Regional Strategies*, in *RENEWABLE ENERGY: SOURCES FOR FUELS AND ELECTRICITY* 157, 189 (T. B. Johansson et al. eds., 1993).

⁵⁷ See NAT'L WIND COORDINATING COMM. (NWCC) SITING SUBCOMMITTEE, PERMITTING OF WIND ENERGY FACILITIES: A HANDBOOK (rev. Aug. 2002) [hereinafter NWCC SITING SUBCOMM.].

⁵⁸ *Id.*

although in some cases a state agency's decisions preempt local jurisdiction. At the state level, the environmental or natural resource agency usually takes the lead in a project review, with additional input from the state energy office, utility commissions, and state historic preservation offices.⁵⁹

In addition to state and local governments, the federal government also has responsibilities for permitting and managing some land-based wind power projects. As of 2002, the Bureau of Land Management (BLM) administered twenty-five wind energy right-of-way authorizations on some 5,000 acres of public lands it manages in California and Wyoming, totaling 500 MW of installed capacity.⁶⁰ In addition, power-marketing agencies that operate under the U.S. Department of Energy (DOE) are involved in either wind power development or the purchasing of electricity from wind projects. For example, the Bonneville Power Administration (BPA), which supplies most of the energy to the Pacific Northwest, incorporates electricity from five different wind power projects into its grid for marketing and distribution.⁶¹

The BLM recently developed an interim wind energy policy "to encourage the development of wind energy in acceptable areas," noting the renewed interest in the development of commercial wind energy projects on federal lands and the potential for wind power development on western federal lands.⁶² Although it only applies to land-based projects on BLM lands, the policy offers the most comprehensive plan for authorizing wind energy projects on federal lands to date. The policy utilizes both land use plans, which could include an assessment of wind resource potential, and environmental reviews of assessments and impact statements to assess individual wind project proposals. A partnership has been created between the BLM and the DOE's National Renewable En-

⁵⁹ *Id.*

⁶⁰ See U.S. DEP'T OF THE INTERIOR, BUREAU OF LAND MGMT. (BLM), INTERIM WIND ENERGY DEVELOPMENT POLICY, INSTRUCTION MEMORANDUM 2003-020 (October 16, 2002) [hereinafter BLM], available at <http://www.blm.gov/nhp/efoia/wofy03/im2003-020.htm>. The interim policy by its own terms expires on September 30, 2004. *Id.* The Forest Service, which administers the national forests, on the other hand, has yet to authorize any development plan for wind energy facilities on its lands. Associated Press, *Forest Service Turns Down Land Swap for Wind Project*, CAPE COD TIMES (March 8, 2004) (discussing Green Mountain National Forest Supervisor Paul Brewster's recent decision to turn down a request to swap 200-300 acres of the Green Mountain National Forest for 1,150 acres of land owned by enXco, French-partner of the Green Mountain Power Company, in an effort to expand its current Searsburg wind farm onto federal lands), available at <http://www.capecodonline.com/special/windfarm/windswap8.htm>. However, no authorization does not spell the end of the project; rather, it could still be developed on national forest lands after an environmental evaluation under NEPA. *Id.*

⁶¹ See BONNEVILLE POWER ADMINISTRATION (BPA), WIND PROJECTS (January 13, 2004), available at <http://www.transmission.bpa.gov/PlanProj/Wind; Bisbee>; *supra* note 33, at 374-78.

⁶² BLM, *supra* note 60.

ergy Laboratory in an effort to inventory wind resources on public lands and to help guide land use planning efforts.⁶³

As its interim policy, the BLM has essentially created a three-stage process of authorizing wind power projects through right-of-way grants on public lands (see Table 2). Although federal right-of-way regulations do provide authority to offer public lands under a competitive bidding procedure, the BLM has decided to process applications on a first come, first served basis in order to “encourage the access to public lands for renewable energy resource assessments and development.”⁶⁴

TABLE 2: BLM WIND ENERGY DEVELOPMENT POLICY

	Authorizations	Requirements/Provisions
Stage 1	Right-of-way grants for site specific wind energy testing and monitoring facilities	<ul style="list-style-type: none"> • Environmental review, consistent with NEPA • Limited 3 year grant term • Does not establish exclusive/preferential rights to development • Annual rental fee
Stage 2	Right-of-way grants for wind energy site testing and monitoring facilities that encompass a site testing and monitoring project area	<ul style="list-style-type: none"> • Environmental review, consistent with NEPA Extendable 3-year grant term • Holder retains an interest in the project area, but has no right to develop • Holder must submit an amended right-of-way application and Plan of Development for BLM review • Annual rental fee • Discretionary reclamation bond, usually not required
Stage 3	Right-of-way grants for commercial wind energy development	<ul style="list-style-type: none"> • Environmental review, consistent with NEPA • Long-term grant, authorizing of all wind-related facilities, with appropriate stipulations • Annual rental fee • Annual production rent • Discretionary reclamation bond, usually required

In the first step, an initial site-specific right-of-way grant may be authorized for small site-specific testing and monitoring facilities such as meteorological towers and instrumentation facilities with a limited term

⁶³ *Id.* As set forth in the BLM’s policy, all wind energy and related facilities will be applied for under Subchapter V of the Federal Land Policy Management Act (FLPMA) and 43 C.F.R. § 2802. *See id.*

⁶⁴ *Id.*

of three years. The site-specific right-of-way grant does not establish any exclusive or preferential rights for future wind development, it cannot be extended or renewed, and the applicant is assessed an annual rental fee.⁶⁵ After the initial site-specific right-of-way grant expires, the developer may apply for a three-year site testing and monitoring project area right-of-way grant, which, although not establishing any right to development, does preclude other wind energy right-of-way applications from being filed for the same area. During this second phase, the applicant must submit an amended right-of-way application and a Plan of Development to the BLM for review in order to retain interest in the project area.⁶⁶ Otherwise, the right-of-way grant terminates and the lands open for other wind energy applications. The applicant also must pay an annual rental fee based on the total public land acreage of the project area.⁶⁷ At the discretion of the authorizing officer, a bond also may be required to ensure proper reclamation of the area and to cover costs incurred by BLM.⁶⁸ Finally, to begin construction and operation, the developer must apply for a right-of-way grant for commercial wind energy development. The authorization includes turbine towers, access roads, electrical transmission facilities, and other support facilities, and the terms of the grant are generally between thirty and thirty-five years.⁶⁹ During this phase, the developer must pay a three-year phased-in annual minimum rent of \$2,635 per megawatt of anticipated installed capacity (this is a BLM-wide rate) and will be assessed annual production rent to the extent that the developer's project exceeds the parameters (e.g., capacity or purchase price of electricity generated) assumed in the BLM-wide rate.⁷⁰ In addition, a reclamation bond is usually required to ensure proper decommissioning and rehabilitation of the project site once commercial production has terminated.⁷¹

⁶⁵ *Id.* Rental fees will be a minimum of \$50 per year for each meteorological tower or instrumentation facility. 43 C.F.R. § 2803.1-2(a) (1987).

⁶⁶ 43 C.F.R. § 2803.6-1 (1982).

⁶⁷ *See* BLM, *supra* note 60. The rental fee is \$1,000 per year or \$1 per acre, whichever is greater. 43 C.F.R. § 2803.1-2(a) (1987).

⁶⁸ *See* BLM, *supra* note 60.

