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Natural Resources Defense Council Comments on 2023-2028 National Outer Continental Shelf Oil and Gas Leasing Proposed Program

I. Introduction

We submit these comments on the Bureau of Ocean Energy Management's (BOEM) *2023-2028 National Outer Continental Shelf Oil and Gas Leasing Proposed Program* (Proposed Program) on behalf of the Natural Resources Defense Council (NRDC) and our hundreds of thousands of members and online activists.

For decades, NRDC has worked to reform the offshore oil and gas leasing program to ensure the protection of irreplaceable ocean and coastal ecosystems, the preservation of community and worker health, and consistency with our laws.

We oppose BOEM's proposed leasing program, which would enable development of the Outer Continental Shelf (OCS) for decades to come, threatening marine life, businesses and workers who rely on a healthy ocean, and generating greenhouse gas emissions that fuel climate change.

BOEM must issue a leasing program with no new leases. Existing leased energy reserves, as well as increasing amounts of renewable energy and new clean energy policies, ensure that the nation's energy needs can be met without opening up new lease areas for development. Further, issuing new leases is contrary to BOEM's mandate to protect marine, coastal, and human environments under the Outer Continental Shelf Lands Act (OCSLA).

Additionally, the analysis in BOEM's Proposed Program is flawed in the following ways:

- **BOEM fails to adequately consider key OCSLA factors –** BOEM has failed to consider key environmental, geographic, and economic factors as required by OCSLA. The flaws in its analysis include: failure to fully consider the environmental and human costs of continued oil and gas development in the Gulf of Mexico, inadequate accounting of the risks to the critically endangered Rice's whale, failure to consider the rapidly changing U.S. energy landscape, including as a result of the Inflation Reduction Act (IRA), ignoring the unique risks posed by deepwater

development, and incorrectly evaluating the implications of the Proposed Program and the no-lease alternative on jobs and state revenues.

- **BOEM fails to appropriately balance the OCSLA factors –** The flaws in BOEM's analysis of the OCSLA factors invalidate the cost-benefit balancing analysis BOEM must conduct under the statute. Additionally, BOEM selectively omits certain costs from its analysis – such as the costs of combusting fossil fuels and catastrophic oil spills – which skews its cost-benefit analysis to artificially favor continued development. Finally, BOEM continues to rely on the MarketSim model in appropriate ways even though the model has been criticized by various courts and remains a poor model to evaluate fuel substitution and subsequent costs and benefits.
- **BOEM's National Environmental Policy Act (NEPA) analysis is flawed** – BOEM fails to comply with NEPA's requirements to adequately evaluate the direct, indirect, and reasonably foreseeable impacts of the Proposed Program. The flaws in BOEM's NEPA analysis include: an inadequate discussion of the full impacts of greenhouse gas emissions resulting from OCS development, failure to fully consider the effects of oil spills, ignoring the full suite of impacts to threatened and endangered species, and not accounting for the legacy of the *Deepwater Horizon* disaster and the potential for other similar events.

BOEM must revise the Proposed Program and issue a program with no new lease sales.

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II. Key Provisions of the Outer Continental Shelf Lands Act

OCSLA, as amended in 1978, directs the Department of Interior (DOI) through the Bureau of Ocean Energy Management (BOEM) to prepare and maintain a program that establishes a schedule of proposed oil and gas lease sales for the Outer Continental Shelf (OCS) for the five years following program approval. 43 U.S.C. § 1344(a). While the preparation of this program is only the first step in a multi-stage leasing process, it is when the "key national decisions as to the size, timing, and location of OCS leasing" are made. *Ctr. for Sustainable Econ. v. Jewell*, 779 F.3d 588, 595 (D.C. Cir. 2015). BOEM is authorized to hold only the lease sales scheduled in each five-year program. 43 U.S.C. § 1344(d)(3).

OCSLA provides "broad standards" for preparing and maintaining such a leasing program. *State of Cal. by & through Brown v. Watt ("Watt I")*, 668 F.2d 1290, 1301 (D.C. Cir. 1981). The Secretary must develop a "schedule of proposed lease sales . . . which [the Secretary] determines will best meet national energy needs for the five-year period." 43 U.S.C. § 1344(a). The statute does not define "best meet national energy needs." That said, in determining how to "best" meet energy needs, the Secretary must strive to implement the policies articulated in the statute, including that the program "preserve, protect, and develop oil and natural gas resources in the Outer Continental Shelf in a manner which is consistent with the need . . . to balance orderly energy resource development with protection of the human, marine, and coastal environments . . . ." 43 U.S.C. § 1802(2).

In addition, the statute requires any five-year program to be consistent with four guiding principles, which include:

> (1) consideration of the "economic, social, and environmental values" and the "impact of oil and gas exploration on . . . the marine, coastal, and human environments," *Id.* § 1344(a)(1);
>
> (2) consideration of eight factors, including, among others, information about the "geographical, geological, and ecological characteristics," other uses of the seabed, including "fisheries," "the relative environmental sensitivity and marine productivity of different areas," and the "relevant environmental and predictive information for different areas of" the OCS, *id.* § 1344(a)(2)(A)-(H);
>
> (3) a "proper balance between the potential for environmental damage, the potential for the discovery of oil and gas, and the potential for adverse impact on the coastal zone," *Id.* § 1344(a)(3); and,
>
> (4) assurance of "fair market value for the lands leased and the rights conveyed," *Id.* § 1344(a)(4).

The Secretary must determine what "best meet[s] national energy needs" based on consideration of all eight factors included in the second principle. *Watt I*, 668 F.2d 1290, 1305 (D.C. Cir. 1981). In doing so, the Secretary retains "broad" discretion to balance the eight factors as appropriate, considering the elements of the third principle: "potential for environmental damage, the potential for the discovery of oil and gas, and the potential for adverse impact on the

coastal zone." 43 U.S.C. § 1344(a)(3); *see Watt I*, 668 F.2d at 1317. Indeed, the D.C. Circuit has noted that the third principle is "in large part, a condensation of the factors specified in" the second principle, so the balancing required by the third principle depends in part on the Secretary's findings under the second. *Watt I*, 668 F.2d at 1315; *Ctr. for Biological Diversity v. Dept. of Interior*, 563 F.3d 466, 488 (D.C. Cir. 2009) (quoting *Watt I*); *see also* Proposed Program at 2-6. But the statute does not require the Secretary to balance equally the elements of the third principle. *Watt I*, 668 F.2d at 1317. Instead, OCSLA "vests the Secretary with discretion to weigh the elements so as to 'best meet national energy needs.'" *Id.* at 1317 (quoting 43 U.S.C. § 1344(a)). In doing so, the Secretary may balance energy potential with environmental risks to determine "how, when, and where oil and gas should be made available." *Watt I*, 668 F.2d at 1297 (quoting H.R. Rep. No. 1474, at 103 (1978)); S. Rep. No. 95-1091, at 103 (1978). And the appropriate weighting of the three elements "may well shift" over time, "with changes in technology, in environment, and in the nation's energy needs." *Id.* at 1317.

While the Secretary retains discretion to carry out its statutory mandates, that discretion is not without limits. The Court of Appeals for the D.C. Circuit has exclusive jurisdiction over petitions for review of BOEM's five-year programs. 43 U.S.C. § 1349(c)(1). Judicial review follows a "hybrid" standard. *Watt I*, 668 F.2d at 1300. The court reviews the Secretary's factual determinations for substantial evidence, 43 U.S.C. § 1349(c)(6), reviews policy judgments to ensure that they are "not arbitrary nor irrational," and reviews statutory construction for permissibility. *Ctr. for Sustainable Econ.*, 779 F.3d at 600.

III. BOEM Should Issue a National Program with No Lease Sales Because That Will "Best Meet National Energy Needs"

OCSLA authorizes the Secretary to issue a five-year program with no new lease sales. Existing leased energy reserves and current energy policies demonstrate that such a program would "meet national energy needs." Given those reserves and policies, the Secretary should finalize a program that includes no new lease sales. At very least, BOEM has not adequately explained and supported its decision to include lease sales in the program in light of existing energy reserves.

Even if BOEM's analysis did not end once it concludes no lease sales are necessary to meet energy needs, a decision to include lease sales would be inconsistent with the Secretary's statutory mandate to prioritize environmental concerns in the analysis and balancing of the eight statutory factors (43 U.S.C. § 1344(a)(2)). *See also id.* § 1344(a)(3). Where, as here, no lease sales are needed to meet energy needs and any lease sale would cause significant environmental harm, it would be arbitrary and capricious to finalize a program that includes lease sales. BOEM has not adequately explained why any lease sales are warranted in light of the environmental harms that would result.

Finally, as discussed further in Section IV, BOEM's analysis and balancing of the eight factors is flawed. BOEM fails to consider important aspects of the problem and improperly ignores contrary evidence. It would be arbitrary and capricious for the Secretary to finalize the program as proposed based on that flawed analysis.

A. BOEM Has Authority to Issue a National Program With No New Lease Sales and Should Do So When Energy Needs Can Be Met Without Lease Sales

OCSLA mandates that the Secretary prepare and maintain a program of lease sales that "best meet national energy needs." In so directing, the statute gives the Secretary discretion to determine what level of leasing activity will meet energy needs and to determine how "best" to meet any such needs. That includes the discretion to issue a program with no lease sales when energy needs can be met without any lease sales. Indeed, the statutory language and legislative history demonstrate that a five-year program should not include lease sales that are not needed to satisfy national energy needs. As demonstrated below, no lease sales are necessary at this time. Therefore, the Secretary should issue a program with no lease sales.

BOEM should use its discretion to prepare a program that includes zero lease sales because no lease sales are necessary to meet energy needs. There is nothing in the statute that mandates sales to be included in a five-year program. *Cf.* 43 U.S.C. § 1344. Rather, the statutory language reflects the Secretary's discretion to determine that a program with zero lease sales best meets national energy needs. For instance, to "meet," by definition, is to "conform to especially with exactitude and precision" or "to provide for"—not to maximize. *Merriam-Webster Dictionary* (defining "meet"). And energy "needs" are a "lack of something requisite, desirable, or useful." *Id.* (defining "need"). Therefore, in order to "meet national energy needs," the Secretary need only propose the amount and timing of oil production minimally necessary to satisfy that energy requirement. In other words, the Secretary's analysis should begin by asking what energy needs exist and whether any lease sales are necessary to meet them. As demonstrated below, for the next five-year period, that number of lease sales is zero.

Congress recognized that OCS resources should be made available "when necessary to meet national needs." S. Rep. No. 93-1140, at 5. Coupled with expressed concerns about environmental harms, this phrase suggests Congress intended OCS resources to be available *only* when necessary. Moreover, Congress considered oil drilling to be something that may be needed from the 1970s through the next decade or generation, but not as an indefinite source of energy. Senate reports viewed the 1978 amendments as a way to develop oil resources over the course of a decade. *See* S. Rep. No. 93-1140, at 1-2 (1974); S. Rep. No. 94-284, at 1-2 (1975). And Congress recognized the possibility that cleaner-burning energy sources could materialize and that the nation's energy needs would evolve. Specifically, a House report argued that "[d]evelopment of our OCS resources will afford us needed time—as much as a generation—within which to develop alternative sources of energy . . . [and] provide time to bring on-line, and improve energy technologies dealing with, solar, geothermal, oil shale, coal gasification and

liquefaction, nuclear, and other energy forms." H. Rep. No. 95-590, at 53; *see* H. Rep. 94-1084, at 48 (1975). Congress's anticipation of an energy transformation would be in tension with a statutory scheme that required the Secretary to propose multiple lease sales in each five-year program indefinitely.

As discussed below, national energy needs can be met without new leases. Since no new leases are needed, OCSLA calls for the Secretary to issue a program that includes no new lease sales. The Secretary has not adequately supported its conclusion to the contrary.

B. The Nation's Energy Needs Can Be Met with No New Leases

The Secretary of the Interior should propose no new leases in the upcoming five-year program for offshore oil and gas leasing. Given the substantial reserves already under lease, stopping new leasing would have minimal projected impacts on U.S. fossil fuel production through at least 2035. These minimal impacts will be more than made up by the country's anticipated energy conservation gains. Indeed, just the federal and state-level efficiency policies that are currently in place will produce energy savings that dwarf the projected production reduction from no new leasing.

The nation's energy needs can be met without any lease sales in the next program because:

(1) We have enough energy to meet the nation's needs without leasing new areas of the Outer Continental Shelf. A no new leasing program would not meaningfully change U.S. oil and gas production and prices, and thereby not disrupt U.S. energy supplies; and
(2) Any impact would be more than offset by significant declines in demand for oil and gas due to increasing deployment of renewable energy, electrification, and energy-saving technologies and policies.

1. We have enough energy reserves to meet the nation's needs without leasing new areas of the OCS.

Even without new leasing, there is enough oil and gas supply in existing offshore leased areas to continue producing at significant rates into the 2030s and beyond, and ten years is an appropriate time frame for this evaluation. Offshore activity accounts for 15 percent of total domestic oil production and around 3 percent of total U.S. natural gas production, a sizable but not overwhelming contribution to our current national oil and gas energy needs.[1] Nearly 95 percent of U.S. offshore oil production and 71 percent of offshore natural gas production takes place in the Gulf of Mexico. The Gulf thus provides a fairly comprehensive picture of offshore

[1] U.S. ENERGY INFO. ADMIN., *Energy Data: U.S. Petroleum and Other Liquids Facts for 2021*, https://www.eia.gov/special/gulf_of_mexico/data.php#petroleum_fuel_facts (last visited Oct. 6, 2022); U.S. ENERGY INFO. ADMIN., *Natural Gas Explained* (Oct. 8, 2021), https://www.eia.gov/energyexplained/natural-gas/where-our-natural-gas-comes-from.php [hereinafter Natural Gas Explained]; U.S. ENERGY INFO. ADMIN., *Natural Gas Summary*, https://www.eia.gov/dnav/ng/ng_sum_lsum_a_EPG0_FPD_mmcf_a.htm (last visited Oct. 6, 2022).

production from currently leased areas.[2] Of the 414 active fields there, 384 were producing as of the end of 2019.

The leased areas in the Gulf of Mexico have been estimated to contain 4,652 million barrels of proved plus probable oil reserves and 6,103 billion cubic feet of natural gas reserves for a combined total of 5,740 million barrels of oil equivalent, enough to fuel 215 million cars for a year.[3] In addition to these "proved plus probable" reserves, there are also substantially greater amounts of already discovered oil and gas resources that could become economically viable in these leased areas.[4] BOEM estimates that the Gulf of Mexico has grown discovered resources of 38.409 billion barrels of oil and 235.791 trillion cubic feet of gas and undiscovered technically recoverable resources of 29.590 billion barrels of oil and 54.845 trillion cubic feet of gas, some of which is likely in leased areas and will likely be developed even without new leases.[5]

Utilizing the National Energy Modeling System (NEMS), which is the accepted "gold standard" for U.S. energy-economy systems modeling, experts at OnLocation, a leading energy analytics and consulting firm, modeled the effects of no new oil and gas leasing in the Gulf beginning in 2021.[6] This modeling relied in part on the Energy Information Administration (EIA) Annual Energy Outlook 2022 (AEO2022) reference case. BOEM's oil and gas production and related

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[2] U.S. ENERGY INFO. ADMIN., *Annual Energy Outlook 2021, Table 58: Lower 48 Crude Oil Production and Wellhead Prices by Supply Region*, https://www.eia.gov/outlooks/aeo/data/browser/#/?id=71-AEO2021&region=0-0&cases=ref2021&start=2019&end=2050&f=A&linechart=ref2021-d113020a.4-71-AEO2021&map=&sourcekey=0 (Feb. 3, 2021); U.S. ENERGY INFO. ADMIN., *Annual Energy Outlook 2021-Appendix D*, https://www.eia.gov/outlooks/aeo/pdf/appd.pdf (last visited Oct. 6, 2022); Natural Gas Explained.

[3] *See* Grant L. Burgess, Kellie K. Cross, and Eric G. Kazanis, *Outer Continental Shelf: Estimated Oil and Gas Reserves Gulf of Mexico OCS Region*, BOEM, at 4 (Sept. 2021), https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/2019-EOGR.pdf. In this report, reserves are proved plus probable (2P) reserve estimates. BOEM defines "*reserves"* as "those quantities of petroleum anticipated to be commercially recoverable by application of development projects to known accumulations from a given date forward under defined conditions." *Id.* at 27. *Reserves* must further satisfy four criteria: They must be discovered, recoverable, commercial, and remaining (as of a given evaluation date) based on the development project(s) applied." *Id; see also* BOEM, *Classification and Methodology for Reserves Calculations*, https://www.boem.gov/oil-gas-energy/resource-evaluation/classification-and-methodology-reserves-calculations (last visited Oct. 6, 2022); Adam Hayes, *Barrel of Oil Equivalent*, INVESTOPEDIA (May 20, 2021), https://www.investopedia.com/terms/b/barrelofoilequivalent.asp; U.S. EPA, *Greenhouse Gas Emissions From a Typical Passenger Vehicle* (Mar 2018), https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100U8YT.pdf.

[4] Burgess at Appendix A. This refers to discovered and contingent resources, which BOEM defines as an accumulation of hydrocarbons that has been discovered but is not yet producing and may be commercially viable only under certain scenarios.

[5] BOEM, *2021 Assessment of Technically and Economically Recoverable Oil and Natural Gas Resources of the Gulf of Mexico Outer Continental Shelf* (Dec. 2021), https://www.boem.gov/sites/default/files/documents/regions/gulf-mexico-ocs-region/resource-evaluation/2021%20Gulf%20of%20Mexico%20Oil%20and%20Gas%20Resource%20Assessment%20%28BOEM%202021-082%29.pdf.

[6] ONLOCATION, *NRDC-NEMS Analysis of a Moratorium on New Offshore Leasing in the Gulf of Mexico*, (Sept. 1, 2022, https://355898.fs1.hubspotusercontent-na1.net/hubfs/355898/NRDC22%20Offshore%20Scenarios%20Results-Final.pdf [hereinafter NRDC-NEMS Analysis].

analyses in the Proposed Program and the PEIS also rely on the AEO2022 reference case. OnLocation's modeling results and a description of them are included as an attachment.

In addition to model runs using the the AEO2022 reference case, OnLocation also developed a "low demand" scenario built off of AEO2022 in order to more accurately account for projected reductions in demand. EIA's AEO2022 reference case projects only a small drop in gasoline and diesel consumption between 2021 and 2040. Gasoline and diesel account for approximately 65 percent of U.S. petroleum consumption.[7] AEO2022 projects gasoline consumption to drop 0.8 percent between 2021 and 2040 (or 3.4 percent between 2022 and 2040) and projects diesel consumption to drop 7.5 percent between 2021 and 2040.[8] These consumption declines are projected with the "legislation and environmental regulations, including recent government actions for which implementing regulations were available as of the end of November 2021."[9]

Since November 2021, however, significant state and federal legislation and rules have been adopted that are projected to reduce gasoline and diesel demand even further. To better estimate demand for transportation fuels between now and 2040 and how that affects U.S. and Gulf of Mexico oil and gas production, OnLocation developed a NEMS model run including transportation policies adopted after November 2021 likely to play a significant role in future energy demand. In this "low demand scenario," OnLocation included the following policies:

New Fuel Economy Standards. The new NHTSA CAFE rule was finalized earlier this year and applies to all manufacturers in the U.S. and displaces the Safer Affordable Fuel-Efficient (SAFE) rule for model years 2024–2026 passenger cars and light trucks.[10] The new CAFE standard would increase fuel economy stringency at a rate of 8% per year rather than the 1.5% year set previously. The standard currently only goes until 2026, but because it is unlikely that the policy would just fall off a cliff in 2026, the scenario assumes 3% per year growth in the standard from 2027 to 2040.

New Greenhouse Gas Emissions Standards. Light Duty Vehicle (LDV) Zero Emission Vehicle (ZEV) Program for California and 16 other states (CT, ME, MD, MA, NJ, NY, OR, WA, RI, VT, VA, MN, DE, CO, NV, NM). State-level ZEV targets are aggregated to their respective Census Divisions. For CA, NY, VA, and WA that have a high number of vehicles and have already passed the legislation with more ambitious targets, ZEV requirements are set to 100% by

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[7] U.S. ENERGY INFO. ADMIN., *Today in Energy:* U.S. petroleum consumption decreased to a 25-year low in 2020 (Aug. 5, 2021), https://www.eia.gov/todayinenergy/detail.php?id=49016.

[8] U.S. ENERGY INFO. ADMIN., *Annual Energy Outlook 2022. Table: Table 2. Energy Consumption by Sector and Source,* https://www.eia.gov/outlooks/aeo/data/browser/#/?id=2-AEO2022&region=1-0&cases=ref2022&start=2020&end=2040&f=A&linechart=ref2022-d011222a.3-2-AEO2022.1-0~ref2022-d011222a.57-2-AEO2022.1-0~ref2022-d011222a.60-2-AEO2022.1-0&map=ref2022-d011222a.4-2-AEO2022.1-0&ctype=linechart&sourcekey=0 (last visited Oct. 6, 2022).

[9] U.S. ENERGY INFO. ADMIN., *Analysis & Projections: Assumptions to AEO2022* (Mar. 3, 2022), https://www.eia.gov/outlooks/aeo/assumptions/.

[10] *See* NHTSA, *Corporate Average Fuel Economy*, https://www.nhtsa.gov/laws-regulations/corporate-average-fuel-economy (last visited Oct. 6, 2022).

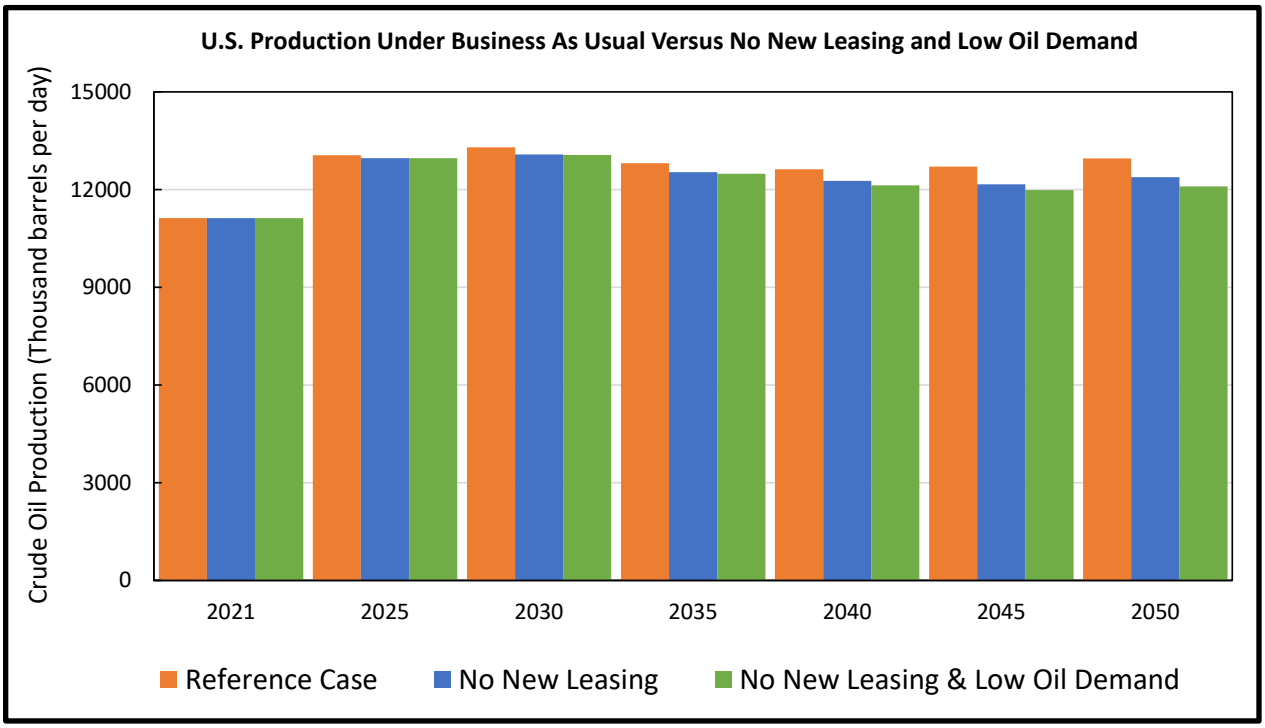
2035 for CA, NY, and VA and 100% by 2030 for WA.[11] For the other 13 states, the ZEV mandates enacted before the SAFE rule preemption (16% EV and 6% PHEV) as modeled previously by EIA for Section 177 of the Federal Clean Air Act are included.

New ZEV Requirements for Trucks. The new Advanced Clean Trucks (ACT) rule for medium-heavy duty vehicles (MHDVs) requires 100% medium and heavy-duty ZEV sales by 2045 for CA and NY. For simplicity, this target was assumed for other states of MA, NJ, OR, WA as well. MHDV sales requirements were modeled at the regional level.

Significantly, although OnLocation included the above-identified policies in its low demand production scenario in order to more accurately represent likely future energy demand compared to AEO2022, this scenario is already outdated as a result of the IRA's passage. Provisions in IRA will further reduce demand for transportation fuels over and above that represented by the OnLocation's assumptions. In addition, OnLocation's 'no new leasing & low demand scenario' did not include any additional oil and gas production that will result from the four lease sales mandated by IRA. Accordingly, OnLocation's 'low demand' scenario modeling, while more accurately capturing likely future demand than the AEO2022 reference case, likely overstates the production impacts of no new leasing.

[11] *See* WHITE HOUSE, *FACT SHEET: President Biden Announces Steps to Drive American Leadership Forward on Clean Cars and Trucks*, (Aug. 5, 2021), https://www.whitehouse.gov/briefing-room/statements-releases/2021/08/05/fact-sheet-president-biden-announces-steps-to-drive-american-leadership-forward-on-clean-cars-and-trucks/; *see also* Governor Gavin Newsom et al., *Multi-State Governors ZEV Letter to President Biden*, (Apr. 21 2021), https://www.gov.ca.gov/wp-content/uploads/2021/04/4.21.21-Multi-State-Governors-ZEV-Letter.pdf; CALIFORNIA AIR RESOURCES BOARD, *15 States and the District of Columbia Join Forces to Accelerate Bus and Truck Electrification* (July 14, 2020, https://ww2.arb.ca.gov/news/15-states-and-district-columbia-join-forces-accelerate-bus-and-truck-electrification; Office of Governor Gavin Newsom, *Governor Newsom Announces California Will Phase Out Gasoline-Powered Cars & Drastically Reduce Demand for Fossil Fuel in California's Fight Against Climate Change* (Sept. 23, 2020), https://www.gov.ca.gov/2020/09/23/governor-newsom-announces-california-will-phase-out-gasoline-powered-cars-drastically-reduce-demand-for-fossil-fuel-in-californias-fight-against-climate-change/. In July 2020, a coalition comprising California, 14 other states, and Washington, D.C., signed a memorandum of understanding committing to accelerate the adoption of zero-emissions technology, with a target of making 100 percent of all new medium- and heavy-duty truck sales be zero-emissions by 2050. California subsequently announced a similar target for 100% ZEV sales by 2035.

a. **Modeling demonstrates that no new leasing will have little impact on U.S. oil and gas production**



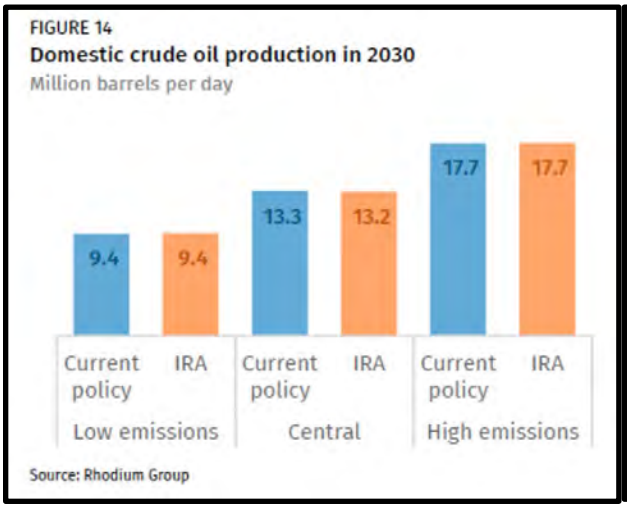
Source: NRDC-NEMS Analysis at 6.

