Changing Oceans, Lagging Management

*Megan Raymond**

This is a story of energy and fish, the federal laws that regulate them, and their past and future as resource industries in the United States.

United States federal law has long treated our oceans as an endless bounty of natural resources, ready for human extraction, consumption, and exhaustion. But our oceans have changed and so too must our ocean policy. We face concurrent crises of climate change, resource depletion, and environmental degradation. And with these realities comes a responsibility on the part of lawmakers to reevaluate ocean resource policies, especially as they relate to emerging resource industries.

During the latter half of the twentieth century, the offshore oil and gas and the capture fishery industries in the United States boomed. In large part, this was due to corresponding federal laws that encourage rapid development, often at the expense of environmental protection and long-term conservation. In contrast to their traditional counterparts, more recent emerging offshore renewable industries—namely, offshore renewable energy and aquaculture—have thus far failed to take off, due in part to their insufficient regulatory structure.

Grounded in a discussion on similarities and differences between these traditional and emerging ocean resource industries, this Note argues three related points. First, the existing legal structure under which emerging offshore resource industries are regulated is insufficient. Second, in developing legal frameworks, the federal government should resist the temptation to shoehorn regulation of offshore renewable energy and aquaculture into the legal structures under which offshore oil and gas and capture fishing are regulated. Third, these new, comprehensive legal frameworks should be responsive to the realities of our oceans today, lessons learned from the impetuous growth of traditional ocean resource industries, and an increased awareness of the interconnection of ocean resources with one another.

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INTRODUCTION

It was 2016, and the National Marine Fisheries Service (NMFS)[1] had a rosy five-year plan for offshore aquaculture, envisioning "[a] robust U.S. marine aquaculture sector that creates jobs, provides sustainable seafood, and supports healthy oceans."[2] Specifically, NMFS sought to "[e]xpand sustainable U.S. marine aquaculture production by volume by at least 50 percent by the year 2020."[3] But just as for the rest of us, 2020 had different plans for NMFS. In August 2020, the Fifth Circuit held in *Gulf Fishermens Association v. National Marine Fisheries Service* that NMFS lacked the statutory authority necessary to enact its plan to issue offshore aquaculture permits, at least in the Gulf of Mexico.[4] Now, with no clear statutory basis for federal permits, and NMFS declining to appeal the Fifth Circuit's decision, the future of offshore aquaculture in the United States is unclear.

But, *Gulf Fishermens* is unlikely to permanently close the door on U.S. offshore aquaculture development for a few reasons: Global and domestic fish consumption is growing;[5] the majority of wild U.S. fish stocks have reached their maximum sustainable levels;[6] the United States is increasingly reliant on seafood imports to feed growing demand;[7] and offshore aquaculture has sustained bipartisan support.[8] What's missing is a statutory scheme sufficient to support industry growth while balancing environmental concerns.

In September 2020, a month after the Fifth Circuit ruled in *Gulf Fishermens*, another emerging offshore resource industry received unexpected and potentially destabilizing news: The Trump administration announced a ten-year moratorium on new offshore leases for all energy exploration, development, and production

1. NMFS, a department within the National Ocean and Atmospheric Administration, is also known as "NOAA Fisheries." *About Us*, NOAA FISHERIES, https://www.fisheries.noaa.gov/about-us (last visited Dec. 15, 2020).

2. NAT'L MARINE FISHERIES SERV., MARINE AQUACULTURE STRATEGIC PLAN FY 2016-2020, at 6 (2015), https://www.afdf.org/wp-content/uploads/8h-NOAA-Marine-Aquaculture-Strategic-Plan-FY-2016-2020.pdf.

3. *Id.* at 8.

4. *See generally* Gulf Fishermens Ass'n v. Nat'l Marine Fisheries Serv., 968 F.3d 454 (5th Cir. 2020).

5. FOOD & AGRIC. ORG. OF THE UNITED NATIONS, THE STATE OF WORLD FISHERIES AND AQUACULTURE: SUSTAINABILITY IN ACTION 65 (2020).

6. HAROLD F. UPTON, CONG. RSCH. SERV., R45952, U.S. OFFSHORE AQUACULTURE REGULATION AND DEVELOPMENT 3 (2019).

7. NAT'L MARINE FISHERIES SERV., FISHERIES OF THE UNITED STATES 2018, at 116 (Michael Liddel & Melissa Yencho eds., 2020).

8. *See, e.g.*, Advancing the Quality and Understanding of American Aquaculture Act, S. 4723, 116th Cong. (2020) (cosponsored by Democratic Senator Brian Schatz and GOP Senators Roger Wicker and Marco Rubio); Promoting American Seafood Competitiveness and Economic Growth, Exec. Order No. 13,921, 85 Fed. Reg. 28,471, 28,473-75 (May 7, 2020). Legislation to establish an offshore aquaculture regulatory framework was also introduced in the 109th, 110th, 111th, 112th, and 115th Congress by a mix of Democrats and Republicans. *See* UPTON, *supra* note 6, at 4.

in federal waters from North Carolina to Florida.[9] The ban's inclusion of renewable energy leases conflicts with the climate-crisis-driven need for viable renewable energy sources, including those located offshore. Indeed, it is estimated that new wind energy leasing off the coast of the Carolinas alone could generate more than eleven gigawatts of power a year.[10]

In contrast to his predecessor, President Biden has signaled support for offshore renewable industries, even announcing a goal of "doubling offshore wind by 2030."[11] However, as of March 2021, he has not explicitly reversed the moratorium. It is unclear how easy it would be to do so through executive action, although Congress could reverse the moratorium through legislation.[12] While the change in administration is likely to benefit the offshore renewable industries, this episode demonstrates nascent industries' vulnerability to political whims and policy changes when there is insufficient regulatory clarity to support the industries' growth and long-term stability.

Farming fish and harnessing ocean energy are distinct endeavors. But from a legal, historical, and policy perspective, they share key characteristics that warrant a shared place in any conversation about the past, present, and future of our oceans. First, they are emerging ocean resources—the demand for both is growing, but the industries are not yet mature enough to have a settled role in economic or public policy frameworks. Second, they have well-developed traditional analogues: Roughly, offshore aquaculture is to capture fishing what offshore renewable production is to offshore oil and gas extraction. Third, while their traditional analogues have detailed federal statutory schemes that encourage growth of their respective industries and provide regulatory clarity, offshore aquaculture and renewable energy production lack the statutory frameworks necessary for their commercial success and responsible regulation.

These characteristics might lead to a conclusion that federal lawmakers have also apparently considered: Because these nascent ocean resource industries have well-developed traditional analogues, and themselves lack the

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9. Memorandum on Withdrawal of Certain Areas of the United States Outer Continental Shelf from Leasing Disposition, 2020 DAILY COMP. PRES. DOCS. 726 (Sept. 25, 2020).

10. Heather Richards, *Trump Drilling Bans Would Stymie Offshore Wind Leasing*, ENERGY WIRE (Sept. 29, 2020), https://www.eenews.net/energywire/2020/09/29/stories/1063714957.

11. Tackling the Climate Crisis at Home and Abroad, Exec. Order No. 14,008, 86 Fed. Reg. 7619, 7624 (Jan. 27, 2021).

12. *See* Jennifer A. Dlouhy, *Trump's Offshore Oil Ban to Halt Coastal Wind Farms Too*, BLOOMBERG GREEN (Sept. 28, 2020, 2:00 PM), https://www.bloomberg.com/news/articles/2020-09-28/trump-s-offshore-oil-ban-to-halt-coastal-wind-farms-too. President Trump assured his supporters, "[if] you don't like [the ban], you're going to let me know, I'm going to change it. I can change things very easily." Matthew S. Schwartz, *As Election Nears, Trump Expands Moratorium on Exploratory Drilling in Atlantic*, NPR (Sept. 26, 2020, 8:02 PM), https://www.npr.org/2020/09/26/917309717/as-election-nears-trump-expands-moratorium-on-exploratory-drilling-in-atlantic. However, in March 2019, a federal district judge in Alaska held that Outer Continental Shelf Lands Act land withdrawals made by executive order could only be revoked by congressional, not executive, action. League of Conservation Voters v. Trump, 363 F. Supp. 3d 1013 (D. Alaska 2019), *vacated and remanded sub nom.*, League of Conservation Voters v. Biden, 843 Fed. App'x 937 (9th Cir. 2021) (remanded with instructions to dismiss based on mootness).

statutory schemes necessary for their growth, why not retrofit their regulation into existing offshore fossil fuel extraction and capture fishing laws? This, as I explain throughout this Note, is the wrong conclusion. To the contrary, these emerging ocean resources need new, comprehensive statutory structures if they are to develop sustainably and successfully.

Our existing patchwork of federal ocean resource laws—those governing traditional and emerging resources—are insufficient in the face of the challenges and opportunities this century presents. Congress has an obligation and an opportunity to ensure the statutory foundation for emerging offshore industries aligns with today's realities: increasingly fragile ocean ecosystems, interrelated ocean resources, and industries' need for clarity and economic and regulatory support. I argue that rather than shoehorning emerging ocean resource management into existing outdated and insufficient laws, new comprehensive statutory schemes are necessary to support their sustainable development.

In Part I, I cover baseline concepts important for the remainder of the Note, including state-federal jurisdictional boundaries in the oceans, my definitions of "traditional" and "emerging" offshore resources, and the current state of development and production of those resources. I will also further explain the Fifth Circuit's decision in *Gulf Fishermen* and its cautionary tale about agency attempts to regulate new resource industries using statutes developed for other resources in other social and legal contexts.

Part II will focus on the history, development, and legal frameworks of traditional offshore ocean resources: capture fisheries and oil and gas extraction. This discussion shows the pivotal role strong statutory schemes play in supporting developing industries. At the same time, it provides a warning about the serious sustainability and environmental consequences of congressional action that is too narrowly focused on resource development and industry success.

Against the backdrop of traditional resources' development and statutory schemes, Part III will focus on emerging offshore ocean resources: aquaculture and renewable energy production. It will discuss past attempts to regulate these industries and explain why specific and comprehensive congressional action on each is necessary.

Finally, after having detailed the current statutory schemes' deficiencies in supporting and regulating emerging offshore resource industries, Part IV puts forward my proposal for new legislation focused on sustainable development of offshore aquaculture and renewable energy production.

I. BACKGROUND: DEFINING OCEAN RESOURCES, OFFSHORE PRODUCTION TODAY, AND A CASE STUDY ON THE NEED FOR LEGISLATIVE CLARITY

Discussing the shortcomings of the existing statutory scheme governing emerging offshore resources and corresponding proposed solutions requires some background on the state of our oceans. This Part begins with an explanation

of ocean boundaries between state and federal jurisdiction, followed by a review of the current state of development and production of offshore resources. It concludes with an explanation of the Fifth Circuit's decision in *Gulf Fishermen* and the chaos that insufficient statutory clarity can cause for emerging resource industries.

A. Jurisdictional Landscape of Ocean Resources

In the United States, jurisdiction over ocean resources is divided between states and the federal government. State jurisdiction extends three nautical miles (nm) seaward from the coastline, except in Texas and western Florida, where state jurisdiction extends nine nm.[13] Within their coastal jurisdiction, states control the waters, submerged land, and natural resources therein.[14] The federal government has jurisdiction beyond the state boundary over the Outer Continental Shelf (OCS), covering the area between three and two hundred nm offshore.[15] In practice, this jurisdictional divide allows the federal government to exercise some authority in state waters and vice versa.[16] In addition, Native American tribes retain certain access and resource rights offshore and must be consulted before some government actions in state and federal waters.[17]

The foci of this Note are resources within federal, not state, waters. Throughout this Note, I use the term "offshore" to refer to those waters,

13. *See* Submerged Lands Act, 43 U.S.C. §§ 1301(a)(2), 1302, 1311 (2018); *Federal Offshore Lands*, BUREAU OF OCEAN ENERGY MGMT., https://www.boem.gov/oil-gas-energy/leasing/federal-offshore-lands (last visited Dec. 15, 2020). A nautical mile is slightly larger than a land-measured, or "statute," mile (1 nautical mile = 1.1508 statute miles). *What Is the Difference between a Nautical Mile and a Knot?*, NAT'L OCEAN SERV., NAT'L OCEANIC & ATMOSPHERIC ADMIN., https://oceanservice.noaa.gov/facts/nauticalmile_knot.html (last visited Feb. 25, 2021).

14. 43 U.S.C. § 1311(a). The Magnuson Stevens Act (MSA) clarified that the same jurisdictional boundaries extend to fisheries. Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. § 1856(a)(1) (2018).

15. Outer Continental Shelf Lands Act, 43 U.S.C. §§ 1331(a), 1332(1) (2018). The 200-nm outer boundary of federal jurisdiction aligns with customary international law as to how far into the ocean a coastal nation may claim jurisdiction. U.S. COMM'N ON OCEAN POL'Y, AN OCEAN BLUEPRINT FOR THE 21ST CENTURY: FINAL REPORT 72 (2004). Two hundred nm is the boundary recognized in the United Nations Law of the Sea Convention, and while the United States is not a party to the convention, it has also confirmed compliance with the 200-nm limit through executive order. *Id.* at 72–73.

16. U.S. COMM'N ON OCEAN POL'Y, *supra* note 15, at 71 ("The federal government retains the power to regulate commerce, navigation, power generation, national defense, and international affairs throughout state waters"); *see, e.g.*, Coastal Zone Management Act of 1972, 16 U.S.C §§ 1451–1466 (2018) (establishing a framework for state and federal coordination in management of coastal waters); Clean Water Act, 33 U.S.C. § 1344 (2018) (requiring Army Corps of Engineer permits for any project involving discharge of dredged or fill material into waters of the United States, including state coastal waters); Outer Continental Shelf Lands Act, 43 U.S.C. § 1345 (requiring the Bureau of Ocean Energy Management to consult with any state affected by projected developed in federal waters under the statute).