⁶⁹ *See id.*

⁷⁰ *Id.* The annual minimum rent is \$2,365 per megawatt. *Id.* The actual rent owed is based on the total anticipated installed capacity of the wind project as described in the Plan of Development, the total number of hours in a year, a capacity factor of thirty percent, a royalty of three percent, and an average purchase price of \$0.03 per kilowatt hour. *Id.* The rent is phased in over three years, in which developers must pay twenty-five percent of the total minimum rental fee for the first year, fifty percent for the second year, and 100 percent the third year and beyond. In addition, if commercial operations begin prior to the third year, the developer must begin to pay 100 percent of the annual minimum rent. *Id.* The authorizing officer determines the wind energy production rental fee when the right-of-way grant is issued. *Id.* The fee is based upon comparative market surveys and appraisals. *Id.*

⁷¹ 43 C.F.R. § 2803.1-2(a) (1987).

IV. LESSONS FROM U.S. OIL AND GAS DEVELOPMENT

As new uses emerge for federal offshore waters, the government must be ready to respond to environmental, jurisdictional, and economic concerns, all while serving the public interest. Yet it remains to be seen how the government will tackle these complex issues. With the glaring lack of any comprehensive and consistent management framework, it is clear that a new legal regime is needed to address new ocean uses such as offshore wind power and aquaculture. However, examining already-existing successful ocean management regimes, such as the OCS oil and gas program, may help guide innovations in future ocean governance. For example, in its final report, the U.S. Commission on Ocean Policy recommends developing comprehensive management plans to guide the planning and leasing process of emerging activities in federal waters, noting, “the scope and comprehensiveness of the outer continental shelf (OCS) oil and gas program can be a model for the management of a wide variety of offshore activities.”⁷² The Commission also recommends legislation to ensure that the public “receives a fair return from the use. . . and development rights” of offshore lands, taking into account “state, local, and public concerns.”⁷³

Offshore oil and gas, to this point, has been the most sought after resource of the United States’ OCS. The history of the U.S. OCS oil development program is quite extensive, spanning the last 100 years.⁷⁴ In fact, the earliest U.S. offshore oil drilling activities took place on piers extending from the shore in Summerland, California, in 1896,⁷⁵ and by the end of 2002, U.S. offshore waters supplied more than twenty-five percent of the country’s natural gas production and more than thirty percent of the total domestic oil production.⁷⁶ But control and jurisdiction over such valuable resources have been controversial. On September 28, 1945, the Truman Proclamation claimed U.S. jurisdiction and control over the natural resources of the subsoil and seabed of the continental shelf, essentially beginning the modern movement of coastal jurisdictional claims and Law of the Sea. Two years later, the U.S. Supreme Court issued its seminal opinion in *United States v. California*,⁷⁷ confirming the federal government’s ownership of the submerged lands and associated natural resources from the tidelands to three miles from

⁷² U.S. COMM’N ON OCEAN POLICY, *supra* note 7, at 307.

⁷³ *Id.* at 320.

⁷⁴ See generally C. Lester, *Contemporary Federalism and New Regimes of Ocean Governance: Lessons from the Case of Outer Continental Shelf Oil Development*, 23 OCEAN AND COASTAL MGMT. 7 (1994).

⁷⁵ *Id.*

⁷⁶ See Offshore Minerals Management Home Page, available at <http://www.mms.gov/offshore> (last visited Oct. 6, 2004).

⁷⁷ See *United States v. California*, 332 U.S. 19 (1947).

shore.⁷⁸ In 1953, though, under the Eisenhower Administration, Congress effectively reversed *United States v. California*. In passing the Submerged Lands Act,⁷⁹ Congress gave the states exclusive rights to resources of the “marginal sea”—the band of water up to three nautical miles from shore.⁸⁰

Some fundamental parallels exist among offshore oil production, offshore wind power production, and offshore mariculture. Each process likely gives rise to controversy involving the siting of structures with the potential to cause negative environmental impacts on the surrounding ocean ecosystem. Although NEPA review processes can be extensive, there remains an air of scientific uncertainty regarding both immediate and long-term effects, both beneficial⁸¹ and harmful,⁸² on the environment. In addition, the potential for navigational hazards exists anytime a facility or structure is erected in the open ocean, whether it arises from an oil and gas platform, a wind turbine support structure, or an aquaculture net pen. On the other hand, because offshore wind power and offshore aquaculture are currently more economically feasible closer to shore than oil and gas, at present, coastal communities might be more susceptible to visual impacts from wind farms and aquaculture facilities than they are from oil platforms located further offshore.

Today, unlike wind power and aquaculture, a mature comprehensive planning and management framework for leasing and production does exist for offshore oil and gas. The OCSLA manages oil and gas resources on the OCS.⁸³ It states, “the outer Continental Shelf is a vital national resource reserve held by the Federal Government for the public, which should be made available for expeditious and orderly development. . . .”⁸⁴ The OCSLA requires the Secretary of the Department of the Interior (DOI) to prepare a five-year leasing program indicating the size, timing, and location of leasing activity “which he determines will best

⁷⁸ *Id.*

⁷⁹ 43 U.S.C. §§ 1301-1315 (1953).

⁸⁰ *Id.* § 1311. The U.S. nevertheless retained the right to regulate, among other things, commerce and navigation in these waters. *See also id.* § 1314 (1953). For historical reasons, Texas and Florida on the Gulf coast each maintain jurisdiction out to nine nautical miles. *See id.* § 1301.

⁸¹ Wind power, for example, could replace coal or oil burning electrical generating facilities, thus reducing the number of premature deaths from air pollution. Kempton et al., *supra* note 16.

⁸² Wind power also could have impacts on avian species and marine mammals. *See, e.g.,* U.S. FISH AND WILDLIFE SERVICE, *Service Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines* (May 13, 2003); *see also* S. Koschinski et al., *Behavioural Reactions of Free-ranging Porpoises and Seals to the Noise of a Simulated 2 MW Windpower Generator*, 265 MAR. ECOL. PROG. SER. 263 (2003).

⁸³ 43 U.S.C. §§ 1331 *et seq.*

⁸⁴ *Id.* § 1332 (1986).

meet national energy needs”⁸⁵ for each five-year period. The Mineral Management Service (MMS) is the bureau within the DOI responsible for implementing the program and fulfilling the requirements of the OCSLA. Currently, the MMS is operating under the 2002-2007 plan, which sets forth eight proposed tract leases in the Alaska region and twelve proposed tract leases in the Gulf of Mexico.⁸⁶ Because of Congressional action in the early 1980s and President George Herbert Walker Bush’s restrictions in 1990, some 610 million acres of OCS lands have been removed from leasing considerations, effectively limiting access to the OCS program to parts of the Gulf of Mexico and Alaska.⁸⁷ In addition to oil and gas, MMS is also responsible for other mineral production offshore, which currently includes gravel and sand.⁸⁸

The current oil leasing plan process, shaped by past litigation and judicial review, is much clearer, more concise, and more transparent than in the past, and perhaps a similarly-structured, albeit more stream-lined, leasing regime could be beneficial for offshore marine aquaculture projects or wind power production. The OCSLA process can be divided into five stages (see Table 3). Stage 1 involves the DOI and MMS prep-

TABLE 3. OCSLA PROCESS

		Requirements
Stage 1	Leasing Plan	<ul style="list-style-type: none"> • DOI/MMS prepares 5-year leasing program • Initial NEPA review of leasing program • Governor’s review for comments
Stage 2	Lease Sales	<ul style="list-style-type: none"> • NEPA review for specific lease sites • CZMA consistency determination by Governors • Notice of sale
Stage 3	Exploration by Lessees	<ul style="list-style-type: none"> • Lessee prepares exploration plan for review • Secretary prepares environmental report • Exploratory well drilling permit • NPDES permit
Stage 4	Development and Production	<ul style="list-style-type: none"> • Approval of development and production plan
Stage 5	Termination	<ul style="list-style-type: none"> • Decommissioning

⁸⁵ *Id.* § 1344(a) (1978).