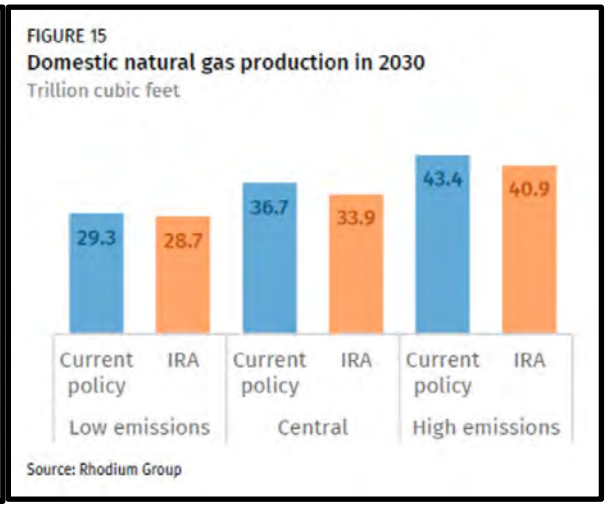
In their production scenarios, OnLocation finds that annual (not cumulative) domestic production of crude oil decreases in 2024 by 52,000 b/d (barrels/day) with a larger decrease of 280,000 b/d by 2035 and 570,000 b/d by 2050 in 'No new leasing' scenario relative to the Reference Case. Annual domestic production of crude oil decreases in 2024 by 52,000 b/d with a larger decrease of 320,000 b/d by 2035 and 860,000 b/d by 2050 in 'No new leasing & low oil demand' scenario. Total U.S. crude oil production is 2.2% and 4.4% lower in 2035 and 2050 in 'No new leasing' scenario relative to the Reference Case, respectively. Total U.S. crude oil production decreases by 2.5% and 6.7% in 2035 and 2050 in 'No new leasing & low oil demand' scenario relative to the Reference Case, respectively. These reductions are a bit larger due to lower crude oil prices that make production less attractive.

Even in the Gulf of Mexico, OnLocation found that crude oil production remains above 2021 levels until 2031 with no new leasing. Compared to the Reference Case, in both 'No new leasing' and 'No new leasing & low oil demand' scenarios, production is 10%, 18%, and 54% lower than the Reference Case in 2030, 2035, and 2050, respectively. This is in contrast to the production analysis BOEM conducted and cites in the Proposed Program, which shows steeper production declines under a no leasing scenario. We discuss the shortcomings of this analysis in the subsection below.

Multiple other analysts have made similar conclusions to OnLocation's, i.e., that issuing no new offshore oil and gas leases would have only a negligible effect on U.S. oil production. For example, analysts at Rystad Energy, a business intelligence and research firm, have conducted studies on the production impacts of a ban on new offshore leasing in the Gulf of Mexico using their own model and reference case and found similar results.[12]

In addition, Rhodium Group recently modeled the impact specifically of IRA provisions on domestic crude oil production. They found that in 2030, crude production is effectively flat (Figure 14) when comparing the IRA with current policy, and gas production declines by 2-7% (Figure 15) with the IRA compared to current policy.[13]





Source: A Turning Point

b. BOEM's "no new leases" production forecast is flawed

Based on the information that BOEM has publicly released, there appear to be significant flaws in the production forecasts for the no new leasing scenario included in the Proposed Program. We want to note that it proved impossible to conduct a complete review of BOEM's Gulf of Mexico production calculations under a no new leasing scenario or to fully understand the basis of these calculations due to the insufficiency of the information provided in the Proposed Program and PEIS and that is otherwise publicly available. NRDC filed a Freedom of Information Act (FOIA) request in an effort to obtain the necessary information on BOEM's

[12] OFFSHORE, *Biden Administration Suspends Federal Oil and Gas Leasing* (Jan. 27, 2021), https://www.offshore-mag.com/regional-reports/us-gulf-of-mexico/article/14196352/biden-administration-suspends-federal-oil-and-gas-leasing. Rystad projected a production decline of 200,000 barrels of oil per day by 2030, an approximately 1.5 percent decline from base case projections.

[13] John Larsen et al., *A Turning Point for US Climate Progress: Assessing the Climate and Clean Energy Provisions in the Inflation Reduction Act* RHODIUM GROUP (Aug. 12, 2022), https://rhg.com/research/climate-clean-energy-inflation-reduction-act/ [hereinafter A Turning Point].

production projection methodology; however, we did not receive the requested information prior to this comment deadline and our request remains pending.[14]

Based on our current understanding of BOEM's methodology, the agency appears to be using a purely engineering data model for its projections. NEMS, on the other hand, utilizes a more robust energy-economics modelling technique. Such a methodology takes into account economic data in shaping its production projections, and not simply engineering information.

More specifically, BOEM's production forecast is separated into three different forecasts of production of reserves, contingent resources, and undiscovered resources. BOEM's production forecast of reserves is relatively similar to that performed in NEMS. This production is from resources that are already developed and for which large capital expenditures have already occurred. Therefore, it is relatively straightforward to carry out an engineering-based extrapolation of production as described by BOEM in its documentation.[15]

However, BOEM's estimation of production from the other resource types that it describes (i.e., "Contingent Resources" and "Undiscovered Resources") is more opaque. It appears that BOEM continues to evaluate those resources by relying on engineering estimates that are based on what it labels as "proprietary geophysical information," which is available to the agency through industry-issued data reports and company press releases.[16] This approach is potentially problematic in that engineering-based estimates exclude consideration of economic factors that would directly affect decisions to commit large outlays of capital in future time periods. Company press releases can provide information about the production that may occur from known, leased, discoveries at a future time period. However, company plans can change, and press releases and other company plans do not address unknown fields that could produce at a future time.

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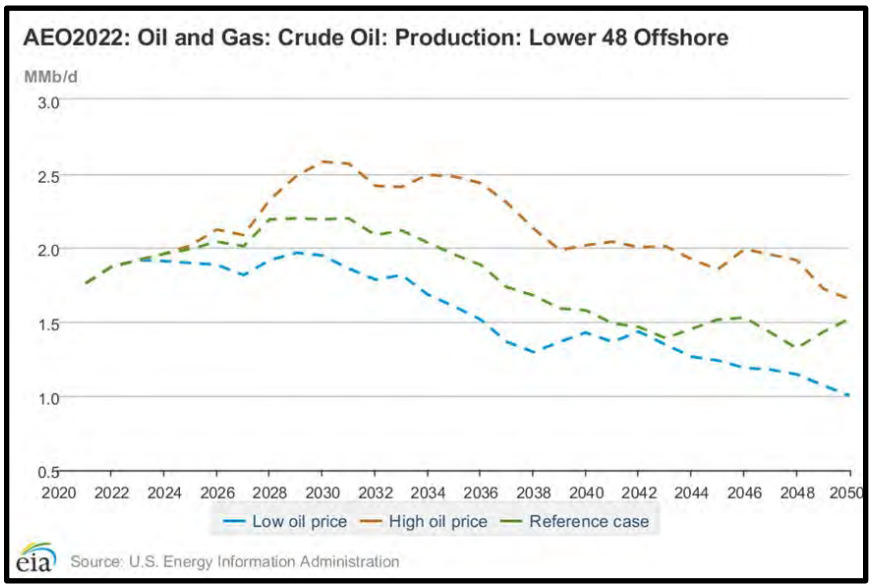
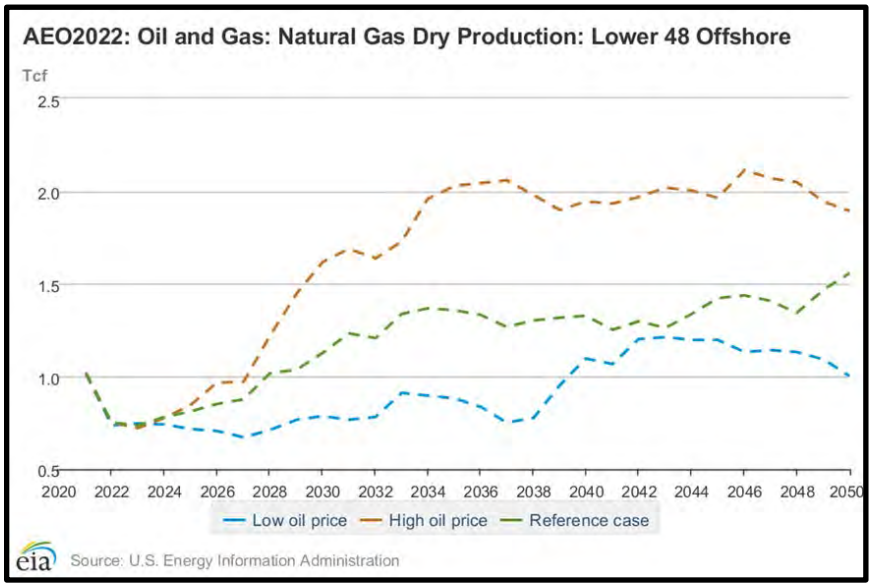
[14] We filed a FOIA request on August 16, 2022. On August 24, BOEM's FOIA officer sent a letter stating they had a backlog and that our request was complex so we wouldn't receive a determination until November 29. On September 27, we sent a letter to BOEM's FOIA officer requesting a status update. The next day, we were informed that many items we requested (economic data) were not relevant to the proposed program or the production analysis. We also received a 163-page document, of which 162 pages were redacted and were referred to several BOEM webpages. For the three outstanding items, we were told to file a request specifying we were asking only for non-proprietary information. We were also told that there was no FOIA backlog at the agency and the request would be fulfilled in a timely manner. Accordingly, on September 29, we filed a new FOIA request specifying that we were only asking for non-proprietary information. However, on October 3, BOEM's FOIA officer informed us that they do indeed have a backlog and would not be able to fulfill our request until later this month (all communication documentation attached).

[15] BOEM, *U.S. Outer Continental Shelf Gulf of Mexico Region Oil and Gas Production Forecast 2022-2031*, at 17-8 (July 2022), https://www.boem.gov/sites/default/files/documents/regions/gulf-mexico-ocs-region/US%20OCS%20GOMR%20Oil%20and%20Gas%20Production%20Forecast%202022-2031.pdf.

[16] *Id.* at 19-21. In addition, an email received on September 28 from boemfoia@boem.gov states "3,4,5: There is no economic analysis in the National OCS Program or 10-year forecast." This confirms that the projections were not informed by economic factors, only engineering factors.

EIA's NEMS projections of the offshore resources directly incorporate known resource characteristics and economic factors that would affect future production from those resources. OnLocation has used NEMS to investigate these issues directly, as discussed in the previous section. EIA itself provides evidence that economic factors, and not just engineering factors, can directly impact offshore oil and natural gas production. Figure A and Figure B below illustrate EIA's projections for crude oil and natural gas production under cases where the only difference is future crude oil prices. From the inspection of these charts, it can be clearly seen that economic factors, such as crude oil prices, affect future decisions regarding whether to invest in offshore oil and natural gas production. In addition, NEMS endogenously calculates the change in net imports, onshore production, and end-use consumption of energy that would occur.





Source: U.S. ENERGY INFO. ADMIN., *Annual Energy Outlook 2002: Table 14 Oil and Gas Supply, https://www.eia.gov/outlooks/aeo/data/browser/#/?id=14-AEO2022&region=0-0&cases=ref2022~highprice~lowprice&start=2020&end=2050&f=A&sid=ref2022-d011222a.13-14-AEO2022~highprice-d011222a.13-14-AEO2022~lowprice-d011222a.13-14-AEO2022~ref2022-d011222a.40-14-AEO2022~highprice-d011222a.40-14-AEO2022~lowprice-d011222a.40-14-AEO2022&sourcekey=0* (last visited Oct. 6, 2022).

c. Modeling demonstrates that no new leases will have a negligible impact on oil and gas prices

OnLocation's modeling demonstrates that projected production declines under no new leasing would have a negligible impact on oil prices. In the OnLocation AEO2022 'no new leasing' scenario, there would be no effect on prices until 2030, when projected gasoline prices would be only 1 cent per gallon higher than under the continued new leasing scenario, a hike of less than 1 percent.[17] In the AEO 2022 no new leasing plus low demand case, even with no new offshore oil and gas leasing, oil and gas prices will actually decline starting in 2030.

In addition, OnLocation found the following:

(1) The Brent crude oil price is $72/barrel in 2021 and drops to $60/b in 2023 then steadily increases to $90/b by 2050 following historical and projected production and demand trends in the Reference and 'No new leasing' scenarios. In 'No new leasing with low oil demand' scenario, crude price drops by $4/b by 2050 due to lower oil demands in the transportation sector and estimated global market impacts.
(2) The Henry Hub natural gas price (the pricing point for natural gas futures on the New York Mercantile Exchange) in the Reference Case decreases from $4.1/MMBtu in 2021 to $3.0/MMBtu in 2025 then rises to $3.6/MMBtu in 2035 and stays almost constant through 2050. In the 'No new leasing' and 'No new leasing with low oil demand' scenarios natural gas prices increase slightly by $0.2/MMBtu from 2030 to 2050 relative to the Reference Case.
(3) From $3.10/gallon in 2021, the price of gasoline decreases to $2.65/gallon in 2024 and gradually increases to $3.15/gallon in 2050 in Reference and 'No new leasing' scenarios. In 'No new leasing & low oil demand' scenario, gasoline prices follow the same quantity and trend as Reference and 'No new leasing' scenarios until 2030. From 2031 through 2050, gasoline prices are 10 to 50 cents/gallon lower than those prices in Reference Case due to higher EV adoption and lower gasoline consumption in the transportation sector. Diesel price starts from $3.25/gallon in 2021 and decreases to $3.00/gallon in 2023 then steadily increases up to $3.55/gallon by 2050 in all three scenarios.

2. Demand for fuel is decreasing, in part due to state and federal transportation policies.

The gradual production declines resulting from no new leasing would leave ample time for the nation to transition to a cleaner energy future that includes renewable energy and more efficient

[17] *See* NRDC-NEMS Analysis.

and electric vehicles. This transition is already underway and is expected to accelerate, especially in light of the adoption of IRA's clean energy and vehicle electrification incentives.[18]

A decline in offshore oil and gas production with no new leasing was projected to be more than offset by an anticipated drop in fuel consumption even before the adoption of IRA and other state zero emission vehicle policies. As part of OnLocation's AEO2022 no new leases low oil demand scenario, they found declines in demand for petroleum. In 2030, demand for petroleum is projected to be 2.4 percent below reference case projections – equivalent to a 421,000-barrels-of-oil-per-day drop, and in 2035, demand is projected to be 5.6 percent below reference case projections. This rises to 6.3 percent by 2040 and 13 percent by 2050.

Significantly, oil imports also dropped substantially in the 'No new leasing and low oil demand' scenario relative to the 'no new leasing' scenario. In the latter scenario, a drop in U.S. oil production is substituted by higher imports. In this no new leasing and low demand scenario, reduced demand is greater than the declines in U.S. oil production and U.S. imports decline beginning in the late 2020s. The cumulative reduction in U.S. imports between 2021 and 2030 is 132 million barrels, which increases to 1.064 billion barrels cumulatively between 2021 and 2035 and continues to grow through 2050.

Rhodium Group, a leading independent energy research firm, previously forecast the effects of federal and state vehicle and utility sector policies that were on the books as of May 2021. Analysts found that by 2027, demand for transportation fuels (which accounts for about 70 percent of U.S. petroleum consumption) will be 8 to 12 percent below 2019 levels, and that by 2030, demand will be 10 to 15 percent below 2019 levels.[19]

In comparison, the 223,000-barrel-per-day drop in offshore oil production by 2030—which is what OnLocation projects in its AEO2022 no-new-leasing scenario—would reduce total U.S. oil production by only around 1.7 percent, an amount dwarfed by projected demand reductions.[20]

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[18] INTERNATIONAL ENERGY AGENCY, *Global EV Outlook 2021: Trends and Developments in Electric Vehicle Markets* (2021), https://www.iea.org/reports/global-ev-outlook-2021/trends-and-developments-in-electric-vehicle-markets; *see also* U.S. DOE, *Clean Energy* (last visited Oct. 6, 2022), https://www.energy.gov/clean-energy.

[19] DOE Office of Energy Efficiency & Renewable Energy, *The Transportation Sector Consumes More Petroleum Than All Other Sectors Combined* (Aug. 12, 2019), https://www.energy.gov/eere/vehicles/articles/fotw-1094-august-12-2019-transportation-sector-consumes-more-petroleum-all; Hannah Pitt et al., *Taking Stock 2021: US Emissions Outlook Under Current Policy* RHODIUM GROUP (July 15, 2021), https://rhg.com/research/taking-stock-2021/; Hannah Pitt et al., *Taking Stock 2021*: *Technical Appendix* RHODIUM GROUP (July 15, 2021), https://rhg.com/wp-content/uploads/2021/07/Taking-Stock-2021-Technical-Appendix.pdf; INTERNATIONAL ENERGY AGENCY, *Annual Energy Outlook Retrospective Review* (Dec. 29, 2020), https://www.eia.gov/outlooks/aeo/retrospective/. Transportation demand projections shared with NRDC by Rhodium Group were used for the emissions numbers. According to an EIA review comparing its projections with realized energy use, EIA overestimated transportation energy use in 77.6 percent of its projections between 1994 and 2019.

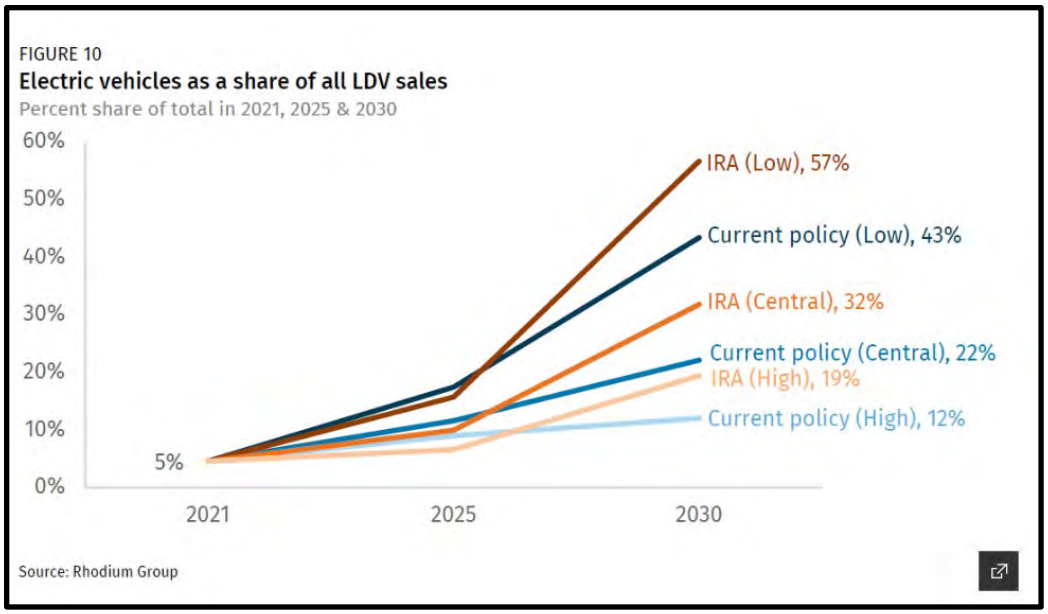
[20] *See* NRDC-NEMS Analysis.

Rhodium Group analysts looked at the potential demand impact of anticipated future federal policies, such as electric vehicle tax incentives and public charging grants as well as more stringent Environmental Protection Agency (EPA) emissions standards. They found that federal incentives for electric vehicles and charging infrastructure would cut gasoline and diesel demand by about another 4 percent by 2030. A strengthened emissions standard for light-duty vehicles could cut demand by an additional 7 percent.[21]

Building on these preexisting measures and trends, IRA has added programs to further accelerate the adoption of electric vehicles, including providing middle and lower-income households up to $4,000 in tax credits for a used passenger electric vehicle (EV) or up to $7,500 for a new EV to help offset the costs (fuel cell vehicles also qualify), extension of the credits until the end of 2032 and removal of the original 200,000 vehicle cap per manufacturer—which numerous companies have exceeded. IRA also has provisions to accelerate adoption of commercial electric vehicles, including $1 billion for operators of school and transit buses, as well as garbage-trucks, to switch to electric vehicles, $3 billion in grants for zero-emissions equipment and technology to be used at ports, and $3 billion for the U.S. Postal Service (USPS) to purchase electric trucks.

Rhodium Group recently modeled the impacts of IRA's provisions on electric vehicle adoption. They found that by 2030 electric vehicles will comprise 19-57% of light duty vehicle (LDV) sales, up from 12-43% without IRA (see figure below). While the North American sourcing requirements limit the emissions impacts of the IRA transportation provisions in the short term, by 2030 EV adoption is projected to have accelerated. In addition, these sourcing requirements will help create a robust domestic EV supply chain.[22]

[21] John Larsen et al., *Pathways to Build Back Better: Investing in Transportation Decarbonization* RHODIUM GROUP, (May 13, 2021), https://rhg.com/research/build-back-better-transportation/pathways-to-build-back-better-investing-in-transportation-decarbonization/ [hereinafter Pathways to Build Back Better].
[22] *See generally* A Turning Point.



Source: Pathways to Build Back Better

Energy Innovation has also modeled the impacts of the IRA on electric vehicle adoption and found increases in EV adoption and stock by 2030 with IRA compared to a business-as-usual scenario.[23]

Scenario	Passenger Vehicle BEV Sales Share in 2030	Passenger Vehicle PHEV Sales Share in 2030	Light/Medium Truck BEV Sales Share in 2030	Light/Medium Truck PHEV Sales Share in 2030	Bus BEV Sales Share in 2030	Heavy Truck BEV Sales Share in 2030
Business as Usual	21%	8%	17%	4%	15%	10%
Low	22%	8%	36%	3%	20%	24%
Moderate	25%	9%	37%	3%	21%	25%
High	29%	10%	38%	3%	21%	27%

Table 3: Sales Shares of BEV and PHEVs in 2030 by Scenario

Scenario	Passenger Vehicle BEV Stock Share in 2030	Passenger Vehicle PHEV Stock Share in 2030	Light/Medium Truck BEV Stock Share in 2030	Light/Medium Truck PHEV Stock Share in 2030	Bus BEV Stock Share in 2030	Heavy Truck BEV Stock Share in 2030
Business as Usual	9%	5%	7%	3%	5%	2%
Low	9%	4%	16%	3%	6%	5%
Moderate	10%	5%	16%	3%	6%	5%
High	11%	5%	16%	3%	6%	6%

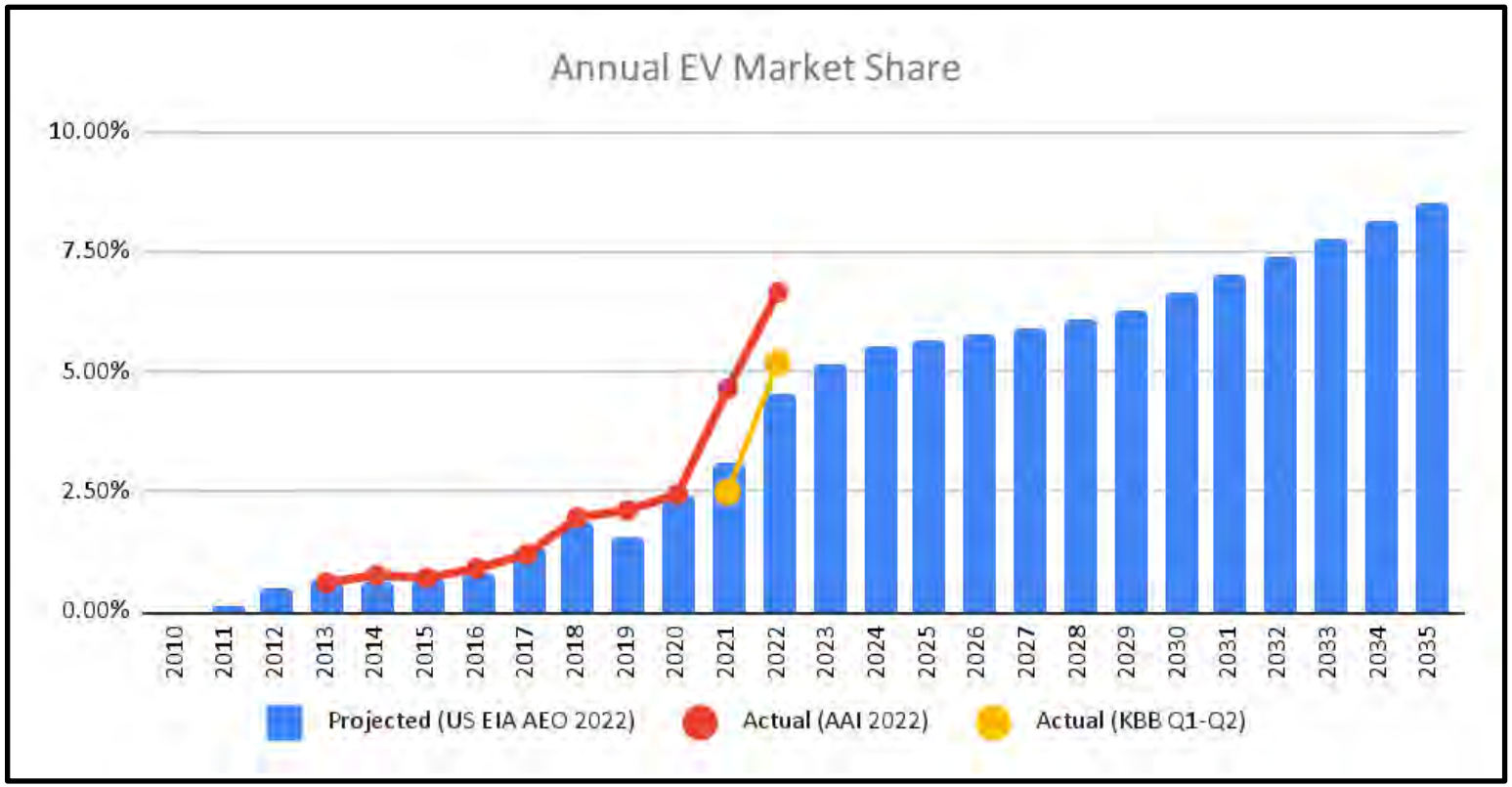
Table 4: Stock Shares of BEV and PHEV in 2030 by Scenario

[23] Megan Mahajan et al., *Updated Inflation Reduction Act Modeling Using the Energy Policy Simulator*, at 3 (Aug 2022), https://energyinnovation.org/wp-content/uploads/2022/08/Updated-Inflation-Reduction-Act-Modeling-Using-the-Energy-Policy-Simulator.pdf.