17. *Sovereign Relations on the West Coast*, NOAA FISHERIES, https://www.fisheries.noaa.gov/west-coast/partners/sovereign-relations-west-coast (last updated Dec. 13, 2019); *Tribal Consultations*, NOAA FISHERIES, https://www.fisheries.noaa.gov/topic/consultations#tribal-consultations (last visited Dec. 15, 2020).

submerged lands, and resources within federal jurisdiction, and "coastal" to refer to those within state jurisdiction.

B. Defining Traditional and Emerging Offshore Resources

Our oceans are full of living and nonliving things that humans have long considered useful or potentially useful resources. This Note focuses specifically on two important categories of emerging offshore resources—aquaculture and renewable energy production—and their traditional analogues—capture fisheries and oil and gas production. Oceans are home to other resources and corresponding industries, including deep-sea mining;[18] seawater mining;[19] aquatic plant harvesting;[20] and freight shipping.[21] While these latter resources are not the focus of this Note, recognizing the diversity of existing ocean resources provides an important reminder of the interconnectedness of all ocean resources. That framing is beneficial in considering possible improvements to the federal government's ocean policy, to which I return in Part IV.

1. Fish: Capture Fisheries and Aquaculture

Capture fisheries, also known as wild fisheries, "refer to the harvesting of naturally occurring or wild fish populations in their native environment."[22] This is what most people think of as fishing, either on a recreational or commercial scale. In turn, "fish," for our purposes, includes "[fin]fish, crustaceans, molluscs and other aquatic animals, but excludes aquatic mammals, reptiles, seaweeds and other aquatic plants."[23]

Aquaculture, also known as "fish farming," is "the propagation and rearing of aquatic species in controlled or selected environments."[24] Mirroring the definition of capture fisheries, aquaculture as discussed in this Note involves raising and harvesting fish to the exclusion of aquatic plants, mammals, or reptiles.[25] Like capture fishing, aquaculture can occur in fresh, coastal, and

18. INT'L UNION FOR CONSERVATION OF NATURE, ISSUES BRIEF: DEEP-SEA MINING (2018), *available at* https://www.iucn.org/sites/dev/files/deep-sea_mining_issues_brief.pdf.

19. OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, U.S. DEP'T OF ENERGY, POWERING THE BLUE ECONOMY: EXPLORING OPPORTUNITIES FOR MARINE RENEWABLE ENERGY IN MARITIME MARKETS 63 (Apr. 2019).

20. *Id.* at 51.

21. Matthew Chambers & Mindy Liu, *Maritime Trade and Transportation by the Numbers*, BUREAU OF TRANSP. STAT. (Mar. 7, 2013), https://www.bts.gov/archive/publications/by_the_numbers/maritime_trade_and_transportation/index.

22. OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, *supra* note 19, at 39.

23. FOOD & AGRIC. ORG. OF THE UNITED NATIONS, *supra* note 5, at 2 n.1.

24. UPTON, *supra* note 6, at 4. More specifically, "[o]ffshore aquaculture is generally defined as the rearing of marine organisms in ocean waters beyond significant coastal influence, primarily in the federal waters of the exclusive economic zone." *Id.* at 1.

25. FOOD & AGRIC. ORG. OF THE UNITED NATIONS, *supra* note 5, at 2 n.2. There is a well-established aquatic algae aquaculture industry (dominated by seaweeds). *Id.* at 21. However, because I am focused on aquaculture in open oceans and as compared to capture fisheries and other protein sources, I

offshore waters, with techniques and species varying by location.[26] Offshore aquaculture, sometimes called "marine aquaculture" or "mariculture,"[27] typically involves raising fish in "floating or submersible net pens or cages that are tethered to the seafloor and attached to buoys."[28] Often, aquaculturists (the fish farmers) use inland hatcheries to spawn and grow fish to specific developmental stages and then transfer the fish to offshore or coastal facilities.[29]

2. Energy: Offshore Oil and Gas and Renewable Energy Production

Oil and gas are extracted from the OCS through wells drilled from above-water platforms.[30] Platforms are either fixed to the seafloor by a foundation or are floating mobile units anchored to the seafloor.[31]

As compared to offshore fossil fuel extraction, there is more variety in technology and type in offshore renewable energy production. Several offshore renewable energy sources are being developed or potentially viable in federal waters.[32] Offshore wind energy is captured by massive wind turbines, secured to fixed-bottom or floating foundations, which generate electricity through the force of the wind turning a turbine's blades around a rotor, which in turn spins a generator that creates electricity.[33] Offshore solar energy production involves the installation of photovoltaic systems directly over bodies of water, secured to floating platforms.[34] The platforms are then anchored to the ocean floor.[35] The commercial viability of solar installations in exposed offshore ocean sites is unknown, given significant concerns about the ability of the structures to withstand extreme wind and wave conditions.[36]

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do not include it in my discussion. The statistics on aquaculture production throughout this Note include only fish production, not aquatic algae.

26. *Id.* at 25.

27. *Id.*

28. OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, *supra* note 19, at 38.

29. UPTON, *supra* note 6, at 4.

30. *Oil and Gas Structures*, NAT'L CTRS. FOR ENV'T INFO.: GULF OF MEX. DATA ATLAS, https://www.ncei.noaa.gov/maps/gulf-data-atlas/atlas.htm?plate=Offshore%20Structures (last visited Dec. 15, 2020).

31. HUACAN FANG & MENGLAN DUAN, OFFSHORE OPERATION FACILITIES: EQUIPMENT AND PROCEDURES 141 (2014).

32. Of course, energy produced offshore still requires transmission systems to transmit the electricity to the grid, which presents its own logistical and legal issues and are not the subject of this Note. For further discussion, *see* Robert Newell, Note, *Transmission Impossible The Case for a Nationwide Permit for Offshore Wind Transmission Lines*, 47 ECOLOGY L.Q. 475 (2020); Benjamin Fox, Note, *The Offshore Grid The Future of America's Offshore Wind Energy Potential*, 42 ECOLOGY L.Q. 651 (2015); Peter J. Schaumberg & Angela F. Colamaria, *Siting Renewable Energy Projects on the Outer Continental Shelf Spin, Baby, Spin!*, 14 ROGER WILLIAMS U. L. REV. 624 (2009).

33. Wind Energy Techs. Off., *How Do Wind Turbines Work?*, U.S. DEP'T OF ENERGY: OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, https://www.energy.gov/eere/wind/how-do-wind-turbines-work (last visited Dec. 15, 2020).

34. WALTER MUSIAL ET AL., BUREAU OF OCEAN ENERGY MGMT., BOEM 2020-017, SURVEY AND ASSESSMENT OF THE OCEAN RENEWABLE ENERGY RESOURCES IN THE US GULF OF MEXICO 48 (2020).

35. *Id.*

36. *Id.* at 47.

"Marine hydrokinetic" (MHK) energy sources convert wave, tidal, or current energy into electricity.[37] Wave energy involves capturing the energy created as waves pass over the ocean surface, causing the water below to move in an orbital motion and to create energy that can be harvested by wave energy converters (WECs).[38] Because wave energy technology is in early development stages, there are a number of WEC technologies being developed and tested.[39] Ocean current energy, which also is in very early development stages (with no installed projects), involves underwater turbines spinning with the passing ocean currents, much like air passing through above-water wind turbines.[40] Ocean thermal energy conversion (OTEC), first conceptualized in the 1880s but not yet commercially viable, uses the temperature differential between warm surface water and cold deep water to generate electricity.[41]

C. Current Offshore Fish and Energy Production in the United States

So how do these offshore industries, as defined, currently fare? In contrast to their emerging counterparts, traditional offshore fish and energy production are significant U.S. industries. Below I discuss the status of the fish industries (capture fishing and aquaculture) and energy industries (renewable production and oil and gas extraction) in turn.

Americans consume a lot of fish—much of which already comes from aquaculture, even though little aquaculture is produced domestically. While the United States is the fifth-largest seafood producer worldwide[42] it is the second-largest consumer.[43] In 2017, that imbalance led to a $16.8 billion seafood trade deficit,[44] with NMFS estimating that 94 percent of fish consumed in 2018 in the United States was imported.[45]

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37. Water Power Techs. Off., *Marine and Hydrokinetic Technology Glossary*, U.S. DEP'T OF ENERGY: OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, https://www.energy.gov/eere/water/marine-and-hydrokinetic-technology-glossary (last visited Dec. 15, 2020). Because tidal energy relies on tides rising and falling, "typically between two bodies of water connected by a narrow land passage," it is "generally confined to state waters," and therefore not a focus here. *See* MUSIAL ET AL., *supra* note 34, at 37.

38. MUSIAL ET AL., *supra* note 34, at 30–31.

39. *Id.* at 31–34. WEC devices in development include point absorbers, submerged pressure differentials, oscillating water columns, overtopping devices, attenuators, and oscillating wave surge converters. Water Power Techs. Off., *Marine and Hydrokinetic Technology Glossary*, U.S. DEP'T OF ENERGY: OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, https://www.energy.gov/eere/water/marine-and-hydrokinetic-technology-glossary (last visited Dec. 15, 2020).

40. *Renewable Energy on the Outer Continental Shelf*, BUREAU OF OCEAN ENERGY MGMT., https://www.boem.gov/renewable-energy/renewable-energy-program-overview (last visited Dec. 15, 2020).

41. MUSIAL ET AL., *supra* note 34, at 53.

42. NAT'L MARINE FISHERIES SERV., *supra* note 7, at 61.

43. *Id.* at 116.

44. *Id.* at xvii.

45. *Id.* at 116. NMFS has noted that it "believes that the existing model overestimates this percentage and [is] investigating improvements to the model." *Id.*

In 2018, U.S. capture fisheries produced 9.4 billion pounds of fish, valued at $5.6 billion.[46] The majority of fish caught domestically come from offshore federal waters.[47] Though U.S. capture fishery production grew steadily until the mid-1980s, it has been relatively stagnant since,[48] as most U.S. stocks are fished at their maximum sustainable yields.[49]

The United States' $1.5 billion aquaculture industry, in contrast, ranks seventeenth worldwide.[50] Without any commercial aquaculture facilities in federal waters due to the lack of permitting authority, all U.S. aquaculture comes from coastal or freshwater sources.[51] Like U.S. capture fishery production, domestic aquaculture production has stagnated.[52] Global aquaculture production, in contrast, has grown steadily since the 1990s.[53] Worldwide, 46 percent of fish produced in 2018 came from aquaculture, including 52 percent of fish produced for human consumption.[54] Aquaculture also accounted for 52 percent ($250 billion) of the total sale value of fish produced worldwide.[55]

Reflective of the United States' seafood trade deficit, NMFS estimates that "over half of the seafood the U.S. imports and consumes comes from aquaculture"[56] even though the United States' own aquaculture industry is relatively undeveloped and stagnant.[57]

U.S. offshore renewable energy production is further along than aquaculture—although not by much. Onshore and offshore renewable energy accounts for 12 percent of U.S. energy production, including biomass, hydropower, geothermal, wind, and solar energy.[58] Offshore renewable energy production is a very small portion of that total.[59] Offshore wind is furthest along,

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46. *Id.* at x.

47. *Id.* at 13–14.

48. *Global Capture Production 1950-2019*, FOOD & AGRIC. ORG. OF THE UNITED NATIONS, http://www.fao.org/fishery/statistics/global-capture-production/query/en (last visited July 4, 2021) (select "Americas"; then choose "United States of America"; then click "submit"). Note that the Food and Agricultural Organization of the United Nations measures all catches, including shellfish, by "live weight" (with the shell), while NMFS measures shellfish as "meat weight" (without the shell), accounting for slight differences in the data reported by the two sources. NAT'L MARINE FISHERIES SERV., *supra* note 7, at 26.

49. UPTON, *supra* note 6, at 3.

50. NAT'L MARINE FISHERIES SERV., *supra* note 7, at 26.

51. UPTON, *supra* note 6, at 6.

52. *Id.* at 3. U.S. aquaculture production peaked in 2007 and has since decreased back to late-1990s levels. *Global Aquaculture Production 1950-2019*, FOOD & AGRIC. ORG. OF THE UNITED NATIONS, http://www.fao.org/fishery/statistics/global-aquaculture-production/query/en (last visited July 4, 2021) (select "Americas"; then choose "United States of America"; then click "submit").

53. FOOD & AGRIC. ORG. OF THE UNITED NATIONS, *supra* note 5, at 22 tbl.9.

54. *Id.* at 2.

55. *Id.*

56. NAT'L MARINE FISHERIES SERV., *supra* note 5, at 26.

57. *Id.*

58. *U.S. Energy Facts Explained*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energy explained/us-energy-facts/ (last updated May 14, 2021).

59. *Lease and Grant Information*, BUREAU OF OCEAN ENERGY MGMT., https://www.boem.gov/ renewable-energy/lease-and-grant-information (last visited Dec. 15, 2020); *Renewable Energy on the*

with two functional ocean wind facilities off the coast of the United States—one in state waters, and one in federal waters. The five-turbine, thirty-megawatt (MW) Block Island Wind Farm, completed in 2016, is located in Rhode Island State waters.[60] In January 2021, a two-turbine, twelve-MW pilot project began commercial operations in federal waters off the coast of Virginia.[61] There are fourteen additional active commercial wind energy leases in federal waters.[62] Off the Oregon coast, the Department of Energy-funded facility PacWave is the first grid-connected, full-scale wave energy test facility.[63] It is currently in the permitting stage,[64] with the first WECs expected to enter the water by 2023.[65] There are currently no commercial offshore solar, ocean-current, or OTEC facilities in coastal or federal waters.[66]

In contrast to offshore renewables, offshore extractive industries are booming, although the Biden administration has signaled the heyday of offshore drilling may be coming to an end. Sixteen percent of all domestic oil and 3 percent of all domestic gas production come from offshore drilling.[67] As of 2020, the Federal Bureau of Ocean Energy Management (BOEM)[68] manages 2,675 active oil and gas leases on over 14.2 million acres of OCS, and new leasing

Outer Continental Shelf, BUREAU OF OCEAN ENERGY MGMT. https://www.boem.gov/renewable-energy/renewable-energy-program-overview (last visited Dec. 15, 2020).

60. *Offshore Wind Power Facts*, AM. CLEAN POWER ASS'N, https://cleanpower.org/facts/offshore-wind/ (last visited Feb. 25, 2021) (click "Are there any offshore wind farms or projects presently in the United States?" to expand).