⁸⁶ See MINERAL MANAGEMENT SERVICE (MMS), U.S. DEPARTMENT OF THE INTERIOR, SCHEDULE OF LEASE SALE STEPS (effective July 1, 2002); MMS, NOTICE OF AVAILABILITY OF THE FINAL NOTICE OF AVAILABILITY OF THE PROPOSED FINAL 5-YEAR OUTER CONTINENTAL SHELF (OCS) OIL AND GAS LEASING PROGRAM, FOR 2002–2007, 67 Fed. Reg. 19,447 (April 19, 2002).

⁸⁷ U.S. COMM’N ON OCEAN POLICY, *supra* note 7, at 289.

⁸⁸ See MMS, SAND AND GRAVEL PROGRAM, available at <http://www.mms.gov/sandandgravel> (last visited Oct. 6, 2004).

aration of the five-year leasing program—a nine-month process involving draft proposals, multiple public comment periods, initial NEPA review, and a mandatory sixty-day comment period in Congress.⁸⁹ Once the five-year program has been announced, Stage 2—planning for specific lease sales—may commence. This ten-month process involves an additional NEPA review for specific lease sites, consistency determinations by state governors, and notice of sale.⁹⁰ Once a lease is issued, the lessee still has no right to proceed with exploration or development, but rather merely has priority in submitting plans to conduct further activities. Stage 3 involves the actual exploration by the lessees who must prepare an exploration plan to be approved by the Secretary, in addition to the Secretary’s environmental report.⁹¹ If approved, the three-month Coastal Zone Management consistency review begins. Meanwhile, the lessee must obtain an exploratory well drilling permit⁹² and perhaps a National Point Discharge Elimination System⁹³ (NPDES) permit if discharge is likely. Stage 4 involves development and production and meeting CZMA consistency.⁹⁴ Stage 5 terminates the lease process with the decommissioning of the production and development platform,⁹⁵ which is particularly important to ensuring unrestricted navigability and the removal of any remaining environmental hazards. It is certainly feasible that any contract or management plan for offshore wind facilities or aquaculture projects would require a similar comprehensive planning and decommissioning process to protect environmental quality in coastal waters.

A major consideration in siting aquaculture or an offshore wind farm is protecting the public interest. With increasing demands for “green” energy spurring the development of offshore wind power and flat or falling capture fisheries doing the same for offshore aquaculture, it will become crucial for the government to protect the land it holds in trust for the public. As with offshore oil and gas production, one way the trustees of the lands and waters—the federal and state governments—might ensure that the public benefits from aquaculture or offshore wind projects is to charge lease and royalty fees. For example, the OCSLA authorizes the Secretary to grant oil and gas leases on submerged lands

⁸⁹ See MMS, THE OUTER CONTINENTAL SHELF LEASING PROCESS, available at <http://www.mms.gov/ld/PDFs/Leasing%20process%20for%20web.pdf> (last visited Oct. 6, 2004).

⁹⁰ *Id.*

⁹¹ 43 U.S.C. § 1340(c)(1) (1985).

⁹² *Id.* § 1340(d) (1985).

⁹³ See U.S. ENVIRONMENTAL PROTECTION AGENCY, NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES), available at <http://cfpub.epa.gov/npdes/> (last visited Feb. 9, 2004).

⁹⁴ 43 U.S.C. § 1351 (1978).

⁹⁵ See 30 C.F.R. §§ 250.1700 *et seq.*

of the OCS to the highest competitive bidder.⁹⁶ It is the role of the DOI and the MMS to ensure that the federal government receives fair market value for such lands leased. In addition to revenue from lease sales (bonus bids) and annual rents, the MMS collects royalties on production. The Federal Government may redeem such royalties in cash or in royalties-in-kind (a volume of the commodity).⁹⁷ Between 1953 and 2002, total federal revenues from offshore oil and gas leasing and production reached approximately \$145 billion;⁹⁸ in fiscal year 2002, the OCS program generated approximately \$5 billion in bonuses, rents, and royalties.⁹⁹ The Secretary also can negotiate leases for resources other than oil, gas, and sulfur, such as sand, gravel, and shell resources, on a competitive basis to the highest bidder.¹⁰⁰ In addition, the Secretary may assess a fee to the lessee based upon the value of the resource and the public interest served.¹⁰¹ However, when a federal, state, or local government agency uses such resources for shore protection, beach restoration, or coastal wetlands restoration, the MMS can negotiate on a non-competitive basis.¹⁰²

Under Section 8(g) of the 1985 amendments to the OCSLA, the federal government shares revenues with adjacent coastal states in those instances when an oil and gas facility is located within three miles of a state's jurisdictional waters (commonly referred to as the "8g zone"), and that state receives twenty-seven percent of all revenues from production. Seaward of the 8g zone, the federal government retains 100% of the royalties.¹⁰³ In 1998, thirty-five states received a total of more than \$559 million from these 8g tracts.¹⁰⁴ Lessons learned from state and federal equity conflicts over oil and gas royalty revenues should help guide any future management plan for aquaculture or offshore wind power development. We discuss this issue in more detail in Section VI.

⁹⁶ 43 U.S.C. § 1337(a)(1) (2000).

⁹⁷ *Id.* § 1353 (a)(1) (2000).

⁹⁸ U.S. COMM'N ON OCEAN POLICY, *supra* note 6, at 292.

⁹⁹ MMS, FACTS AND FIGURES (2003). A small portion of this amount would have been disbursed to the States pursuant to 43 U.S.C. § 1337(g). *See supra* notes 96-97 and accompanying text.

¹⁰⁰ *See* 43 U.S.C. § 1337(k)(1); 30 C.F.R. § 281.18.

¹⁰¹ 43 U.S.C. § 1337(k)(2)(B) (1999).

¹⁰² *Id.*

¹⁰³ *Id.* § 1337(g).

¹⁰⁴ MMS, 35 STATES RECEIVE \$559 MILLION IN 1998 AS SHARE OF FEDERAL MINERAL REVENUES (Feb. 22, 1999) (MMS News Release), *available at* <http://www.mms.gov/ooc/press/1999/99011.htm> (last visited Sept. 1, 2004).

V. LESSONS LEARNED FROM OTHER COUNTRIES' MANAGEMENT OF OFFSHORE WIND AND AQUACULTURE

A. OFFSHORE WIND POWER IN EUROPE

The European Union's (E.U.'s) first offshore wind farm began operation in Denmark in 1991. As of mid-2003, 11 offshore wind power projects totaling 279 megawatts had been implemented in the E.U. in Denmark, the Netherlands, Sweden, and the United Kingdom. Projects are planned in Belgium, France, Germany, and Ireland.¹⁰⁵

Although offshore wind power projects have operated in the E.U. for over a decade, regulations governing the development of projects are in varying stages. For example, according to a 2002 study by the European Wind Energy Association (EWEA) which examined offshore wind power project regulation in eight E.U. member nations, development of offshore wind projects in all countries studied requires input from at least seven different agencies.¹⁰⁶ Within several E.U. member nations, different regulations apply depending on the location of a proposed project, that is, whether the project would be located within a country's territorial sea (within 12 nautical miles of shore) or its EEZ.¹⁰⁷ Often, as in Germany, provincial law will apply in the territorial sea, while national law will apply in the EEZ. The E.U.'s regulatory scheme thus is somewhat analogous to the United States' federal scheme for offshore waters.¹⁰⁸ This confusing regulatory structure has been identified as a major factor limiting European development of offshore wind energy.¹⁰⁹ Those nations, such as France, that have not developed an explicit planning and permitting process for offshore wind projects tend to have the most complex and confusing combinations of regulatory authorities.