Source: Mahajan et al. at 9.

Even before the adoption of the IRA, Americans were beginning to adopt electric vehicles more quickly than projected. Electric vehicle (EV) sales increased by 76% in Q1 and 66.4% in Q2 of 2022 compared with the same quarter in 2021. 2022 YTD (June 2022) EV and Fuel Cell Electric Vehicle sales are 69% higher when compared to this quarter in 2021. This is in contrast to a very slight decrease (-0.3%) in Hybrid and Plug-In Hybrid sales over the same time period.[24]

[24] KELLEY BLUE BOOK, *Electrified Light-Vehicle Sales Report – Q1 2022* (2022), https://www.coxautoinc.com/wp-content/uploads/2022/04/Q1-2022-Kelley-Blue-Book-Electrified-Light-Vehicle-Sales-Report-04-20-2022-.pdf [hereinafter KBB Q1]; KELLEY BLUE BOOK, *Electrified Light-Vehicle Sales Report – Q2 2022* (2022), https://www.coxautoinc.com/wp-content/uploads/2022/07/Kelley-Blue-Book-Q2-2022-Electrified-Vehicle-Sales-Report.pdf [hereinafter KBB Q2]; KELLEY BLUE BOOK, *Quarterly Light-Vehicle Sales Report* – Q1 2022 (2022), https://www.coxautoinc.com/wp-content/uploads/2022/04/Q1-2022-Kelley-Blue-Book-Sales-and-Data-Report.pdf; U.S. ENERGY INFO. ADMIN., *Annual Energy Outlook 2022* (2022), https://www.eia.gov/outlooks/aeo/.

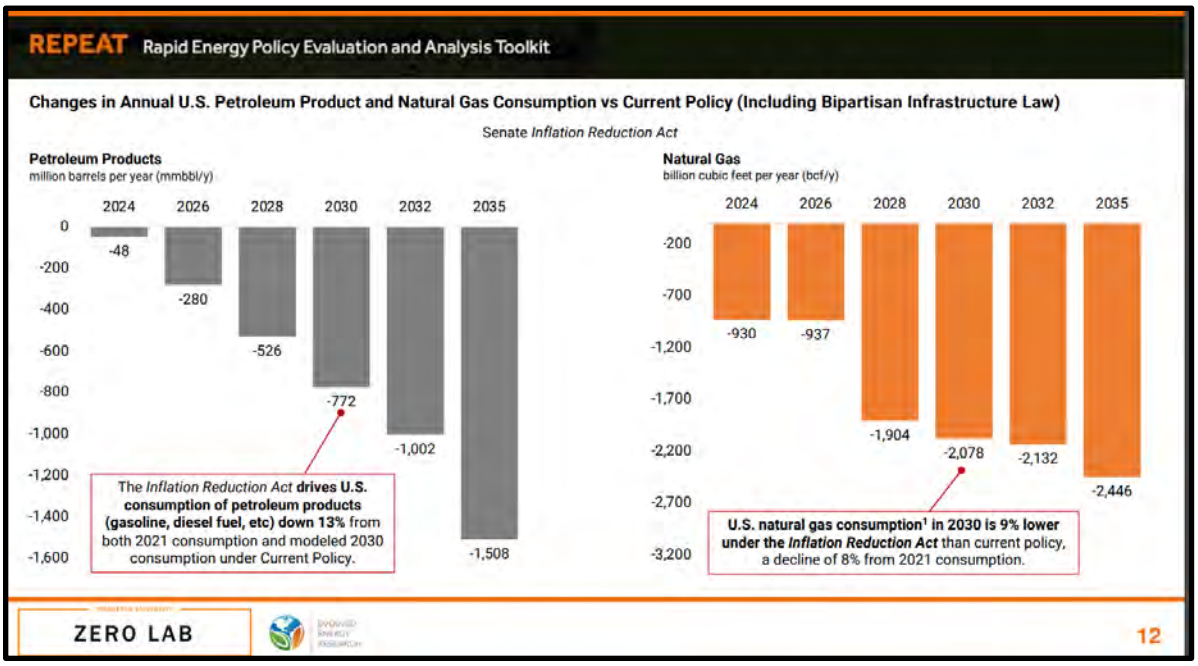


Source: Consumption Figure Data.

Projected annual EV market share over the prediction period (AEO 2022) plotted with actual annual EV market share (AAI EV Sales Dashboard) and actual Q1-Q2 EV market share (KBB Q1, 2022; KBB Q2, 2022).[25]

[25] *See* ALLIANCE FOR AUTOMOTIVE INNOVATION, *Advanced Technology Vehicle Sales Dashboard*, https://www.autosinnovate.org/resources/electric-vehicle-sales-dashboard (last visited Oct, 2022); U.S. Energy Information Administration (EIA), *Consumption figure data*: *Annual Energy Outlook 2022: Consumption* (2022), https://www.eia.gov/outlooks/aeo/ppt/AEO2022_narrative_graphs_consumption.pptx (last visited Aug, 2022) [hereinafter Consumption Figure Data]. (Figure 1, leftmost graph); *see also* KBB Q1; KBB Q2.

The Princeton REPEAT project has modeled the oil consumption implications of fully implementing IRA and found substantial demand declines for petroleum products. As shown in the chart below, by 2030, U.S. consumption of petroleum is projected to decline 13 percent, or 772 million barrels per year, from 2021 levels.[26] This is equivalent to 2.1 million barrels per day decline, which exceeds the current rate of production from offshore leases. By 2035, demand for petroleum is projected to have dropped 1,508 million barrels per year, approximately 25 percent below 2021 levels.



Source: Jenkins at 12.

Rhodium Group's modeling also projects a decline in petroleum demand, though they do not report the petroleum data; rather they report emissions data and find that IRA's transportation-related provisions drive total transportation emissions down to 18-26% below 2005 levels in 2030, compared with an 18-24% reduction without the IRA. Rhodium further finds that, on top of the transportation provisions, the clean technology provisions in the IRA lead to small reductions (<1%) in petroleum consumption and larger reductions of 3-10% in natural gas consumption across the economy.

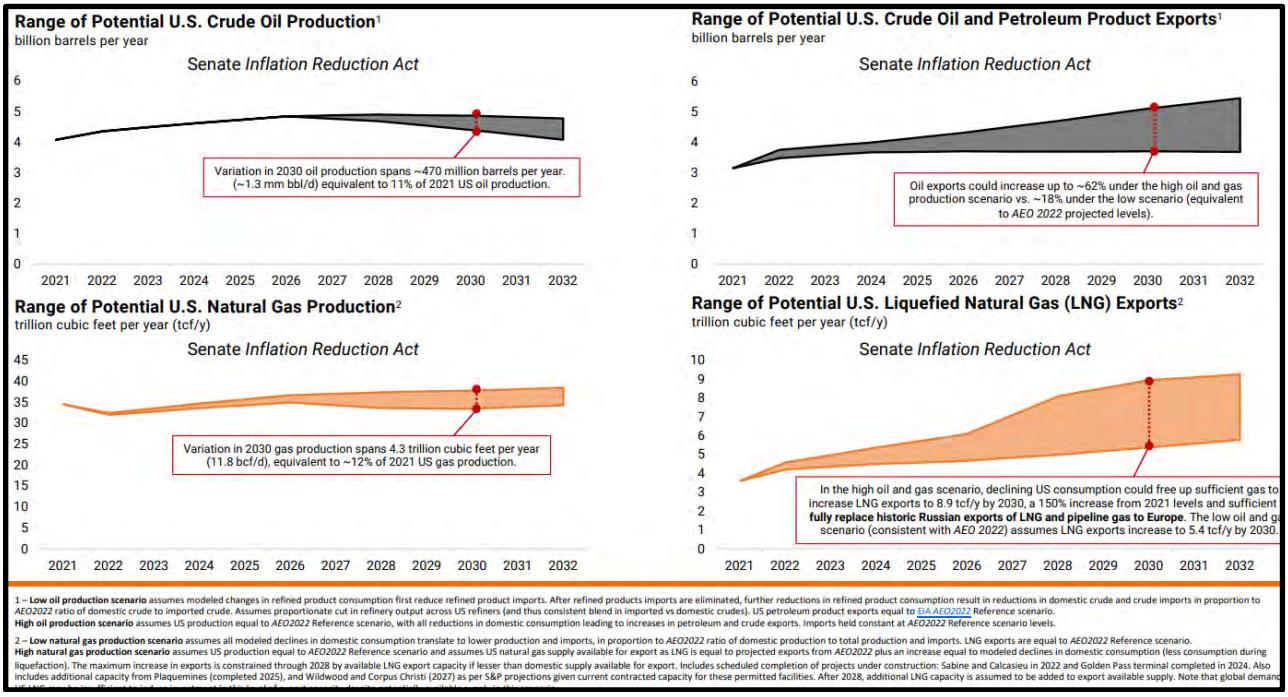
Energy Innovation's modeling also finds significant declines in natural gas consumption in the U.S. and moderate declines in petroleum consumption in the U.S. as a result of IRA provisions. Energy Innovation finds that U.S. natural gas demand decreases by roughly 18 to 27 percent relative to the BAU Scenario, equivalent to 6.2 to 9.3 trillion cubic feet (TCF) of natural gas.

[26] Jesse Jenkins et al. *Preliminary Report: The Climate and Energy Impacts of the Inflation Reduction Act of 2022* PRINCETON UNIVERSITY ZERO LAB, at 12 (Aug. 2022), https://repeatproject.org/docs/REPEAT_IRA_Prelminary_Report_2022-08-12.pdf

As the REPEAT project notes, the global oil market plays a large role in determining the production impacts of the IRA provisions. REPEAT modeled several different scenarios.

REPEAT's low oil production scenario assumes that declines in petroleum consumption first reduce imports of refined products. After refined product imports are eliminated, further reductions in refined product consumption result in reductions in domestic crude and crude imports in proportion to the AEO2022 ratio of domestic crude to imported crude. Exports of U.S. petroleum products are set to equal those in the EIA AEO2022 Reference scenario.

REPEAT also modeled a high oil production scenario. That scenario assumes that U.S. production is equal to levels in the AEO2022 Reference scenario, and that all reductions in domestic consumption lead to increases in petroleum and crude exports. In this scenario, imports are held constant at AEO2022 Reference scenario levels. As illustrated in the chart below, in a high production scenario, oil exports could increase up to 62%.



Source: Jenkins at 14.

The IRA mandates BOEM accept the bids from Lease Sale 257 and hold lease sales 258, 259, and 261. Production that might result from these lease sales would likely not come online until the 2030s when petroleum demand has dropped. The oil production resulting from these lease sales would likely be exported rather than meeting U.S. national energy needs.

C. Finalizing A Program With Lease Sales Would Be Inconsistent With BOEM's Statutory Mandate to Prioritize Environmental Concerns In Determining How to Best Meet National Energy Needs

Even if BOEM's analysis did not end once it concludes no lease sales are necessary to meet energy needs, its determination of how to "best" meet any such needs must reflect OCSLA's mandate to protect the "human, marine, and coastal environments," 43 U.S.C. § 1802(2), and be based on consideration of the eight statutory factors in section 1344(a)(2) and balancing in section 1344(a)(3). BOEM should only authorize lease sales as necessary and based on its balancing and analysis of these eight factors. Where, as here, no lease sales are needed to meet energy needs and any lease sale would cause significant environmental harm, it would be arbitrary and capricious to finalize a program that included lease sales. BOEM has not adequately explained why any lease sales are warranted in light of the environmental harms that would result.

OCSLA grants the Secretary broad discretion in determining not only whether lease sales are necessary to meet energy needs but also how best to meet any such needs. The statute leaves undefined "best meet national energy needs." 43 U.S.C. § 1344(a). The D.C. Circuit has reiterated that both the "general wording of the statute and the nature of the task Secretary is asked to perform" make the Secretary's discretion broad. *Watt I*, 668 F.2d 1290, 1317 (D.C. Cir. 1981); *see Watt II*, 712 F.2d 584, 600 (D.C. Cir. 1983). And courts in other contexts have indicated that statutory language requiring an agency to determine how to "best meet . . . needs" "breathes discretion at every pore." *See Perkins v. Bergland*, 608 F.2d 803, 806 (9th Cir. 1979) (internal citations omitted).

Indeed, the Secretary's statutory authorization to determine the "timing" of lease sales illustrates this broad discretion. *See* 43 U.S.C. § 1344(a). As the D.C. Circuit has explained, the Secretary "could authorize new leasing this year, next year, or in fifty years. Every day that Interior waits has a cost insofar as valuable fuel that could be used today instead lies dormant. But waiting also has benefits, including what is referred to as informational value. More is learned with the passage of time: Technology improves." *Ctr. For Sustainable Econ. v. Jewell*, 779 F.3d 588, 610 (D.C. Cir. 2015) (internal citations omitted). It is within the Secretary's discretion to determine when—and if—it should schedule proposed lease sales, particularly in response to changing circumstances. And as those circumstances change, the proper balancing of concerns may change over time. *Watt I*, 668 F.2d at 1317.

That said, OCSLA's emphasis on environmental concerns requires BOEM to prioritize those concerns in exercising its discretion. Three of the four principles with which the program must be consistent address environmental concerns. The first principle directs that management of the OCS be conducted in a manner that considers "economic, social, and environmental values of the renewable and nonrenewable resources" and the "impact of oil and gas exploration on other resource values of the outer Continental Shelf and the marine, coastal, and human

environments." 43 U.S.C. § 1344(a)(1). The second principle includes among the eight factors the Secretary must consider: information about the "geographical, geological, and ecological characteristics" of the regions; an "equitable sharing of developmental benefits and environmental risks among the various regions"; the location with respect to "fisheries" among other uses; the "relative environmental sensitivity and marine productivity of different areas"; and "relevant environmental and predictive information for different areas." *Id.* § 1344(a)(2). And the third principle requires a "proper balance between the potential for environmental damage, the potential for the discovery of oil and gas, and the potential for adverse impact on the coastal zone." *Id.* § 1344(a)(3).[27]

The legislative history also reflects Congress's prioritization of environmental considerations. For instance, the 1978 amendments were introduced in part in response to growing concerns about environmental harms. *See* S. Rep. No. 95-284, at 42 (1977); *see also Ctr. for Sustainable Econ.*, 779 F.3d at 593 (amendments reflected "intensifying awareness of the need for environmental safeguards"). Prior to that, OCSLA had given the Secretary a very general mandate that was "essentially a carte blanche delegation of authority." S. Rep. No. 95-284, at 43; H.R. Rep. No. 95-950, at 54 (1977). The amendments were therefore intended to provide structure for the Secretary that would ensure consideration of environmental protection, among other factors. H.R. Rep. No. 95-950, at 46 (explaining the timing and location of leasing is "to be based on a balance of an assessment of environmental damage, discovery potential, and impact on the coastal zone"); *id.* at 52 ("the whole OCS process . . . must consider environmental consequences – to the waters, to the air, to adjacent coastal areas, and to the living resources"); *see also* S. Rep. No. 94-284, at 48 (Secretary of Interior expressing opposition to early draft language that would make all productive lands "available for leasing as soon as practicable" on the grounds that such development "may involve undesirable environmental or other effects").

OCSLA's prioritization of environmental risks confirms that BOEM must be judicious about development of the OCS, only authorizing lease sales as necessary and based on its consideration of the eight factors in the second principle and balancing in the third principle. Where environmental risks of oil production are significant, BOEM must justify how authorizing any

[27] An analogous California statutory provision demonstrates how environmental concerns are prioritized in determining how to "best meet" energy needs. California Public Resources Code, section 3106 authorizes the state agency to oversee oil drilling in California to prevent damage to health, property, and natural resources. Cal. Pub. Res. Code § 3106(a). In relevant part, section 3106 directs: "[t]o best meet oil and gas needs in this state, the supervisor shall administer this division so as to encourage the wise development of oil and gas resources." *Id.* § 3106(d). That provision was added to section 3106 in 1972 to strengthen the role of the state agency in dealing with environmental problems. Letter from Senator Deukmejian to Governor Reagan re S.B. 1022 (Aug. 11, 1972). Indeed, the legislature conceived of section 3106(d) not as a mandate to promote oil development but rather as a means of providing protection for the public. That amendment was one step in the evolution of the statutory scheme to prioritize health, safety, environmental protection, and the achievement of California's climate goals. As the statutory scheme shifted, what constituted "wise development" to "best meet" oil needs in California shifted as well. And the state agency must prioritize environmental and health concerns, highlighted in section 3106(a), in determining what "wise development" would "best meet" oil needs. *Id.* § 3106(a), (d). Today, minimizing the extraction and burning of fossil fuel would be the type of "wise development" that would "best meet" those needs.

lease sales would "best" meet national energy needs. *Cf. Com. of Mass. v. Andrus*, 594 F.2d 872, 889 (1st Cir. 1979) (explaining that where environmental threats are "too great," the Secretary has a duty under OCSLA to not permit oil leasing).

Here, the environmental risks are enormous, as discussed in detail below (see section IV). Offshore oil drilling can result in oil spills that are ecological disasters with significant and lasting environmental, public health, and economic consequences. Oil from these spills damages marine organisms, including coral reefs, marine plants, dolphins, sea turtles, oysters, and countless fish species. More generally, offshore oil production activities pose serious risks to habitat of endangered species like Rice's whale and the Cook Inlet beluga whale. Oil production also creates air and water pollution in the communities living near refineries and petrochemical facilities and destruction of the coastal ecosystems that support local livelihoods and culture. And these hazards disproportionately impact communities of color and low-income communities. Offshore drilling also requires construction of new pipelines, which create the risk of spills and ruptures, destroy sensitive ecosystems and exacerbate other environmental harms to the coast such as erosion and saltwater intrusion into wetland habitats.[28]

In addition, greenhouse gas emissions from offshore oil and gas drilling contribute to climate change. New offshore drilling makes it even more challenging to keep global warming below 1.5 degrees Celsius (° C) by the end of this century, which is what scientists have determined is necessary to prevent catastrophic climate change impacts.[29] In its modeling of no new offshore oil and gas leases, OnLocation found that, relative to continued leasing at a business-as-usual pace, no new offshore leasing would lead to a cumulative reduction of 410 million metric tons of carbon dioxide equivalent, which is equal to one year of emissions from 110 coal-fired power plants or 8824 million passenger cars by 2050, and cumulative reductions through 2050 of 4800 million metric tons of carbon dioxide equivalent in its no new leasing plus low demand scenario.[30] Figure 2 demonstrates the disparity between business-as-usual oil production and the levels that would be consistent with keeping global warming below 1.5° C.[31]

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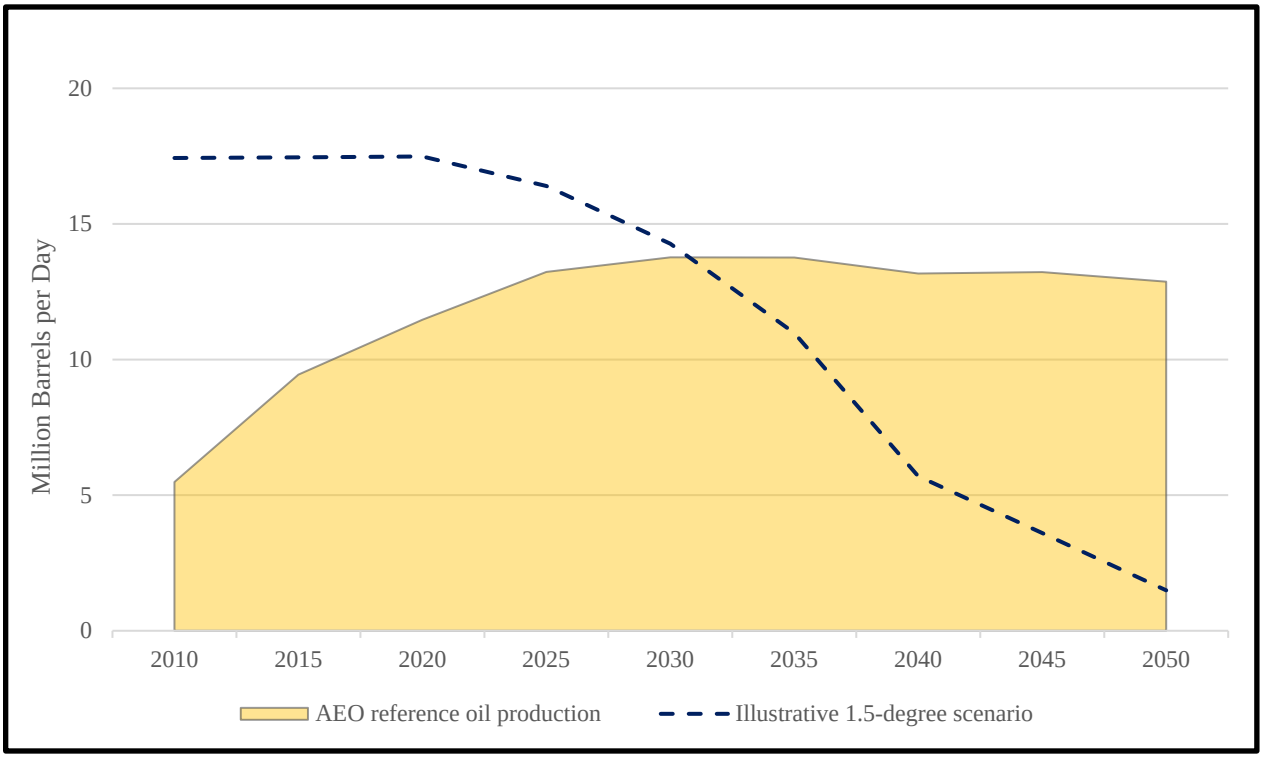
[28] Elizabeth Ridlington & Kelsey Lamp, *Offshore drilling, onshore damage: Broken pipelines, dirty refineries and the pollution impacts of energy infrastructure*, at 12 (2019), https://environmentamerica.org/center/resources/offshore-drilling-onshore-damage/; Bob Marshall, *Losing Ground: Southeast Louisiana is disappearing, quickly*, Sci. Am., Aug. 28, 2014; *see* section IV.B (discussing how the oil and gas industry has contributed to Louisiana coastal land loss).

[29] Stéphanie Bouckaert et al., *Net Zero by 2050: A Roadmap for the Global Energy Sector*, IEA (2021), https://www.iea.org/reports/net-zero-by-2050; IPCC, *Summary for Policymakers*, *in Global Warming of 1.5 °C: An IPCC Special Report on the Impacts of Global Warming of 1.5 °C Above Pre-industrial Levels* (V. Masson-Delmotte et al., eds., 2018), https://www.ipcc.ch/sr15/chapter/spm/.

[30] NRDC-NEMS Analysis.

[31] U.S. Energy Info. Admin., *Annual Energy Outlook 2021*, app. D (Feb. 3, 2021) https://www.eia.gov/outlooks/aeo/pdf/appd.pdf; Rachel Fakhry & Starla Yeh, *The Biden Administration Must Swiftly Commit to Cutting Climate Pollution at Least 50 Percent by 2030*, NRDC (Mar. 2021), https://www.nrdc.org/sites/default/files/2030-biden-climate-pollution-ib.pdf.

Figure: How business-as-usual fossil fuel production is inconsistent with climate action



Source: Rachel Fakhry and Starla Yeh, *The Biden Administration Must Swiftly Commit to Cutting Climate Pollution at Least 50 Percent by 2030*, NRDC (Mar. 2021), https://www.nrdc.org/sites/default/files/2030-biden-climate-pollution-ib.pdf; EIA, *Annual Energy Outlook 2021*, app. D, "Crude Oil Production," (Feb. 3, 2021), https://www.eia.gov/outlooks/aeo/pdf/appd.pdf.

Without quick and aggressive action to reduce global dependency on fossil fuels and invest in new, clean energy technologies and options, we will likely face catastrophic climate impacts. Already, communities across the country, and particularly communities of color, are feeling the impacts of climate change, including sea level rise and increased flooding, increased intensity and severity of storms, increased wildfire activity and associated air quality risks, and deadly heatwaves.

BOEM must consider these environmental risks of oil drilling. Where, as here, no lease sales are needed to meet energy needs (see section III.B) and any lease sale would cause significant environmental harm, it would be arbitrary and capricious to finalize a program with lease sales. Such a program would be inconsistent with OCSLA's mandate to prioritize environmental concerns in determining how to "best" meet national energy needs. 43 U.S.C. § 1344(a). And BOEM has not adequately explained why any lease sales are warranted in light of these significant environmental harms.

IV. BOEM Has Failed to Adequately Consider Key OCSLA Factors

In the Proposed Program, BOEM has failed to adequately consider several key factors under OCSLA; as a result, BOEM must revise its analysis and reissue the Proposed Program for public comment. As we discuss in greater detail below, BOEM omits important considerations from its analysis, including: a full consideration of the effects of climate change, the imperiled status of the endangered Rice's whale, the severe pollution and health burdens carried by communities on the Gulf Coast, and the long-lasting effects of the *Deepwater Horizon* disaster. It also fails to conduct a proper analysis of the environmental sensitivity of the Gulf region and the economic effects of the Proposed Program and a no-lease alternative. These deficiencies require revision of the Proposed Program and recirculation for public comment.

OCSLA requires BOEM to consider various factors – among them, information about the ecological characteristics of planning regions, equitable sharing of developmental benefits and environmental risks among the various regions, other uses of the sea and seabed, the relative environmental sensitivity and marine productivity of different regions, and relevant environmental information – when determining the "[t]iming and location of exploration, development, and production" of oil and gas on the outer Continental Shelf. 43 U.S.C. § 1344(a)(2). Failure to properly consider the factors required by Section 18(a)(2) will "hinder[ ] Interior's ability to obtain a proper balance of the factors under Section 18(a)(3)." *Ctr. for Biological Diversity v. Dept. of Interior*, 563 F. 3d 466, 488 (D.C. Cir. 2009). Such flaws in BOEM's analysis will require vacatur of the program and revision of BOEM's analysis. *See Ctr. for Biological Diversity*, 563 F. 3d at 489. Further, BOEM's actions may be deemed arbitrary and capricious if it "entirely failed to consider an important aspect of the problem." 5 U.S.C. § 706(2)(A); *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins.*, 463 U.S. 29, 43 (1983).