61. *Id.* The twelve-MW pilot project is Phase I of a planned larger, 2,640-MW windfarm that will include nearly 180 turbines. Construction of Phase II of the project is expected to begin in 2024. *About Coastal Virginia Offshore Wind*, DOMINION ENERGY: COASTAL VA. OFFSHORE WIND, https://coastalvawind.com/about-offshore-wind.aspx (last visited Feb. 28, 2021).

62. *Renewable Energy Lease and Grant Information*, BUREAU OF OCEAN ENERGY MGMT., https://www.boem.gov/renewable-energy/lease-and-grant-information (last visited Dec. 15, 2020).

63. *PacWave*, OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, https://www.energy.gov/eere/water/pacwave (last visited Dec. 15, 2020).

64. *PacWave South Project*, BUREAU OF OCEAN ENERGY MGMT., https://www.boem.gov/pacwave-south-project (last visited Dec. 15, 2020).

65. Justin Gerdes, *Oregon's PacWave Aims to Jump-Start US Marine Energy Market*, GREEN TECH MEDIA (June 3, 2020), https://www.greentechmedia.com/articles/read/oregon-pacwave-marine-energy-jumpstart.

66. *Renewable Energy on the Outer Continental Shelf*, BUREAU OF OCEAN ENERGY MGMT., https://www.boem.gov/renewable-energy/renewable-energy-program-overview (last visited Dec. 15, 2020).

67. BUREAU OF OCEAN ENERGY MGMT., OIL AND GAS ENERGY FACT SHEET (2020), https://www.boem.gov/sites/default/files/documents/oil-gas-energy/BOEM_FactSheet-Oil%26amp%3BGas-2-26-2020.pdf (reporting 2019 statistics).

68. BOEM is responsible for management energy and mineral resource development on the OCS. *About BOEM*, BUREAU OF OCEAN ENERGY MGMT., https://www.boem.gov/about-boem (last visited Dec. 15, 2020); *infra* Subpart II.B.2. BOEM was created in 2010 during the division of the former Minerals Management Service into BOEM, the Bureau of Safety and Environmental Enforcement, and the Office of Natural Resources Revenue. *The Reorganization of the Former MMS*, BUREAU OCEAN ENERGY MGMT., https://www.boem.gov/about-boem/reorganization/reorganization-former-mms (last visited Dec. 15, 2020).

continues.[69] However, soon after taking office, President Biden placed a moratorium on all *new* offshore oil and gas leases, pending a comprehensive review and reconsideration of drilling practices.[70] It remains to be seen whether the ban on new leases will become permanent, which would be in line with the administration's promise to address the climate crisis.[71]

D. Gulf Fishermens Ass'n v. National Marine Fisheries Services

In August 2020, in the shadow of the halting progress of emerging offshore industries, the Fifth Circuit found NFMS's attempt to regulate domestic aquaculture went beyond its statutory authority.[72] In a 2-1 decision, the court held that the Magnuson-Stevens Fishery Conservation and Management Act (MSA), which governs capture fisheries, does not extend to aquaculture.[73]

At issue in *Gulf Fishermens* was a first-in-the-nation attempt by the Gulf of Mexico Fishery Management Council to regulate and permit offshore aquaculture.[74] The MSA is the primary federal statute governing capture fisheries in federal waters and grants NMFS regulatory authority over such fisheries. Some of that authority is delegated to eight Regional Fishery Management Councils, each of which is responsible for drafting a Fishery Management Plan (FMP) for capture fisheries in its respective region.[75] FMPs need NMFS's approval before going into effect.[76]

In 2009, the Gulf Regional Council developed an FMP to approve a limited number of offshore aquaculture operations over a ten-year period, treating aquaculture as a "fishery" under its MSA authority to develop FMPs.[77] The aquaculture FMP would have allowed up to 64 million pounds of aquaculture production a year.[78] The Council submitted the plan to NMFS, which finalized a federal rule to implement the plan in 2016.[79] A coalition of fishing and conservation groups, concerned about the FMP's commercial and environmental impacts, challenged the rule.[80]

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69. *U.S. Energy Facts Explained*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/us-energy-facts/ (last updated May 7, 2020).

70. Tackling the Climate Crisis at Home and Abroad, Exec. Order No. 14,008, 86 Fed. Reg. 7619, 7624–25 (Jan. 27, 2021).

71. *See id.* at 7619 ("The United States and the world face a profound climate crisis. We have a narrow moment to pursue action at home and abroad in order to avoid the most catastrophic impacts of that crisis and to seize the opportunity that tackling climate change presents.").

72. Gulf Fishermens Ass'n v. Nat'l Marine Fisheries Serv., 968 F.3d 454, 456 (5th Cir. 2020).

73. *Id.*

74. *Id.* at 458–59.

75. 16 U.S.C. §§ 1801(b)(5), 1852–53 (2018).

76. *Id.* § 1853(a)(1)–(a)(2).

77. *Gulf Fishermens*, 968 F.3d at 458.

78. *Id.* at 459.

79. *Id.* at 458.

80. *Id.* at 459.

The case centered on a statutory interpretation question: whether aquaculture fits within the meaning of "fishing" encompassed by the MSA.[81] The MSA defines "fishing" as "the catching, taking, or harvesting of fish."[82] As the court recognized, neither "aquaculture" nor a similar term, such as "fish farming," is defined or mentioned in the MSA.[83] The plaintiffs argued that the aquaculture rule fell outside NMFS's MSA authority to regulate "fisheries" because aquaculture facilities are not fisheries.[84] NMFS disagreed, arguing that "harvesting," included in the MSA's definition of "fishing," implies the gathering of crops and fish are considered aquaculture's crop.[85] At the very least, NMFS argued, the MSA is ambiguous as to whether NMFS has authority to regulate aquaculture, and therefore its interpretation was due deference under the *Chevron* two-step framework for agency interpretations of ambiguous statutes.[86]

The District Court for the Eastern District of Louisiana disagreed, finding the MSA unambiguously forecloses NMFS from regulating aquaculture.[87] NMFS appealed to the Fifth Circuit, and the Fifth Circuit affirmed in a 2-1 decision.[88] Because it found the MSA to be unambiguous in denying NMFS jurisdiction over aquaculture, the court resolved the issue at the first of the two *Chevron* steps and declined to defer to NMFS's interpretation of the MSA.[89]

Critical to the Fifth Circuit's opinion was the fact that the original text of the MSA did not mention "aquaculture" or "fish farming."[90] In addition to the MSA's silence on aquaculture, the court found the term "harvesting" within the definition of "fishing" to be synonymous with, not expanding beyond, "catching" and "taking."[91] Looking to the legislative history, the court noted that when the MSA was passed in 1976, Congress "knew what aquaculture was and how to confer authority to regulate it," but chose not to.[92] Finally, the court highlighted

81. *Id.* at 456–58.

82. 16 U.S.C. § 1802(16).

83. *Gulf Fishermens*, 968 F.3d at 458.

84. *Id.* at 459.

85. *Id.* at 456. This is not a baseless argument, as aquaculture has adopted many farming terms. *See, e.g.*, *Term Portal Aquaculture*, FOOD & AGRIC. ORG. OF THE UNITED NATIONS, http://www.fao.org/faoterm/en/?defaultCollId=14 (last visited Dec. 15, 2020) (defining "seed" as "eggs, spawn, offspring, progeny or brood of the aquatic organism (including aquatic plants) being cultured," "standing crop" as "[t]he total live weight of a group (or stock) of living organisms . . . ." and "harvestable fish" as "[f]ish of size desired for harvest").

86. *Gulf Fishermens*, 968 F.3d at 459. Since 1984, federal courts have engaged in a two-step process when analyzing agency interpretations of statutes. *See* Chevron U.S.A., Inc. v. Nat. Res. Def. Council, Inc., 467 U.S. 837 (1984). First, the court asks whether a statute unambiguously expressed the intent of Congress; and if not, whether the agency's interpretation is reasonable. *Id.* at 843. In *Gulf Fishermens*, the Fifth Circuit found that Congress was unambiguous in excluding NMFS jurisdiction over aquaculture under the MSA, and therefore never reached *Chevron* step two. *Gulf Fishermens*, 968 F.3d at 460.

87. *Gulf Fishermens*, 968 F.3d at 459.

88. *Id.* at 455–56.

89. *Id.* at 460.

90. *Id.* ("We usually start with the text, but more telling here is the Act's lack of text.").

91. *Id.* at 462–63 (referencing 16 U.S.C. § 1802(16)).

92. *Gulf Fishermens*, 968 F.3d at 466.

the "various ways in which [the Act] is nonsensical when applied to aquaculture," including the requirement that fisheries refrain from overfishing—illogical in the context of aquaculture where *all* fish are intended to be harvested.[93] Therefore, the court held the Council's plan and NMFS's rule invalid.[94]

Questions remain in the wake of *Gulf Fishermens*. It is unclear how widespread the effects of the case will be, since the decision is only binding on the Gulf of Mexico Fishery Management Council's aquaculture plan.[95] A few months before *Gulf Fishermens*, the Trump administration issued an executive order "Promoting American Seafood Competitiveness and Economic Growth."[96] It designated NMFS as the lead agency for offshore aquaculture projects and directed NMFS to develop "aquaculture opportunity areas" in consultation with other federal agencies, states, and tribes.[97] Seemingly undeterred by the *Gulf Fishermens* decision, NMFS has continued to proceed under this executive authority in creating these "aquaculture opportunity areas."[98] In moving forward, NMFS explained, "[t]he ruling is not a prohibition on marine aquaculture, neither nationally nor in the Gulf of Mexico, and we will continue to work with stakeholders through existing policies and legislation to increase aquaculture permitting efficiency and predictability."[99] As of March 2021, the Biden administration has not indicated whether it will continue pursuing this policy or its stance on aquaculture more broadly.[100] There is still no law giving any federal agency authority to permit aquaculture operations, and NMFS's actions are likely to face challenges similar to that at issue in *Gulf Fishermens*.[101]

One of the most important lessons from the case, not just for the future of the offshore aquaculture industry but for the development of emerging industries more broadly, is the court's recognition of the "various ways in which [the Act]

93. *Id.* (quoting Gulf Fishermens Ass'n v. Nat'l Marine Fisheries Serv., 341 F.Supp.3d 632, 639 (E.D. La. 2018)) (alteration in original).

94. *Id.* at 469.

95. The question in *Gulf Fishermens* was specifically whether NMFS's aquaculture rule, developed to implement the Gulf of Mexico Fishery Management Plan for aquaculture, exceeded NMFS's statutory authority. *See id.* at 456. Therefore, the decision is only binding on that plan, not NMFS action elsewhere in the country.

96. *See* Promoting American Seafood Competitiveness and Economic Growth, Exec. Order No. 13,921, 85 Fed. Reg. 28,471 (May 7, 2020).

97. *Id.* at 28,473–74.

98. *Press Release, NOAA Announces Regions for First Two Aquaculture Opportunity Areas under Executive Order on Seafood*, NOAA FISHERIES (Aug. 20, 2020), https://www.fisheries.noaa.gov/feature-story/noaa-announces-regions-first-two-aquaculture-opportunity-areas-under-executive-order; *NMFS Planning for Offshore Aquaculture Areas*, NAT'L FISHERMAN (Dec. 3, 2020), https://www.nationalfisherman.com/national-international/nmfs-planning-for-offshore-aquaculture-areas.

99. Tristan Baurick, *Trump Administration Moves Forward with Gulf Fish Farming Plan Despite Court Decision*, NOLA.COM (Sept. 8, 2020, 5:45 PM), https://www.nola.com/news/environment/article_a17ff10c-f202-11ea-a4cb-f352b9ed1d03.html.

100. *NMFS Planning for Offshore Aquaculture Areas*, *supra* note 98.

101. *Id.*

is nonsensical when applied to aquaculture."[102] NMFS's argument—that the MSA was at least ambiguous as to whether it encompassed aquaculture—was not patently unreasonable.[103] But setting aside the merits of the case, the Fifth Circuit's refusal to transpose NMFS's traditional capture fishery jurisdiction to emerging offshore aquaculture is the better policy outcome for a future responsible offshore aquaculture industry.

Attempts to shoehorn emerging industry regulation into existing statutory schemes governing traditional industries is detrimental to the responsible growth of emerging industries and to today's vital societal and environmental concerns, including climate change, environmental degradation, and diminishing natural resources. As discussed in the next two Parts, both the development contexts and resulting provisions of traditional offshore resource statutory schemes make clear how ill-fitted they are to govern today's emerging offshore resources. While law makers can and should draw some lessons from traditional offshore resource development, these new resources demand new and distinct statutory and regulatory schemes.

II. THE OCEANS THEN: DEVELOPMENT OF TRADITIONAL RESOURCE STATUTORY SCHEMES

Understanding traditional offshore resources statutes is helpful for a discussion of emerging offshore resources management for a few reasons. First, through legislative and administrative action, the federal government has attempted to use existing traditional resource statutes as a basis for emerging resource regulation. Second, the traditional resources' historical development contexts and general frameworks show why attempts to regulate emerging resources under them is insufficient. Finally, while the offshore capture fishery and oil and gas industries are problematic and cause significant environmental degradation, their statutory schemes have been successful in building up nascent industries and provide some lessons for establishing effective statutory frameworks for emerging resources. Notably, the statutory schemes for both traditional offshore resources clearly designate lead agencies to oversee projects, require those agencies to do prospective and regional planning, and were developed explicitly to support their respective industries' growth.

Subpart II.A will discuss the MSA, which provides the primary statutory basis for regulation of offshore capture fisheries. I will discuss what prompted its passage, its statutory requirements, and how it has shaped the offshore fishing industry, the health of offshore fish stocks, and the offshore environment. Subpart II.B will provide a similar discussion about the history, scheme, and

102. Gulf Fishermens Ass'n v. Nat'l Marine Fisheries Serv., 968 F.3d 454, 466 (5th Cir. 2020) (alteration in original) (quoting Gulf Fishermens Ass'n v. Nat'l Marine Fisheries Serv., 341 F. Supp. 3d 632, 639 (E.D. La. 2018)).