Additionally, requirements for environmental impact assessments (EIA) for offshore wind projects vary from nation to nation within the E.U. Council Directive 97/11/EC obliges E.U. Member States to perform an EIA for certain projects.¹¹⁰ This Directive is transposed into

¹⁰⁵ L.W. M. BEURSKENS & M. DE NOORD, OFFSHORE WIND POWER DEVELOPMENTS: AN OVERVIEW OF REALIZATIONS AND PLANNED PROJECTS 6-7 (Energy Research Centre of the Netherlands, ECN-C-03-058 (2003)).

¹⁰⁶ S. SHAW ET AL., ENABLING OFFSHORE WIND DEVELOPMENTS 102 (3E and European Wind Energy Association, 2003).

¹⁰⁷ See *supra* note 2.

¹⁰⁸ See *supra* note 4 and accompanying text.

¹⁰⁹ GARRAD HASSAN & PARTNERS ET AL., OFFSHORE WIND ENERGY: READY TO POWER A SUSTAINABLE EUROPE, FINAL REPORT, CONCERTED ACTION ON OFFSHORE WIND ENERGY IN EUROPE 7-24 (Delft University of Technology, NNE5-1999-562, Dec. 2001).

¹¹⁰ Council Directive 97/11/EC of 3 March 1997, Assessment of the Effects of Certain Public and Private Projects on the Environment (amending Council Directive 85/337/EEC of 27 June 1985), available at <http://europa.eu.int/comm/environment/eia/full-legal-text/9711.htm>.

each nation's federal law by individual legislation. Directive 97/11/EC includes "installations for the harnessing of wind power for energy production (wind farms)" as projects that may or may not be subject to EIA, and does not distinguish between onshore and offshore wind energy projects.¹¹¹ Member States are to either review applications for wind farms on a case-by-case basis or set thresholds for wind farm projects that would be subject to EIA. Consequently, each E.U. Member State utilizes different criteria, generally stated in the codifying legislation, to determine whether a wind farm project is subject to an EIA. For example, some nations, such as Germany, specifically require EIA for offshore wind projects, while other nations simply require that any wind farm larger than a certain number of turbines or generating capacity falls under the provisions of an EIA. Table 4 shows examples of EIA criteria for wind farms in different nations.

B. BEST PRACTICES

The European Wind Energy Association (EWEA) study identified several best practices to enable development of offshore wind energy policy. In particular, the study recommends utilizing a "one-stop shop" for leasing, permitting, and environmental assessment to streamline the approval process for offshore wind energy development. Denmark has implemented such a scheme, with the Danish Energy Authority exercising jurisdiction over all offshore wind projects. A second best management practice would ensure that financial requirements for application and permitting are clear to project developers. Clarity is important because fee schedules for offshore energy project applications vary by country, with some countries requiring high application fees whereas others do not ask for payment until the time of leasing the project. Fee schedules vary greatly among nations, as shown in Table 4. Although most nations have public involvement requirements through their EIA laws, enhanced communication and public involvement beyond minimum EIA standards would better enable offshore wind power developments. Finally, nations should enact clauses that oblige the developer to be financially responsible for decommissioning wind turbines¹¹²

C. DIFFERENCES IN THE E.U. AND U.S. WITH RESPECT TO OFFSHORE WIND FARMS

Differences in the prevalence of offshore wind energy production between the E.U. and the United States can be attributed to several fac-

¹¹¹ Council Directive 97/11/EC of 3 March 1997, Assessment of the Effects of Certain Public and Private Projects on the Environment, amending Council Directive 85/337/EEC O.J. (L 073), 5-15.

¹¹² SHAW ET AL., *supra* note 106, at 103-08.

tors. First, the E.U. has made a strong commitment to the development of renewable energy sources. Whereas the United States has declared a need to reduce dependency on foreign fossil fuel imports, the federal government has yet to take the actions necessary to achieve this goal. The United States also has yet to ratify the Kyoto Protocol, which would require reductions in fossil fuel consumption through international law. Finally, the governments of E.U. member nations have made strong and specific commitments to offshore wind power. Denmark, for instance, which currently leads the globe in offshore wind production, is implementing its Energy 21 Plan that sets a target of 5,500 megawatts of installed wind capacity, of which 4,000 megawatts is to be generated offshore.¹¹³

Even in the event that the U.S. does adopt an aggressive and comprehensive offshore wind power program and dedicates significant financial and personnel resources to making offshore wind a reality, offshore wind may have to face additional burdens that have not yet presented themselves to the E.U. Indeed, areas of high wind energy potential in the U.S. and the E.U. experience different user conflicts, and it is possible that the user conflicts present in the E.U. have proven easier to resolve than they would be in the U.S. The locations of existing and planned offshore wind projects in the E.U. tend to be geographically separate from areas of high coastal tourist use. Resort areas—in particular the Mediterranean Sea—have generally not been targeted for offshore wind development. Furthermore, those areas that have been targeted in the North Sea and Baltic Sea do not share the same characteristics as proposed offshore wind projects in the United States such as Cape Cod, with high recreational use, expensive vacation homes, and high levels of

¹¹³ Development of Offshore Wind Power in Denmark (2002), *available at* <http://green.nature.com/article1040.html>.

TABLE 4: REGULATION OF OFFSHORE WIND PROJECTS IN EUROPE¹¹⁴

Country	Belgium	Denmark	France	Germany	Ireland	Netherlands	Sweden	UK
Projects implemented (as of April 2003)	NO	233 MW	NO	NO	NO	19 MW	23 MW	4 MW
Projects planned (April 2003)	644 MW	649 MW	1.5 MW	6.5 GW by 2006	2 GW	219 MW	114 MW	Min. 2 GW
Fixed Procedure	YES	YES	NO	YES	YES	Under review	YES, but weak	YES
One-stop shopping	NO	YES	NO	NO	NO	NO	NO	YES
Pre-selected sites	NO	YES	NO	NO, but characteristics of preferential sites identified	NO, but certain areas prohibited	Discouraged within 12 miles; may designate preferential areas	NO	NO
Lead agencies	1. Commission for the Regulation of Electricity and Gas: <i>leasing</i> 2. Ministry of Environment: <i>permitting</i> 3. Management Unit of North Sea Mathematical Models: <i>EIA</i>	Danish Energy Authority: <i>0-200 miles</i>	1. Ministry of Equipment, Transport, Housing, Tourism, and the Sea. 2. Le Prefet Maritime 3. Several other agencies	1. Regional governments: <i>0-12 miles/grid connections</i> 2. Federal Maritime and Hydrographic Authority: <i>12-200 miles</i>	1. Department of Communications, Marine and Natural Resources, Foreshore Administration Section 2. Commission for Energy Regulation 3. Local planning authorities	1. Ministry of Transport, Public Works, and Water Management: <i>licensing</i> 2. Ministry of Finance: <i>leasing</i> 3. Several others	1. Ministry of Industry, Employment, & Communications 2. National Board of Housing 3. Swedish Energy Agency 4. National Judicial Board for Public Lands & Funds 4. Regional state authorities 5. Environmental Court 6. Municipalities	1. Crown Estates: <i>leasing</i> 2. Department of Trade and Industry: <i>licensing</i>

¹¹⁴ BEURSKENS AND DE NOORD, *supra* note 105; HASSAN ET AL., *supra* note 109; S. SHAW ET AL., *supra* note 106.