A. BOEM Has Failed to Adequately Consider How Continued Oil and Gas Development in the Gulf of Mexico Will Harm a Heavily Burdened Ecosystem

OCSLA requires BOEM to consider, among other things, the "environmental values of the renewable and nonrenewable resources contained in the outer Continental shelf," as well as the impacts of oil and gas exploration "on other resource values of the outer Continental Shelf and the marine, coastal, and human environments." 43 U.S.C. § 1344(a)(1). When developing the national program, the agency must also consider "geographical, geological, and ecological characteristics," and "relevant environmental and predictive information for different areas of the outer Continental Shelf." 43 U.S.C. §§ 1344(a)(2)(A), (a)(2)(H). BOEM fails to fully consider key issues relevant to these factors, rendering its analysis invalid and requiring revision of the Proposed Program.

1. Climate Change Must Be Taken Into Account in Developing the Program

The effects of climate change are a critical environmental effect that must be fully considered in developing the Proposed Program.

International scientific evidence has unequivocally established that human-caused climate change is a severe and pervasive threat to all aspects of society. The climate crisis is largely driven by the burning of fossil fuels, and the impacts of climate change are projected to worsen without a significant and rapid reduction in global reliance on fossil fuels. Scientific consensus makes clear that "we are on a fast track to climate disaster," rapidly approaching "tipping points that could lead to cascading and irreversible climate impacts."[32]

In the United Nations Framework Convention on Climate Change Paris Agreement (Paris Agreement) the United States agreed to hold "the increase in the global average temperature to well below 2° C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5° C, recognizing that this would significantly reduce the risks and impacts of climate change."[33] The Intergovernmental Panel on Climate Change (IPCC) and other scientific bodies and institutions[34] have made clear that current projected global greenhouse gas (GHG) emissions will exceed the 1.5° C goal of the Paris Agreement, leading to catastrophic and potentially irreversible damage in the United States and globally. Using updated nationally determined contributions (NDCs) submitted prior to the 26th United Nations Climate Change Conference of the Parties (COP26), the IPCC projects that global GHG emissions in 2030 will likely exceed 1.5° C, and after 2030 it will be more difficult to limit warming to below 2° C.[35] Despite the more ambitious NDCs from COP26, other reports similarly confirm that global emissions in 2030 will be roughly twice the amount required to stay within 1.5° C and may lead to warming of 2.4° C by the end of the century.[36]

Research has determined that to stay within the 1.5° C goal of the Paris Agreement, no new fossil fuel facilities can be developed, and existing fossil fuel production must be rapidly phased

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[32] António Guterres, United Nations Secretary-General, *Secretary-General's video message on the launch of the third IPCC report* (Apr. 4, 2022), https://www.un.org/sg/en/content/sg/statement/2022-04-04/secretary-generals-video-message-the-launch-of-the-third-ipcc-report-scroll-down-for-languages.

[33] U.N. Framework Convention on Climate Change, Conference of the Parties, Twenty-first session, Adoption of the Paris Agreement art. 2, ¶ 1(a), U.N. Doc. FCCC/CP/2015/L.9 (Dec. 12, 2015), http://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf ("Paris Agreement").

[34] U.N. Env't Programme, *Addendum to the Emissions Gap Report 2021: A preliminary assessment of the impact of new or updated nationally determined contributions, other 2030 pledges and net-zero emissions pledges announced or submitted since the cut-off dates of the Emissions Gap Report 2021* (2021), https://wedocs.unep.org/handle/20.500.11822/37350; Stockholm Envt. Inst. et al., *The Production Gap: Government's planned fossil fuel production remains dangerously out of sync with Paris Agreement limits* (2021), http://productiongap.org/2021report [hereinafter The Production Gap].

[35] Intergovernmental Panel on Climate Change, *Summary for Policymakers*, *in Climate Change 2022: Mitigation of Climate Change*, W*orking Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, at SPM-18 (Priyadarshi R. Shukla et al. eds., 2022), https://www.ipcc.ch/report/sixth-assessment-report-working-group-3/.

[36] The Production Gap; Climate Analytics & NewClimate Inst., *Climate Action Tracker, Despite Glasgow Climate Pact, 2030 climate target updates have stalled*, at 1 (Cindy Baxter et al. eds., 2021), https://climateactiontracker.org/documents/1051/CAT_2022-06-03_Briefing_MidYearUpdate_DespiteGlasgowTargetUpdatesStalled.pdf; Kjell Kühne, Nils Bartsch, Ryan Driskell Tate, Julia Higson & André Habet, *"Carbon bombs" – Mapping key fossil fuel projects*, 166 Energy Pol'y 1 (2022), https://www.sciencedirect.com/science/article/pii/S0301421522001756.

out. [37] One study suggests that staying within the 1.5° C warming goal would require leaving almost 40% of developed fossil fuel reserves unextracted, as developed reserves "substantially exceed" the carbon budget to limit warming to 1.5° C.[38] Another estimate for a 50% probability of limiting global warming to 1.5° C concludes that 58% of oil reserves and 56% of gas reserves from the 2018 base level must remain unextracted.[39]

World leaders also agree that to stay within 1.5° C of warming there is no room in the remaining carbon budget for any expansion of oil and gas production. Upon the release of the International Energy Agency's (IEA) climate report in May 2021, Fatih Birol, the IEA's executive director, stated: "If governments are serious about the climate crisis, there can be no new investments in oil, gas and coal, from now – from this year."[40] The United Nations Secretary-General similarly stated that the release of the IPCC's Sixth Assessment Report "must sound a death knell for coal and fossil fuels, before they destroy our planet" and that countries should "end all new fossil fuel exploration and production."[41] President Biden has expressed the view that climate change is a pervasive and "existential threat to human existence as we know it."[42] In his Executive Order on Tackling the Climate Crisis at Home and Abroad, President Biden asserted that "there is little time left to avoid setting the world on a dangerous, potentially catastrophic, climate trajectory."[43] In a statement at COP26, President Biden stated that we are at an "inflection point" in the fight

[37] *E.g.*, Dan Calverley & Kevin Anderson, *Phaseout Pathways for Fossil Fuel Production Within Paris-compliant Carbon Budgets*, Int'l Inst. for Sustainable Dev. (2022), https://www.research.manchester.ac.uk/portal/en/publications/phaseout-pathways-for-fossil-fuel-production-within-pariscompliant-carbon-budgets(c7235a8e-e3b1-4f44-99de-c27958c03758).html; Dan Tong et al., *Committed emissions from existing energy infrastructure jeopardizes 1.5° C climate target*, 572 Nature 373 (2019), https://www.nature.com/articles/s41586-019-1364-3; Dan Welsby, James Price, Steve Pye & Paul Ekins, *Unextractable fossil fuels in a 1.5° C World*, 597 Nature 230 (2021), https://www.nature.com/articles/s41586-021-03821-8; Stéphanie Bouckaert et al., *Net Zero by 2050: A Roadmap for the Global Energy Sector*, IEA (2021), https://www.iea.org/reports/net-zero-by-2050.

[38] Kelly Trout et al., *Existing fossil fuel extraction would warm the world beyond 1.5 ° C*, 17(6) Env't Rsch. Letters 1 (2022), https://iopscience.iop.org/article/10.1088/1748-9326/ac6228.

[39] Dan Welsby, James Price, Steve Pye & Paul Ekins, *Unextractable fossil fuels in a 1.5° C World*, 597 Nature 230, 231 (2021), https://www.nature.com/articles/s41586-021-03821-8.

[40] Fiona Harvey, *No new oil, gas or coal development if world is to reach net zero by 2050, says world energy body*, The Guardian (May 18, 2021), https://www.theguardian.com/environment/2021/may/18/no-new-investment-in-fossil-fuels-demands-top-energy-economist.

[41] António Guterres, U.N. Secretary-General, Secretary-General's statement on the IPCC Working Group I Report on the Physical Science Basis of the Sixth Assessment (Aug. 9, 2021), https://www.un.org/sg/en/content/secretary-generals-statement-the-ipcc-working-group-1-report-the-physical-science-basis-of-the-sixth-assessment.

[42] Remarks by President Biden at the COP26 Leaders Statement, Glasgow, Scotland (Nov. 1, 2021), https://www.whitehouse.gov/briefing-room/speeches-remarks/2021/11/01/remarks-by-president-biden-at-the-cop26-leaders-statement/.

[43] Exec. Order No. 14,008, 86 Fed. Reg. 7619 (Jan. 27, 2021).

against climate change and that he hopes the United States will be "leading by the power of our example."[44]

Despite President Biden's desire for the U.S. to be a leader in the fight against climate change, the United States is the world's leader in oil and gas production, the world's second-largest coal producer, and is currently increasing domestic oil production.[45] Assuming continued new leasing on the outer Continental Shelf, the U.S. Energy Information Administration projects that U.S. oil and gas production will increase by 17% and 24% from 2021 to 2050, respectively.[46] A 2021 study concluded that the U.S. would see the largest absolute increase in oil and gas production by 2030, more than twice the amount of any other country.[47] Another analysis found that U.S. oil and gas production would account for 60% of global growth in oil and gas production by 2030, and if U.S. oil and gas expansion continued, it would exhaust nearly 50% of the global allowance for oil and gas to stay within a 1.5° C pathway.[48]

Scientific research provides estimates of the remaining carbon budget – the maximum amount of CO_2 that can be emitted that would keep global warming to a given level – to determine the likelihood of meeting the goals of the Paris Agreement. The IPCC estimates that the remaining carbon budget from 2020 onwards to limit warming to 1.5° C with a 67% probability is approximately 400 $GtCO_2$, and 500 $GtCO_2$ with a 50% probability.[49] The IPCC also estimates the remaining carbon budget from 2020 onwards as 1150 $GtCO_2$ for a 67% probability of limiting warming to 2° C.[50] A different study found that the remaining carbon budget for a 50% likelihood of limiting warming to 1.5° C from the beginning of 2022 onwards is 420 $GtCO_2$.[51]

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[44] Remarks by President Biden at the COP26 Leaders Statement, Glasgow, Scotland (Nov. 1, 2021), https://www.whitehouse.gov/briefing-room/speeches-remarks/2021/11/01/remarks-by-president-biden-at-the-cop26-leaders-statement/.

[45] The Production Gap, tbl. 4.1; Sheela Tobben, *U.S. Sees Record Oil Production Next Year Moving Even Higher*, Bloomberg (Feb. 8, 2022), https://www.bloomberg.com/news/articles/2022-02-08/u-s-raises-forecasts-for-record-crude-oil-production-in-2023#xj4y7vzkg.

[46] U.S. Energy Info. Admin., *Annual Energy Outlook 2022* (Mar. 3, 2022), https://www.eia.gov/outlooks/aeo/.

[47] Ploy Achakulwisut & Peter Erickson, *Trends in fossil fuel extraction: Implications for a shared effort to align global fossil fuel production with climate limits*, fig. 3 (Apr. 2021), https://www.sei.org/publications/trends-in-fossil-fuel-extraction/.

[48] Kelly Trout & Lorne Stockman, *Drilling towards disaster: Why U.S. oil and gas expansion is incompatible with climate limits*, Oil Change Int'l, at 6 (Susan Rubinstein ed., 2019), https://priceofoil.org/2019/01/16/report-drilling-towards-disaster/.

[49] Arnulf Jäger-Waldau & Tek Sapkota, Intergovernmental Panel on Climate Change, *Technical Summary*, *in Climate Change 2022: Mitigation of climate change, Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, at TS-16 (Priyadarshi R. Shukla et al. eds., 2022), https://www.ipcc.ch/report/sixth-assessment-report-working-group-3/.

[50] Intergovernmental Panel on Climate Change, *Summary for Policymakers*, *in Climate Change 2022: Mitigation of climate change. Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, at SPM-5 (Priyadarshi R. Shukla et al. eds., 2022), https://www.ipcc.ch/report/sixth-assessment-report-working-group-3/.

[51] Pierre Friedlingstein et al., *Global Carbon Budget 2021*, 14(4) Earth Sys. Sci. Data 1917 (2022), https://essd.copernicus.org/articles/14/1917/2022/essd-14-1917-2022-discussion.html.

Even without any new fossil fuel extraction projects, emissions from existing production would be 66% higher in 2030 than what is needed to limit warming to 1.5° C.[52] Burning developed coal, oil and gas reserves would produce 936 $GtCO_2$, well above the remaining carbon budget for limiting warming to 1.5° C.[53] Developed oil and gas fields alone would produce 488 $GtCO_2$,[54] fully exhausting and exceeding the IPCC's estimated carbon budget to remain within 1.5° C of warming with a 67% probability. Similarly, a study of "carbon bombs" – fossil fuel extraction projects that would result in more than one gigaton of CO_2 emissions if completely extracted – found that carbon bombs that have not yet begun extraction have a combined global potential to release 419 $GtCO_2$.[55] Including already producing fossil fuel projects, the study found that global carbon bombs have total potential emissions of 1,182.3 $GtCO_2$.[56] The United States has 28 carbon bombs, the third most of any country, seven of which had not begun extraction as of early 2022.[57] The combined potential emissions of all U.S. carbon bombs is 151.1 $GtCO_2$, the second highest potential emissions from carbon bombs globally.[58] At the current rate of global emissions, the carbon budget for a 50% chance of remaining within 1.5° C of warming would be exhausted in fewer than ten years.[59] Assessing the carbon budget with a 67% probability of remaining within 1.5° C of warming, there are only seven years of emissions at the current rate before the carbon budget is depleted.[60]

Given the severity of the climate crisis, it is imperative that the U.S. cease any new fossil fuel projects and begin phasing out existing fossil fuel production to keep in line with the Paris Agreement and prevent the worst impacts of climate change.

a. Impacts of climate change on health and communities

The impacts of climate change are felt across all aspects of society, but fall disproportionately on the most vulnerable communities. Black, brown, Indigenous, and other communities of color disproportionately feel the impacts of climate change, and climate change only exacerbates

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[52] Sven Teske & Sarah Niklas, *Fossil Fuel Exit Strategy: An orderly wind down of coal, oil and gas to meet the Paris Agreement*, Univ. Tech. Sydney, at 4 (2021), https://fossilfueltreaty.org/exit-strategy.
[53] Kelly Trout et al., Existing fossil fuel extraction would warm the world beyond 1.5 ° C, 17(6) Env't Rsch. Letters 1, 5 (2022).
[54] *Id.* at 5, 7.
[55] Kjell Kühne, Nils Bartsch, Ryan Driskell Tate, Julia Higson & André Habet, "*Carbon bombs" – Mapping key fossil fuel projects*, 166 Energy Pol'y 1, 5 (2022), https://www.sciencedirect.com/science/article/pii/S0301421522001756.
[56] *Id.* at 6.
[57] *Id.* at 5; *id.* app. 1.
[58] *Id.* at 5.
[59] Dan Calverley & Kevin Anderson, *Phaseout Pathways for Fossil Fuel Production Within Paris-compliant Carbon Budgets*, Int'l Inst. for Sustainable Dev., at 19 (2022), https://www.research.manchester.ac.uk/portal/en/publications/phaseout-pathways-for-fossil-fuel-production-within-pariscompliant-carbon-budgets(c7235a8e-e3b1-4f44-99de-c27958c03758).html.
[60] *Id.*

existing inequalities.[61] Across the United States, a range of communities have already felt the effects of climate change, including sea level rise and increased flooding, increased intensity and severity of storms, increased wildfire activity, and deadly heatwaves. Without a rapid and deep transition away from fossil fuels, the impacts of climate change will continue to worsen and harm communities, particularly communities of color.

i. Human health

Global climate change has had adverse impacts not only on the natural environment, but also on human health and safety. Changes in temperature and precipitation are projected to increase health risks from air pollution and heat-related deaths, as well as increase exposure to diseases. The risks to human health as a result of climate change are only expected to increase in the future.[62]

Climate change is worsening air pollution levels, leading to an increase in adverse human health effects.[63] Climate change has already lengthened the wildfire season in the United States and increased the frequency of large fires, and the frequency of wildfires are projected to continue increasing over the 21st century.[64] Wildfires are a major source of particulate matter (PM) and contribute to the formation of ozone. These air pollutants pose serious risks to human health, particularly among children, the elderly, and people with chronic illnesses.[65] Exposure to particulate matter and ozone can cause adverse respiratory and cardiovascular effects, including aggravated asthma, hospital and emergency room visits, and premature death.[66] Increased wildfire activity is also associated with increased hospital admissions, even far distances from a wildfire.[67] Even without the adverse impacts of wildfire smoke on air pollution, climate change is expected to increase ozone levels over most of the United States and may cause a small but significant increase in PM2.5 (particulate matter less than 2.5 micrometers in diameter), increasing the incidence of adverse health effects.[68] Additionally, climate change has been linked

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[61] Jeffrey A. Hicke et al., Intergovernmental Panel on Climate Change, *Chapter 14: North America, in Climate Change 2022: Impacts, Adaptation and Vulnerability, Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, at 69 (Margot Hurlbert & Linda Means eds., 2021) [hereinafter IPCC North America].
[62] U.S. Global Change Research Program, *Fourth National Climate Assessment, Volume II: Impacts, Risks, and Adaptation in the United* States, at 541 (D.R. Reidmiller et al. eds., 2018), https://nca2018.globalchange.gov/. [hereinafter, "U.S. Global Change Reseach Program"]
[63] *Id.* at 513.
[64] *Id.* at 521.
[65] EPA, *Particulate Matter (PM) Pollution, Health and environmental effects of particulate matter (PM)*, https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm (last updated Aug. 30, 2022); EPA, *Ground-level ozone pollution, Health effects of ozone pollution*, https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution (last updated June 14, 2022).
[66] *Id.*; U.S. Global Change Reseach Program, at 517
[67] IPCC North America, at 55.
[68] U.S. Global Change Research Program, at 519-20.

to increases in heat-related deaths, and warming temperatures are projected to increase heat-related morbidity such as incidence of asthma.[69]

Climate change is also projected to increase exposure and risk of vectorborne, waterborne, and foodborne diseases. There have already been observed increases in exposure and risk to Lyme disease from ticks and mosquito-borne diseases such as West Nile virus, chikungunya, and dengue.[70] For example, since 1991, the incidence of Lyme disease has nearly doubled and there is evidence that the range of disease-carrying ticks has expanded northward, which is associated with increasing cases of Lyme disease.[71] As the geographic range of these vectors shift and the seasons of transmission lengthen due to climate change, risk disease transmission is expected to increase.[72] Climate change is also projected to intensify heavy precipitation events, which are associated with contamination of drinking water, waterborne diseases and gastrointestinal illness.[73] For example, heavy precipitation can cause overflows of combined sewer systems, releasing untreated sewage into local waterways that may be used for drinking water or recreation.[74] Lastly, warmer air and ocean temperatures, changes in precipitation, and extreme weather events can increase microbial pathogen loads in food, impacting food safety.[75] Increases in sea surface temperature have also been associated with higher accumulation of mercury in seafood and more frequent harmful algal blooms, which can produce toxins that cause gastrointestinal illness, neurological disorders, and other illnesses in humans.[76]

In addition to physical impacts to human health, climate change has had and will continue to have negative impacts on mental health.[77] Studies have found links between climate change and "depression and generalized anxiety; ecological grief and loss; increased drug and alcohol usage, family stress, and domestic violence; increased suicide and suicidal ideation; and loss of cultural knowledge, and place-based identities and connections."[78] Additionally, displacement from a home or loss of family and community stability due to a disaster such as a flood places a heavy burden on the mental health of children.[79]

ii. Coastal communities and economies

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[69] IPCC North America, at 54.
[70] *Id.* at 56.
[71] EPA, *Climate Change Indicators: Lyme disease*, https://www.epa.gov/climate-indicators/climate-change-indicators-lyme-disease (last updated Aug. 2, 2022); Rebecca J. Eisen, Lars Eisen, Nicholas H. Ogden & Charles B. Beard., *Linkages of weather and climate with* Ixodes scapularis *and* Ixodes pacificus *(Acari: Ixodidae), enzootic transmission of* Borrelia burgdorferi, *and Lyme Disease in North America*, 53(2) J. Med. Entomology 250, 257 (2016), https://pubmed.ncbi.nlm.nih.gov/26681789/.
[72] IPCC North America, at 56.
[73] *Id.* at 12, 56.
[74] U.S. Global Change Research Program, at 701.
[75] IPCC North America, at 57.
[76] *Id.* at 57; U.S. Global Change Research Program, at 552, 701.
[77] IPCC North America, at 58.
[78] *Id.*
[79] U.S. Global Change Research Program, at 546.

Almost 40% of the U.S. population lives on the coast and the U.S. marine economy provides 2.4 million jobs and contributes $397 billion in gross domestic product.[80] Coastal communities are already feeling the impacts of climate change, and infrastructure and local economies are at risk from worsened coastal flooding, storms, and degraded ecosystems and fisheries. The omnipresent nature of climate change means that there is no economic sector in North America that will be unaffected.[81]

Along the U.S. coastline, the sea level is projected to rise, on average, ten to twelve inches in the next thirty years (2020-2050), equivalent to the amount of measured sea level rise over the last 100 years (1920-2020).[82] By 2050, sea level rise is expected to cause a shift in U.S. coastal flood regimes, with major and moderate damaging high tide flood events occurring ten times more frequently than today.[83] Higher sea levels can also turn common wind events or seasonal high tides into flood events, even absent significant rainfall, impacting coastal communities, overloading stormwater and wastewater systems, impacting coastal groundwater aquifers, and stressing wetlands and estuarine ecosystems.[84] Higher sea levels will also result in higher storm surge – the rise in seawater level caused solely by a storm – causing seawater from tropical storms to reach farther inland, harming more communities and infrastructure.[85] The National Oceanic and Atmospheric Administration (NOAA) estimates that if we continue on our current emissions path, up to $106 billion worth of coastal property will likely be below sea level by 2050.[86] By the end of the century, there is a one in twenty chance that more than $1 trillion

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[80] NOAA Office for Coastal Management, *Fast Facts: Marine Economy*, https://coast.noaa.gov/states/fast-facts/marine-economy.html (last updated Oct. 5, 2022); NOAA Office for Coastal Management, Fast Facts: Economics and Demographics. HYPERLINK "https://coast.noaa.gov/states/fast-facts/economics-and-demographics.html"https://coast.noaa.gov/states/fast-facts/economics-and-demographics.html (last updated Oct. 5, 2022).

[81] IPCC North America, at 62.

[82] National Ocean Service, *2022 Technical Report Overview, 2022 Sea Level Rise Technical report: Updated projections available through 2150 for all U.S. coastal waters*, https://oceanservice.noaa.gov/hazards/sealevelrise/sealevelrise-tech-report.html; *see also* William V. Sweet et al., *Global and Regional Sea Level Rise Scenarios for the United States: Updated mean projections and extreme water level probabilities along U.S. coastlines*, at 1 (Feb. 2022), https://aambpublicoceanservice.blob.core.windows.net/oceanserviceprod/hazards/sealevelrise/noaa-nos-techrpt01-global-regional-SLR-scenarios-US.pdf.

[83] William V. Sweet et al., *Global and Regional Sea Level Rise Scenarios for the United States: Updated mean projections and extreme water level probabilities along U.S. coastlines*, at xiii (Feb. 2022), https://aambpublicoceanservice.blob.core.windows.net/oceanserviceprod/hazards/sealevelrise/noaa-nos-techrpt01-global-regional-SLR-scenarios-US.pdf; NOAA, *U.S. Coastline to see up to a foot of sea level rise by 2050: Report projects a century of sea level rise in 30 years* (Feb. 15, 2022), https://www.noaa.gov/news-release/us-coastline-to-see-up-to-foot-of-sea-level-rise-by-2050.

[84] William V. Sweet et al., *Global and Regional Sea Level Rise Scenarios for the United States: Updated mean projections and extreme water level probabilities along U.S. coastlines*, at 2-3 (Feb. 2022), https://aambpublicoceanservice.blob.core.windows.net/oceanserviceprod/hazards/sealevelrise/noaa-nos-techrpt01-global-regional-SLR-scenarios-US.pdf.