103. *See supra* note 85 and accompanying text.

effects of the Outer Continental Shelf Lands Act (OCSLA), which governs offshore oil and gas production in federal waters.

A. Capture Fisheries

1. Historical Context of Federal Capture Fishery Regulation

The MSA is the primary federal statute governing the management and conservation of capture fisheries in federal waters.[104] While ostensibly passed to address overfishing,[105] the specific motivating concern was foreign overfishing of U.S. waters, not overall decline of fish stocks.[106]

Historically, states managed recreational and commercial fisheries, as most fish were caught nearshore in state waters.[107] In 1945, President Truman issued a proclamation expressing the need for fishery conservation and management in waters beyond state jurisdiction but did not assert federal jurisdiction to the exclusion of foreign fishers.[108] In the 1950s and 1960s, offshore foreign fleet activity beyond state boundaries increased and did so in direct competition with the growing domestic fishing industry.[109] This fueled complaints from U.S. fishers and increased pressure on Congress to act.[110] Indeed, "the perceived need to control foreign fishing provided broad support for passage of the [MSA]."[111]

2. Statutory Scheme Governing Capture Fisheries

The MSA, passed in 1976,[112] created a system of federal fishery management over fisheries between three and two hundred nm offshore, and declared exclusive federal jurisdiction over the area.[113] A primary purpose was "to take immediate action to conserve the fishery resources found off the coasts of the United States."[114] Responding to domestic fishers' campaign against

104. 16 U.S.C. § 1801–1891 (2018).

105. *Id.* § 1801(a)(2).

106. *Id.*

107. HAROLD F. UPTON, CONG. RSCH. SERV., R43565, REAUTHORIZATION ISSUES FOR THE MAGNUSON STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT 31 (2014).

108. Policy of the United States with Respect to the Natural Resources of the Subsoil and Sea Bed of the Continental Shelf, Proclamation No. 2667, 10 Fed. Reg. 12,303 (Sept. 28, 1945); Policy of the United States with Respect to Coastal Fisheries in Certain Areas of the High Seas, Proclamation No. 2668, 28 Fed. Reg. 12,304 (Sept. 28, 1945); UPTON, *supra* note 107, at 31.

109. UPTON, *supra* note 107, at 31.

110. James P. Walsh, *The Origins and Early Implementation of the Magnuson-Stevens Fishery Conservation and Management Act of 1976*, 42 COASTAL MGMT. 409, 414 (2014).

111. UPTON, *supra* note 107, at 6.

112. The law was originally passed as the Fishery Conservation and Management Act (FCMA, P.L. 94-265), later renamed the Magnuson Fishery Conservation and Management Act (MFCMA, P.L. 97-191) and finally the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA, 109-479). UPTON, *supra* note 107, at 31.

113. 16 U.S.C. § 1811(a) (2018). For a brief explanation as to why U.S. jurisdiction generally ends at two hundred nm *see* U.S. COMM'N ON OCEAN POL'Y, *supra* note 15, at 72–73.

114. 16 U.S.C. § 1801(b)(1).

foreign fishing, the MSA is explicit in finding that "[t]he activities of massive foreign fishing fleets in waters adjacent to such coastal areas have contributed to [fish stock] damage, interfered with domestic fishing efforts, and caused destruction of the fishing gear of United States fishermen."[115] Additionally, the MSA requires conservation and management measures that both "prevent overfishing" and continuously achieve fisheries' "optimum yield," which is the "maximum sustainable yield . . . as reduced by any relevant economic, social, or ecological factor."[116] Until the late 1980s, fishery policy under the MSA primarily "focused on controlling and replacing foreign fishing and developing U.S. fisheries in [federal waters.]"[117] The MSA has since been amended several times, including in 2006 to add specific provisions aimed at reducing overfishing and rebuilding overfished stocks.[118]

As mentioned in the *Gulf Fishermens* case discussion, the MSA created a comprehensive region-based fishery management scheme over federal waters, where none existed before.[119] It gave the Secretary of Commerce primary regulatory authority over fisheries management (thereafter delegated to NMFS).[120] Additionally, it created eight Regional Fishery Management Councils, comprised of the NMFS regional director, representatives from each covered state's fishery management agency, and members appointed by the Secretary of Commerce.[121]

One of the main tasks of the councils is to develop FMPs for all fisheries within their respective regions.[122] A single FMP may cover an individual species, a few related species, or a larger collection of species living in similar habitats.[123] FMPs must contain specific conservation and management measures necessary to manage stocks, including catch limits, vessel permitting, and allowable fishing seasons.[124] FMPs must also be prospective in describing potential revenues, probable future conditions of a fishery, and likely effects of an FMP's implementation.[125] The MSA also requires FMPs to comply with a list of conservation- and management-based national standards.[126] NMFS must review and approve each FMP before it can take effect,[127] and FMPs are frequently amended in response to changing conditions.[128] As of 2018, NMFS

115. *Id.* § 1801(a)(3).
116. *Id.* §§ 1802(33), 1851(a)(1).
117. UPTON, *supra* note 107, at i.
118. *Id.* at 2.
119. 16 U.S.C. §§ 1801–1891.
120. *Id.* § 1802(39).
121. *Id.* § 1852.
122. *Id.* §§ 1801(b)(5), 1852–53.
123. HAROLD F. UPTON, CONG. RSCH. SERV., R42563, ENDING OVERFISHING AND REBUILDING FISH STOCKS IN U.S. FEDERAL WATERS 7 (2012).
124. 16 U.S.C. § 1853.
125. *Id.*
126. *Id.* § 1851.
127. *Id.* § 1854.
128. UPTON, *supra* note 123, at 7.

manages forty-six FMPs, covering 461 stocks or multispecies stock complexes.[129]

The MSA was successful in expanding the capacity of U.S. fishing fleets in federal waters,[130] with production increasing by nearly 60 percent within a decade of its passage.[131] However that "rapid expansion" led to significant overfishing of many fish populations and "economic losses associated with overcapitalization and lower fish landings."[132]

B. Oil and Gas

Like capture fisheries, the offshore oil and gas industry is regulated by a well-developed, detailed, and industry-friendly federal statutory scheme.

1. Historical Context of Offshore Oil and Gas Regulation

OCSLA is the primary federal statute governing the OCS beyond state jurisdiction (generally three to two hundred nm offshore).[133] Like the MSA, OCSLA was the result of a years-long jurisdictional battle over rights to ocean resources.[134] The story of U.S. offshore oil and gas development dates back to the 1800s, when California citizens drilling for oil realized the wells closest to the ocean were the best producers.[135] Soon, coastal states and the federal government claimed competing jurisdiction to the lucrative leasing of submerged lands off the coast.[136] Development and conflicts continued, and the disputes eventually reached the U.S. Supreme Court in a series of cases in the late 1940s–1950.[137]

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129. *Status of Stocks 2019*, NOAA FISHERIES, https://www.fisheries.noaa.gov/national/sustainable-fisheries/status-stocks-2019 (last updated Apr. 19, 2021).

130. UPTON, *supra* note 123, at 6.

131. *Global Capture Production 1950-2018*, *supra* note 48 (select "Americas"; then choose "United States of America"; then click "submit").

132. UPTON, *supra* note 123, at 6. The term "landing" refers to the fish and shellfish that are caught and brought back to shore (or "landed"). *Commercial Fisheries Landings*, NOAA FISHERIES, https://www.fisheries.noaa.gov/national/sustainable-fisheries/commercial-fisheries-landings (last updated Aug. 22, 2019).

133. Outer Continental Shelf Lands Act, 43 U.S.C. § 1331(a) (2018); *Federal Offshore Lands*, *supra* note 13. OCSLA also governs other mineral exploration, development, and production on the OCS, not at issue here. 43 U.S.C. § 1331(q).

134. *Federal Offshore Lands*, *supra* note 13.

135. *OCS Lands Act History*, BUREAU OF OCEAN ENERGY MGMT., https://www.boem.gov/oil-gas-energy/leasing/ocs-lands-act-history (last visited Dec. 15, 2020).

136. *See generally* Parker Drilling Mgmt. Serv. v. Newton, 139 S. Ct. 1881, 1887 (2019).

137. *See* United States v. California, 332 U.S. 19 (1947); United States v. Louisiana, 339 U.S. 699 (1950); United States v. Texas, 339 U.S. 707 (1950). Each of the cases held that the federal government, not the state in issue, had exclusive jurisdiction over the continental shelf along the coast, with full domain over the resources therein. The cases were superseded by the jurisdictional divisions confirmed in OCSLA and the Submerged Lands Act. *See Parker Drilling Mgmt. Serv.*, 139 S. Ct. at 1887.

In those cases, the Court held the federal government had exclusive jurisdiction over the entire OCS.[138] Given the era, it is perhaps unnecessary to point out that environmental protection and conservation were not central issues in the cases, beyond protection from international interference.[139] Soon thereafter, in 1953, Congress acted to divide jurisdiction between states and the federal government through the Submerged Lands Acts and OCSLA.[140] The Submerged Lands Act, passed first, granted states jurisdiction over submerged lands up to the current three nm offshore boundary (or nine nm for Texas and western Florida).[141] Congress followed up with OCSLA, declaring that "the subsoil and seabed of the [OCS] appertain to the United States and are subject to its jurisdiction, control, and power of disposition."[142] OCSLA, even more so than the MSA, is explicitly focused on resource exploitation, with its "primary purpose" being "to facilitate the federal government's leasing of its offshore mineral resources and energy resources."[143]

2. Statutory Scheme Governing Offshore Oil and Gas Production

OCSLA grants the Secretary of the Interior (Secretary) regulatory jurisdiction over OCS mineral exploration, development, and leasing (authority that today is delegated to BOEM).[144] Like the MSA, it has been amended several times, including significant amendments in 1978 to increase coastal state participation in leasing and provide additional environmental protections.[145] It also, like the MSA, prioritizes resource development over environmental protection. OCSLA characterizes the OCS as "a vital national resource reserve . . . [that] should be made available for expeditious and orderly development, subject to environmental safeguards."[146]

But, as the National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling aptly noted in the wake of the Deep Water Horizon Crisis, the balance between environmental and fossil fuel development priorities on the OCS "depends largely on the politics of the moment," and OCSLA's statutory scheme does not "come close to *ensuring* a reasonable level of overall

138. *United States v. California*, 332 U.S. at 38–39; *United States v. Louisiana*, 339 U.S. at 705; *United States v. Texas*, 339 U.S. at 717–18.

139. *United States v. California*, 332 U.S. at 29 (1947) ("The crucial question on the merits is not merely who owns the bare legal title to the lands under the marginal sea. The United States here asserts rights in capacities . . . [to] protect this country against dangers to the security and tranquility of its people . . . and its responsibl[ity] for conducting United States relations with other nations.").

140. *Parker Drilling Mgmt. Serv.*, 139 S. Ct. at 1887.

141. 43 U.S.C. §§ 1301–1315 (2018).

142. *Id.* § 1332(1).

143. *Id.* § 1332(3)–(5); *BOEM Governing Statutes*, BUREAU OF OCEAN ENERGY MGMT., https://www.boem.gov/about-boem/regulations-guidance/boem-governing-statutes (last visited Dec. 15, 2020).

144. *Id.* §§ 1331(b), 1334(a); *see supra* note 58 for an explanation of the reorganization within DOI that led to the creation of BOEM.

145. ADAM VANN, CONG. RSCH. SERV., RL33404, OFFSHORE OIL AND GAS DEVELOPMENT: LEGAL FRAMEWORK 6 (2018).

146. 43 U.S.C. § 1332(3).

environmental protection applicable to all aspects of oil and gas activities on the [OCS]."[147] Analogous to the MSA's maximum sustainable yield focus, OCSLA requires that unless otherwise specified, lessees should produce oil and gas at "the maximum rate of production which may be sustained without loss of ultimate recovery of oil or gas, or both."[148]

OCSLA also contains "detailed provisions for the exercise of exclusive jurisdiction in the [OCS] area and for the leasing and development of the resources of the seabed."[149] It requires that BOEM oversee offshore oil and gas development in four distinct administrative stages.[150] First, every five years, BOEM develops a national leasing program for all oil and gas leases on the OCS, which establishes "a schedule of proposed lease sales indicating, as precisely as possible, the size, timing, and location of leasing activity[,] which [BOEM] determines will best meet national energy needs for the five-year period following its approval or reapproval."[151] BOEM refers to this as the "five-year program."[152] Public notice and comment periods for the program are required at both the federal and state level (for those coastal states affected by the proposals).[153] It typically takes BOEM two to three years to finalize a five-year program.[154]

Second, after finalizing its five-year program, BOEM issues leases on a competitive basis.[155] Before doing so, it must consider state input regarding proposed sales, and it must publish a list of lease sale offerings in the *Federal Register*.[156] OCSLA also stipulates minimum royalty or net profit share rates on lease sales.[157] Third, lessees planning oil and gas operations must prepare and comply with a detailed exploration plan, which the Secretary has thirty days to review and approve.[158] Finally, as for exploration, the lessee must develop, submit, and gain approval on a development and production plan, which is subject to another round of environmental review.[159]

The Secretary has significant leeway to adjust lease terms to support lessees' economic success. Leases are issued for an initial term of five years or up to ten years when the Secretary finds it necessary because of development

147. NAT'L COMM'N ON THE BP DEEPWATER HORIZON OIL SPILL & OFFSHORE DRILLING, DEEP WATER: THE GULF OIL DISASTER AND THE FUTURE OF OFFSHORE DRILLING 80–81 (2011).

148. *See* 43 U.S.C. § 1334(g); 16 U.S.C. §§ 1802(33), 1851(a)(1).

149. United States v. Maine, 420 U.S. 515, 527 (1975); *see* 43 U.S.C. §§ 1334–54.

150. VANN, *supra* note 145, at 6.

151. 43 U.S.C. § 1344(a).