TABLE 4, CONTINUED

EIA	EIS required for all offshore wind farms	Determined by Danish Energy Authority	Required for all wind parks exceeding 1.83 M€ under decree 77-1141	Required for offshore wind projects under Offshore Installations Ordinance	EIS mandatory for all wind energy projects over 5 turbines or over 5 MW	Offshore wind projects over 10 MW or 10 turbines subject to discretionary EIS	Required by Environmental code and Act on Electricity	Required under Electricity Works Regulations 2000
Lease fee	NO	Under review	Fixed by tax authority (no set amount)	NO (but minimum 10,000€ application fee)	YES (3800€/MW/year or, if higher, 2.5% of gross revenue)	YES	YES (150€ per year per turbine)	YES (2% gross revenue)
Priority grid access	YES	Under review	YES	YES	NO	NO	YES	NO
Decommissioning fund	YES	Developer provides economic guarantee	Potential requirement	Potential requirement	YES	YES	YES	YES
Economic incentives	Green certificates	Preferential tax scheme	Tender and feed-in tariff	Feed-in tariff	Tender	Direct subsidy, green certificate, and preferential tax scheme	Direct subsidy and green certificate	Direct subsidy, green certificate, and preferential tax scheme
Other policy aspects	3 separate royal decrees regulate leasing, licensing, and EIA for offshore wind energy projects	Development of lease and permit streamlining through Danish Energy Authority	No existing legal framework for leasing or permitting offshore wind farms	Gov't published strategy on offshore wind energy which identifies protected areas and sets forth provisions for specially-suited areas for wind power plants	"Offshore Electricity Generating Stations: Note for Intending Developers," published by Department of Communications, Marine and Natural Resources	Offshore wind projects not allowed within 12 miles of shore. Within EEZ, no regulatory scheme	Conflicts between two main laws: Planning and Building Act and Environmental Code	"Guidance Note for Offshore Windfarms for Environmental Impact Assessment" published by Department of Environment, Food, and Rural Affairs

tourism. Areas in which wind farms have been proposed in the E.U. tend to experience high commercial shipping volumes.¹¹⁵

D. REGULATION OF OFFSHORE AQUACULTURE PROJECTS OVERSEAS

As with offshore wind power, development of offshore aquaculture projects has proceeded more quickly outside of the United States, particularly in Japan, Norway, Ireland, the United Kingdom (Scotland), Chile, New Zealand, and Australia. Moreover, other nations are likewise grappling with fitting new offshore uses into existing complex legal regimes. Overwhelmingly, most other nations have developed legislation for aquaculture under national fisheries acts, implemented either by an agency analogous to a ministry of fisheries or an oceans agency. For the most part, these nations require both a lease for an area of ocean and a license to operate an aquaculture facility. Discussed below are the regulatory frameworks for Ireland, Japan, New Zealand, and Chile. Table 5 provides a comparison of each nation's policies.¹¹⁶

The Ireland Department of the Marine is a comprehensive oceans agency that regulates its aquaculture industry. In addition to aquaculture, it regulates commercial shipping, fisheries, forestry, port services, minerals and hydrocarbons exploration, marine coastal zone management, marine tourism, emergency response, research, and technology development. Within the Department of the Marine, the Inland Fisheries/Aquaculture Policy Division leases development space on the foreshore (sea bed) and issues licenses for the aquaculture industry under the 1959-1997 Fisheries Acts. Ireland, recognizing the important economic impact of marine aquaculture, has initiated a US\$37 million plan to survey and map the entire EEZ to help determine the best use of offshore and coastal resources for potentially conflicting purposes, including aquaculture, fisheries, and oil and gas exploration.¹¹⁷

Chile's General Law of Fisheries and Aquaculture of 1991 regulates leases and licenses for aquaculture. A lease is required for the use of a certain area of the coastal waters for aquaculture purposes. An applicant who has received a lease must obtain a license to develop an aquaculture facility. In order to reduce conflicts between aquaculture and other coastal and marine uses, a process was developed for siting aquaculture facilities. Each region set up a commission that determined areas suitable for aquaculture. With insights gained from stakeholder input, the

¹¹⁵ Buck, *supra* note 19.

¹¹⁶ See generally B. CICIN-SAIN ET AL., DEVELOPMENT OF A POLICY FRAMEWORK FOR OFFSHORE MARINE AQUACULTURE IN THE 3-200 MILE U.S. OCEAN ZONE (Center for the Study of Marine Policy, 2000), available at <http://darc.cms.udel.edu/sgeez/sgeez1.html>.

¹¹⁷ *Id.* at 114-15.

Ministry of Defense then finalized the process with Executive Decrees for at least six of Chile's nine regions.¹¹⁸

Japan's national Law of Fisheries sets fishing and aquaculture policy at the national level. However, administration of the regulatory framework for aquaculture is carried out at the prefecture (local/regional) level. Under the Law of Fisheries, organized groups of fishers may apply for an "aquaculture right," which grants its holder exclusive use of a certain ocean area for aquaculture. Applications must include information on the type of facility to be constructed, the precise area involved, and which species are involved. The Prefecture Governor, on the advice of the Prefecture Fisheries Coordination Committee, grants aquaculture rights, which are valid for five years. A fisher holding an aquaculture right over a certain area can exclude other users from entering that area.¹¹⁹

New Zealand's aquaculture industry is regulated by the Ministry of Fisheries, which implements regulations set forth under the Fisheries Act. The Ministry of Fisheries is self-funding; that is, rather than receiving a budget from the government, it has in place a fee structure that applies to all holders of leases, permits, or licenses. For aquaculture, these fees are referred to as Aquaculture Levies and Transaction Charges and are earmarked for the enforcement of aquaculture regulations and for aquaculture research costs. The Ministry of Fisheries requires all aquaculture facilities to have fishing permits for the removal of fish. Regional and district councils issue leases and operating licenses for aquaculture facilities. It does not seem that New Zealand requires EIA for aquaculture facilities; however, "cultural, economic, and social and environmental factors are considered in the granting of a marine farming lease or license."¹²⁰

¹¹⁸ *Id.* at 118-21.

¹¹⁹ *Id.* at 127-29.

¹²⁰ *Id.* at 124-37.