[85] U.S. Global Change Research Program, at 49; NOAA, *What is storm surge?*, Nat'l Ocean Serv., https://oceanservice.noaa.gov/facts/stormsurge-stormtide.html (last updated Mar. 18, 2022)

[86] NOAA, *Fast Facts: Climate Change Predictions*, Office for Coastal Mgmt, https://coast.noaa.gov/states/fast-facts/climate-change.html (last updated Oct. 5, 2022).

worth of coastal property will be below mean sea level or at risk of it during high tide.[87] Climate change also threatens coastal infrastructure, such as roads, bridges, and seaports. More than 60,000 miles of U.S. roads and bridges in coastal floodplains are vulnerable to extreme weather events.[88]

Climate change is impacting marine industries and tourism. Across the U.S., the seafood industry and recreational fisheries support over 1.7 million jobs.[89] Climate change has resulted in yield losses for multiple subsistence, recreation, and commercial fisheries and contributed to fishery closures, negatively impacting the fishing industry.[90] Indigenous communities may be more affected by climate change impacts to fisheries than other communities because of a higher dependence on certain fisheries for food and cultural value.[91]

Climate change is rapidly warming the ocean, causing changes to some species' distribution range, resulting in increased travel to fishing grounds, shifted fish stocks across regulatory and international boundaries, and increased interactions with protected species.[92] Nearshore areas of the Chesapeake Bay and the Pacific coast have a high proportion of species near their upper thermal limit, particularly at risk from climate change.[93] Marine heat waves are also increasing in intensity and frequency and have already been attributed to climate change in every marine system in North America.[94] These heat waves directly affect productivity and behavior of fish species, resulting in shifting species distributions poleward and to deeper water. Shifts in distribution of economically important species have already been observed in Bering Sea Pacific cod and American lobster.[95] Ocean warming and marine heat waves have also created more favorable conditions for harmful algal blooms, with widespread impacts. For example, during the 2013-2016 heat wave off the U.S. West Coast, a harmful algal bloom caused extensive closures of crab and razor clam fisheries, resulting in economic and societal impacts beyond the fisheries sector.[96] Similarly, during the same heat wave, the Pacific cod population dramatically declined, dropping nearly 80% from 2013 levels.[97] In 2020, due to the continued low cod population,

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[87] *Id.*
[88] U.S. Global Change Research Program, at 326.
[89] U.S. Dep't of Commerce, *Fisheries Economics of the United States 2019: Economics and Sociocultural Status and Trends Series*, NOAA Technical Memorandum NMFS-F/SPO-229, at 8 (Mar. 2022), https://media.fisheries.noaa.gov/2022-06/FEUS-2019-final.pdf.
[90] IPCC North America, at 39.
[91] U.S. Global Change Research Program, at 363.
[92] IPCC North America, at 39.
[93] *Id.* at 75.
[94] *Id.* at 30.
[95] *Id.*
[96] *Id.* at 29-30.
[97] NOAA Fisheries, *Alaska cod populations plummeted during the blob heatwave – new study aims to find out why* (Nov. 8, 2019), https://www.fisheries.noaa.gov/feature-story/alaska-cod-populations-plummeted-during-blob-heatwave-new-study-aims-find-out-why.

fishery managers closed the federal Pacific cod fishery, citing climate change as the reason for closure.[98]

Ocean acidification further harms coastal resources. Ocean acidification occurs when excess CO_2 is dissolved in the ocean, decreasing the pH of the water. Acidification is greater along U.S. coastlines than the global average due to ocean circulation patterns and freshwater and nutrient inputs.[99] Ocean acidification adversely impacts the shellfish industry because acidifying waters can lead to shell dissolution of calcifying organisms, as well as limit shell growth.[100] Increased acidification is expected to reduce harvests of U.S. shellfish, with cumulative consumer losses of $230 million across all U.S. shellfish fisheries by 2099 under a high emissions scenario.[101] In one model of ocean acidification in California, acidification had negative economic impacts on California's state-managed crab, shrimp, mussel, clam, and oyster fisheries.[102] In the Northwest United States, shellfish growers have implemented monitoring systems to track ocean acidity because of the significant impact of acidification on shellfish.[103]

In addition to economic impacts on marine industries, climate change will likely have significant impacts on tourism in coastal areas. The combined impacts of sea level rise, coastal flooding, shoreline erosion, saline intrusion, and storm surge directly threaten coastal cities from impacts to infrastructure, port and transportation facilities, water resources, and cultural heritage sites.[104] Along the Gulf of Mexico and Caribbean Sea, 30% of hotels are exposed to flooding and 66% of hotels are located on eroding beaches.[105] Impacts to marine ecosystems can also affect tourism. By 2100, the loss of recreational benefits from coral reefs in the United States is expected to reach $140 billion.[106]

b. Ecosystem impacts of climate change

Climate change has had widespread impacts on species and ecosystems. Terrestrial, marine, and freshwater ecosystems are all being significantly altered by climate change, harming biodiversity, species populations and habitats, and ecological processes. Warming will continue shifting species ranges as well as phenological changes – changes in the timing of seasonal biological events – potentially leading to phenological mismatches, such as unavailability of primary food sources when migratory species arrive at feeding grounds.[107] More intense droughts and loss of seasonal snow and ice will lead to further reduced stream flows, impacting

[98] Kavitha George, *Alaska cod fishery closes and industry braces for ripple effect*, NPR (Dec. 8, 2019), https://www.npr.org/2019/12/08/785634169/alaska-cod-fishery-closes-and-industry-braces-for-ripple-effect.
[99] U.S. Global Change Research Program, at 84.
[100] *Id.* at 357, 687, 1048.
[101] *Id.* at 362-63.
[102] *Id.* at 1121.
[103] *Id.* at 1048.
[104] IPCC North America, at 47.
[105] *Id.* at 60.
[106] U.S. Global Change Research Program, at 355.
[107] *Id.* at 275.

the competing needs of aquatic species and agriculture.[108] Extreme low oxygen (hypoxic) events are projected to increase in frequency and extent over the next century.[109] Hypoxia has directly caused mortality events for crabs and fish in the U.S. Atlantic, Pacific, and Gulf of Mexico.[110]

Climate change has led to a significant loss of Arctic sea ice, resulting in loss of habitat for a variety of species such as polar bears and walruses. Loss of sea ice is expected to accelerate over the next century as a result of climate change,[111] and it is likely that as warming continues there will be a summer without Arctic sea ice within this century.[112] The unprecedented loss in sea ice has also created new risks to communities and the Arctic ecosystem. Populations of sea ice-dependent marine mammals have precipitously declined, and the direct and indirect impacts of sea ice loss on food webs have imperiled seabirds, subsistence hunters, and coastal communities.[113]

Coral reefs face increasing risk of bleaching and mortality, leading to loss of ecosystem structure, fish habitat, and food for coastal communities.[114] Research predicts that without mitigation to maintain global temperatures below 2° C by 2100, up to 99% of coral reefs will be lost.[115] Increased ocean acidification is also expected to adversely impact coral reef growth and contribute to coral mortality, leading to loss of reef structure and lower fishery yields.[116] The multiple impacts of climate change on coral reefs will have a cascading effect, ultimately harming coastal communities and economies that depend on healthy reefs for fish habitat, tourism, and shoreline protection.[117]

Climate change is also changing ecosystem productivity, altering important trophic relationships with potential impacts throughout entire ecosystems.[118] Although changes to species' ranges and phenologies indicate that some species are able to adjust to changing climatic conditions, not all species have the same capacity to adapt and climate change may lead to local and global extinctions.[119] Accelerating climate change poses risks to human and ecological systems that may lead to tipping points, irreversibly altering ecosystems and livelihoods.[120]

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[108] IPCC North America, at 5.
[109] *Id.* at 29.
[110] *Id.*
[111] *Id.*
[112] U.S. Global Change Research Program, at 1192.
[113] IPCC North America, at 28.
[114] *Id.* at 29.
[115] *Id.*
[116] U.S. Global Change Research Program, at 776, 828, 1264.
[117] *Id.* at 830.
[118] *Id.* at 282.
[119] *Id.* at 281.
[120] IPCC North America, at 77.

2. The Ecosystem is Still Affected by Continuing Effects of the BP Oil Spill

On April 20, 2010, BP's *Deepwater Horizon* drilling rig exploded in the Gulf of Mexico, killing 11 workers, injuring 17 others, and creating the biggest oil spill in United States history.[121] The ecological disaster generated immense ecological, economic, and public health consequences that will last for generations.[122] The blowout caused over 200 million gallons of oil to spill into the Gulf, killing, harming, and stranding countless marine species who were exposed to the oil and toxins.[123] The spill contaminated more than 1,300 miles of coastline, at least 3,200 square miles of the deep ocean floor, and as much as 92,500 square miles of surface water.[124] Some of the Gulf's most critical habitats were severely impacted, including up to 721 miles of salt marsh, 320 acres of globally significant seagrass beds, 600 miles of sand and dune habitats, and 4,300 square miles of open ocean *Sargassum* habitats that are essential for sea turtles and seabirds.[125] Spill cleanup operations are rarely capable of recovering or treating more than a small portion of the oil spilled, resulting in decades- or centuries-long impacts from a single event.[126] This has been the case with the *Deepwater Horizon* blowout, with recent and ongoing research continuing to reveal the full extent of short and long-term impacts.[127] The information has only mounted about just how devastating the spill was and continues to be.[128] For example, a 2020 study

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[121] NOAA, *Deepwater Horizon Natural Resource Damage Assessment* (March 16, 2015), www.gulfspillrestoration.noaa.gov/wp-content/uploads/statement-from-EC-to-BP-5-yr-3_16_15_with_contact.pdf; *see also* Alejandra Borunda, *We still don't know the full impacts of the BP oil spill, 10 years later*, National Geographic (Apr. 20, 2020), https://www.nationalgeographic.com/science/article/bp-oil-spill-still-dont-know-effects-decade-later.

[122] NOAA, *Deepwater Horizon Natural Resource Damage Assessment* (March 16, 2015), www.gulfspillrestoration.noaa.gov/wp-content/uploads/statement-from-EC-to-BP-5-yr-3_16_15_with_contact.pdf.

[123] Julia Lingelbach, *Oysters & the BP Drilling Disaster*, Healthy Gulf (Sept. 2, 2020), https://healthygulf.org/2020/09/02/oysters-the-bp-drilling-disaster/.

[124] Deepwater Horizon Natural Resource Damage Assessment Trustees, *Deepwater Horizon Oil Spill: Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement*, NOAA (2016) [hereinafter "NRDA" followed by the relevant page number]; *see also* Laura Geggel, "*Missing Oil" From 2010 BP Spill Found on Gulf Seafloor*, LIVE SCIENCE (Feb. 2, 2015), https://www.livescience.com/49664-deepwater-horizon-missing-oil.html; Ian R. MacDonald et al., *Natural and Unnatural Oil Slicks in the Gulf of Mexico*, J. OF GEOPHYSICAL RESEARCH: OCEANS 8364 (2015); https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2015JC011062.

[125] NRDA, at 4-197; *id.* at 4-337; *id.* at 4-396; *id.* at 4-420; *id.* at 4-429; *id.* at 4-430.

[126] Andrew Nikiforuk, *Why We Pretend to Clean Up Oil Spills*, SMITHSONIAN MAGAZINE (July 12, 2016), https://www.smithsonianmag.com/science-nature/oil-spillcleanup-illusion-180959783; *see also* Wendi Lane, *10 Years Later: Scientists Learn Long-Term Impact of Deepwater Horizon Spill*, ABC ACTION NEWS (Sept. 2, 2021) https://www.abcactionnews.com/news/full-circle/10-years-later-scientists-learn-long-term-impact-of-deepwater-horizon-spill (quoting Steven Murawski, a Marine Science professor with the University of South Florida, who said, "The oil that's stranded in the deep bottom of the gulf will not be landfilled by sediment deposition for another 100 years.").

[127] Megan Woodyard et al., *A comprehensive petrochemical vulnerability index for marine fishes in the Gulf of Mexico*, SCI. OF THE TOTAL ENVIRONMENT 1, 2 (2022), https://pubmed.ncbi.nlm.nih.gov/35051468/.

[128] *See, e.g.*, Tracey T. Sutton et al., *The Open-Ocean Gulf of Mexico After* Deepwater Horizon*: Synthesis of a Decade of Research*, 9 FRONTIERS IN MARINE SCIENCE 1, 2 (2022) (stating "We conclude that, for the intermediate and higher trophic levels of the open-ocean [Gulf of Mexico], even a decade after the event we have no evidence to suggest that impacts from DWH are 'over.'"), https://www.frontiersin.org/articles/10.3389/fmars.2022.753391/full.

revealed that the footprint of the oil spill spread roughly 30 percent wider than originally estimated, contaminating many more areas than were originally known.[129]

The *Deepwater Horizon* blowout has been particularly pernicious because the vast majority of the oil and toxins could not be cleaned up and remain in the water, seabed, and marine life to this day. After the spill, oil continued to sink to the ocean floor for more than a year, changing the area's sediment chemistry and reducing oxygen.[130] Roughly 22,000 tons of oil washed up on the shores of the Gulf Coast and mixed with the sand to create clumps that will take at least thirty years to degrade.[131] Eight years after the disaster, oil concentrations along the coastlines were measured at levels ten times higher than before the spill.[132] It is estimated that it could take fifty to one hundred years to fully bury the contaminants spilled during the blowout in light of the slow sediment accumulation rate.[133]

In addition to the harm caused by the spilled oil itself, the chemical dispersants used to clean up the spill exacted their own costs. Within a three month period after the spill, at least 1.84 million gallons of dispersants were poured into the Gulf.[134] These dispersants increased the toxicity of the oil to the marine organisms in the water column and significantly increased the level of contamination sustained in the Gulf.[135] This contamination traveled with the ocean currents and oil slicks, depositing on to the ocean floor and integrating into deep-sea plumes.[136] More than two months after dispersants were injected at the wellhead, chemicals were found in deep-sea plumes 185 miles away from the well.[137] More than six months after the spill, these chemicals

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[129] Igal Berenshtein et al., *Invisible Oil Beyond the Deepwater Horizon Satellite Footprint*, 6 SCI. ADV. 1, 1 (2020), https://www.science.org/doi/10.1126/sciadv.aaw8863.
[130] Uta Passow & Scott A. Stout, *Character and Sedimentation of "Lingering" Macondo Oil to the Deep-Sea after the Deepwater Horizon Oil Spill*, 218 MARINE CHEMISTRY 1, 2 (2020), https://www.sciencedirect.com/science/article/pii/S0304420319302403.
[131] Michel Boufadel et al., *Simulation of the Landfall of the Deepwater Horizon Oil on the Shorelines of the Gulf of Mexico*, 48 ENV'T SCI. & TECHNOLOGY 9496, 9496-9505 (2014), https://pubmed.ncbi.nlm.nih.gov/25068902/; Ioana Bociu et al. *Decomposition of Sediment-Oil-Agglomerates in a Gulf of Mexico Sandy Beach*, 9 SCI REP 1 (2019), https://www.nature.com/articles/s41598-019-46301-w.
[132] R. Eugene Turner, Nancy N. Rabalais, et al., *Oiling of the Continental Shelf and Coastal Marshes Over Eight Years after the 2010 Deepwater Horizon Oil Spill*, 252 ENVIRONMENTAL POLLUTION 1367, 1374 (2019), https://www.sciencedirect.com/science/article/pii/S0269749119304841.
[133] Patrick T. Schwing et. al., *Assembling the Benthic Record of Species and Community Change for the Gulf of Mexico Following the Deepwater Horizon Event*, presentation at Gulf of Mexico Oil Spill and Ecosystem Science Conference (Feb. 4, 2020), https://nsuworks.nova.edu/occ_facpresentations/691/.
[134] NRDA, at 4-38; *see also* Tracey T. Sutton, Rosanna J. Milligan, et al., *The Open-Ocean Gulf of Mexico After* Deepwater Horizon*: Synthesis of a Decade of Research*, *in* FRONTIERS IN MARINE SCIENCE 1, 3 (2022) (stating that the Deepwater Horizon spill introduced ~2.1 million gallons of dispersants into the water), https://www.frontiersin.org/articles/10.3389/fmars.2022.753391/full.
[135] NRDA, p. 4-39.
[136] *Id*.
[137] NRDA, at 4-38.

were found on deep-sea corals, and, up to three years after the spill, traces were found on beaches.[138]

The Gulf of Mexico has been identified as one of the most diverse mesopelagic ecosystems in the world,[139] and the *Deepwater Horizon* oil spill profoundly affected its many marine plants and organisms, ranging from bacteria to deep sea corals to arthropods.[140] These organisms absorbed significant amounts of oil and contaminants from the spill, and recent studies show that, for some of these species and ecosystems, recovery will take decades or longer.[141] Coral reefs were particularly impacted. Coral reefs create important habitat for many species; a single 12-inch coral can host up to 2,000 animals, including small fish, crabs, shrimp, and mollusks—many of which are food for higher trophic levels.[142] The *Deepwater Horizon* blowout injured about half of the coral colonies living near the wellhead, which were thriving before the spill.[143] Coral colonies are extremely slow growing and could take decades or longer to recover, meaning that the loss of this habitat will continue to have untold impacts for the entire marine ecosystem.[144]

Studies show that the impact of the oil spill on marine animals was and continues to be devastating. Large-scale oil spills, as well as smaller oil releases, can expose marine species to crude oil, which has been shown to "damage marine species' embryonic development, inhibit species' cellular and immune systems, swimming performance, cognition, cardiac function, and lead[s] to development of edema, cataracts, lesions, tumors, and narcosis, all of which have the potential of early onset mortality for various species."[145] Tens of thousands of whales, for example, were exposed to oil from the *Deepwater Horizon* spill, after which the endangered sperm whales suffered a seven percent decline in population, and the Gulf of Mexico Bryde's whale population (also known as the Rice's whale), a highly threatened species, was diminished by more than twenty percent.[146] The Gulf of Mexico Bryde's whale population now consists of

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[138] NRDA, at 4-39.
[139] Tracey T. Sutton, Rosanna J. Milligan, et al., *The Open-Ocean Gulf of Mexico After* Deepwater Horizon*: Synthesis of a Decade of Research*, *in* FRONTIERS IN MARINE SCIENCE 1, 3 (2022), https://www.frontiersin.org/articles/10.3389/fmars.2022.753391/full.
[140] *Id*. at 4 (stating "Abundance declines in the open-ocean [Gulf of Mexico] biota after DWH ranged from imperceptible (mesozooplankton) to ephemeral (phytoplankton) to extensive (deep-pelagic fishes, macrocrustaceans).").
[141] P. Montagna et al., *Deep-Sea Benthic Footprint of the Deepwater Horizon Blowout*, PLOS ONE 1, 1 (2013), https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0070540.
[142] J.K. Reed et al., *Community Composition, Structure, Aereal and Trophic Relationships of Decapods Associated with Shallow- and Deep-Water* Oculina *Varicosa Coral Reefs*, 32 BULLETIN OF MARINE SCI. 761, 761-86 (1982), https://repository.si.edu/handle/10088/9680.
[143] Peter J. Etnoyer et al., *Decline in Condition of Gorgonian Octocorals on Mesophotic Reefs in the Northern Gulf of Mexico: Before and After the Deepwater Horizon Oil Spill*, 35 CORAL REEFS 78, 78 (2015), https://link.springer.com/article/10.1007/s00338-015-1363-2.
[144] *See* NOAA, *Coral Facts*, https://coralreef.noaa.gov/education/coralfacts.html (last visited Oct. 6, 2022).
[145] Megan Woodyard et al., *A Comprehensive Petrochemical Vulnerability Index for Marine Fishes in the Gulf of Mexico*, SCIENCE OF THE TOTAL ENV'T 1, 2 (2022), https://pubmed.ncbi.nlm.nih.gov/35051468/.
[146] NRDA, at 4-599; *id.* at 4-623; *id.* at 4-624; *id.* at 4-631.

less than 50 individuals, and its recovery is highly uncertain.[147] The harms to oceanic cetaceans (such as whales and dolphins) are further exacerbated by other stressors in the marine environment, including "excessive anthropogenic noise, fisheries bycatch and entanglement, prey pressure related to climate change and fishing, ship strikes, ocean plastics, and [other] environmental pollutants."[148]

Bottlenose dolphins have also sustained significant impacts from the *Deepwater Horizon* spill. In the months following the disaster, about a thousand dolphins died from exposure to the oil and toxins. Many of the dead dolphins were calves, who died in utero during late pregnancy or soon after their birth.[149] In Barataria Bay and the Mississippi Delta, two heavily oiled areas, bottlenose dolphins have declined by more than half and will require fifty years to rebound to pre-spill levels.[150] More broadly, oil exposure has led to the largest die-off of bottlenose dolphins in the Gulf's history.[151] Sub-lethal impacts have led to poor reproductive health, with more than seventy five percent of pregnant dolphins observed within the oil footprint giving birth to dead or non-viable dolphin calves between 2010 and 2015.[152] More recent studies show that these numbers remain largely unchanged, with "only about 20 percent of pregnancies among the dolphins in Louisiana's heavily oiled Barataria Bay [being] successful, compared with 83 percent in unoiled regions."[153]

Fish communities and sea turtles have also faced significant harms due to the spill, including consistently low population densities. As long as seven years after the spill, many fish species continued to show "little indication of recovery" due to disruptions in the marine community directly and indirectly caused by the *Deepwater Horizon* oil spill.[154] Many fish were highly

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[147] *Id*.
[148] Tracey T. Sutton, Rosanna J. Milligan, et al., *The Open-Ocean Gulf of Mexico After* Deepwater Horizon*: Synthesis of a Decade of Research*, *in* FRONTIERS IN MARINE SCIENCE 1, 14 (2022), https://www.frontiersin.org/articles/10.3389/fmars.2022.753391/full.
[149] NOAA, *In the Wake of the Deepwater Horizon Oil Spill, Gulf Dolphins Found Sick and Dying in Larger Numbers Than Ever Before* (Apr. 3, 2015) https://response.restoration.noaa.gov/about/media/wake-deepwater-horizon-oil-spill-gulf-dolphins-found-sick-and-dying-larger-numbers-ever..
[150] NRDA, at 4-623; *id.* at 4-631; *id.* at 4-633; *id.* at 4-584; *see also* Tracey T. Sutton, Rosanna J. Milligan, et al., *The Open-Ocean Gulf of Mexico After* Deepwater Horizon*: Synthesis of a Decade of Research*, *in* FRONTIERS IN MARINE SCIENCE 1, 13 (2022), https://www.frontiersin.org/articles/10.3389/fmars.2022.753391/full.
[151] NRDA, at 4-623; *id.* at 4-631; *id.* at 4-633; *id.* at 4-584.
[152] *Id*.
[153] Joan Meiners, *Ten Years Later, BP Oil Spill Continues to Harm Wildlife—Especially Dolphins*, NAT'L GEOGRAPHIC (Apr. 17, 2020), https://www.nationalgeographic.com/animals/article/how-is-wildlife-doing-now--ten-years-after-the-deepwater-horizon; *see also* National Marine Mammal Foundation, *New Study Predicts Catastrophic Decline Of Dolphins In Barataria Bay, LA* (Apr. 20, 2022), https://www.nmmf.org/new-study-predicts-catastrophic-decline-ofdolphins-in-northern-gulf-of-mexico/.
[154] Justin P. Lewis et al., *Changes in Reef Fish Community Structure Following the Deepwater Horizon Oil Spill*, 10 SCI. REP. 1, 1 (2020) (stating "We observed significant changes in community structure immediately following the DWH, with a 38% decline in species richness and 26% decline in Shannon-Weiner diversity. Initial shifts were driven by widespread declines across a range of trophic guilds, with subsequent recovery unevenly distributed among guilds and taxa. For example, densities of small demersal invertivores, small demersal browsers, generalist carnivores, and piscivores remained persistently low with little indication of recovery seven years after the DWH.

impacted due to dermal contact with the toxins, consumption of contaminated food, disruptions to the food chain, harm to their habitats and spawning areas, and the low resilience attributes of many fish to begin with.[155] Trillions of larval fish and invertebrates were killed in estuarine, offshore surface, and deep oceanic waters. These larval deaths resulted in the loss of millions to billions of fish that would have otherwise reached at least a year old.[156] These disruptions to native species changed the marine environment, creating new challenges for the recovering Gulf ecosystem, such as the arrival of the now-widespread invasive lionfish.[157] Recent research shows that fish across the Gulf still display evidence of oil exposure,[158] and, even years after the spill, the marine environment remained toxic to fish larvae.[159] Turtles have suffered similarly from the spill. In the Gulf, there are five species of sea turtle, and all of them are listed as either threatened or endangered under the Endangered Species Act.[160] The *Deepwater Horizon* blowout killed or injured as many as 202,600 sea turtles as a result of contamination or spill response activities, and this number does not include the many turtles lost due to foregone reproduction nor other unquantified injuries.[161]

Initial declines among these guilds occurred prior to the arrival of the now-widespread, invasive lionfish …, but their lack of recovery suggests lionfish predation may be affecting recovery. Factors affecting persistently low densities of generalist carnivores and piscivores are not well understood but warrant further study given the myriad ecosystem services provided by [northern Gulf of Mexico] reef fishes."), https://www.nature.com/articles/s41598-020-62574-y.

[155] Tracey T. Sutton, Rosanna J. Milligan, et al., *The Open-Ocean Gulf of Mexico After* Deepwater Horizon*: Synthesis of a Decade of Research*, *in* FRONTIERS IN MARINE SCIENCE 1, 6, 9-10 (2022), https://www.frontiersin.org/articles/10.3389/fmars.2022.753391/full.

[156] NRDA, at 4–197.

[157]Lewis, J.P., Tarnecki, J.H., Garner, S.B. et al., *Changes in Reef Fish Community Structure Following the Deepwater Horizon Oil Spill*, *in* SCI REP 1, 1 (2020) (stating "We observed significant changes in community structure immediately following the DWH, with a 38% decline in species richness and 26% decline in Shannon-Weiner diversity. Initial shifts were driven by widespread declines across a range of trophic guilds, with subsequent recovery unevenly distributed among guilds and taxa. For example, densities of small demersal invertivores, small demersal browsers, generalist carnivores, and piscivores remained persistently low with little indication of recovery seven years after the DWH. Initial declines among these guilds occurred prior to the arrival of the now-widespread, invasive lionfish …, but their lack of recovery suggests lionfish predation may be affecting recovery. Factors affecting persistently low densities of generalist carnivores and piscivores are not well understood but warrant further study given the myriad ecosystem services provided by [northern Gulf of Mexico] reef fishes.").
Justin P. Lewis et al., *Changes in Reef Fish Community Structure Following the Deepwater Horizon Oil Spill*, 10 SCI. REP. 1, 1 (2020), https://www.nature.com/articles/s41598-020-62574-y.

[158] Univ. South Florida, *USF Marine Scientists Conclude 10 Years of Unprecedented Studies on the Impacts of the Deepwater Horizon Oil Spill*, NEWSROOM (Apr. 13, 2020), https://www.usf.edu/news/2020/10-year-deepwater-horizon-oil-spill-research-concludes.aspx.

[159] Matthew Alloy et al., *Co-exposure to Sunlight Enhances the Toxicity of Naturally Weathered Deepwater Horizon Oil to Early Lifestage Red Drum and Speckled Seatrout*, 36 ENVIRONMENTAL TOXICOLOGY & CHEMISTRY 780, 780 (2016), https://setac.onlinelibrary.wiley.com/doi/epdf/10.1002/etc.3640.

[160] NOAA, *Frequent Questions: Northern Gulf of Mexico Sea Turtle Strandings*, https://www.fisheries.noaa.gov/southeast/marine-life-distress/frequent-questions-northern-gulf-mexico-sea-turtle-strandings (last updated June 28, 2022) (stating "Five of the world's seven species of sea turtle are found within the Gulf of Mexico, including the Kemp's ridley, green turtle, loggerhead, hawksbill, and leatherback. All are threatened or endangered under the Endangered Species Act.")

[161] NRDA, at 4-561, 4-565, 4-570, 4-518, and 4-569 (summarizing data presented).