152. LAURA B. COMAY ET AL., CONG. RSCH. SERV., R44504, THE BUREAU OF OCEAN ENERGY MANAGEMENT'S FIVE-YEAR PROGRAM FOR OFFSHORE OIL AND GAS LEASING: HISTORY AND FINAL PROGRAM FOR 2017-2022, at 1 (2017).

153. 43 U.S.C. § 1344(c); *see also* VANN, *supra* note 145, at 7.

154. COMAY, *supra* note 152, at 1.

155. 43 U.S.C. § 1337.

156. *Id.* § 1337(l).

157. *Id.* § 1337(a).

158. *Id.* § 1340(b), (c)(1)–(3).

159. *Id.* § 1351.

difficulties caused by "unusually deep water or other unusually adverse conditions."[160] Likewise, the area the lease covers can be no greater than 5,760 acres unless the Secretary determines a larger lease area is necessary for "reasonable economic production."[161]

Other federal statutes may affect BOEM's oil and gas leasing program. The National Environmental Policy Act (NEPA) requires environmental review of BOEM leasing activities,[162] and the Coastal Zone Management Act requires state consultation of federal actions and federally permitted activities that may affect state waters.[163] The Marine Sanctuaries Act and Antiquities Act may limit BOEM's ability to lease certain areas of the OCS.[164] But by and large, OCSLA and BOEM's related regulations are the primary, and most powerful, sources of law for offshore oil and gas development.[165]

Like the MSA for capture fisheries, OCSLA has proven a success in supporting Congress's goal of extracting offshore fossil fuels, with OCS leases producing 16 percent of total domestic oil and 3 percent of domestic gas production in 2019.[166]

III. THE OCEANS NOW: RESOURCES TODAY, EMERGING RESOURCE REGULATION, AND THE NEED FOR NEW STATUTORY SCHEMES

Last century's offshore resource management statutes are unequipped to meet the realities and demands facing this century's emerging offshore industries. OCSLA and MSA are industry-focused, development-first statutes with insufficient environmental protection requirements, as evidenced by devastating oil spills[167] and collapse of fish stocks[168] in federal waters. Both were developed to offer industry protection in response to jurisdictional fights over growing lucrative industries. While they require some environmental protection, the goal of each is to maximize production—encouraging the "maximum sustainable yield" for capture fisheries and the "maximum rate of production" for oil and gas.[169] But the oceans have changed drastically since these statutes were implemented, in part *because* of the production-first priority

160. *Id.* § 1337(b)(2).
161. *Id.* § 1337(b)(1).
162. *Id.* §1332(2)(C).
163. 16 U.S.C. §1456(c).
164. *See id.* §1431; 54 U.S.C. § 320301.
165. *See* 43 U.S.C. §§ 1331 *et seq.*; 30 C.F.R. pt. 550–551 (2020).
166. BUREAU OF OCEAN ENERGY MGMT., OIL AND GAS ENERGY FACT SHEET (2020), https://www.boem.gov/sites/default/files/documents/oil-gas-energy/BOEM_FactSheet-Oil%26amp%3BGas-2-26-2020.pdf (2019 statistics).
167. *Largest Oil Spills Affecting U.S. Waters Since 1969*, NOAA OFF. OF RESPONSE & RESTORATION, https://response.restoration.noaa.gov/oil-and-chemical-spills/oil-spills/largest-oil-spills-affecting-us-waters-1969.html (last updated Apr. 5, 2017).
168. Brad Plumer, *How the US Stopped Its Fisheries from Collapsing*, VOX (May 8, 2014, 1:01 PM), https://www.vox.com/2014/5/8/5669120/how-the-us-stopped-its-fisheries-from-collapsing.
169. 16 U.S.C. § 1802(33); 43 U.S.C. § 1334(g).

of OCSLA and the MSA, making the statutes bad fits for emerging offshore resources.

This Part discusses how the oceans have changed, the current patchwork of laws governing emerging offshore resources and recent congressional attempts to fix the laws' insufficiencies. Subpart III.A describes the state of fish and energy resources in our oceans today. Subpart III.B focuses on attempts to regulate offshore aquaculture, while Subpart III.C focuses on the more robust but still insufficient statutory scheme governing offshore renewables. Subpart III.D concludes with an explanation of why the statutory insufficiencies should be dealt with comprehensive statutory overhauls rather than under existing schemes.

A. The State of Our Ocean Resources

Ocean waters no longer offer the endless bounty of fish they were perceived to in the 1900s. In 1974, 90 percent of fish stocks worldwide were fished at biologically sustainable levels; in 2017 that figure dropped to 65.8 percent.[170] More concerning, only 6.2 percent of fish stocks worldwide are not yet fished at their maximum sustainable levels.[171] This trend of pushing fish stocks to their limits has not, however, corresponded with overall increased production. Since the late 1980s, capture fishery production worldwide and in the United States has been relatively stagnant, while demand continues to grow.[172] From 1961 to 2017, global food fish consumption increased at a 3.1 percent annual rate—almost twice as fast as population growth over the same period, and faster than the rate for any other animal protein food.[173] The global fishing industry, including operations in state and inland waters in the United States, has been turning to aquaculture to meet this demand. The Food and Agriculture Organization of the United Nations predicts that by 2030, global aquaculture production will increase by 32 percent over 2018 production, accounting for 53 percent of total fishery production.[174]

Meanwhile underground, offshore oil and gas production booms, at an extreme environmental and societal price. U.S. offshore oil hit a record high of 697 million barrels in 2019.[175] Offshore gas production has decreased significantly in recent years but still topped 1 trillion cubic feet in 2019.[176] This offshore production has caused thousands of oil spills, including, since 1969, over forty that each spilled more than 10,000 barrels.[177] It is also responsible for

170. FOOD & AGRIC. ORG. OF THE UNITED NATIONS, *supra* note 5, at 7.

171. *Id.*

172. *Id.* at 9; *Global Capture Production 1950-2018*, *supra* note 48 (select "Americas"; then choose "United States of America"; click "submit").

173. FOOD & AGRIC. ORG. OF THE UNITED NATIONS, *supra* note 5, at 3.

174. *Id.* at 165.

175. *Outer Continental Shelf Oil and Gas Production*, BUREAU OF OCEAN ENERGY MGMT., https://www.data.boem.gov/Production/OCSProduction/Default.aspx (last updated Dec. 4, 2020).

176. *Id.*

177. *Largest Oil Spills Affecting U.S. Waters Since 1969*, *supra* note 167.

significant greenhouse gas emissions, not just when oil and gas is ultimately consumed, but also during the production process through (involuntary) leaking and (purposeful) venting.[178] The remaining potential for extraction and its corresponding environmental harm is significant, as BOEM estimates the OCS still contains 90 billion unextracted barrels of oil and 327 trillion cubic feet of gas.[179]

As offshore drilling continues, so too does the potential and need for offshore renewable production. Unlike offshore oil and gas production, which relies on depleting nonrenewable fossil fuels, offshore renewable energy's total production potential is infinite. It is also promising. The Department of Energy estimates that wind production alone in state and federal waters has the potential to produce more than 7,200 terawatt hours (TWh) of power per year—more than double our current domestic electricity consumption.[180] The annual technical production potential is estimated at between 898 and 1,129 TWh for wave power, between forty-five and 163 TWh for ocean current power, and 576 TWh for OTEC.[181] These estimates may grow as technology evolves.

The current federal strategy of fitting emerging offshore resource regulation into traditional resource statutes fails to account for how much our oceans have changed in the last few decades as well as the important differences between traditional and emerging resources.

B. Offshore Aquaculture

1. Attempted Regulation under Existing Statutes

There is no explicit statutory authority governing aquaculture permitting and operations in federal waters, a fact confirmed by *Gulf Fishermens*.[182]

178. Alan M. Gorchov Negron et al., *Airborne Assessment of Methane Emissions from Offshore Platforms in the U.S. Gulf of Mexico*, 54 ENV'T SCI. & TECH. 5112 (Apr. 13, 2020). Indeed, a 2020 assessment out of the University of Michigan found that offshore platforms in U.S. Gulf of Mexico waters are emitting two times as much methane as official federal government estimates suggest. *Id.* at 5112. Gas venting is the deliberate, "direct release of natural gas into the atmosphere," for economic, operational expediency, or safety reasons. U.S. DEP'T OF ENERGY, NATURAL GAS FLARING AND VENTING: STATE AND FEDERAL REGULATORY OVERVIEW, TRENDS, AND IMPACTS 1 (2019), https://www.energy.gov/sites/prod/files/2019/08/f65/Natural%20Gas%20Flaring%20and%20Venting%20Report.pdf. It is common during oil and gas production. *Id.*

179. *Oil and Gas Energy*, BUREAU ENERGY MGMT., https://www.boem.gov/oil-and-gas-energy (last visited Dec. 15, 2020).

180. *Computing America's Offshore Wind Energy Potential*, OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY (Sept. 9, 2016), https://www.energy.gov/eere/articles/computing-america-s-offshore-wind-energy-potential.

181. *Marine Energy Resource Assessment and Characterization*, OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, https://www.energy.gov/eere/water/marine-and-hydrokinetic-resource-assessment-and-characterization (last visited Dec. 15, 2020).

182. *See* UPTON, *supra* note 6, at i; Gulf Fishermens Ass'n v. Nat'l Marine Fisheries Serv., 968 F.3d 454, 456 (5th Cir. 2020). There are at least eight federal agency departments, governed by at least eighteen federal statutes, with some regulatory authority relevant to various aspects of offshore aquaculture operations: NMFS, NOAA's National Oceanic Service; the Army Corps of Engineers, EPA, Fish and

However, there have been attempts to develop regulation under existing statutory authority.

One might think the National Aquaculture Act of 1980 would provide the statutory authority necessary to develop an offshore aquaculture scheme.[183] Congress passed the Aquaculture Act "[t]o promote aquaculture in the United States."[184] Primarily, it created the multi-agency Joint Subcommittee on Aquaculture, which is led by the Secretary of Agriculture[185] and tasked with researching and developing "a national aquaculture plan."[186] However, "the Act has failed to influence aquaculture regulation in any meaningful way[,]" with the Joint Subcommittee "yet to promulgate any comprehensive regulations or even request the funds it needs to implement the plan."[187] And more critically, the Act does not give any agency permitting authority over potential offshore operations.[188]

Relatedly, as discussed above, NMFS's attempt to use the MSA to regulate offshore aquaculture was rejected in *Gulf Fishermens*.[189] The FMP, developed by the regional Gulf of Mexico Fishery Management Council, would have established a comprehensive scheme for regulating and permitting aquaculture in its jurisdictional area.[190] Permits would have allowed permit holders to develop aquaculture facilities comprised of "hatcheries, equipment, and associated infrastructure used to hold, propagate, and rear allowable aquaculture species."[191] Only species or subspecies native to the facilities locations would have been allowed, "to ensure that the genetic make-up of cultured animals is similar to the wild stocks where the facility is located."[192] Permits were to be for an initial period of ten years, renewable at five-year increments thereafter.[193] The FMP also gave the council's regional manager authority to deny proposed sites based on potential environmental harm, including risk to wild fish.[194] But *Gulf*

Wildlife Service, BOEM, Animal and Plant Health Inspection Service, and Coast Guard. U.S. GOV'T ACCOUNTABILITY OFF., GAO-08-594, OFFSHORE MARINE AQUACULTURE: MULTIPLE ADMINISTRATIVE AND ENVIRONMENTAL ISSUES NEED TO BE ADDRESSED IN ESTABLISHING A U.S. REGULATORY FRAMEWORK 10–11 (2008). However, none has apparent authority necessary to create an overall aquaculture regime and greenlight facilities in federal waters. *See id.*; UPTON, *supra* note 6, at I; *Gulf Fishermens Ass'n*, 968 F.3d at 456.

183. *See* National Aquaculture Act of 1980, 16 U.S.C. §§ 2801–2810.

184. *Id.* § 2801(b).

185. *Id.* § 2802(8).

186. *Id.* § 2801(b).

187. Kristen L. Johns, Note, *Farm Fishing Holes Gaps in Federal Regulation of Offshore Aquaculture*, 86 S. CAL. L. REV. 681, 714 (2013).

188. D. Douglas Hopkins et al., *An Environmental Critique of Government Regulations and Policies for Open Ocean Aquaculture*, 2 OCEAN & COASTAL L.J. 235, 249 (1997).

189. Gulf Fishermens Ass'n v. Nat'l Marine Fisheries Serv., 968 F.3d 454, 456 (5th Cir. 2020).

190. *Id.*

191. Fisheries of the Caribbean, Gulf, and South Atlantic; Aquaculture, 81 Fed. Reg. 1761 (Feb. 12, 2016) (invalidated in *Gulf Fishermens*).

192. *Id.* at 1763.

193. *Id.* at 1762.

194. *Id.* at 1765–66.

Fishermens closed the door on the MSA serving as the basis for aquaculture facilities without statutory amendments.[195]

2. Recent Legislative Proposals

Since 2005, several bills have been introduced in Congress to establish a regulatory framework for offshore aquaculture development in federal waters.[196] None have passed both chambers.[197] The bills sought to balance promoting development and ensuring environmental protection, each to varying degrees.[198] The more pro-development bills introduced in the 109th and 110th Congresses "would have supported production of food, encouraged development, established a permitting process, and promoted research and development of offshore aquaculture."[199] Those bills had bipartisan sponsorship.[200] While still encouraging and authorizing development, bills introduced in the 111th and 112th Congresses were more explicit in mitigating aquaculture's potential harmful impacts, "stress[ing] elements such as determining appropriate locations, issuing regulations to prevent impacts on marine ecosystems and fisheries, and supporting research to guide precautionary development of offshore aquaculture."[201] Both of those bills were introduced by California Democratic Representative Lois Capps, with six Democrats and one Republican cosponsoring the 2011 bill.[202]

During that same time period, several unenacted bills were introduced to restrict offshore aquaculture activities in federal waters.[203] Most were introduced by Alaskan lawmakers, Senator Lisa Murkowski and Representative Don Young, and would have prohibited agencies' offshore aquaculture permitting attempts until Congress established a comprehensive statutory scheme governing offshore aquaculture.[204]

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195. *Gulf Fishermens*, 968 F.3d at 456.