TABLE 5: REGULATION OF OFFSHORE AQUACULTURE PROJECTS OUTSIDE THE U.S.¹²¹

Country	Ireland	Chile	New Zealand	Japan
Aquaculture value	US\$89 million (1998)	US\$625 million (1999 - salmon only)	US\$97 million (1998)	1.1 million metric tons (1997)
Fixed Procedure	YES	YES	YES	YES
Leases required	YES - "foreshore license"	YES - "concession"	YES	YES - "aquaculture right," which includes both lease and license
Licenses required	YES - "aquaculture license"	YES - "authorization"	YES - both fishing permit (for removal of fish) and operating license	
Pre-selected sites	Under development	YES - Process: "Determining Areas Suitable for Aquaculture" was established. Final decrees issued on regional basis	Recommended areas outlined by Ministry of Fisheries, but areas not specified to site-level [*]	YES - through aquaculture right
Lead agency	Department of the Marine (includes Inland Fisheries/ Aquaculture Policy Division and Sea Fisheries Policy and Development Division)	-Sub-Secretary for Marine Affairs of the Ministry of Defense (leases) -Sub-Secretary for Fisheries of the Ministry of Economics (licenses)	Ministry of Fisheries (operationalized through Regional and District Councils)	Regulatory framework administered by Division in charge of fisheries at prefecture or local level
Other responsible agencies	Irish Sea Fisheries Board (includes aquaculture research and development program)	Secretariat General of the President's National Environmental Commission (CONAMA)	Ministry of Environment and Department of Conservation	Prefecture Fisheries Coordination Committee
Relevant legislation	1959-1997 Fisheries Acts, 1933 and 1992 Foreshore Acts, and 1954 State Property Act	General Law of Fisheries and Aquaculture of 1991	Fisheries Act of 1996	Law of Fisheries
EIA	YES - Required for all farms with annual production exceeding 100 tons	YES - CONAMA developed "Guidelines for EIA for Hydrobiological Resources Culture and Processing Plants"	YES ^{**}	Not specified
Lease/license fee	YES - US\$76/year	Not specified	YES - Aquaculture Levies and Transaction Charges	Not specified
Other policy aspects	Government spending US \$33 million to survey EEZ. Potential aquaculture sites will be identified.	Farmers must register with National Aquaculture Registry before starting operations	1998 report suggests reforms to New Zealand's aquaculture regulatory regime	Only fisheries cooperative associations can apply for aquaculture right

* See generally JOHN D. BOOTH, NEW ZEALAND MINISTRY OF THE ENVIRONMENT, MARINE ENHANCEMENT IN NEW ZEALAND: POTENTIAL SPECIES AND AREAS (2000).

** NEW ZEALAND MINISTRY OF FISHERIES, GUIDE TO PREPARING A FISHERIES RESOURCE IMPACT ASSESSMENT (FRIA) FOR MARINE FARMING AND SPAT CATCHING PERMIT APPLICATION SITES (Nov. 2002), available at <http://www.fish.govt.nz/commercial/aquaculture/fria/index.html>.

¹²¹ Table created from CICIN-SAIN ET AL., *supra* note 116, unless otherwise noted.

VI. FRAMEWORK FOR SUSTAINABLE USE, CONSERVATION, AND MANAGEMENT OF FEDERAL OFFSHORE WATERS

Drawing on the land and sea experiences in the U.S. and offshore development in other parts of the world, we make five recommendations for improvements in the use, conservation, and management of federal offshore waters: (1) Conveyance of property rights; (2) Protection of and fair compensation for the use of public resources; (3) Compensation for local impacts and (4) Facility closure; and (5) Administration, planning, and management.

A. LEASING, RIGHT-OF-WAYS, OR OTHER CONVEYANCE OF RIGHTS AND SECURITY OF TENURE

The ability of an aquaculture or wind business venture to successfully navigate federal offshore waters will depend in part on the degree to which the entrepreneur behind that venture is able to exercise control over the site of operations. Typically, on land, control would be manifested through ownership, a lease, or some other form of conveyance. A glaring defect of the present regulatory regime for offshore uses is that possession of an RHA permit regulates newly emerging uses. With the RHA, no conveyance occurs and no property interest in the ocean space at issue in the permit is vested in the permittee. A lease (or lease substitute), on the other hand, would provide developers with a degree of exclusivity and security sufficient to obtain the financing necessary to bring a project to fruition.

B. PROTECTION OF AND FAIR COMPENSATION FOR THE USE OF PUBLIC RESOURCES

While a lease would provide security of tenure to developers, it also would “protect[] the public’s interests in the resource by setting forth detailed rights and responsibilities . . . including the obligation to pay rent (and royalties, as appropriate) and to ensure proper closure of the facility,”¹²² which we discuss in more detail below. In order to protect the public interest, the lead agency would need to adopt lease application regulations that specify the information (in conjunction with the results of the environmental evaluation and public input) it needs to be able to make an informed decision on the application. In addition to specifying items such as duration, dimensions, and annual rent, leases should require developers to provide the federal government with access to the facility to conduct monitoring, inspection, and enforcement activities and to furnish copies of documents for the same purposes.

¹²² Firestone, *supra* note 32.

Given that an offshore facility may generate significant revenues during its finite life, it is neither prudent nor fiscally responsible for the federal government to forego revenues that private individuals would surely demand had the ocean bottom and ocean space been privately held. Although some federal programs that allow the extraction of non-renewable or renewable resources do not provide for public compensation (capture fisheries)¹²³ or only absurdly minimal compensation (hard rock mining),¹²⁴ these programs are rooted in eras that no longer exist. The Mining Law dates back to 1872,¹²⁵ and capture fisheries policy was based on the obsolete notion of the freedom of any fisher to fish in almost the entire ocean expanse and the antiquated belief that humans could not fish out the seas.¹²⁶ More appropriate examples are offshore oil and gas leasing, land-based mineral leasing on federal lands,¹²⁷ timber harvesting in national forests,¹²⁸ and grazing on federal lands,¹²⁹ all of which require the lessee or permittee, as appropriate, to provide some compensation to the federal government.

More importantly, as a first principle, requiring a fee to occupy ocean space and to make use of related resources (and consequently to impair or prevent the use of these resources for other purposes) is consistent with the notion that the federal government holds ocean space and related resources in trust for its citizens.¹³⁰ Further, to forgo rents and royalties for the use of ocean space would result in an unintended policy of subsidizing offshore wind power to a greater extent than is done for land-based wind power placed on private lands and would, as a consequence, unduly favor ocean-based over land-based development. We

¹²³ See John A. Duff, *Offshore Management Considerations: Law and Policy Questions Related to Fish, Oil, and Wind*, 31 B.C. ENVTL. AFF. L. REV. 385, 388-91 (2004).

¹²⁴ CHARLES F. WILKINSON, *CROSSING THE NEXT MERIDIAN: LAND, WATER, AND THE FUTURE OF THE WEST* 30 (1992) (stating that the mining industry reaps billions annually while paying the federal government no royalties and \$5 or less per acre to mine hard rock minerals located on federal lands).

¹²⁵ 30 U.S.C. §§ 22 *et seq.*

¹²⁶ See, e.g., HUGO GROTIUS, *MARE LIBERUM* (1609).

¹²⁷ See, e.g., 30 U.S.C. § 226 (2000); Federal Oil and Gas Royalty Management Act of 1982, 30 U.S.C. §§ 1701-1757 (2000); *see also* 30 U.S.C. § 360 (2000); Geothermal Steam Act of 1970, 30 U.S.C. §§ 1001-1025 (2000).

¹²⁸ See, e.g., 16 U.S.C. § 472a (2000).

¹²⁹ See, e.g., 43 U.S.C. §§ 1751-1752 (2000). See generally WILKINSON, *supra* note 124, at 81 (indicating that grazing fees on public lands are considerably lower than that charged by private landowners).

¹³⁰ DAVID C. SLADE ET AL., *PUTTING THE PUBLIC TRUST DOCTRINE TO WORK* (Coastal States Org. 2d ed. 1997); Peter H. Sand, *Sovereignty Bounded: Public Trusteeship for Common Pool Resources?*, 4.1 GLOBAL ENVTL. POLITICS 47 (2004); Charles F. Wilkinson, *The Public Trust Doctrine in Public Land Law*, 14 U.C. DAVIS L. REV. 269 (1980). Article 56 of United Nations Convention on the Law of the Sea further protects the sovereign rights of coastal states for purposes of economic exploitation, research, and preservation. See United Nations Convention on the Law of the Sea, Dec. 10, 1982, 21 I.L.M. 1261 (hereinafter UNCLOS).

thus recommend that annual rents be paid by offshore developers to compensate the public for the use of ocean space and that royalties in the form of a percentage of the revenue generated from the activities of such developers be paid to the government in an amount equivalent to the fair market value of interest in the ocean space conveyed.