Oysters are another species that have suffered greatly due to the spill. Oysters are a keystone species and contribute significantly to all aspects of the Gulf ecosystem. For example, "oyster populations that are large and healthy will create reefs that not only act as a safe space for their young, but also provide habitat for a number of small creatures, clean water and recycle nutrients through filtration processes, and even protect the Gulf by ensuring structural integrity for the coast."[162] The spill and the subsequent cleanup efforts, however, killed up to 8.3 billion oysters, and, still today, 5.7 million oysters per year are unable to settle because of lost habitat.[163] Low oyster densities and the loss of oyster habitat have jeopardized the Gulf oyster population, which is not expected to recover without substantial restoration.[164] Significant resources, including over $300 million, have been put towards oyster restoration in the Gulf since the spill, but recovery continues to be slow, as hurricanes raze the marine areas each year, disturbing the oyster populations and damaging their habitats.[165] Unfortunately, hurricanes are only expected to increase in intensity due to the climate crisis, meaning future restoration efforts will be even more difficult.[166]

The long-term human health impacts of the *Deepwater Horizon* spill have also been significant. People involved in the oil cleanups suffered from diminished blood, liver, lung, and heart function, with prolonged or even worsening symptoms seven years after the disaster.[167] Workers exposed to the chemical dispersants used to help clean up the oil suffered from coughing, wheezing, skin irritations, and burning eyes, sometimes for years afterward.[168] Those who worked on spill cleanup for more than six months had an increased risk of a nonfatal heart attack.[169] Additionally, the disaster was a source of trauma for Gulf area residents. Exposure to the disaster was significantly associated with illness anxiety ("excessive concern or worry about

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[162] Julia Lingelbach, *Oysters & the BP Drilling Disaster*, HEALTHY GULF (Sept. 2, 2020), https://healthygulf.org/2020/09/02/oysters-the-bp-drilling-disaster/.
[163] *Id*.; *see also* NRDA, at 5-54.
[164] NRDA, at 5–54.
[165] Julia Lingelbach, *Oysters & the BP Drilling Disaster*, HEALTHY GULF (Sept. 2, 2020), https://healthygulf.org/2020/09/02/oysters-the-bp-drilling-disaster/.
[166] *See* Angela Colbert, *A Force of Nature: Hurricanes in a Changing Climate*, NASA (Jun. 1, 2022), https://climate.nasa.gov/news/3184/a-force-of-nature-hurricanes-in-a-changing-climate/.
[167] Mark D'Andrea & G. Kesava Reddy, *The Development of Long-Term Adverse Health Effects in Oil Spill Cleanup Workers of the Deepwater Horizon Offshore Drilling Rig Disaster*, FRONTIERS IN PUBLIC HEALTH 1, 6 (2018), https://www.frontiersin.org/articles/10.3389/fpubh.2018.00117/full.
[168] Craig McGowan et al., *Respiratory, Dermal, and Eye Irritation Symptoms Associated With Corexit™ EC9527A/EC9500A Following the Deepwater Horizon Oil Spill: Findings From the GuLF STUDY*, 125 ENVIRONMENTAL HEALTH PERSPECTIVES 097015-1, 097015-1 (2017), https://pubmed.ncbi.nlm.nih.gov/28934097/.
[169] Jean Strelitz et al., *Deepwater Horizon Oil Spill Exposures and Nonfatal Myocardial Infarction in the Gulf STUDY*, 17 ENVIRONMENTAL HEALTH 1, 1 (2018), https://ehjournal.biomedcentral.com/articles/10.1186/s12940-018-0408-8.

having or getting a serious illness"), and fishing and seafood industry workers at the time were more likely than other Gulf state residents to show signs of depression.[170]

Finally, the economic impact of the *Deepwater Horizon* spill was significant and long lasting. The commercial fishing industry in the Gulf of Mexico was estimated to have lost $247 million as a result of fishery closures after the spill due to contamination.[171] The oil spill killed up to 8.3 billion oysters, representing 508 million pounds of fresh oyster meat.[172] Losing this population to the spill's contamination contributed to a 50 percent drop in Louisiana's oyster harvest in the following two years.[173] The spill also caused the public to lose almost 17 million user days for outdoor recreation such as boating, recreational fishing, and beach-going.[174] Total recreational use damages due to the spill are estimated at $693.2 million.[175]

In sum, the *Deepwater Horizon* spill caused both catastrophic immediate effects and long lasting harms, with many of the latter continuing to this day and expected to last for decades to come. From contaminated water, seabeds, and beaches to diseased marine organisms that struggle to repopulate to human beings suffering long-term health impacts, the spill has proved to be a multigenerational catastrophe, the likes of which the Gulf of Mexico cannot afford again. If oil and gas drilling continues long term in the Gulf, however, the question of another oil spill of significant magnitude is not if, but when.

3. The Critically Endangered Rice's Whale Will Be Harmed By Continued Oil and Gas Development

As noted above, OCSLA requires BOEM to prepare its leasing program in a manner that considers, *inter alia*, "other resource values of the outer Continental Shelf and the marine, coastal, and human environments." 43 U.S.C. § 1344(a)(1). Further, it must base the timing and location of offshore oil and gas leases on a consideration that includes "the relative environmental sensitivity" and "relevant environmental and predictive information for different areas of the outer Continental Shelf." *Id.* at § 1344(a)(2)(G), (H). The agency has not yet met this burden with respect to the Gulf of Mexico whale, perhaps the most vulnerable of all endangered species in the region. Failure to properly consider this extraordinarily sensitive marine population, and its habitat, will "hinder[] Interior's ability to obtain a proper balance of the

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[170] Ruth Elkund, Landon C. Knapp, Paul A. Sandifer & Rita C. Colwell, *Oil Spills and Human Health: Contributions of the Gulf of Mexico Research Initiative*, 3 GEOHEALTH 398, 391 (2019), https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2019GH000217.
[171] A. McCrea-Strub et al., *Potential Impact of the Deepwater Horizon Oil Spill on Commercial Fisheries in the Gulf of Mexico*, 36 FISHERIES 332, 332–336 (2011), https://afspubs.onlinelibrary.wiley.com/doi/abs/10.1080/03632415.2011.589334.
[172] NOAA Fisheries, "Landings," analysis of data for 2010–2012/Louisiana/Eastern Oyster, https://foss.nmfs.noaa.gov/apexfoss/f?p=215:200:::NO:::, (last accessed Oct. 6, 2022).
[173] *Id.*
[174] NRDA, at 4-649.
[175] *Id*.

factors under Section 18(a)(3)." *Ctr. for Biological Diversity v. Dept. of Interior*, 563 F. 3d 466, 488 (D.C. Cir. 2009).

The Gulf of Mexico whale, also known as Rice's whale (*Balaenoptera ricei*), is the only baleen whale species whose entire known range is limited to waters off the United States. It is also generally recognized by the National Marine Fisheries Service (NMFS) and others to be one of the most endangered marine mammals in existence.[176] Approximately 50 individuals remain, according to NMFS' best estimates, and the species can only afford to lose one animal about every fifteen years as a result of human impacts if it is to achieve its optimum sustainable population consistent with federal law.[177] The whale is listed as endangered under the Endangered Species Act (ESA) and as "critically endangered"—the most severe rating short of extinction—on the International Union for Conservation of Nature (IUCN) Red List.[178]

As NMFS concluded in its endangered species listing, the population faces myriad threats to its survival and recovery. Such threats include the curtailment of habitat due to oil and gas development, oil spills and oil spill response, anthropogenic noise, vessel collisions, ingestion of marine debris, and potential fisheries interactions, as well as the deleterious genetic effects associated with limited abundance.[179] A number of these threats—including those at issue in the present action—were separately deemed by NMFS' most recent species Status Review, prepared

[176] *E.g.*, NMFS, *Rice's whale* ("With likely fewer than 100 individuals remaining, Rice's whales are one of the most endangered whales in the world"), fisheries.noaa.gov/species/rices-whale (last accessed Oct. 6, 2022).

[177] Sean A. Hayes, Elizabeth Josephson, Katherine Maze-Foley, Patricia E. Rosel, and Jennifer Turek, eds., *U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments 2020*, at 160-67 (2022) (NOAA Tech. Memo. NMFS-NE-271), https://media.fisheries.noaa.gov/2021-07/Atlantic%202020%20SARs%20Final.pdf?null%09. Under the Marine Mammal Protection Act, annual sustainable loss of marine mammals, known as Potential Biological Removal (PBR), is quantified as the product of the species' minimum population size, one-half of its maximum net productivity rate, and a recovery factor. 16 U.S.C. § 1362. According to NMFS' most recent Stock Assessment Report for the Gulf of Mexico whale (2020), the minimum population size for the species is 34, the maximum productivity rate is 0.04 (the default value for cetaceans), and the recovery factor is 0.1 because the stock is listed as endangered. We therefore calculate PBR for the Gulf of Mexico whale as 0.068, or about one whale lost to human impacts every fifteen years. (In our view, PBR should not be rounded up to 0.1, as is done in the Stock Assessment Reports.)

[178] 50 C.F.R. §§ 17.11(h), 224.101(h) (ESA listing); P. Rosel, P. Corkeron & M. Soldevilla, *Balaenoptera ricei, in The IUCN Red List of Threatened Species*, e.T215823373A208496244 (2022) (IUCN listing), iucnredlist.org/species/215823373/208496244.

[179] Patricia E. Rosel, Lynsey A. Wilcox, Tadasu K. Yamada & Keith D. Mullin, *A new species of baleen whale (*Balaenoptera*) from the Gulf of Mexico, with a review of its geographic distribution*, 37 Marine Mammal Sci. 577 (2021); Patricia E. Rosel et al., *Status review of Bryde's whales (*Balaenoptera edeni*) in the Gulf of Mexico under the Endangered Species Act* (2016) (NOAA Tech. Memo. NMFS-SEFSC-692), https://repository.library.noaa.gov/view/noaa/14180; M.S. Soldevilla et al., *Spatial distribution and dive behavior of Gulf of Mexico Bryde's whales: Potential risk of vessel strikes and fisheries interactions*, 32 Endangered Species Research 533 (2017), https://www.fisheries.noaa.gov/resource/peer-reviewed-research/spatial-distribution-and-dive-behavior-gulf-mexico-brydes-whales.

in 2016, as "likely to eliminate or seriously degrade" the population.[180] As the review unanimously concluded, the whales "are at high risk of extinction as a result of their small population size and the suite of anthropogenic threats posed primarily by energy exploration, development and production and vessel collisions. Small-scale incremental impacts over time or a single catastrophic event could result in extinction."[181]

Notwithstanding these facts and findings, BOEM does not consider the Gulf of Mexico whale in its environmental sensitivity analysis for the 2023-28 Proposed Program. *See* 43 U.S.C. § 1344(a)(2)(G); Proposed Program, at 7-1 to 7-16. Nor has BOEM incorporated the latest scientific information about the species into its DPEIS, resulting in incorrect assumptions about the extent of the whale's habitat use in the Central and Western GOM Planning Areas. *See, e.g.*, DPEIS, at 105, 106, 193, 194, 220.

BOEM must revise its analysis in the following ways:

BOEM must add the Gulf of Mexico whale to the species selected for its relative environmental sensitivity analysis. This is required both for manifest conservation reasons and for consistency with the agency's own established methodology. Perhaps it is not surprising that BOEM's foundational sensitivity analysis, from 2014, omitted the whale.[182] As the agency states, "[t]he primary measure to determine conservation importance is Federal listing status under the [Endangered Species Act]," Proposed Program at 7-8, and Rice's whale was not listed as an endangered species until 2019. 84 Fed. Reg. 15,446, 15,487-88 (Apr. 15, 2019) (originally listed *sub. nom.* "Whale, Bryde's (Gulf of Mexico subspecies)"). Yet BOEM has neglected to add the now-listed whale to the updated sensitivity analysis it prepared to support the Proposed Program. *See* Proposed Program at 7-10 to 7-11 (Table 7.2). There is no justification for that omission under the methodology the agency set forth in 2014, which, above all, prioritizes endangered species over threatened ones.[183] The Gulf of Mexico whale—"one of the most endangered whales in the world"[184]—must be added to the list of selected species for the Eastern and Western/Central Gulf of Mexico Ecoregions.

The agency must also update its Draft Programmatic Environmental Impact Statement to incorporate best available science on the species' habitat use. The DPEIS consistently bases

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[180] Patricia E. Rosel et al., *Status review of Bryde's whales (*Balaenoptera edeni*) in the Gulf of Mexico under the Endangered Species Act* (2016) (NOAA Tech. Memo. NMFS-SEFSC-692), at 130-132, https://repository.library.noaa.gov/view/noaa/14180.

[181] *Id.* at iv.

[182] BOEM, *A Method for the Evaluation of the Relative Environmental Sensitivity and Marine Productivity of the Outer Continental Shelf*, OCS Study BOEM 2014-616 (2014).

[183] BOEM, *A Method for the Evaluation of the Relative Environmental Sensitivity and Marine Productivity of the Outer Continental Shelf*, OCS Study BOEM 2014-616 (2014); *id.* at 17-18 ("Four conservation status marine mammal and sea turtle species for each broad OCS region were chosen in the following order, primarily by status: endangered, threatened, proposed threatened, and then candidate"). Rice's whale would also rise to the top of the list if the other factors listed in the 2014 analysis were considered. *See id.* at 18 (selecting species with the lowest Potential Biological Removal among endangered species for which critical habitat has not been designated).

[184] NMFS, *Rice's whale*, https://www.fisheries.noaa.gov/species/rices-whale (last visited Oct. 6, 2022).

its assessment of species risk on the assumption that the whale occurs, or occurs "almost exclusively," in the northeastern Gulf. *See* DPEIS, at 105 (finding that detections of Rice's whales "*occur almost exclusively in the northeastern Gulf in the De Soto Canyon area*") (emphasis added); *id.* at 106 (finding that "Rice's whale is very sensitive to low-frequency sound and may be impacted by further exploration and development *along the shelf break in the northeastern GOM, where it mostly occurs*") (emphasis added); *id.* at 193 (finding that "the Rice's whale population is found *in the Eastern GOM Planning Area* and may be impacted by increased noise from vessels or seismic airguns *in this area*") (emphasis added); *id.* at 194 (finding that "increased vessel activity along the coast may put [Rice's whales, along with manatees] at risk, *especially in the Eastern GOM Planning Area, where Rice's whales reside*") (emphasis added); *id.* at 220 (finding that high-intensity sound sources, such as high-energy seismic surveys, operating in GOM Planning Area 1 "could affect animals, such as Rice's whale, that *occur almost exclusively in the Eastern GOM Planning Area*") (emphasis added). But that assumption is based largely on older large-vessel survey data and fails to consider a recently completed, five-year, multivalent study of the whales' habitat, led by NOAA and funded through the RESTORE Act.

This NOAA-led study, "Trophic Interactions and Habitat Requirements of Gulf of Mexico Rice's Whales," represents the best available scientific information for defining the species' habitat.[185] It was designed to develop "a comprehensive ecological understanding" of the species by integrating research along multiple lines: photo-identification and mark-recapture analyses to help determine the size and site-fidelity of the population, tagging of individual whales to understand their foraging behavior, sampling of both the whales' fecal matter and the prey composition of the area they forage, monitoring of potential habitat with passive acoustics, mapping of the distribution of the whales' prey, and determination of the oceanographic features associated with their habitat.[186] Taken individually and together, these multiple lines of evidence support the identification of habitat extending from an area in the upper depths of the De Soto Canyon, in the eastern Gulf, along the continental shelf break between the 100m and 400m isobaths, through waters off Louisiana and Texas. *See* Figure *Offshore Drilling Planning Areas and Gulf of Mexico Whale Habitat* below. Notably, acoustic detections along the same

[185] NOAA provides a detailed overview of the study on its website. *See* NOAA RESTORE Science Program, *Trophic Interactions and Habitat Requirements of Gulf of Mexico Rice's Whales*, restoreactscienceprogram.noaa.gov/projects/rices-whales (last accessed Oct. 6 2022); NOAA Fisheries, *Trophic Interactions and Habitat Requirements of Gulf of Mexico Rice's Whales*, https://www.fisheries.noaa.gov/southeast/endangered-species-conservation/trophic-interactions-and-habitat-requirements-gulf-mexico (last accessed Oct. 6, 2022).

[186] *Id.* Some of the study's components have already been published and others are pending publication. In all cases, final reports have been received by NMFS. In fall 2021, BOEM environmental compliance staff participated in a five-day Recovery Workshop, convened by NMFS, in which the findings of the study were presented. *See* NOAA Fisheries, *Rice's Whale Recovery Planning Workshop: Workshop Summary*, (Oct-Nov. 2021), https://media.fisheries.noaa.gov/2022-04/RIWH_WorkshopSummary_Oct-Nov2021_FinalDraft_Public-Version_508%20Compliant.pdf.

bathymetric contours confirm that some Gulf of Mexico whales "persistently occur" in the northwestern Gulf.[187] Thus, the whale is highly likely to occur regularly in areas slated for development under the Proposed Program.

The study, as its description by the RESTORE Science Program indicates, was specifically intended to "contribute directly to the development of restoration plans, recovery plans, and environmental impact analyses that are key to the effective conservation of Gulf of Mexico Rice's whales."[188] Consistent with this, NMFS underscored the study's findings in commenting to BOEM earlier this year on another offshore development activity, the determination of wind energy areas in the central and western Gulf.

> This species—the most highly endangered large whale in the world—is considered to have its core habitat area in the northeastern GOM. The Rice's whale core distribution area in the northeastern GOM is based on visual sighting data, and includes a 30-km buffer around known whale sightings that accounts for animal movement of tagged whales and uncertainty. However, increasing evidence from sighting data, passive acoustic monitoring (PAM), and habitat suitability modeling is showing Rice's whale occurrence in the western and central GOM at the edge of the continental shelf in the depth band from 100 to 400 meters [citation omitted]. Their occurrence in the western and central Gulf is persistent, with PAM data indicating sporadic occurrence of Rice's whales throughout the year, on 16-30% of days, and presence in every month of the year [citation omitted].[189]

Accordingly, NMFS recommended that no offshore wind leasing or development occur "within the boundaries of the currently known distribution of Rice's whales in the western and central GOM."[190] And BOEM rightly took account of this habitat in its recent identification of proposed wind lease areas, considering it "unsuitable" for offshore wind development and completely excluding it from leasing.[191] As Figure *Offshore Drilling Planning Areas and Gulf of Mexico Whale Habitat* (below) makes clear, the same bathymetrically-defined habitat extends through the Central and Western OCS Planning Areas—that is, the region, denominated "GOM Planning

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[187] Melissa .S. Soldevilla, Amanda J. Debich, Lance P. Garrison, John A. Hildebrand, Sean M. Wiggins, *Rice's whale in the northwestern Gulf of Mexico: Call variation and occurrence beyond the known core habitat,* 48 Endangered Species Res. 155 (2022). As the authors note, this distribution "will be important to consider when designating critical habitat for this endangered species." *Id.* at 172.

[188] *See* NOAA RESTORE Science Program, *Trophic Interactions and Habitat Requirements of Gulf of Mexico Rice's Whales*, restoreactscienceprogram.noaa.gov/projects/rices-whales (last accessed Oct. 6 2022).

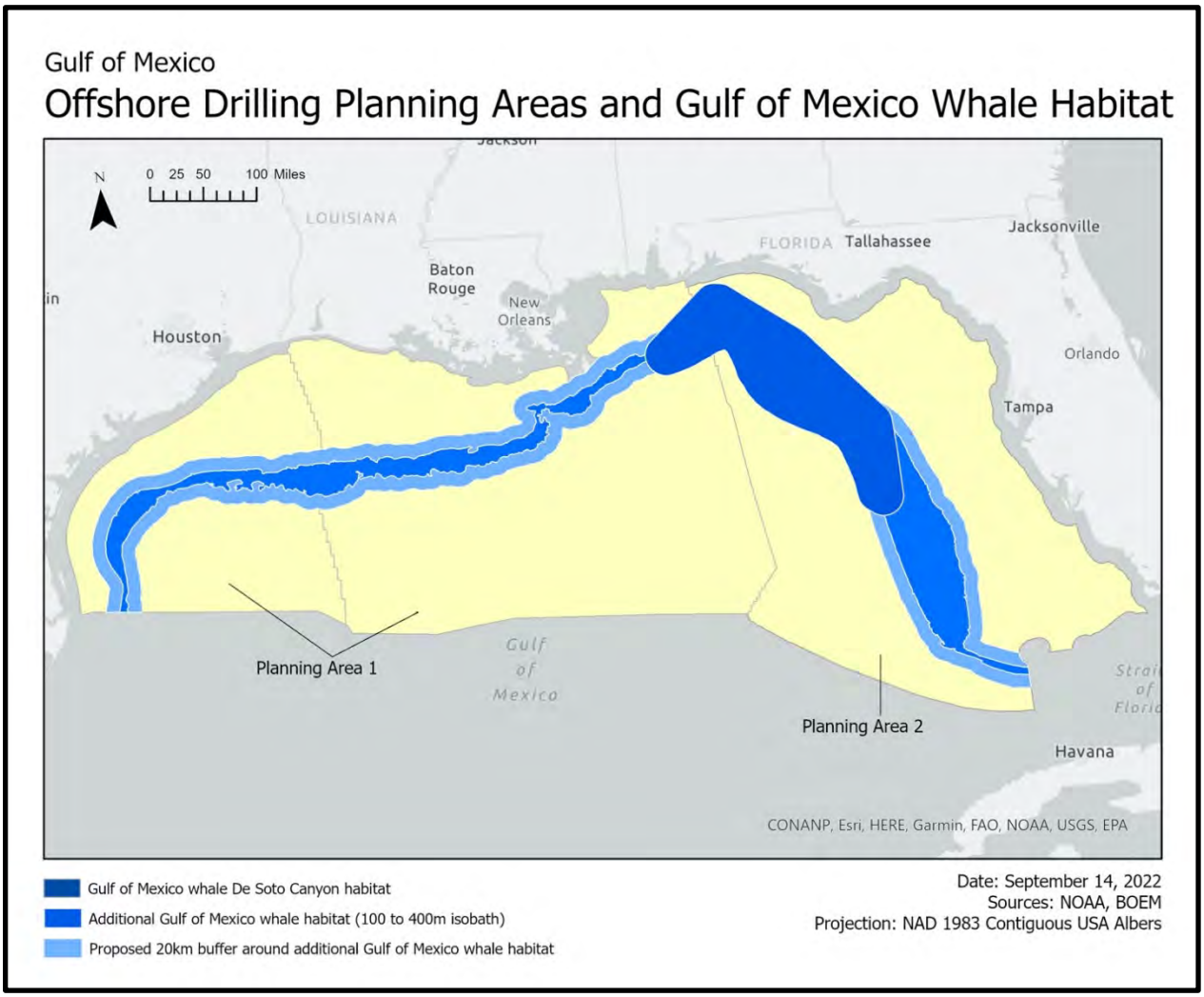
[189] Comments of A.J. Strelcheck, NMFS Regional Administrator for the Southeast Regional Office, to Tershara Matthews, Chief of Emerging Programs, BOEM, at 6 (Feb. 9, 2022) (scoping comments on Draft Environmental Assessment for commercial leasing wind power development on the Outer Continental Shelf in the Gulf of Mexico).

[190] *Id.*

[191] Memorandum from M. Celata, Regional Director for BOEM Gulf of Mexico Regional Office, to Amanda Lefton, BOEM Director, at 12-13, 34 (July 20, 2022) (request for concurrence on Preliminary Wind Energy Areas for the Gulf of Mexico).

Area 1," in which as many as ten out of eleven possible lease sales would occur under BOEM's current proposal.

The agency must revise its DPEIS, and the Proposed Program that the DPEIS supports, to reflect the best available scientific information on the extent of Gulf of Mexico whale habitat in the central and western Gulf. *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43, 52 (1983) (holding that an agency's action is arbitrary and capricious where, *inter alia*, it has "failed to consider an important aspect of the problem" or "offered an explanation for its decision that runs counter to the evidence before the agency").



The polygon "Gulf of Mexico whale De Soto Canyon habitat" is taken from NMFS' 2019 Biological Opinion on oil and gas activities in the Gulf of Mexico, which is based in turn on the agency's 2016 Status Review. The proposed 20km buffer mapped around the 100-400m isobath reflects the methodology used by NMFS to define the species' habitat in the De Soto Canyon, where the agency added a buffer of 20km to account for whale movement. (NMFS added an additional 10km in that instance to account for uncertainties in sighting locations, which is not a relevant consideration outside the De Soto Canyon area.)

BOEM must advance a Proposed Program that fully considers the potential impacts of further oil and gas development in the Gulf on this exceedingly vulnerable species. This will ensure BOEM remains consistent with its responsibilities under OCSLA.

There is no indication in the Proposed Program that BOEM has considered the impacts of new oil and gas development on the Gulf of Mexico whale, in discharge of its responsibilities under section 18(a) of OCSLA, 43 U.S.C. § 1344(a). On the contrary, the Proposed Program does not contain a single reference to the species, nor, as discussed above, has BOEM selected it for the agency's relative environmental sensitivity analysis. Nor does BOEM's NEPA review provide much additional information or assessment. Its DPEIS addresses the Gulf of Mexico whale summarily, in a handful of brief statements within the section describing the "Affected Environment"; nowhere in the agency's impacts analysis, alternatives analysis, cumulative effects analysis, or analysis of potential exclusions is the species considered. *See generally* DPEIS. And the few brief statements that are made rely, as noted above, on outdated assumptions about the extent of the whale's habitat use in the central and western Gulf. This nearly complete omission of a critically endangered species is not supportable under OCSLA or NEPA. *See State of Cal. by & through Brown v. Watt ("Watt I")*, 668 F.2d 1290, 1313 (D.C. Cir. 1981) (finding Secretary erred by failing to consider "existing information" related to environmental sensitivity); *NRDC v. Hodel*, 865 F.2d 288, 299 (D.C. Cir. 1988) (finding Secretary, in EIS prepared to support OCS lease program, failed to consider effects on migratory ESA-listed species).

What BOEM must consider in its impacts and alternatives analysis under NEPA, and in its mandated balancing under OCSLA, is the significant risk of population-level harm if additional leasing occurs in GOM Planning Area 1 or 2.

The Gulf of Mexico whale is acutely vulnerable to environmental impacts due to its dangerously low abundance, its limited range, and, as NMFS observed in its recent comments to BOEM, "the seemingly poor health of individual animals."[192] NMFS has stated that "the loss of even a single reproductive female could lead this species to extinction," and that the "[r]ecovery of the species depends on the protection of each remaining whale."[193] More pointedly, and as noted above, NMFS' most recent species Status Review found that energy exploration and development and seismic surveys were among those environmental threats "likely to eliminate or seriously degrade" the population and, together with vessel collisions, to put the whale "at high risk of extinction."[194] Similarly, NMFS' 2020 Biological Opinion concluded that future oil and gas activities in the Gulf of Mexico would jeopardize the continued existence of the species.[195]

[192] Comments of A.J. Strelcheck, NMFS Regional Administrator at 6.
[193] *Id.*; NMFS, "Rice's whale," https://www.fisheries.noaa.gov/species/rices-whale.
[194] Rosel et al., *Status Review* (2016) at iv, 130-32 (emphases omitted).
[195] NMFS, *Biological Opinion on Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico* 554 (2020). Even so, the Biological Opinion made this finding *before* information from NMFS' five-year habitat study

Gulf of Mexico whales are particularly vulnerable to acoustic disturbance from seismic testing.[196] In baleen whales, the airgun arrays used in high-energy seismic exploration have repeatedly been shown to disrupt whale vocalizations over large areas of the ocean (greater than 10,000 km^2 in some cases) and across a wide range of important behavioral contexts: foraging, breeding, and migrating.[197] Under NMFS' current standard, disruption amounting to species take begins, for Gulf of Mexico whales, at 140 dB re 1 µPa (RMS); and while that threshold is plainly not conservative given a scientific record showing impacts to baleen whales at much lower exposure levels, the standard is such that Rice's whale may be taken at distances of more than 30km, based on BOEM's 2017 modeling.[198] During its Endangered Species Act consultation over Gulf oil and gas activities, before BOEM withdrew from its proposed action an area that includes virtually the whole of the De Soto Canyon, along with nearly all of the northeastern Gulf, NMFS estimated that the whales would experience behavioral disruption or temporary hearing loss approximately 450 times each year and that about twelve Gulf of Mexico whales would suffer permanent hearing damage annually.[199] The new information concerning the whales' habitat use in the central and western Gulf means that at least part of the population regularly occurs within the same Planning Area exposed to the vast majority of lease sales under the Proposed Program.

Furthermore, seismic surveys have repeatedly been demonstrated to elevate background levels of noise over even larger areas, masking conspecific calls and other biologically important signals and thereby compromising the ability of marine wildlife to communicate, feed, find mates, and

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had become available, at a time when the whale was presumed to regularly occur in the northeastern Gulf of Mexico alone. It is certain that the agencies will need to reinitiate consultation to address this significant new information. *See id.* at 618-19 (NMFS acknowledging that reinitiation may be required if new information becomes available about the Gulf of Mexico whale, particularly if that information concerns "population trends or distribution, significant changes to the known distribution area, [or] distribution outside the [De Soto Canyon area]."

[196] The following discussion on particular threats from offshore oil and gas development focuses on seismic survey noise, oil spills, and vessel collisions and vessel noise. It should be noted that other industry activities, such as infrastructure placement, can also affect the species and its habitat and thus require analysis.