196. UPTON, *supra* note 6, at 44; *see, e.g.*, National Sustainable Offshore Aquaculture Act of 2011, H.R. 2373, 112th Cong. (2011); National Sustainable Offshore Aquaculture Act of 2009, H.R. 4363, 111th Cong. (2009); National Offshore Aquaculture Act of 2007, H.R. 2010, 110th Cong. (2007); National Offshore Aquaculture Act of 2007, S. 1609, 110th Cong. (2007); National Offshore Aquaculture Act of 2005, S. 1195, 109th Cong. (2005).

197. UPTON, *supra* note 6, at 44.

198. *Id.*

199. *Id.* at 44–45.

200. The National Offshore Aquaculture Act of 2005, Senate Bill 1195, and National Offshore Aquaculture Act of 2007, Senate Bill 1609, were sponsored by Republican Senator Ted Stevens of Alaska and Democratic Senator Daniel Inouye of Alaska.

201. UPTON, *supra* note 6, at 45.

202. *See* National Sustainable Offshore Aquaculture Act of 2011, H.R. 2373, 112th Cong. (2011); National Sustainable Offshore Aquaculture Act of 2009, H.R. 4363, 111th Cong. (2009).

203. UPTON, *supra* note 6, at 45.

204. *Id.*; *see, e.g.*, S. 2859, 108th Cong. (2004) ("A bill [t]o amend the National Aquaculture Act of 1980 to prohibit the issuance of permits for marine aquaculture facilities until requirements for such permits are enacted into law."); H.R. 7109, 110th Cong. (2008) ("A bill [t]o prohibit the Secretary of the Interior from authorizing commercial finfish aquaculture operations in the Exclusive Economic Zone").

Most recently, Democratic and Republican Senators introduced the Advancing the Quality and Understanding of American Aquaculture (AQUAA) Act of 2020.[205] Again having bipartisan sponsorship, the AQUAA Act is the most comprehensive and detailed aquaculture legislation to date.[206] With the National Oceanic and Atmospheric Administration (NOAA) (which houses NMFS) designated as the lead agency, the act lays out a permitting process, which begins with national study and designation of offshore "aquaculture opportunity areas" where aquaculture projects may be permitted.[207] It also would require any activity to comply with a set of national environmental standards, use of the best available science, preference for native species, and prioritization of the health of cultured fish.[208] Additionally, the act would provide industry support through offering workforce development grants[209] and educational programs on sustainable aquaculture;[210] creating regional networks of public and private aquaculture leaders;[211] establishing an aquaculture database to share information throughout the industry;[212] and providing financial institutions economic analyses of the aquaculture industry to support investment.[213] As of March 2021, the bill has not been reintroduced in the current Congress.[214]

C. Offshore Renewable Energy Production

1. Existing Statutory Scheme

The Energy Policy Act of 2005 (EPAct) was Congress's first legislation explicitly regulating, among other subjects, offshore renewable energy production.[215] It was motivated by the United States' rising energy prices and growing dependence on foreign oil.[216] At the time the EPAct was passed, there were no offshore renewable projects in federal waters.[217] Prior to the EPAct, the Army Corps of Engineers had asserted jurisdiction over potential offshore wind project permitting under the Rivers and Harbors Appropriation Act of 1899,

205. S. 4723, 116th Cong. (2020) (cosponsored by Democratic Senator Brian Schatz and Republican Senators Roger Wicker and Marco Rubio).

206. *Id.*

207. *Id.* § 102.

208. *Id.* § 101(b).

209. *Id.* § 402(c).

210. *Id.* § 403.

211. *Id.* § 402(d).

212. *Id.* § 402(e).

213. *Id.* § 402(g).

214. 166 Cong. Rec. S. 5863 (daily ed. Sept. 24, 2020).

215. Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594 (2005) (codified as amended in scattered sections of 22, 25, 42, and 43 U.S.C.).

216. MARK HOLT & CAROL GLOVER, CONG. RSCH. SERV., RL33302, ENERGY POLICY ACT OF 2005: SUMMARY AND ANALYSIS OF ENACTED PROVISIONS 1 (2006).

217. As discussed previously, there is still only one functioning offshore wind project in federal waters and no MHK or solar projects. *See supra* Subpart I.C.

which gave it permitting authority over obstructions to navigation in "waters of the United States and on the OCS."[218]

The 550-page omnibus EPAct covers a wide range of environmental and energy topics, including energy efficiency, onshore renewable energy, fossil fuel development, vehicles and fuel standards, and electricity markets, among other topics.[219] It made significant changes affecting onshore renewable energy infrastructure and markets.[220] But it failed to provide the level of detail and clarity necessary to support budding offshore renewable industries.

Only one section of the EPAct, section 388, addressed offshore renewable energy leasing.[221] Section 388 amended OCSLA to authorize the Department of the Interior (thereafter delegated to BOEM) to lease OCS lands for activities that "produce or support production, transportation, or transmission of energy from sources other than oil and gas."[222] Like OCSLA's oil and gas provisions, the renewable energy provisions set up a payment and revenues scheme for BOEM to issue competitive leases (or noncompetitive leases where no competition exists).[223] The law also generally requires BOEM to consult with affected states and other federal agencies.[224] More explicitly than OCSLA's oil and gas provisions, section 388 lists ten requirements with which the leasing program must comply, including "protection of the environment," "conservation of the natural resources of the [OCS]," and a fair return to the United States on any leases issued.[225] Beyond that, section 388 left the details largely up to the BOEM in developing regulations.[226]

While EPAct section 388 granted BOEM some permitting authority over offshore renewable projects, it explicitly declined to supersede any existing laws.[227] Therefore, a number of other agencies continue to claim regulatory jurisdiction over offshore renewable development. The Army Corps of Engineers retains partial permitting authority over offshore wind projects under the Rivers and Harbors Act.[228] OTEC still falls under NOAA jurisdiction under the 1980 Ocean Thermal Energy Conversion Act.[229] Between 2005 and 2009, both

218. ADAM VANN, CONG. RSCH. SERV., R40175, WIND ENERGY: OFFSHORE PERMITTING 4 (2012).

219. 119 Stat. at 594–604.

220. SENATE COMM. ON ENERGY & NAT. RES., IMPACTS OF THE ENERGY POLICY ACT (2006), https://www.energy.senate.gov/services/files/36ED1777-1CED-4FBD-AC03-0FCC685F8E49.

221. 43 U.S.C. § 1337(p).

222. *Id.*

223. *Id.* § 1337(p)(2)–(3).

224. *Id.* § 1337(p)(1), (7).

225. *Id.* § 1337(p)(4).

226. *Id.* § 1337(p)(8).

227. *Id.* § 1337(p)(9).

228. VANN, *supra* note 218, at 5.

229. Ocean Thermal Energy Conversion Act, 42 U.S.C. §§ 9101–9168. The history of OTEC demonstrates that just *having* a statute to ostensibly govern an industry is not enough to push industry development. Interest in OTEC grew in the late 1970s as oil and gas prices increased. Todd J. Griset, *Harnessing the Ocean's Power Opportunities in Renewable Ocean Energy Resources*, 16 OCEAN & COASTAL L J. 395, 426 (2011). This led to Congress passing the OTEC Act in 1980 and NOAA the next year implementing regulations aimed at attracting OTEC project investment and development. *Id.*

BOEM and the Federal Energy Regulatory Commission (FERC) claimed regulatory jurisdiction over MHK projects on the OCS.[230] BOEM claimed jurisdiction under EPAct section 388. FERC claimed jurisdiction under the Federal Powers Acts of 1920, under which it has authority to "issue licenses . . . for the purpose of constructing, operating, and maintaining . . . project works necessary or convenient for the . . . utilization of power across, along, from, or in any of the streams or other bodies of water over which Congress has jurisdiction."[231] Each agency developed its own dueling regulations.[232] In 2009, the issue was resolved not by congressional action clarifying authority, but by a memorandum of understanding between the agencies.[233] In the agreement, BOEM and FERC took a "why not both?" approach to permitting. They agreed that BOEM leases are required for offshore energy projects that involve temporarily or permanently attaching a structure or device to the seabed,[234] and FERC does not have jurisdiction over non-MHK renewable projects, including solar and wind.[235] However, MHK projects also generally require a FERC license unless they are intended for limited testing meeting specific requirements.[236]

2. Recent Legislative Proposals

Since the EPAct, both Democrats and Republicans have proposed several bills to support development of the offshore renewable industry. The Offshore Renewable Energy Development Act of 2008 was proposed "[t]o provide for assessment and identification of sites as appropriate for the location of offshore renewable electric energy generation facilities, [and] to provide funding for offshore renewable electric energy generation projects."[237] Several bills have been proposed to support offshore renewable energy research and development

However, the 1980s also saw a decrease in the cost of fossil fuels. *Id.* The availability of alternative fuel, coupled with OTEC's high capital costs, resulted in not a single application for an OTEC project under NOAA's regulations. *Id.* In 1995, NOAA withdrew the regulations. *Id.* at 427.

230. Peter F. Chapman, Note, *Offshore Renewable Energy Regulation FERC and MMS Jurisdictional Dispute Over Hydrokinetic Regulation Resolved?*, 61 ADMIN. L. REV. 423, 424 (2009); *see also* NIC LANE, CONG. RSCH. SERV., RS22721, WAVE, TIDAL, AND IN-STREAM ENERGY PROJECTS: WHICH FEDERAL AGENCY HAS THE LEAD? 2 (2008).

231. 16 U.S.C. § 797(e).

232. Chapman, *supra* note 230, at 424.

233. Memorandum of Understanding (MOU) Between the U.S. Dep't of the Interior and Fed. Energy Regul. Comm'n (Apr. 9, 2009), https://www.ferc.gov/sites/default/files/2020-04/mou-doi.pdf [hereinafter 2009 MOU].

234. BUREAU OF OCEAN ENERGY MGMT., BOEM / FERC GUIDELINES ON REGULATION OF MARINE AND HYDROKINETIC ENERGY PROJECTS ON THE OCS 2 (May 27, 2020).

235. *Partnering with Federal Energy Regulatory Commission*, BUREAU OF ENERGY MGMT., https://www.boem.gov/environment/environmental-studies/partnering-federal-energy-regulatory-commission (last visited Dec. 15, 2020).

236. BUREAU OF OCEAN ENERGY MGMT., *supra* note 234, at 3.

237. Offshore Renewable Energy Development Act, H.R. 7142, 110th Cong. (2008).

projects.[238] Others have focused specifically on offshore wind, aimed at increasing project funding,[239] incentivizing development through tax credits,[240] expanding coastal states' shares of offshore renewable project revenue,[241] and establishing job training programs.[242] However, none has attempted to streamline or clarify regulatory authority over project development or operations.

D. Comprehensive, Not Piecemeal, Statutory Overhaul Is Necessary

Having articulated the existing statutory schemes under which emerging offshore resources are or might be regulated, this Subpart explains why legislative action is necessary and why that action should take the form of new statutes, not amendments to existing ones. The current statutory schemes under which the federal government attempts to regulate offshore aquaculture and renewable energy production are technically insufficient, providing inadequate clarity for regulators and the regulated communities. Additionally, as *Gulf Fishermens* shows, there is no guarantee courts would be sympathetic to reading new meaning into years old, well-established, and much litigated statutes like the MSA and OCSLA. And perhaps most important, regulating emerging technology under old statutes ignores our growing societal recognition of the necessity of conservation and sustainability. Federal statutes should reflect societal concerns contemporaneous to their passage, as did the development-first MSA and OCSLA during an era of maximizing resource exploitation.

1. Existing Resource Statutes Lack Details Sufficient to Govern Emerging Offshore Resources

To remedy the lack of statutory authority over aquaculture, Congress could simply amend the MSA to include "aquaculture" in its definition of "fishing." However, doing so would be ill-advised. As the Fifth Circuit recognized in *Gulf Fishermens*, "the incompatibility of the requirements of the [MSA] with aquaculture operations [is not] an unfortunate happenstance, but rather, [] a clear indication that Congress did not intend for the [Act] to grant NMFS the authority to regulate aquaculture."[243]

238. *See, e.g.*, H.R. 2200, 114th Cong. (2015); S. 1419, 113th Cong. (2013); S. 923, 111th Cong. (2009); H.R. 2036, 110th Cong. (2007).

239. American Renewable Energy Act of 2009, S. 826, 111th Cong. (2009).

240. Offshore Wind Incentives for New Development Act 2019, H.R. 4887, 116th. Cong. (2019).

241. Opening Federal Financial Sharing to Heighten Opportunities for Renewable Energy Act of 2020, S. 3485, 116th Cong. (2020).

242. H.R. 3068, 116th Cong. (2019).

243. Gulf Fishermens Ass'n v. Nat'l Marine Fisheries Serv., 968 F.3d 454, 468 (5th Cir. 2020) (fourth alteration in original) (quoting Gulf Fishermens Ass'n v. Nat'l Marine Fisheries Serv., 341 F. Supp. 3d 632, 640 (E.D. La. 2018)).

While the MSA is primarily a development statute, it does have a number of sustainability requirements intended to prevent and remedy overfishing.[244] These overfishing preventions are illogical as applied to aquaculture, in which the aquaculturist hatches, sustains, and intends to harvest all fish.[245] In addition, because aquaculture involves introducing new fish within existing ecosystems, the corresponding environmental concerns are more complex than those of traditional capture fishery operations. These concerns include fish waste; potential escapes of nonnative and invasive species; fish disease; drugs and other chemicals used to treat the fish; and interaction with native species.[246] Aquaculture also requires significant amounts of energy "to power monitoring equipment, circulation pumps, feeding systems, and navigation lighting, as well as refrigerate the harvested product."[247] The MSA's failure to speak to these concerns leaves too much regulatory discretion over critical issues to agencies and industry itself.