However, for newly emerging activities, the government may wish to accept a smaller percentage for a period of time—for example, five to ten years from the enactment of legislation—that could vary depending on the activity. In the alternative, the government could choose to reinvest revenues during this initial time period in research that would facilitate sustainable uses of federal offshore waters. Finally, given that management of federal offshore waters may change during the life of some projects, we also recommend that any permit issued by the Army Corps of Engineers in the interim have a provision requiring that the permit be reopened in the event that Congress passes legislation establishing a property rights regime for new federal offshore uses. The legislation as well should itself direct that existing permits be reopened to require the permittee to enter into such a property rights arrangement with the United States and to pay the government rent and royalties equivalent to the fair market value of the lease.

C. SHARING ROYALTIES WITH STATES FOR SUBSTANTIAL LOCAL IMPACTS

The local public is more likely to voice concern when a project is expected to have local impacts and diffuse benefits.¹³¹ Given this fact, the federal government should consider sharing royalties with states or local governments for any revenue-generating project proposed for federal offshore waters that is anticipated to have substantial local impacts. The federal government also may wish to consider sharing revenues to the extent that such action would facilitate appropriate, sustainable, and environmentally sound development of federal offshore waters.

For example, Congress may wish to consider revenue sharing for an offshore wind power project that a developer proposes to construct in federal waters yet within view from the shore. Likewise, to the extent that an aquaculture facility has ecological impacts on a capture fishery that straddles federal and state jurisdictional waters, it also may wish to consider state compensation. For ease of implementation, rather than make case-by-case determinations, Congress may wish to follow its own lead in the oil and gas context and share revenues when a project is within three miles of a state's jurisdictional waters, or, alternatively, to

¹³¹ See Kempton et al., *supra* note 16.

marry the obligation to share revenues with the present breadth of the territorial sea (twelve miles from the coast).

D. DECOMMISSION, PERFORMANCE BONDING, AND CLOSURE ASSURANCE

Even under regimes such as hydroelectric power licensing, where authority to mandate closure funds is not explicit,¹³² FERC has begun to see the benefits of utilities maintaining such funds. In its opinion approving a settlement, *In re Consumers Power Company*,¹³³ FERC directed the utility to seek authority to collect dam retirement funding at eleven dams from present ratepayers. As noted above, decommissioning funding was likewise identified as a best practice in offshore wind power development in the E.U.

From an economic standpoint, closure assurance funding for offshore wind power and aquaculture facilities makes sense because it requires those benefiting from offshore wind power or aquaculture to pay for the full costs of those activities, which include the costs of decommissioning facilities at the end of their useful lives. Moreover, the principle of intergenerational equity suggests that a future generation should not be saddled with the costs of decommissioning a facility that benefited the present generation. In addition, the notion of performance bonding and closing assurance is consistent with fiduciary responsibilities of the federal government with regard to the ocean.

For the reasons mentioned above, we believe that any regulatory scheme for offshore development, including wind power and marine aquaculture, should provide for detailed provisions on site closure, performance bonding, and closure funding. A performance-bonding requirement also will help to ensure that, if the operations of an offshore facility cause, contribute to, or result in damages to an ecosystem or a part thereof, the operator will have funds on hand to pay for remediation and restoration of the environment, or, in those instances when remediation and restoration are not feasible, to compensate the public by reimbursing it for the damages incurred.

E. CONSOLIDATION OF OCEAN FUNCTIONS AND ENHANCED ADMINISTRATION, PLANNING, AND MANAGEMENT

In its Final Report, the U.S. Commission on Ocean Policy recommends streamlining the process for licensing, leasing, and permitting of

¹³² See 18 C.F.R. § 6.2 (2004) (noting that licensees are required, in any event, to restore the lands to a condition satisfactory to the Department having supervision over such lands upon surrendering of the licenses).

¹³³ 68 FERC 61,077 (1994).

renewable energy facilities in U.S. waters.¹³⁴ Although land-based wind and near-shore aquaculture projects have been successful, to date there has yet to be any successful wind or aquaculture project in federal off-shore waters.

Better planning and management should begin by having the process led by a resource agency rather than an agency whose prime concern is navigation. An argument could be made for Congress to designate as the lead agency for offshore aquaculture or wind power either the MMS, given its experience in oil and gas planning and leasing,¹³⁵ or the NOAA, given its broader resource management focus and experience in commercial fishing regulation. Indeed, having one of these two agencies as the lead for emerging offshore activities may be the only feasible approach in the short-term, given political realities. Nevertheless, we advocate a more radical ecosystem-based approach. At the same time, it should be recognized that our other recommendations for a framework (planning and management of federal offshore waters, leasing, rents, royalties, and closure assurance) are not dependent on the re-organization advocated below and should be undertaken in any event.

In our view, rather than having two masters of the sea—the NOAA and the MMS—and several sub-masters, federal offshore waters should be managed by a single entity. Just as private property has the same owner regardless of whether the owner is approached with a plan to develop and lease the property for residential, commercial, or industrial purposes or to place a conservation easement on the property to ensure its maintenance in its natural condition, only one entity should decide whether a given area of the ocean should be protected from certain activities or whether a specific activity in ocean space, be that activity oil and gas development, sand and gravel mining, aquaculture, or offshore wind farming, ought to be permitted, and if so, under what conditions.

To meet the objective of better planning and management, Congress should consolidate the MMS and the NOAA either into an agency within

¹³⁴ U.S. COMM'N ON OCEAN POLICY, *supra* note 7, at 320.

¹³⁵ See generally, S. 2095, 108th Cong. § 321 (2004) (illustrating that legislation has been introduced that would vest authority in the MMS to grant leases, easements, and rights-of-way for the development of wind power and other energy sources and for marine-related purposes, presumably including aquaculture at existing offshore energy facilities). For the most part, Section 321 vests a great deal of discretion in the hands of the Secretary of the Interior on how to structure the program. While the provision requires the Secretary to establish "reasonable" payments, the bill would prohibit the establishment of payments based on "throughput or production." *Id.* The provision would provide the Secretary with discretion (subject to specified criteria) to determine whether to enter into a competitive or noncompetitive agreement. *Id.* Finally, it would require the developer to furnish a surety bond or other form of acceptable security. Given differences between the House and the Senate on certain aspects of the Omnibus Energy bills, there is considerable doubt as to whether this provision will become law during the 108th Congress. For other proposed bills, see Utzinger, *supra* note 17, at 10805-10807.

an existing cabinet department or into a new cabinet-level department—the Department of Oceans. In addition, Congress should consider incorporating some functions of other agencies, such as EPA’s national estuary program, the Army Corps of Engineers’ Rivers and Harbor Act jurisdiction over federal and state oceanic waters,¹³⁶ and the Coast Guard’s ballast water control program, spill response, and environmental and natural resource enforcement capabilities¹³⁷ into this new entity. On the other hand, some functions presently administered by the NOAA should be transferred elsewhere. First and foremost, the management of marine mammals and marine endangered species, which is presently shared, between the NOAA/NMFS and the U.S. Fish and Wildlife Service (USFWS) should be consolidated in the USFWS.¹³⁸ Consolidation would result in a more coherent ocean species preservation program and would allow the new ocean entity to concentrate on ocean management loosened from the grip of the conflict of interest between resource use (e.g., commercial fisheries management) and the protection of marine flora and fauna.¹³⁹ Ultimately, the model for this new entity would be federal land management agencies with multiple use mandates such as the Forest Service and the BLM.¹⁴⁰

Whether or not a new agency is created, Congress should pass legislation setting forth in more detail how the oceans are to be administered,

¹³⁶ Under the proposal discussed herein, the Army Corps of Engineers would retain its RHA jurisdiction in other U.S. waters.