[197] *E.g.*, M. Castellote, C.W. Clark, and M.O. Lammers, *Acoustic and Behavioural Changes by Fin Whales (Balaenoptera physalus) in Response to Shipping and Airgun Noise*, 147 BIOLOGICAL CONSERVATION 115 (2012), https://www.sciencedirect.com/science/article/abs/pii/S0006320711004848; S. Cerchio, S. Strindberg, T. Collins, C. Bennett, and H. Rosenbaum, *Seismic Surveys Negatively Affect Humpback Whale Singing Activity off Northern Angola*, 9(3): e86464 PLOS ONE (2014), https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0086464; S.B. Blackwell, C.S. Nations, T.L. McDonald, A.M. Thode, D. Mathias, K.H. Kim, C.R. Greene, Jr., and M. Macrander, *Effects of Airgun Sounds on Bowhead Whale Calling Rates: Evidence for Two Behavioral Thresholds*, 10(6): e0125720 PLOS ONE (2015), https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0125720&type=printable.

[198] *See* BOEM, *Gulf of Mexico OCS Proposed Geological and Geophysical Activities: Western, Central, and Eastern Planning Areas Final Programmatic Environmental Impact Statement* at D-220 to D-226 (2017) (BOEM 2017-051), https://www.boem.gov/sites/default/files/environmental-stewardship/Environmental-Assessment/NEPA/BOEM-EIS-2017-051_v2.pdf.

[199] NMFS, *Biological Opinion* at 551.

engage in other vital behavior.[200] The intermittency of airgun pulses hardly mitigates this effect since their acoustic energy spreads over time and sounds virtually continuous at tens of kilometers and further distances from the array.[201] Unfortunately, the Gulf of Mexico whale is particularly vulnerable to masking effects since its call repertoire coincides with the low frequencies occupied by seismic survey noise.[202] And they may regularly be exposed: In the Gulf of Mexico, seismic surveys occur frequently and at all stages of oil and gas development.[203] A three-year study of the Gulf region, undertaken by Cornell, showed that industry airguns "dominated the noise environment and chronically elevated noise levels across several paramount marine habitats."[204] Noise from single surveys was found to propagate over spatial scales of several hundred kilometers, "exposing a wide range of species and habitats to chronically elevated noise levels."[205]

As numerous commentators have observed, impacts from acoustic masking and chronic stress, experienced repeatedly and at the geographic scale of populations, can accumulate to impacts on vital rates and to population-level harm.[206] NMFS drew this very conclusion in its Biological Opinion:

> Based on the available data, we expect all [Gulf of Mexico whales] will experience chronic exposure to sounds associated with seismic activity. Such

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[200] *E.g.*, M. Guerra, A.M. Thode, S.B. Blackwell, and A.M. Macrander, *Quantifying Seismic Survey Reverberation off the Alaskan North Slope*, 130 J. OF THE ACOUSTICAL SOCIETY OF AMERICA 3046 (2011); S.L. Nieukirk, D.K. Mellinger, S.E. Moore, K. Klinck, R.P. Dziak, and J. Goslin, *Sounds from Airguns and Fin Whales Recorded in the Mid-Atlantic Ocean, 1999-2009*, 131 J. OF THE ACOUSTICAL SOCIETY OF AMERICA 1102 (2012); B.J. Estabrook, D.W. Ponirakis, C.W. Clark, and A.N. Rice, *Widespread Spatial and Temporal Extent of Anthropogenic Noise Across the Northeastern Gulf of Mexico Shelf Ecosystem*, 30 ENDANGERED SPECIES RES. 267 (2016).

[201] This property of seismic noise derives from basic physics (reverberation and multi-path propagation) and has been demonstrated repeatedly and in a range of environments, including the Gulf of Mexico. *Id.*

[202] *See* M.S. Soldevilla, K. Ternus, A. Cook, J.A. Hildebrand, K.E. Frasier, A. Martinez, and L.P. Garrison, *Acoustic Localization, Validation, and Characterization of Rice's Whale Calls*, 151 J. OF THE ACOUSTICAL SOCIETY OF AMERICA 4264 (2022) (describing low-frequency call repertoire of the Gulf of Mexico whale).

[203] The sheer intensity of activity is a hallmark of seismic surveys, particularly in the Gulf of Mexico. Some individual seismic surveys in the Gulf of Mexico persist for months at a time, operating day and night, and the frequency of activity makes seismic noise a chronic stressor in many parts of the Gulf. Estabrook, et al., *Widespread Spatial and Temporal Extent of Anthropogenic Noise Across the Northeastern Gulf of Mexico Shelf Ecosystem*, at 279. By contrast, the noise produced by offshore wind farm construction would occur far less frequently and over a much shorter span of time, in addition to having a substantially lower effective source level.

[204] *Id.* at 267.

[205] *Id.* at 279.

[206] *E.g.*, C.W. Clark, and G.C. Gagnon, Considering the temporal and spatial scales of noise exposures from seismic surveys on baleen whales (2006) (IWC Sci. Comm. Doc. IWC/SC/58/E9); E.C.M. Parsons, S.J. Dolman, M. Jasny, N.A. Rose, M.P. Simmonds, and A.J. Wright, *A Critique of the UK's JNCC Seismic Survey Guidelines for Minimising Acoustic Disturbance to Marine Mammals: Best Practice?*, 58 MARINE POLLUTION BULLETIN 643 (2009); D.P. Nowacek, C.W. Clark, D. Mann, P.J. Miller, H.C. Rosenbaum, J.S. Golden, M. Jasny, J. Kraska, and B.L. Southall, *Marine Seismic Surveys and Ocean Noise: Time for Coordinated and Prudent Planning*, 13(7) FRONTIERS IN ECOLOGY AND THE ENVIRONMENT 378 (2015).

> exposure is expected to result in chronic stress in some individuals, which may have impacts on health and ultimately fitness. Chronic exposure to seismic sound is also expected to interfere with [Gulf of Mexico whale] communication and mask important biological cues, which is expected to negatively affect the fitness of individual [Gulf of Mexico whales] by interfering with individuals' abilities to find mates and disrupting mother-calf communication…. Given [the whales'] precarious status, any effects that are expected to reduce the fitness of individuals or result in mortality are of great concern.[207]

Oil spills also represent a significant threat to the population, as demonstrated by the fallout from the *Deepwater Horizon* disaster.[208] In the Final Programmatic Damage Assessment and Restoration Plan published by the *Deepwater Horizon* Trustees, NMFS estimated that Gulf of Mexico whales were the most impacted shelf / oceanic species, with 17% (95%CI=7-24%) expected excess mortality, 22% (95%CI=10-31%) excess failed pregnancies, and 18% (95%CI=7-28%) adverse health effects.[209] The one individual sampled during a post-spill biopsy study showed levels of nickel and chromium—two genotoxic metals found in Macondo oil—consistent with those seen in Gulf sperm whales, some of which were sampled closer to the spill site; these levels were two to five times higher than the global mean for sperm whales.[210] Baleen whale calves appear particularly vulnerable to contaminant effects given efficient transplacental and lactational transfer from their mothers.[211] Considering the population's small abundance, these lingering effects of the *Deepwater Horizon* are already driving the whales to the brink of extinction, as defined by the conventional metrics employed by NMFS in its species Status Review, apart from any other anthropogenic or environmental stressors.[212]

Notably, the whales' regular occurrence west of the De Soto Canyon puts them at greater risk of exposure to a large oil spill. Each one of the blowout scenarios modeled by BOEM in its analysis of catastrophic spill events—whether they occurred in shallow or deep water, whether near the

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[207] NMFS, *Biological Opinion* at 552-53.

[208] Rosel et al., *Status Review* (2016) at 30-31; *see also id.* at 95, 131.

[209] DWH NRDA Trustees (*Deepwater Horizon* Natural Resource Damage Assessment Trustees), Deepwater Horizon *Oil Spill: Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement* (2016). *See also* R. Takeshita, L. Sullivan, C. Smith, T. Collier, A. Hall, T. Brosnan, T. Rowles, and L. Schwacke, L., *The* Deepwater Horizon *Oil Spill Marine Mammal Injury Assessment*, 33 ENDANGERED SPECIES RES. 95 (2017).

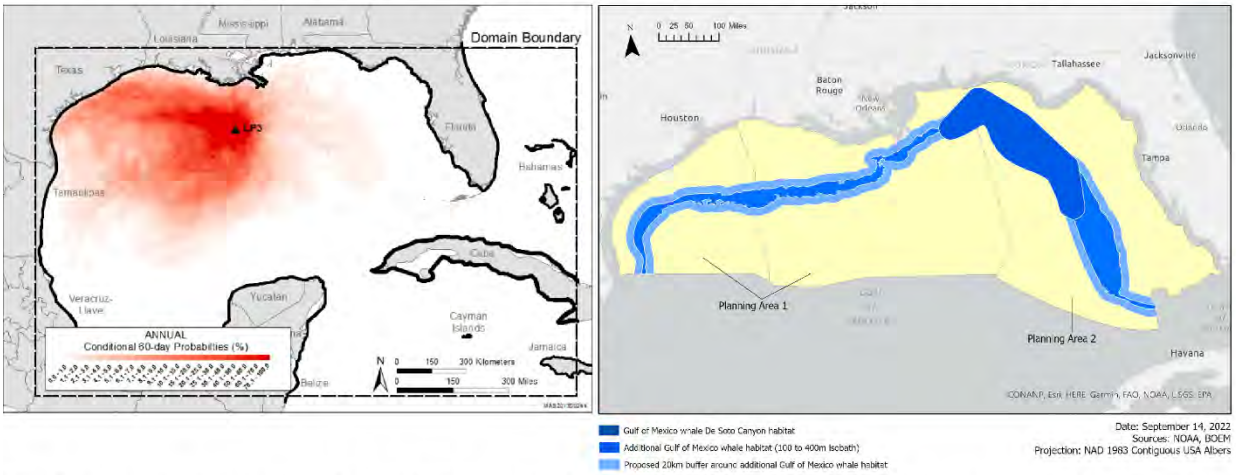
[210] J.P. Wise, Jr., J.T.F. Wise, C.F. Wise, S.S. Wise, C. Gianios,, Jr., H. Xie, W.D. Thompson, C. Perkins, C. Falank, and J.P. Wise, Sr., *Concentrations of the Genotoxic Metals, Chromium and Nickel, in Whales, Tar Balls, Oil Slicks, and Released Oil From the Gulf of Mexico in the Immediate Aftermath of the* Deepwater Horizon *Oil Crisis: Is Genotoxic Metal Exposure Part of the* Deepwater Horizon *Legacy?*, 48 ENV'T SCI. & TECH. 2997 (2014).

[211] C. Metcalfe, B. Koenig, T. Metcalfe, G. Paterson, and R. Sears, *Intra- and Inter-species Differences in Persistent Organic Contaminants in the Blubber of Blue Whales and Humpback Whales From the Gulf of St. Lawrence, Canada*, 57 MARINE ENV'T RES. 245 (2004).

[212] *See* Rosel et al., *Status Review* (2016).

shelf break or hundreds of kilometers away—would result in contamination of Gulf of Mexico whale habitat, as illustrated in the figure below.[213]

Modeled Trajectory of an Oil Spill at CPA Launch Point and Gulf of Mexico Whale Habitat



The figure on the left is taken from BOEM's revised model of oil spill trajectories from a catastrophic spill in the northern Gulf of Mexico, where the triangle marked "LP3" denotes the launch point of the modeled spill. When compared to the figure on the right, from earlier in this section, a broad overlap between the projected oil exposure area and Gulf of Mexico whale habitat can be seen.

Finally, BOEM must fully consider the threat represented by ship-strikes with industry vessels. In general, vessel collisions have been identified as one of the top human threats to large whale populations globally,[214] coinciding with a four-fold increase in marine vessel density from the early 1990s through 2012.[215] While larger ships have long been associated with severe strike-related injury, there is increasing recognition that smaller vessels can also cause mortality, particularly when traveling at faster speeds.[216] Here, too, the biology of the Gulf of Mexico whale leaves it particularly vulnerable to harm. Alarmingly, the whale spends a considerable amount of time at night within the upper 15 meters of the water column, within the draft depths of most commercial vessels. Such behavior significantly raises the risk of vessel collision.[217]

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[213] *Compare* Fig. (Gulf of Mexico whale habitat) *with* BOEM, *Gulf of Mexico Catastrophic Spill Event Analysis: High-Volume, Extended-Duration Oil Spill Resulting from Loss of Well Control on the Gulf of Mexico Outer Continental Shelf, 2nd Revision*, at 192-205 (2021) (OCS Report BOEM 2021-007) (oil trajectory and probability for each of seven modeled spill sites).

[214] R.P. Schoeman, C, Patterson-Abrolat, and S. Plön, *A global review of vessel collisions with marine animals*, 7 FRONTIERS IN MARINE SCI. 292 (2020).

[215] J. Tournadre, *Anthropogenic Pressure on the Open Ocean: The Growth of Ship Traffic Revealed by Altimeter Data Analysis*, 41 GEOPHYSICAL RES. LETTERS 7924 (2014).

[216] *E.g.*, D.E. Kelley, J.P. Vlasic, and S.W. Brillant, *Assessing the lethality of ship strikes on whales using simple biophysical models*, 37 MARINE MAMMAL SCI. 251-67 (2021).

[217] M.S. Soldevilla, J.A. Hildebrand, K.E. Fraser, L.A. Dias, A. Martinez, K.D. Mullin, P.E. Rosel, and L.P. Garrison, *Spatial Distribution and Dive Behavior of Gulf of Mexico Bryde's Whales: Potential Risk of Vessel Strikes and Fisheries Interactions*, 32 ENDANGERED SPECIES RES. 533 (2017).

Two Gulf of Mexico whales have shown direct evidence of strikes. In 2009, an adult, lactating female was stranded in Tampa Bay, Florida, with injuries consistent with blunt force trauma; and, in 2019, a free-swimming whale was observed in the northeastern Gulf of Mexico with a severely deformed spine posterior to the dorsal fin consistent with a vessel strike.[218] But the majority of incidents may well have gone undetected: as a comparative example, only 36 percent of North Atlantic right whale carcasses were detected from 1990 to 2017.[219] In its Biological Opinion, NMFS estimated that Gulf of Mexico whales would be struck 23 times, seventeen times fatally, over the next fifty years of offshore oil and gas development in the region.[220] On its own, that incidence vastly exceeds the human-caused mortality rate—approximately one death in fifteen years, as noted above—that cannot be surpassed if the population is to become sustainable. As NMFS has stated, the loss of even a single whale could jeopardize the continued existence of the species.[221]

To make matters worse, it is well established that vessel noise can disrupt baleen whale behavior, mask their communications, and induce chronic stress.[222] As one example, a study that combined long-term acoustic monitoring data with AIS vessel-tracking data and acoustic propagation modelling found that routine vessel passages in the Huruki Gulf of New Zealand constricted communication space of Bryde's whales, a related complex of species, by up to 87.4%.[223] This level suggests that vessel noise reduces communication ability well beyond the evolutionary context of the species and may lead to chronic effects.[224] Notably, researchers participating in the five-year NOAA study found that Gulf of Mexico whales responded strongly to the approach of

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[218] Rosel et al., *A New Species of Baleen Whale (*Balaenoptera*) from the Gulf of Mexico, with a Review of its Geographic Distribution*.

[219] R.M. Pace III, R. Williams, S.D. Kraus, A.R. Knowlton, and H.M. Pettis, *Cryptic Mortality of North Atlantic Right Whales*, CONSERVATION SCI. & PRACTICE 2021: e346 (2021).

[220] NMFS, *Biological Opinion* at 551. Of relevance here, BOEM discounted most (though not all) of these collisions from its estimate, on the grounds that "many of the estimated strike events" would occur outside the De Soto Canyon, where the whales are typically found. Of course, the new scientific information on the whales' central and western Gulf habitat suggests the agency's original estimate should be revisited.

[221] Comments of A.J. Strelcheck, NMFS Regional Administrator at 6.

[222] *See, e.g.*, L.T. Hatch, C.W. Clark, S.M. van Parijs, A.S. Frankel, and D.W. Ponirakis, *Quantifying loss of acoustic communication space for right whales in and around a U.S. National Marine Sanctuary*, 26 CONSERVATION BIOLOGY 983 (2012); R.M. Rolland, S.E. Parks, K.E. Hunt, M. Castellote, P.J. Corkeron, D.P. Nowacek, S.K. Wasser, and S.D. Kraus, *Evidence that Ship Noise Increases Stress in Right Whales*, PROCEEDINGS OF THE ROYAL SOCIETY B 2012: doi:10.1098/rspb.2011.2429 (2012); C. Gomez, J.W. Lawson, A.J. Wright, A.D. Buren, D. Tollit, and V. Lesage, *A systematic review on the behavioural responses of wild marine mammals to noise: The disparity between science and policy*, 94 CANADIAN J. OF ZOOLOGY 801 (2016); C.M. Duarte, L. Chapuis, S.P. Collin, D.P. Costa, R.P. Devassy, V.M. Eguiluz, C. Erbe, T.A. Gordon, B.S. Halpern, H.R. Harding, and M.N. Havlik, *The Soundscape of the Anthropocene Ocean*, SCIENCE 371: art. eaba4658 (2021).

[223] R.L. Putland, N.D. Merchant, A. Farcas, and C.A. Radford, *Vessel Noise Cuts Down Communication Space for Vocalizing Fish and Marine Mammals*, 24 GLOBAL CHANGE BIOLOGY 1708 (2018).

[224] *Id*.

their survey vessel, going silent—and therefore ceasing to engage in biologically relevant vocalizations—for 30-60 minutes or more.[225]

OCSLA does not call for the unqualified extraction of offshore oil and gas. Consistent with congressional policy, OCS energy resources should be preserved, protected, and developed based on a balancing of the nation's energy needs with the need to protect "the human, marine, and coastal environments." 43 U.S.C. § 1802(1), (2). Presently, the United States is a net exporter of energy.[226] Further, as noted above, there is ample energy available from existing resources, making developing new leases unnecessary. Consequently, new lease sales on the OCS are not necessary to ensure national security, reduce dependence on foreign energy, or meet the nation's energy needs. Furthermore, when such energy needs are balanced with environmental protection, reduced energy needs result in a lower tolerance for environmental harm.

Given the extremity of the Gulf of Mexico whale's endangerment and the probability of significant harm from oil and gas development, a reasonable balance cannot support additional offshore leasing in the Gulf, including within GOM Planning Area 1. *See Center for Biological Diversity v. Dept. of Interior*, 563 F.3d 466, 488 (D.C. Cir. 2009).

B. BOEM Has Failed to Consider The Extent to Which Communities in the Gulf of Mexico are Already Heavily Burdened By the Oil and Gas Industry

Under OCSLA, BOEM must consider "the potential impact of oil and gas exploration on . . . the marine, coastal, and human environments" when developing a national leasing program. 43 U.S.C. § 1344(a)(1). OCSLA further recognizes that OCS development "will have significant impacts on coastal and non-coastal areas of the coastal States," and that there is a "national interest in the effective management of the marine, coastal, and human environments." 43 U.S.C. § 1332(4). The "human environment" is defined as "the physical, social, and economic components, conditions, and factors which interactively determine the state, condition, and quality of living conditions, employment, and health of those affected, directly or indirectly, by activities occurring on the outer Continental Shelf." *Id.* § 1331(i). Assistance to states and local governments to protect affected areas from adverse effects may be required, and states and local governments' rights to preserve and protect their marine, human, and coastal environments should be considered and recognized. *Id.* § 1332(5).

In addition to its harmful impacts on the natural environment, offshore oil and gas drilling harms communities proximate to both the offshore production facilities and the related onshore oil and gas infrastructure. Such harms include air and water pollution in the communities living near refineries and petrochemical facilities, destruction of the coastal ecosystems that support local livelihoods and culture, and oil spills, both small and—inevitably—large.

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[225] Soldevilla et al., *Acoustic Localization, Validation, and Characterization of Rice's Whale Calls* at 4275.

[226] Energy Information Administration, Annual Energy Outlook 2020 with Projections to 2050 (2020), https://www.eia.gov/outlooks/aeo/pdf/AEO2020%20Full%20Report.pdf.

These hazards posed by oil and gas drilling disproportionately impact communities of color and low-income communities. Polluting facilities have been and continue to be sited in or near Black communities, with more than one million African Americans living within a half-mile radius of an oil and gas facility.[227] Continued expansion of offshore oil and gas drilling pursuant to the Proposed Program will further harm these already overburdened communities.

1. Oil and gas infrastructure and waste

Offshore oil and gas production requires an extensive amount of onshore and offshore infrastructure to store, process, and transport oil.[228] This infrastructure includes transportation systems (e.g., pipelines), ports and services to move personnel and equipment, processing facilities, and waste management facilities.[229] Expansion of offshore oil and gas leasing will expand these facilities, as well as their environmental and public health impacts.

Expanding offshore drilling, for example, will likely require construction of new pipelines, which create the risk of spills and ruptures, destroy sensitive ecosystems and exacerbate other environmental harms to the coast such as erosion and saltwater intrusion into wetland habitats.[230] This required onshore infrastructure will likely largely end up in states with significant offshore oil and gas production, namely Louisiana and Texas.[231] Louisiana alone has almost 50,000 miles of pipelines, with the highest concentration of pipelines in the 19 parishes on or near the Gulf of Mexico.[232]

Offshore, there are also approximately 8,600 miles of active pipelines on the seafloor in the Gulf of Mexico, and approximately 18,000 miles of decommissioned pipelines have been left on the seafloor in the Gulf of Mexico since the 1960s.[233] As climate change increases the severity of hurricanes and tropical storms, this offshore infrastructure becomes increasingly vulnerable to damage and spills. After Hurricane Ida, the National Oceanic and Atmospheric Administration reported 55 oil spills, an unprecedented number of spills based on a 10-year record, with "the

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[227] Patrick Mustain et al., Hindsight 2020: Lessons we Cannot Ignore From the BP Disaster 48 (2020).
[228] Fred Jacobs & Kirsten Strellec, Minerals Management Service, *OCS Oil and Gas Onshore/Coastal Infrastructure*, Presentation to the North Carolina Advisory Subcommittee on Onshore Energy Exploration 4 (Feb. 23, 2010), archived at https://web.archive.org/web/20190516200251/https://www.ncleg.gov/documentsites/committees/OEESC/2-23-10%20Meeting/Presentations/Jacobs%20&%20Strellec%20-%20On-shore%20Infrastructure.pdf.
[229] *Id.*
[230] Elizabeth Ridlington & Kelsey Lamp, Offshore Drilling, Onshore Damage: Broken Pipelines, Dirty Refineries and the Pollution Impacts of Energy Infrastructure 12 (2019); Bob Marshall, *Losing Ground: Southeast Louisiana is disappearing, quickly*, SCI. AM. (Aug. 28, 2014); *see* Sections IV.A.1, IV.B (discussing how the oil and gas industry has contributed to Louisiana coastal land loss).
[231] Ridlington & Lamp (2019).
[232] Louisiana Department of Natural Resources, Office of Conservation, "Pipeline Operations Program," http://www.dnr.louisiana.gov/index.cfm/page/150.
[233] GAO, Report to Congressional Requesters, *Offshore Oil and Gas: Updated Regulations Needed to Improve Pipeline Oversight and Decommissioning*, GAO 21-293 at Highlights (Mar. 2021), https://www.gao.gov/assets/gao-21-293.pdf.

most significant impact to offshore drilling" since the federal government started using satellite data to track oil spills.[234] Pipelines are also susceptible to corrosion and can become exposed or moved through natural processes. Corrosion is the largest cause of pipeline failure and can cause oil and gas to leak from active pipelines and from pipelines decommissioned-in-place if the pipeline is not properly cleaned.[235] Pipelines that have been exposed or moved due to natural processes can become hazards to commercial fishing and navigation and potentially impact other oil and gas infrastructure.[236] After Hurricane Katrina, one report found that nine miles of buried pipeline were dragged 4,000 feet across the seafloor.[237] Existing infrastructure already poses significant risks to the Gulf of Mexico. If more pipelines are needed as a result of expanded offshore oil and gas production, the risk of damage and leaks or spills increases, disproportionately impacting communities on and near the Gulf of Mexico.

The offshore oil and gas industry also creates a significant amount of waste that ends up onshore in local communities. Offshore drilling creates a variety of waste, including oil, chemical products, toxic contaminants, and radioactive materials.[238] More than 18 billion barrels of waste fluid are produced annually from oil and gas production in the United States.[239] Some waste from offshore oil and gas production is dumped directly into the ocean, but where ocean discharge is not allowed, the waste is either injected into geologic formations or disposed of onshore.[240] In the Gulf of Mexico, nearly all the waste that cannot be disposed of in the ocean is brought onshore for disposal.[241] When waste is improperly disposed of or water percolates through it, leachate and contaminated water can reach the water table, contaminating drinking water and harming nearby residents in some instances.[242] In Texas, a 2020 report on groundwater monitoring and contamination found 3,056 cases of groundwater contamination; the most common contaminants in those cases were gasoline, diesel, and other petroleum products.[243]

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[234] Blacki Migliozzi & Hiroko Tabuchi, *After Hurricane Ida, Oil Infrastructure Springs Dozens of Leaks*, N.Y. TIMES, Sept. 26, 2021, https://www.nytimes.com/interactive/2021/09/26/climate/ida-oil-spills.html.
[235] GAO, *Offshore Oil and Gas* at 5.
[236] Ella Nilsen & Liz Stark, *America's Offshore Oil Infrastructure is Aging. 'We Don't Know There's a Problem Until There's a Problem.'*, CNN, Oct. 5, 2021, https://www.cnn.com/2021/10/05/us/oil-spill-aging-fossil-fuel-infrastructure-climate/index.html; GAO, *Offshore Oil and Gas* at 5.
[237] *Id.*
[238] BOEM, "Questions, Answers, and Related Resources," https://www.boem.gov/environment/environmental-assessment/questions-answers-and-related-resources.
[239] Sarah Giltz, *Dirty and Dangerous Offshore Drilling Pollutes our Ocean and Coastal Communities*, Oceana (Nov. 6, 2021), https://usa.oceana.org/blog/dirty-and-dangerous-offshore-drilling-pollutes-our-ocean-and-coastal-communities/.
[240] Ridlington & Lampat, Offshore Drilling, Onshore Damage, at 4; BOEM, "Questions, Answers, and Related Resources."
[241] Energy Digital, *How to Manage Waste on Offshore Oil Rigs* (May 17, 2020), https://energydigital.com/utilities/how-manage-waste-offshore-oil-rigs.
[242] Mustain et al., Hindsight 2020, at 48; Groundwater Contamination in Texas Aquifers: Volume I at 41 (July 2011).
[243] Tex. Groundwater Prot. Comm., *Joint Groundwater Monitoring and Contamination Report, 2020* at 6 (2021).