While offshore renewable regulation does have a statutory basis, it is insufficient. The first problem with EPAct section 388 is that it fails to specify what types of offshore renewable projects it governs. Given its application to OCS activities that "produce or support production, transportation, or transmission of energy from sources other than oil and gas," OCSLA could, textually, apply to all offshore renewable technologies.[248] But it has been interpreted as to not apply to OTEC, and while it does govern MHK, the Federal Power Act also plays a significant role in MHK permitting and development.[249] In such projects, it is unclear what agency should take the lead in coordinating permitting and environmental analysis.[250] Even so, if Congress were to amend OCSLA, it would have to do significantly more than clarify agency authority.

Section 388 is conspicuously undetailed when compared to the rest of OCSLA governing offshore oil and gas. In contrast to its oil and gas leasing program, BOEM is not required to prepare a five-year program for offshore renewable production.[251] Besides a general consultation requirement, there are no details as to how and when BOEM must consult with other federal agencies and affected states.[252] There are also no details as to royalties, fees, and other payments leases must meet to comply with the requirement that all activities permitted under section 388 "ensure a fair return to the United States."[253] The list of missing details, as compared to OCSLA's oil and gas provisions, goes on.

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244. *See* 16 U.S.C. §§ 1801–1891. The term "overfish" and its morphemes appear seventy-two times in the act.

245. *Gulf Fishermens*, 968 F.3d at 467.

246. UPTON, *supra* note 6, at 23–30.

247. OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, *supra* note 19, at 38.

248. 43 U.S.C. § 1337(p).

249. 2009 MOU, *supra* note 233.

250. VANN, *supra* note 145, at 5.

251. *See* 43 U.S.C. § 1344(a).

252. *Id.* § 1337(p)(1), (7).

253. *Id.* § 1337(p)(2)(A).

Tacking section 388 onto OCSLA as part of an omnibus energy bill may have been the best Congress could do at the time to acknowledge the potential for offshore renewable development, but the nascent offshore renewable industry needs significantly more support and statutory clarity.

2. Regulatory Ambiguity Slows Development and Risks Setbacks

As the previous Subparts show, significant statutory ambiguity and an insufficient patchwork of regulations exist for both offshore aquaculture and renewable energy production. This has hindered and will continue to hinder responsible industry development.

For offshore aquaculture, the most obvious example of the damage to development that statutory ambiguity can cause is *Gulf Fishermens*. The Gulf of Mexico Fishery Management Council and NMFS spent over a decade working on the regional aquaculture FMP—first developing then litigating it—before the Fifth Circuit declared it invalid.[254] Even before *Gulf Fishermens*, "[r]egulatory uncertainty ha[d] been identified by the [Obama] Administration as the main barrier to developing open ocean aquaculture."[255]

Likewise, coastal and offshore renewable energy history provides a number of cautionary tales highlighting the problems statutory ambiguity causes. The Cape Wind Project was planned off the coast of Massachusetts as the first offshore wind farm in the country.[256] The project was ultimately abandoned after a decade of litigation, permitting delays, and millions of dollars spent.[257] Or, as discussed, FERC and BOEM spent four years fighting over MHK jurisdiction, with each developing its own regulations, to the confusion of potential developers.[258] And evocative of the problems confronted in *Gulf Fishermens*, there is no guarantee a court would agree with the division of authority FERC and BOEM reached in their 2009 agreement.[259]

Leaving multiple agencies to regulate various aspects of an industry can also lead to underregulation, which has negative effects both on industry and the environment. A patchwork regulatory scheme, in which multiple agencies each focus on a small aspect of a project but none focuses on the macro effects, risks

254. *See* Gulf Fishermens Ass'n v. Nat'l Marine Fisheries Serv., 968 F.3d 454, 458 (5th Cir. 2020). The Council announced the plan in 2009, and NMFS issued its final rule in 2016. *Id.*

255. UPTON, *supra* note 107, at 24; *see also* John S. Corbin et al., *Regulation and Permitting of Standalone and Co-located Open Ocean Aquaculture Facilities*, *in* AQUACULTURE PERSPECTIVES OF MULTI-USE SITES IN THE OPEN OCEAN: THE UNTAPPED POTENTIAL FOR MARINE RESOURCES IN THE ANTHROPOCENE 187, 192 (Bela H. Buck & Richard Langan eds., 2017) ("Commercial offshore aquaculture will not fully develop unless governments create a supportive political climate and resulting regulatory conditions.").

256. Kenneth Kimmell & Dawn Stolfi Stalenhoef, *The Cape Wind Offshore Wind Energy Project A Case Study of the Difficult Transition to Renewable Energy*, 5 GOLDEN GATE UNIV. ENV'T L.J. 197, 199 (2011).

257. Newell, *supra* note 32, at 18–20.

258. *See* Chapman, *supra* note 230, at 424.

259. *See generally* 2009 MOU, *supra* note 233; *Gulf Fishermens*, 968 F.3d at 454.

inadequately protecting the environment and other economic activities in the project area.[260] Furthermore, an insufficiently detailed statutory scheme fails to give developers the clarity they need before committing significant capital investments to new projects.

3. Policy Concerns Distinct from Traditional Offshore Resources

Perhaps most significant, the societal context in which offshore aquaculture and renewable energy production are being developed is distinct from that that existed when traditional resources were nascent. In part, policy makers have a responsibility to learn from the societal and environmental failures of traditional resource regulation. Capture fisheries nearly collapsed in the 1980s and 1990s due to overfishing.[261] There are thousands of oil spills in federal waters each year.[262] Emerging resource statutes must be framed to prevent similar mistakes. For example, the new statutory schemes must set appropriate limits for density of operations so as to not significantly interfere with the water quality, marine animal health, or existing uses of an area. Additionally, offshore renewable energy production and aquaculture each have societal and environmental costs and benefits that are distinct from those of offshore oil and gas and capture fishing. Statutes framed to maximize traditional resources' benefits cannot effectively govern emerging resources requiring different cost-benefit analyses.

More broadly, offshore capture fisheries and oil and gas industries were established in an era that prioritized maximizing resource production over other considerations. As Professor Robin Kundis Craig wrote in a 2002 critique still salient today, "[t]he United States' ocean policies and laws are currently rooted in [a] 'paradigm of inexhaustibility[,]' . . . emphasiz[ing] use instead of protection and preservation [and] individual resources instead of interconnected ecosystems[.]"[263] This includes the MSA and OCSLA, which were written to support industrial growth, not conserve exhaustible resources. And today's emerging offshore industries, necessary in part because of the effects of overuse and overdevelopment of traditional offshore resources, do not belong in those same statutes.

IV. LEGISLATIVE RECOMMENDATIONS: GET SPECIFIC, THINK BIG

A few caveats are necessary before sharing my recommendations for components of new comprehensive statutes governing these emerging ocean resources.

First, while there are many parallels between offshore renewable energy production and aquaculture, they are also dissimilar in significant ways. Offshore

260. *See* Johns, *supra* note 187, at 699.

261. Plumer, *supra* note 168.

262. *Largest Oil Spills Affecting U.S. Waters Since 1969*, *supra* note 167.

263. Robin Kundis Craig, *Taking the Long View of Ocean Ecosystems Historical Science, Marine Restoration, and the Oceans Act of 2000*, 29 ECOLOGY L.Q. 649, 651 (2002).

renewable energy production involves using, not extracting, ocean resources (waves, winds, sun, and temperature differentials). Offshore aquaculture does rely on adding, maintaining, then removing fish from ecosystems. While the effect on wild populations is abstractly net zero, there are significant concerns, noted in Subpart III.C, over likely environmental and biological effects of operations.[264] Additionally, there is a more pressing need for offshore renewable energy production than aquaculture. We urgently need to decarbonize our electric grid through increased renewable energy sources.[265]

The argument for offshore aquaculture development relies on the premise that we will continue eating fish in large amounts and we may want to lower our heavy reliance on seafood imports. A simpler solution than developing a comprehensive regulatory scheme and building a new industry would be to stop eating so many fish. While doing so may be part of the solution to fish stock shortages, relying on mass behavior change in consumption habits seems an unrealistic strategy, especially given sustained bipartisan support for aquaculture.[266] Furthermore, responsible offshore aquaculture could reduce reliance on animal protein sources that have the greatest negative environmental effects, namely industrial beef production and farmed (freshwater) catfish.[267] If the federal government is going to allow offshore aquaculture, which seems likely, a comprehensive statutory scheme balancing sustainability and industry development is better than ad hoc agency decisions or executive orders.

Second, as Parts II and III demonstrate, statutory schemes regulating offshore resource management are, and should be, complex. Therefore, my legislative recommendations are, of course, not exhaustive nor sufficiently detailed. In particular, the recommendations that follow are not particularized for individual species/energy sources within each category of emerging ocean resources (for example, there are not specific recommendations for provisions for salmon aquaculture, oyster aquaculture, offshore solar development, or wave energy development). While the recommendations I provide are broadly applicable, such resource-by-resource treatment is likely necessary for certain statutory provisions, given the distinct costs, benefits, viability, and technologies of individual resources.

With that in mind, I have several recommendations Congress should consider in developing sufficient emerging resource statutory schemes. I offer specific recommendations to provide necessary clarity to the regulating agencies

264. *Supra* Subpart III.C; UPTON, *supra* note 6.

265. *See generally* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, GLOBAL WARMING OF 1.5 C: AN IPCC SPECIAL REPORT ON THE IMPACTS OF GLOBAL WARMING OF 1.5 C ABOVE PRE-INDUSTRIAL LEVELS AND RELATED GLOBAL GREENHOUSE GAS EMISSION PATHWAYS, IN THE CONTEXT OF STRENGTHENING THE GLOBAL RESPONSE TO THE THREAT OF CLIMATE CHANGE, SUSTAINABLE DEVELOPMENT, AND EFFORTS TO ERADICATE POVERTY (Valérie Masson-Delmotte et al. eds., 2018).

266. *See supra* Subpart III.A.2.

267. Ray Hillborn et al., *The Environmental Cost of Animal Source Foods*, 16 FRONTIERS IN ECOLOGY & ENV'T 329, 329 (2018).

and regulated communities. I also make broad recommendations to ensure Congress's interest in economic development does not override the critical need for sustainability and environmental protection—a balance it failed to strike for traditional resources.

A. Align Legislative Purposes with This Century's Realities

Most importantly, any new statutory schemes should begin with prefatory statements (congressional findings and statements of intent and purpose) that explicitly recognize the fragile state of our oceans today and emphasize the federal government's responsibility to protect, not just extract, ocean resources. First, Congress should acknowledge that the climate crisis already is affecting and will continue to affect our oceans. Ocean warming and associated changes are contributing to decline in fish stocks.[268] Offshore renewables are an essential component in the United States' necessary transition to green energy. The federal government's actions going forward, in both the traditional and emerging resource spheres, cannot be framed by an anachronistic extraction mentality. Congress must recognize the oceans have changed and will continue to change along with the climate.

Relatedly, while one purpose of these statutes will be industry development, the laws must effectively balance that development with environmental, sustainability, and public health concerns. In contrast to the MSA and OCSLA, they should not focus primarily on "maximizing" production.[269] To be sure, aquaculture and renewable energy production do not present the same resource exhaustion concerns as their traditional analogues: Aquaculture cannot harvest more fish than it raises, and renewable energy is, by definition, inexhaustible. But production of each has environmental and economic costs and should not be a goal in and of itself. Instead, Congress should recognize that development of offshore renewable energy and aquaculture industries is a part of the solution to lessening our burden on natural resources, alongside other conservation and mitigation strategies.[270]

Finally, the legislation must recognize the interrelatedness of our ocean resources. As Kundis Craig wrote nearly two decades ago, "[a]lthough ocean resources are directly interconnected and mutually influential, U.S. law regulates ocean resources on a resource-by-resource and often on a species-by-species basis rather than on a comprehensive ecosystem basis."[271] Aquaculture

268. Nathaniel L. Bindoff et al., *Changing Ocean, Marine Ecosystems, and Dependent Communities*, *in* IPCC SPECIAL REPORT ON THE OCEAN AND CRYOSPHERE IN A CHANGING CLIMATE, 451 (Hans-Otto Pörtner, et al. eds., 2019).

269. *See* 43 U.S.C. § 1334(g); 16 U.S.C. §§ 1802(33), 1851(a)(1).

270. For example, in the aquaculture statute's purpose section, Congress might write, "The purpose of this Act is to lessen our reliance on overfished wild fish stocks and foreign trade by encouraging the development of a sustainable aquaculture industry in federal waters, while balancing environmental impacts on surrounding ecosystems."

271. Kundis Craig, *supra* note 263, at 666.

operations can affect capture fisheries, aquatic mammals, and general ocean health.[272] Renewable energy facilities may disrupt ocean wildlife populations.[273] Offshore aquaculture, drilling, and renewable energy production require siting decisions that may compete with one another. Ocean ecosystems are fragile, and legislation should be framed so as to recognize that no ocean industry exists in vacuum, especially those that require adding substantial infrastructure to waters and the submerged lands below.

While not considered operative provisions, statutory findings, intent, and purposes are more than symbolic. Courts often use them, as in *Gulf Fishermens*, to derive legislative intent in statutory interpretation disputes.[274] So as disagreements arise about what the new laws require or allow, these statements provide textual support for judicial decisions that align with the realities of oceans today.

Additionally, these purposes should guide the drafting of the new statutes' operative provisions. For example, because ocean resources are interrelated, there must be opportunities for frequent and meaningful consultation between various ocean resource industries, regulators, and stakeholders. Because we need to build a healthy offshore renewable industry *now*, Congress should create substantial grant and workforce development opportunities to promote development. And because resource production is a means, not an end, Congress should require regulations to earnestly consider need and environmental impact alongside technical capacity in setting production limits.

B. Require Centralized Planning

Congress needs to explicitly identify the lead agency that will handle permitting, regulation development, coordination with other agencies, and all required environmental review of projects. If this role is granted to an existing agency, it should likely be BOEM for offshore renewables and NMFS for offshore aquaculture, given their institutional knowledge and expertise in offshore resources. However, creating new offices specifically focused on these emerging industries, still housed within the departments of their respective traditional analogues, may be preferable. First, it would allow the regulators to focus on developing specific expertise necessary to manage these emerging

272. Diego Valderrama & James Anderson, *Interactions Between Capture Fisheries and Aquaculture*, *in* OFFSHORE AQUACULTURE IN THE UNITED STATES: ECONOMIC CONSIDERATIONS, IMPLICATIONS & OPPORTUNITIES 199 (Michael Rubino ed., July 2008).