¹³⁷ This would require separating out the Coast Guard’s border patrol and port security activities, which would remain with the Department of Homeland Security.

¹³⁸ The U.S. Commission on Ocean Policy recommends that the President and Congress consolidate ocean management in a similar fashion to that advocated here. U.S. COMM’N ON OCEAN POLICY, *supra* note 7, at 77 (recommending that the President and Congress consolidate similar functions among the federal ocean, coastal, and atmospheric programs). Yet, one area where we differ from USCOP is with regards to where the authority over marine mammals should reside. USCOP recommends that jurisdiction be placed in the hands of the NOAA, while we, as indicated in the text, advocate USFWS jurisdiction to minimize conflicts of interest in the protection of marine mammals and marine endangered species. *Cf. id.* at 267 (recommending that jurisdiction over marine mammals be placed in the hands of the NOAA). We note that the USFWS has a similar role in species conservation in analogous land management systems administered by the Forest Service and the BLM.

¹³⁹ A second program that should be transferred from this new entity is the NOAA’s coastal non-point source pollution program, which should be transferred to EPA and merged with EPA’s non-point source program under the CWA.

¹⁴⁰ While the Forest Service emphasizes logging and the BLM emphasizes mining and grazing, both agencies approach management on a multiple use basis. *E.g.*, 16 U.S.C. §§ 475-482 (2000) (setting general administrative guidelines); National Forest Management Act of 1976 [hereinafter NFMA], 16 U.S.C. §§ 1600-1687 (2000) (setting forest land management planning guidelines); Federal Land Policy and Management Act of 1976 [hereinafter FLPMA], 43 U.S.C. §§ 1701-1784 (setting public land management planning guidelines). *See also* 16 U.S.C. § 1604 (2000) (requiring the Secretary of Agriculture to develop “land and resource management plans” for the national forests); 43 U.S.C. § 1712 (2000) (requiring the Secretary of the Interior to develop “land use plans” for the public lands).

specifying a research agenda for the oceans, and prioritizing where and how federal dollars should be spent.¹⁴¹ In addition, Congress should pass legislation to guide the comprehensive planning and management of federal offshore waters, to delimit agency responsibilities for the governance of emerging uses such as offshore wind power and offshore aquaculture, and to clarify and confirm that NEPA applies to activities in the EEZ. The use, conservation, and management of offshore waters in turn should be driven by the norms of sustainability, ecosystem management, precaution, fair return to the public, minimization of environmental impacts, transparency in decision-making,¹⁴² and equity among users and uses.¹⁴³

Planning and management would allow for improved site selection and adequate consideration of cumulative impacts. For example, while initially wind power site selection might be developer driven, given both the developer's proposals already underway and the lack of adequate public mapping of potential sites, site selection should move toward federal planning based on wind mapping of federal offshore waters and other considerations to marine zoning.¹⁴⁴ A similar graduated effort could evolve for aquaculture. Developing a regional planning regime along the lines employed for offshore oil and gas development also would allow for better consideration of cumulative impacts of the discharge of environmental effluents from aquaculture facilities and of the placement and operations of wind farms on the migration, feeding, and

¹⁴¹ It is important to recognize that, to this day, the NOAA operates under a 1970 Administrative plan that reorganized government functions, but Congress has yet to spell out the NOAA's mission and administration in legislation as it has for other agencies, such as the Forest Service. Compare U.S. COMM. ON OCEAN POLICY, *supra* note 7, at 73-75, with 16 U.S.C. §§ 475-482 (2000); see also *United States v. New Mexico*, 438 U.S. 696, 713-720 (1978) (citing 16 U.S.C. § 475, that Congress should reserve national forests in order to improve and protect said forests, to secure favorable timber flows, and to furnish a continuous supply of timber); *id.* at 720 (citing 16 U.S.C. § 528, that Congress' secondary purposes in reserving national forests include outdoor recreation, range, watershed, and fish and wildlife).

¹⁴² The NWCC notes that the "public has a right to have its interests considered in the permitting decisions, and without early and meaningful public involvement there is a much greater likelihood of subsequent opposition and costly and time-consuming administrative review and judicial appeals." NWCC SITING SUBCOMM., *supra* note 57, at 15 ("The public has a right to have its interests considered in permitting decisions, and without early and meaningful public involvement there is a much greater likelihood of subsequent opposition and costly and time-consuming administrative reviews and judicial appeals."). See *e.g.*, Kempton et al., *supra* note 16 (reflecting findings supporting this conception of the public role).

¹⁴³ NWCC SITING SUBCOMM., *supra* note 57, at 16 (recommending the development of clear decision criteria to ensure the permitting process is both fair and efficient).

¹⁴⁴ Some agencies involved in permitting wind facilities on land have actually begun to zone land for wind development by identifying preferred siting areas for wind projects prior to receiving permit applications, so development of the initial wind projects would be guided toward the least environmentally sensitive lands and ensure the protection of environmentally sensitive areas. *Id.* at 17. See also Santora et al., *supra* note 52.

breeding activities of marine mammals and allow for proper siting, sizing, and spacing of activities in federal offshore waters.

Legislation establishing planning and management should be integrative on the one hand, but also should include more specific provisions that take into account the peculiarities of existing uses and management challenges such as offshore oil and gas, commercial fishing, and marine mammal protection as well as each new and emerging use such as open-ocean aquaculture, offshore wind, tidal power, and wave power. Following the example of the countries that we surveyed, Congress should establish leasing or right-of-way grant authority for new activities in federal offshore waters, which would govern matters such as dimensions, duration, compensation, monitoring, access and termination, and permitting, which would concern the precise activity at issue.¹⁴⁵

Finally, following the best practices established in the E.U. for offshore wind power development, the new U.S. offshore waters regime should provide one-stop regulation, which would allow a developer to file all the necessary documents with the lead federal agency, which would then be responsible for coordinating with other necessary federal and state agencies. By making one agency responsible for coordinating the permit review process by all other agencies, delay will be minimized, saving both the developers and the reviewing agencies significant expenses that they would otherwise incur.¹⁴⁶

CONCLUSION

With the recent policy attention the oceans have garnered in the past year due to the release of reports by the U.S. Commission on Ocean Policy and the Pew Oceans Commission, a policy window has opened. In order to fulfill the promise of offshore development, ensure that responsible development proceeds rather than being unnecessarily sidetracked, and protect the marine environment, it is imperative that Congress devise an offshore regulatory regime that provides for the sustainable use, conservation, protection, and management of the marine environment in a transparent and equitable fashion. It should do so before development proceeds much further, so as to put that regime into place while the window remains open.

¹⁴⁵ Again, this could form the basis for regulation of offshore aquaculture and offshore wind power should a broader restructuring not be undertaken as advocated here.

¹⁴⁶ NWCC SITING SUBCOMM., *supra* note 57, at 16-17.