273. *Renewable Energy Development and Marine Mammals*, MARINE MAMMAL COMM'N, https://www.mmc.gov/priority-topics/offshore-energy-development-and-marine-mammals/renewable-energy-development-and-marine-mammals/ (last visited Dec. 15, 2020).

274. *See* Gulf Fishermens Ass'n v. Nat'l Marine Fisheries Serv., 968 F.3d 454, 464–66 (5th Cir. Aug. 3, 2020); VICTORIA L. KILLION, CONG. RSCH. SERV., R46484, UNDERSTANDING FEDERAL LEGISLATION: A SECTION-BY-SECTION GUIDE TO KEY LEGAL CONSIDERATIONS 23 (2020) ("After enactment, courts may use these statements to resolve ambiguities in the statutory text or to ascertain Congress's purpose in enacting the law.").

industries that have, for decades, lacked necessary regulatory support. Additionally, it would reduce potential mission conflicts since emerging resource industries may be seen as an economic threat to well-established traditional resource industries. Congress should also consider further regionalization of duties, as is recommended in the AQUAA Act's creation of a Regional Aquaculture Coordinator and regional networks.[275]

The lead agency should have a mandate to manage its assigned industry actively, prospectively, and holistically. The new statutes should require the lead agency to develop prospective five-year programs, as OCSLA requires for oil and gas development,[276] that indicate proposed lease and permit sale areas. This would hold the agency accountable in developing, and announcing, sector-wide outlooks, rather than making ad hoc permitting and leasing decisions. It would also provide important information and assurances to industry as to expected development opportunities. Additionally, as is required for oil and gas, the five-year program development process should include consultation requirements between Congress, federal agencies, states, tribes, local governments, and the public.[277] Relatedly, the statutes should require NEPA analysis of the program itself instead of relying only on piecemeal environmental review of individual projects.

C. Streamline Consultation and Permitting Process

States, tribes, local governments, other federal agencies, and the public have meaningful interests in the development of emerging offshore resources. And it is likely multiple permits will, and should, be required for these projects.[278] But, as led by the assigned lead agency, all agencies that will have permitting or licensing authority over a project should coordinate to create a clear step-by-step process through which applicants can expect to move. Here, the oil-and-gas industry provides another lesson. While multiple steps are necessary for offshore fossil fuel exploration and development, developers understand how long each step of the process should take.[279] This would also help prevent delays midway through a project's approval process that can ultimately lead to its downfall.[280]

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275. *See* S. 4723 116th Cong. §§ 401(b)(4), 402(d) (2020).

276. *See* 43 U.S.C. § 1344(a).

277. *Id.*

278. For example, the Department of Defense currently exercises effective veto power over offshore wind project off the West Coast. *See* Nadia Senter, Note, *A Silent Hostility, How Gaps in the Department of Defense's Review Procedures Undermine Critical Offshore Wind Development*, 48 ECOLOGY L.Q. 671 (2021). Streamlining the project approval process will help provide much needed clarity. The important debate over whether it would be advantageous to more significantly limit which agencies are involved in the emerging offshore resources approval processes, and to what degree, is beyond the scope of this Note.

279. VANN, *supra* note 145, at 11.

280. *See* Kimmel & Stalenhoef*, supra* note 256, at 212.

The lead agency should also lead all NEPA review of individual projects.[281] As is done for oil and gas development, the lead agency should establish a tiered environmental review system: first publishing a programmatic environmental impact statement for proposed lease and license areas, then conducting individual project environmental review.[282] Tiered environmental review would accelerate the permitting process for individual projects. Additionally, it would lessen the possibility of project timelines getting derailed because of legal findings of insufficient NEPA analyses.

There may be some benefit to imposing strict deadlines for each step of the review and approval process, as some scholars have argued.[283] However, that decision should be approached with caution, as the nascency of the industry may mean unexpected issues will arise, and thorough analysis should not be sacrificed to meet deadlines.[284]

D. Support Research and Industry Development

Past failures within the offshore aquaculture and renewable energy industries demonstrate that development is far from inevitable.[285] And the proliferation of the offshore oil and gas and capture fishing industries in the years after OCSLA and the MSA were passed show the role federal law can play in industrial success. While regulatory clarity itself will significantly benefit emerging industries, Congress should provide additional specific assistance to support emerging offshore resource development. The laws should provide funding for research and development projects that further Congress's goals of

281. A few more specific NEPA suggestions, beyond the scope of this Note, are worth mentioning. First is revising NEPA to ensure renewable energy projects are evaluated using the National Renewable Energy Laboratory's lifecycle assessment and are compared to the lifecycle costs and benefits of other OCS energy uses (i.e., oil and gas). *See* Jeffrey Thaler, *Fiddling as the World Floods and Burns How Climate Change Urgently Requires a Paradigm Shift in the Permitting of Renewable Energy Projects*, 42 ENV'T L. 1101, 1149 (2012). Second, again more compelling for renewable energy production than aquaculture, is instructing agencies not to consider projects' unavoidable visual and aesthetic impacts as a basis for denying project approval. *See* Michael B. Gerrard, *Legal Pathways for a Massive Increase in Utility-Scale Renewable Generating Capacity*, 47 ENV'T L. REP. (ENV'T LAW INST.) 10,591, 10,601–02 (2017); Mitchell Hokanson, Note, *Avoiding the Doldrums Evaluating the Need for Change in the Offshore Wind Permitting Process*, 44 COLUM. J. ENV'T L. 181, 236–38 (2019) (considering Gerrard's suggestions for NEPA revisions in light of a Republican administration).

282. *See* COMAY, *supra* note 152, at 7. This idea has been proposed in multiple iterations of offshore aquaculture legislation, *see* S. 4723, 116th Cong. § 406 (2020); H.R. 4363, 111th Cong. § 4 (2009), and by scholars alike, *see, e.g.*, Gerrard, *supra* note 281, at 10601–02.

283. Thaler, *supra* note 281, at 1146 ("There must be binding time limits for each step of the NEPA and BOEM processes—for example, the Department of Energy (DOE), the Corps, or other lead agency must turn around the draft EA [environmental analysis] or EIS [environmental impact statement] within a specific number of days, or else waive amendments or revisions. Likewise, consulting agencies must be required to submit any comments within a specified number of days, or be precluded from commenting.").

284. For further discussion in the context of offshore wind, *see* Hokanson, *supra* note 281, at 226.

285. For example, Congress passed laws promoting OTEC and aquaculture development, yet little progress has occurred in either industry in the last forty years. Griset, *supra* note 229 and accompanying text (explaining the history, and failure, of U.S. OTEC policy and development); *supra* Subpart III.B.1 (discussing the shortcomings of the National Aquaculture Act).

industry development and environmental protection. As proposed in past aquaculture and offshore renewable bills, the laws should also require the lead agencies to develop job training programs to help build a workforce with the skills necessary for these emerging industries.[286]

E. Consider Oceanwide Solutions

The discussion and recommendations thus far have focused on offshore aquaculture, offshore renewable energy, and other ocean resource industries largely as distinct resources and governed by discrete statutory and regulatory schemes. However, given the extent of legislative changes needed to sufficiently manage emerging resource industries, this is an opportune moment for Congress to once again consider more holistic approaches to ocean resource management.[287] These efforts could be encouraged in individual statutes governing offshore aquaculture and renewable energy, or they could be considered in a broader omnibus legislative proposal governing all ocean resources.

There are substantial opportunities for colocation of offshore resource facilities. Kundis Craig describes this connection between ocean resources as the "marine food-water-energy-climate nexus."[288] Under EPAct section 388, BOEM already has authority to issue leases and easements for "energy-related purposes or for other authorized marine-related purposes, [for] facilities currently or previously used for activities authorized under [OCSLA's leasing program]."[289] Such colocation projects should be encouraged. Capture fisheries can use energy from collocated offshore renewable facilities.[290] Aquaculture can be located on or near offshore oil and gas facilities or on decommissioned drilling platforms.[291] Or, aquaculture facilities can get their power from nearby offshore

286. *See* S. 4723 § 402; H.R. 3068, 116th Cong. (2019).

287. For decades, scholars have advocated for replacing the existing federal piecemeal ocean management scheme with unified governance. *See, e.g.*, Martin H. Belsky, *The Ecosystem Model Mandate for a Comprehensive United States Ocean Policy and Law of the Sea,* 26 SAN DIEGO L. REV. 417, 430 (1989); Kundis Craig, *supra* note 263, at 704 (published in 2002); Michael LeVine & Andrew Hartsig, *Modernizing Management of Offshore Oil and Gas in Federal Waters*, 49 ENV'T L. REP. (ENV'T LAW INST.) 10,452, 10,454 (2019).

288. Robin Kundis Craig, *Harvest the Wind, Harvest Your Dinner Using Law to Encourage an Offshore Energy-Food Multiple-Use Nexus*, 59 JURIMETRICS 61, 63 (2018).

289. 43 U.S.C. § 1337(p)(1)(D).

290. Katherine L. Yates et al., *Ocean Zoning for Conservation, Fisheries and Marine Renewable Energy Assessing Trade-offs and Co-location Opportunities*, 152 J. ENV'T MGMT. 201 (2015); Christine Röckmann et al., *Operation and Maintenance Costs of Offshore Wind Farms and Potential Multi-use Platforms in the Dutch North Sea*, *in* AQUACULTURE PERSPECTIVE OF MULTI-USE SITES IN THE OPEN OCEAN: THE UNTAPPED POTENTIAL FOR MARINE RESOURCES IN THE ANTHROPOCENE 97 (Bela H. Buck & Richard Langan eds., 2017).

291. CLARE M. HARMON, CONSIDERATIONS FOR CO-LOCATION OF AQUACULTURE AND OCEAN ENERGY FACILITIES 5–6 (Sea Grant L. Fellow Publ'ns No. 77, 2016); *see generally* AQUACULTURE PERSPECTIVE OF MULTI-USE SITES IN THE OPEN OCEAN: THE UNTAPPED POTENTIAL FOR MARINE RESOURCES IN THE ANTHROPOCENE (Bela H. Buck & Richard Langan eds., 2017).

renewable facilities.[292] Colocation recognizes the inherent interconnectedness of offshore resources and capitalizes on it in mutually beneficial ways.

Also warranting serious consideration and a deeper discussion than possible here is federal implementation of marine spatial planning (MSP). MSP is "the allocation of human uses and activities within a marine area, across both space and time, to achieve specified objectives."[293] In recognizing the need for ocean resource industries and uses to coexist, MSP "provides a means of managing potentially conflicting activities and ensuring sustainable use of resources by accounting for cumulative effects on an area."[294] Federal MSP efforts began under the Obama administration[295] but were reversed by President Trump in 2018.[296] Several states already use MSP to coordinate marine activities in state waters.[297]

The preceding legislative suggestions specific to offshore emerging resources are compatible with broader oceanwide reform efforts that incorporate MSP, colocation opportunities, and recognize the marine food-water-energy-climate nexus.

CONCLUSION

U.S. ocean resource management is at a crossroads. Continuing to regulate ocean activities under last century's extraction- and exploitation-focused laws will harm the environment and hinder responsible management of emerging resource industries. Current regulations are not working to support and regulate either offshore aquaculture or offshore renewable energy production. These industries do not fit within the statutory schemes of their traditional analogues, and the federal government should not continue attempts to shoehorn them in. If the United States wants to facilitate smart and sustainable development of these emerging offshore resource industries, legislative action to develop new statutory schemes is necessary now.

In developing new statutes, and subsequent regulations, there is an opportunity to recognize and reflect the realities of our oceans today: the climate crisis has and will continue to affect ocean ecosystems; ocean resources are interrelated; and ocean resources are not endless bounties for human exploitation, and they must be managed sustainably.

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292. Kundis Craig, *supra* note 288, at 61; *see also* OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, *supra* note 19, at xii.

293. JORDAN DIAMOND ET AL., ENV'T L. INST., MARINE SPATIAL PLANNING IN U.S. WATERS: AN ASSESSMENT AND ANALYSIS OF EXISTING LEGAL MECHANISMS, ANTICIPATED BARRIERS, AND FUTURE OPPORTUNITIES, at V (2009).

294. *Id.*

295. *Id.*

296. David Malakoff, *Trump's New Oceans Policy Washes Away Obama's Emphasis on Conservation and Climate*, SCIENCE (June 19, 2018, 9:15 PM), https://www.sciencemag.org/news/2018/06/trump-s-new-oceans-policy-washes-away-obama-s-emphasis-conservation-and-climate.

297. MIKAELA FREEMAN ET AL., U.S. DEP'T OF ENERGY, PNNL-28608, MARINE HYDROKINETICS REGULATORY PROCESSES LITERATURE REVIEW 16 (2019).

While details will vary, I present recommendations appropriate for both offshore aquaculture and renewable energy production, which would set agencies on the right path of implementing regulations that balance resource demand with long-term sustainability. These mutual recommendations, coupled with the need for action in multiple ocean resource industries, present an opportunity for Congress to address ocean resources more comprehensively. Given the interconnection between ocean resources, legislators can and should consider reform in industries beyond offshore aquaculture and renewables: The statutory schemes for shipping, mining, capture fisheries, and oil and gas should be reconfigured to align with the realities of the oceans today, not as they stood last century.[298]

The halting progress of emerging offshore resource industries also provides a broader lesson beyond the oceans. It highlights the problem with trying to fit new industries, driven by new technologies and societal needs, into existing anachronistic frameworks. Doing so is tempting, especially in a time marked by legislative inaction and gridlock, in an effort to make *some* progress. But it has significant consequences. As shown by *Gulf Fishermens*, doing so can leave a nascent industry in limbo after legal invalidation. It can lead to overregulation that harms industry and underregulation that harms the environment or economy. And it does society a disservice, in perpetuating an outlook that no longer reflects the realities of the day.

298. For specific recommendations to modernize federal oil and gas management, *see* LeVine & Hartsig, *supra* note 287.