2. Human health impacts of oil spills

Following the BP *Deepwater Horizon* oil spill, numerous studies were conducted on the adverse human health impacts of exposure to an oil spill and to the dispersants used to clean up the oil. One study of U.S. Coast Guard *Deepwater Horizon* oil spill responders found statistically significant positive associations between crude oil exposure and coughing, shortness of breath, wheezing, headaches, light-headedness/dizziness, diarrhea, stomach pain, nausea/vomiting, and painful/burning urination.[244] The study also found that responders had higher relative risks for dermal conditions, asthma, and chronic respiratory conditions.[245] Another study found that *Deepwater Horizon* response workers experienced prolonged or worsening health problems seven years after their exposure to the spill, including blood disorders and respiratory and cardiac problems.[246] A study of the health impacts of exposure to oil dispersants used in the *Deepwater Horizon* spill response cleanup found that exposure to the dispersants was associated with burning in the nose, throat, eyes and lungs as well as tightness in the chest, both at the time of exposure and years later.[247] Although these studies looked at the human health impacts of oil spills on responders, the same oil washes up on shores, pollutes local beaches, and ends up contaminating areas where local residents live and recreate.

Exposure to oil spills has been additionally linked to considerable adverse mental health effects.[248] High rates of depression and severe mental distress were found among women living in the southern coastal Louisiana parishes affected by the *Deepwater Horizon* oil spill, as well as increased domestic conflict.[249] People with significant community attachment to an area impacted by the spill or who were more economically impacted were also more negatively affected and experienced higher levels of stress.[250] Studies have also found that children exposed to the Deepwater Horizon oil spill were twice as likely to have mental and physical health issues as children who were not exposed, and children from African American and low-income households had a higher prevalence of health effects from exposure.[251]

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[244] Jennifer Rusiecki et al., *The* Deepwater Horizon *Oil Spill Coast Guard Cohort Study*, 75 OCCUPATIONAL ENV'T MED. 165, 165 (2017).
[245] *Id.*
[246] Mark A. D'Andrea & G. Kesava Reddy, *The Development of Long-term Adverse Health Effects in Oil Spill Cleanup Workers of the* Deepwater Horizon *Offshore Drilling Rig Disaster*, 6 FRONTIERS IN PUB. HEALTH 1, 1 (2018).
[247] Craig J. McGowan et al., *Respiratory, Dermal, and Eye Irritation Symptoms Association with Corexit™ EC9527A/EC9500A Following the* Deepwater Horizon *Oil Spill: Findings from the GuLF STUDY*, 125 ENV'T HEALTH PERSP. 9 at 1 (2017), https://ehp.niehs.nih.gov/doi/10.1289/ehp1677.
[248] Ariane Rung et al., *Depression, Mental Distress, and Domestic Conflict Among Louisiana Women Exposed to the* Deepwater Horizon *oil spill in the WaTCH Study*, 124 ENV'T HEALTH PERSP. 1429, 1430 (2016).
[249] *Id.* at 1433-34.
[250] Nathan Andrews et al., *Oil, Fisheries and Coastal Communities: A Review of Impacts on the Environment, Livelihoods, Space and Governance*, 75 ENERGY RSCH. & SOC. SCI. 1, 8 (2021), https://www.sciencedirect.com/science/article/pii/S221462962100102X.
[251] Paul A. Sandifer et al., *Human Health and Socioeconomic Effects of the Deepwater Horizon Oil Spill in the Gulf of Mexico*, 34 OCEANOGRAPHY 174, 179 (2021).

3. Oil refineries and petrochemicals

Offshore oil and gas production is harmful to the communities that live near refineries, processing plants, and other oil and gas infrastructure. The production of oil and gas helps drive the production of industrial chemicals and plastics. As of 2018, 14% of global oil production and 8% of global gas production was used to manufacture petrochemicals and their derivatives.[252] According to the International Energy Agency, petrochemicals are projected to account for more than one third of global oil demand by 2030, and oil consumption for plastics production will outpace that of cars by 2050.[253]

As plastics production increases, plastic pollution continues to harm the environment and communities where pollution accumulates. While a significant quantity of plastic pollution is from produced consumer products, the petrochemical industry also produces plastic pollution in the form of nurdles—tiny beads of pure plastic that form the building block of almost all plastic products. Given their small size and weight, and their use in the production of nearly all plastic products, nurdles are easily spilled in everyday activities of the petrochemical industry.[254] Nurdles are not currently classified as pollutants or hazardous materials, so there is little oversight of the millions of nurdles that end up on shorelines and in waterways annually.[255]

Microplastics like nurdles cause pernicious health and environmental harms. Microplastics can absorb and subsequently leach toxic chemicals and contaminants into the surrounding environment.[256] Additionally, many plastics contain known endocrine disrupters—chemicals that can alter the functioning of the endocrine system.[257] Microplastics are also mistaken for food by fish, seabirds, and other marine organisms, and research has shown that microplastics have been found in human blood, internal organs, and even in the placentas of newborn babies.[258] Although

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[252] ARACELI FERNANDEZ PALES ET AL., THE FUTURE OF PETROCHEMICALS: TOWARDS MORE SUSTAINABLE PLASTICS AND FERTILISERS, at 3 (Robert Priddle & Caren Brown eds., 2018).
[253] *Id.* at 11, 13.
[254] *See* Julissa Treviño & Undark, *The lost nurdles polluting Texas beaches*, THE ATLANTIC (July 5, 2019), https://www.theatlantic.com/science/archive/2019/07/plastic-pellets-nurdles-pollute-oceans/593317/.
[255] Neel Dhanesha, *The massive, unregulated source of plastic pollution you've probably never heard of*, VOX (May 6, 2022), https://www.vox.com/recode/23056251/nurdles-plastic-pollution-ocean-microplastics; Beth Gardiner, *How a dramatic win in plastic waste case may curb ocean pollution*, NAT'L GEOGRAPHIC (Feb. 22, 2022), https://www.nationalgeographic.com/environment/article/how-a-dramatic-win-in-plastic-waste-case-may-curb-ocean-pollution.
[256] UNEP, *Plastic planet: How tiny plastic particles are polluting our soil* (Dec. 22, 2021), https://www.unep.org/news-and-stories/story/plastic-planet-how-tiny-plastic-particles-are-polluting-our-soil; Yukie Mato et al., *Plastic resin pellets as a transport medium for toxic chemicals in the marine environment*, 35 ENV'T SCI. TECH. 318, 318 (2001); Therese Karlsson et al., *Plastic pellets found on beaches all over the world contain toxic chemicals* INT'L PELLET WATCH 4, 6 (2021).
[257] Chelsea M. Rochman et al., *Early warning signs of endocrine disruption in adult fish from the ingestion of polyethylene with and without sorbed chemical pollutants from the marine environment*, 493 SCI. OF THE TOTAL ENV'T 656, 656 (2014); Sara Brosché et al., *Widespread chemical contamination of recycled plastic pellets globally* INT'L PELLET WATCH 4, 7-8 (2021).
[258] Antonio Ragusa et al., *Plasticenta: First evidence of microplastics in human placenta*, 146 Env't Int'l at 1, 5 (2021); Dhanesha.

research is limited, there is evidence to suggest that microplastics can cause oxidative stress, inflammation, and severe immune responses in humans.[259]

In 2019, a federal judge approved a settlement in a case alleging that Formosa Plastics had violated its permits by illegally discharging nurdles into the waters of Cox Creek and Lavaca Bay, Texas.[260] The judge found that Formosa had violated its permits on 736 days at one discharge point, and 1,149 days across eight other discharge points.[261] A year later, in August 2020, a shipping container of nurdles fell off a container ship in the Port of New Orleans during a thunderstorm, resulting in the release of an estimated 743 million nurdles into the Mississippi River.[262] Despite the enormity of the spill, no authority began assessing cleanup of the spill until ten days had passed, allowing an estimated 75% of the spilled nurdles to wash downstream.[263] In a map of nurdle pollution, areas with high recorded numbers of nurdles correspond to petrochemical hubs in Texas and Louisiana, areas already impacted by the other forms of pollution from the oil and gas industry.[264]

Disproportionate impacts on Gulf of Mexico Communities. Communities along the Gulf of Mexico are burdened with some of the worst impacts of the offshore oil and gas industry. Over 47% of total U.S. petroleum refining capacity and 51% of total U.S. natural gas processing plant capacity are located along the Gulf coast.[265] In particular, the petrochemical industry has disproportionately impacted Black, Indigenous, and communities of color.[266] These communities face disproportionate burdens from multiple pollution sources, including toxic air pollution, plastic pollution, and groundwater contamination. In a nationwide study mapping the spread of cancer-causing chemicals from sources of hazardous air pollutants, census tracts where a majority of residents were people of color experienced on average about 40% more cancer-causing industrial air pollution than primarily white census tracts.[267] In census tracts where the majority of residents were Black, the estimated cancer risk from toxic air pollution was found to be more than twice the risk of majority-white tracts.[268] Two areas in the Gulf of Mexico have unduly felt the harms of the oil and gas industry: "Cancer Alley," Louisiana and southeastern

[259] FAO & UNEP, *Chapter 4: Env't, health and socio-economic impacts of soil pollution, in* Glob. assessment of soil pollution: Report (Natalia Rodríguez Eugenio et al. eds., 2021); *see also* Prata et al., *Env't exposure to microplastics: An overview on possible hum. health effects*, 702 SCI. OF THE TOTAL ENV'T 1 (2020).
[260] Dhanesha.
[261] Gardiner.
[262] Jacob Wallace, *When plastic pours into the Mississippi, who's responsible?*, E&E NEWS GREENWIRE (Sept. 9, 2021), https://www.eenews.net/articles/when-plastic-pours-into-the-mississippi-whos-responsible/.
[263] *Id.*
[264] Danesha; NURDLE PATROL, https://nurdlepatrol.org/map (last visited. Oct. 6, 2022).
[265] U.S. ENERGY INFO. ADMIN., *Gulf of Mexico Fact Sheet* (June 21, 2022), https://www.eia.gov/special/gulf_of_mexico/.
[266] EARTHJUSTICE, *How big oil is using toxic chemicals as a lifeline – and how we can stop it* (July 2, 2020), https://earthjustice.org/features/petrochemicals-explainer.
[267] Lylla Younes et al., *Poison in the air*, ProPublica (Nov. 2, 2021), https://www.propublica.org/article/toxmap-poison-in-the-air.
[268] *Id.*

Texas. These two regions are highlighted to illustrate the severe impact of the offshore oil and gas industry on communities across the Gulf coast.

a. "Cancer Alley," Louisiana

"Cancer Alley," the 85-mile stretch along the Mississippi River between Baton Rouge and New Orleans, gets its name from the high concentration of petrochemical facilities and high cancer risk from toxic pollution.[269] In 2012, the average cumulative cancer risk in Cancer Alley was more than 50% higher than the average cumulative risk in the United States.[270] The burden of this toxic air pollution is felt by Black and low-income communities. President Biden has acknowledged the environmental injustices Black, Indigenous, and people of color face, and has explicitly named Cancer Alley as an area that has been disproportionately harmed.[271] Some residents and community groups have started calling the area "Death Alley" due to the number of deaths and serious adverse health effects residents experience from the ongoing pollution of toxic chemicals.[272]

For example, within ten miles of St. Gabriel, Louisiana, a majority-Black community, there are at least thirty large petrochemical facilities; thirteen of those are within three miles.[273] EPA data from 2014 estimated that nationwide cancer risk from air toxics exposure was thirty in one million.[274] In the census tract in which St. Gabriel sits, the total cancer risk in 2017 was 200 in one million, over six times the national average.[275] St. Gabriel is also home to a chemical manufacturing plant that once ranked in the top ten plants in the country in terms of creating high, toxic levels of cancer-causing chemicals in the surrounding air.[276] A plastics facility across the river from St. Gabriel recently announced a $1.3 billion facility expansion.[277] Despite the existing health burdens in the region, many new petrochemical facilities or facility expansions

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[269] Kimberly A. Terrell & Gianna St Julien, *Air pollution is linked to higher cancer rates among black or impoverished communities in Louisiana*, 17 ENV'T RSCH. LETTERS at 1-2 (2022); *see also*, EPA, *EJScreen*, https://ejscreen.epa.gov/mapper/ (last visited Oct. 6, 2022); Tristan Baurick et al., *Welcome to "Cancer Alley," where toxic air is about to get worse*, PROPUBLICA (Oct. 30, 2019), https://www.propublica.org/article/welcome-to-cancer-alley-where-toxic-air-is-about-to-get-worse; Matt Black, *Cancer Alley: Big industry, big problems*, PULITZER CENTER (Aug 10., 2015), https://pulitzercenter.org/stories/cancer-alley-big-industry-big-problems.
[270] Julie Schwartzwald Meaders, *Health impacts of petrochemical expansion in Louisiana and realistic options for affected communities*, 34 TULANE ENV'T LAW J. 113, 120 (2021).
[271] THE WHITE HOUSE, *Remarks by President Biden before signing executive actions on tackling climate change, creating jobs, and restoring scientific integrity* (Jan. 27, 2021).
[272] COALITION AGAINST DEATH ALLEY, *Our Coalition*, https://www.enddeathalley.org/our-coalition (last visited Oct. 6, 2022).
[273] Baurick et al.
[274] EPA, *2014 National Air Toxics Assessment: Fact Sheet 1*, https://www.epa.gov/sites/default/files/2018-08/documents/2014_nata_overview_fact_sheet.pdf (last visited Oct. 6, 2022).
[275] EPA, *AirToxScreen Mapping Tool*, Iberville Parish, LA Tract ID: 22047953200 (2017) https://epa.maps.arcgis.com/apps/dashboards/fb6e6b70c7e2480c8ef88cc8e9c061ac.
[276] Younes et al., *In a notoriously polluted area of the country, massive new chemical plants are still moving in*, PROPUBLICA (Oct. 30, 2019), https://projects.propublica.org/louisiana-toxic-air/.
[277] STATE OF LOUISIANA OFFICE OF THE GOVERNOR, *Gov. Edwards and Shintech announce $1.3 billion expansion for plastics facility* (Jan. 26, 2021), https://gov.louisiana.gov/index.cfm/newsroom/detail/2936.

are planned in or near communities that already have some of the most dangerous air in the country.[278]

In St. John the Baptist Parish, the town of Reserve, a small, predominantly Black and low-income community, has a cancer risk rate fifty times the national average.[279] Residents of Reserve and surrounding towns have been concerned about the health effects of high levels of chloroprene emissions from the Denka Performance Elastomer facility, a synthetic rubber plant in the parish.[280] After a 2015 EPA air toxicity report, the Denka plant was determined to be responsible for the greatest risk of cancer of any manufacturing facility in the United States.[281] Air monitoring around the parish has shown quantities of chloroprene, a likely carcinogenic chemical, dozens of times above EPA's guidance.[282] EPA has stated that emissions of chloroprene above its recommended limit (0.2 micrograms per cubic meter) are unsafe for humans to breathe over the course of a lifetime.[283] The air monitoring station at a local elementary school, on the fenceline of the Denka plant, recorded at one point levels of chloroprene 755 times above EPA's guidance.[284] Over 500 children attend the elementary school daily.[285]

One study of cancer risk in residents living near the Denka plant found that cancer prevalence and non-cancer health conditions associated with chloroprene exposure were unusually high and correlated to proximity to the plant.[286] Cancer prevalence for residents who lived within one-and-a-half kilometers of the plant was 44% higher than the national average.[287] Of survey respondents who lived within one-and-a-half kilometers of the plant, more than half regularly experienced headaches, dizziness or lightheadedness; nearly half regularly experienced eye pain/irritation and/or watery eyes; more than 40% experienced coughing, sneezing, and/or a sore/hoarse throat most of the time; more than one third regularly experienced skin rash/irritation and/or itchy skin; nearly 40% experienced chest pain, heart palpitations or both; one third regularly experienced wheezing and/or difficulty breathing; and nearly 30% experienced

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[278] Baurick et al.
[279] Oliver Laughland, *Proposed deal could slash toxic emissions in America's 'Cancer Alley'*, THE GUARDIAN (June 8, 2022), https://www.theguardian.com/environment/2022/jun/08/cancer-alley-louisiana-denka-pollution-consent-decree.
[280] *See Id.*; CONCERNED CITIZENS OF ST. JOHN, *Our Mission and Our Work in Action*, https://www.ccosj.com/ (last visited Oct. 6, 2022).
[281] Jamiles Lartey & Oliver Laughland, *Cancer Town Louisiana: 'Almost every household has someone that died from cancer'*, THE GUARDIAN (May 6, 2019), https://www.theguardian.com/us-news/ng-interactive/2019/may/06/cancertown-louisana-reserve-special-report.
[282] Laughland.
[283] Lartey & Laughland.
[284] *Id.*
[285] Sharon Lerner, *EPA rejects Denka's request to weaken assessment of chloroprene*, THE INTERCEPT (Mar. 17, 2022), https://theintercept.com/2022/03/17/epa-cancer-chloroprene-denka/.
[286] UNIVERSITY NETWORK FOR HUMAN RIGHTS, *"Waiting to die:" Toxic emissions and disease near the Louisiana Denka/DuPont Plant*, at 6-7 (2019).
[287] *Id.* at 7.

fatigue/lethargy most of the time.[288] In surveyed households within one-and-a-half kilometers of the plant, nearly 50% of the children suffered from headaches, nosebleeds, or both.[289] These health effects are consistent with the short- and long-term health effects EPA has found associated with chloroprene exposure.[290] Additional long-term health effects of chloroprene exposure include cancer, rapid heartbeat and reduced blood pressure, and temporary hair loss.[291]

Due to EPA's concern about high levels of chloroprene emissions in St. John the Baptist Parish, EPA, the Louisiana Department of Environmental Quality, and Denka have made efforts to reduce chloroprene emissions from the facility.[292] Yet from January to June 2022, average chloroprene concentrations from 18 monitoring locations on the fenceline of the Denka facility were all still above EPA's recommended level, and EPA's six monitoring sites continue to report chloroprene concentrations over the recommended level.[293]

In St. James Parish, as of 2019, at least four new or expanded petrochemical plants had been planned.[294] Formosa Plastics, a plastics and petrochemicals company, plans to establish a new $9.4 billion plastics complex that would nearly double the amount of toxic chemicals released into the air.[295] The plan would create at least fourteen separate production plants and would have the authority to release 1.6 million pounds of toxic chemicals annually, including 15,400 pounds of ethylene oxide and 73,160 pounds of benzene, both known cancer-causing agents.[296] The burden of this toxic pollution would primarily fall on already overburdened Black communities.[297] Sharon Lavigne, founder of RISE St. James, a faith-based grassroots

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[288] *Id.*
[289] *Id.*
[290] Bao Chuong et al., EPA OFFICE OF INSPECTOR GENERAL, IMPROVING AIR QUALITY: EPA SHOULD CONDUCT NEW RESIDUAL RISK AND TECHNOLOGY REVIEWS FOR CHLOROPRENE- AND ETHYLENE OXIDE-EMITTING SOURCE CATEGORIES TO PROTECT HUMAN HEALTH, REPORT NO. 21-P-0129, at 6 (2021).
[291] *Id.*
[292] LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY, *LDEQ and Denka sign AOC designed to reduce chloroprene emissions at LaPlace facility* (Jan. 10, 2017), https://www.deq.louisiana.gov/news/ldeq-and-denka-sign-aoc-designed-to-reduce-chloroprene-emissions-at-laplace-facility; *see also* EPA, EPA in Louisiana, *LaPlace, Louisiana - Background Information*, https://www.epa.gov/la/laplace-louisiana-background-information#about-denka (last visited Oct. 6, 2022).
[293] DENKA ELASTOMERS, LLC, *Denka Ambient Air Monitoring Locations and Average Chloroprene and Butadiene Ambient Concentration*s, https://www.epa.gov/system/files/documents/2022-09/Denka%20Fenceline%2009_09_2022.pdf (last visited Oct. 6, 2022); EPA, *Continuous Air Monitoring Summary Results for Chloroprene March 10, 2020 - April 19, 2022* (2022), https://www.epa.gov/system/files/documents/2022-06/continuous-monitoring-summary-march-10-2020-through-april-19-2022.pdf.
[294] Younes.
[295] David J. Mitchell, *For massive new plants, Formosa wants OK to double amount of chemicals released into St. James Parish air*, THE ADVOCATE (July 8, 2019), https://www.theadvocate.com/baton_rouge/news/article_c30d4620-a1be-11e9-837c-13f09466bb79.html.
[296] *Id.*
[297] Steven Mufson, *Huge plastics plant faces calls for environmental justice, stiff economic headwinds*, THE WASHINGTON POST, (April 19, 2021), https://www.washingtonpost.com/climate-environment/2021/04/19/huge-plastics-plant-faces-calls-environmental-justice-stiff-economic-headwinds/; Deacon Chris Kellerman SJ, The Roman Catholic Diocese of Baton Rouge, *Environmental racism and Formosa Plastics in St. James*, Jan. 12, 2021,

organization fighting for environmental justice, has said that "Formosa Plastics would be a death sentence for St. James Parish."[298]

In addition to its harmful health impacts, the Formosa plant would cause significant cultural harm to the parish. The graves of people enslaved on former plantations were found on the land that Formosa plans to develop.[299] An independent archaeologist found that there were possibly as many as five other cemeteries on the land.[300] In the efforts to block the Formosa plant from being constructed, Lavigne stated: "Our ancestors are crying out to us from their graves—they are telling us to not let industry disturb their burial sites."[301]

Even without the Formosa project, there are still twelve petrochemical facilities within a ten-mile radius in St. James Parish; the Formosa plant would be the thirteenth.[302] Residents of the Parish and Cancer Alley generally have long been aware of the unusually high number of people who fall ill with cancer and other diseases.[303] One resident of Reserve recalled her niece saying, just before passing away from cancer: "We're just sitting here, waiting to die."[304]

b. Southeastern Texas

Like Cancer Alley, southeastern Texas is heavily burdened with the toxic pollution and adverse health impacts of oil refineries and the petrochemical industry. The impacts of the industry are acutely felt in the greater Port Arthur and Houston areas, the areas with the second and third largest hot spots of cancer-causing air pollution in the country, respectively, after Cancer Alley.[305]

In an assessment of benzene pollution at the fencelines of petroleum refineries from April 2021 to March 2022, twelve refineries exceeded nine micrograms per cubic meter—the level above which EPA requires a refinery to take action to reduce benzene emissions.[306] Six of these refineries are located in Texas: one in Port Arthur, four in Greater Houston, and one in Corpus Christi.[307] Benzene is a known human carcinogen with harmful health effects from both short-

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https://diobr.org/news/environmental-racism-and-formosa-plastics-in-st-james; *see also* Antonia Juhasz, *Louisiana's 'Cancer Alley' is getting even more toxic – but residents are fighting back*, ROLLING STONE (Oct. 30, 2019), https://www.rollingstone.com/politics/politics-features/louisiana-cancer-alley-getting-more-toxic-905534/.

[298] Deacon Kellerman SJ.

[299] CENTER FOR CONSTITUTIONAL RIGHTS, *RISE St. James – The fight to protect burial sites of enslaved people*, https://ccrjustice.org/home/what-we-do/our-cases/rise-st-james-fight-protect-burial-sites-enslaved-people (last visited Oct. 6, 2022.

[300] *Id.*

[301] Christina Carrega, *$9.4 billion plastics facility to be built on slave burial grounds, report says*, ABC News, Mar. 15, 2020, https://abcnews.go.com/US/94-billion-plastics-facility-built-slave-burial-grounds/story?id=69555811.

[302] U.S. House of Representatives Committee on Natural Resources, Grijalva McEachin letter to Biden on Army Corps permits for Formosa plant (March 17, 2021).

[303] Lartey & Laughland.

[304] University Network for Human Rights at 5.

[305] Younes et al.

[306] ENVIRONMENTAL INTEGRITY PROJECT, *Benzene pollution at petroleum refinery fencelines* (July 8, 2022).

[307] *Id.*, the remaining refineries are in Pennsylvania (1), Louisiana (3), New Jersey (1), and Indiana (1).

and long-term exposure, including headaches, dizziness, and irritation of the eyes, skin and respiratory tract, as well as harmful effects to bone marrow, excessive bleeding, and damage to the immune system.[308]

In Jefferson County, in which Port Arthur is situated, 92% of sulfur dioxide emissions come from one petroleum coke plant; the plant is one of the largest sources of sulfur dioxide pollution in Texas.[309] Exposure to sulfur dioxide can also have short-term and chronic effects. Short-term exposure can cause respiratory problems, including shortness of breath and chest tightness, particularly during physical activity.[310] Chronic exposure can increase susceptibility to respiratory infections and reduce the ability of the lungs to function.[311] Additionally, children, older adults, and people with asthma are at increased risk of hospitalization and emergency room visits if exposed to sulfur dioxide.[312] Of the approximately 2,600 residents who live within a three-mile radius of the petroleum coke plant, 98% are people of color and 62% are lower income.[313] The predominantly Black neighborhood of Port Arthur closest to the plant reports a 13.7% asthma rate, above the 10.5% average asthma rate for Port Arthur and the 8% national average.[314] In 2021, EPA recognized the harm that air pollution from the plant was causing the mostly African American community in Port Arthur when it agreed to investigate whether Texas violated the civil rights of residents by allowing the plant to continue emitting harmful air pollution without requiring modern pollution controls.[315]

The greater Houston area is likewise heavily burdened by the oil and gas industry. The area is home to the largest petrochemical manufacturing complex in the western hemisphere as well as 44% of the nation's petrochemical capacity, with 618 chemical manufacturing facilities.[316] Shipping is another major source of pollution for the area: one study found that children living

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[308] EPA, *Benzene* (Jan. 2012), https://www.epa.gov/sites/default/files/2016-09/documents/benzene.pdf; CENTER FOR DISEASE CONTROL AND PREVENTION, *Facts about Benzene* (April 4, 2018), https://emergency.cdc.gov/agent/benzene/basics/facts.asp.

[309] ENVIRONMENTAL INTEGRITY PROJECT, *Environmental groups demand EPA investigate Texas industrial plant for pollution-driven civil rights violations* (Aug. 18, 2021), https://environmentalintegrity.org/news/groups-demand-epa-investigate-texas-industrial-plant-for-civil-rights-violations/.

[310] AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, *Medical Management Guidelines for Sulfur Dioxide*, https://wwwn.cdc.gov/TSP/MMG/MMGDetails.aspx?mmgid=249&toxid=46 (last visited Oct. 6, 2022); AMERICAN LUNG ASSOCIATION, *Sulfur Dioxide*, https://www.lung.org/clean-air/outdoors/what-makes-air-unhealthy/sulfur-dioxide (last visited Oct. 6, 2022);

[311] Agency for Toxic Substances and Disease Registry; American Lung Association.

[312] American Lung Association.

[313] Environmental Integrity Project.

[314] Savanna Strott & David Leffler, *Small plant, big polluter*, HOUSTON PUBLIC MEDIA (Nov. 2, 2021), https://www.houstonpublicmedia.org/articles/news/health-science/2021/11/02/412279/small-plant-big-polluter/.

[315] Clarissa Ayala, *EPA agrees to investigate Texas for alleged civil rights violations caused by air pollution from Port Arthur plant*, LONE STAR LEGAL AID (Oct. 18, 2021), https://www.lonestarlegal.org/news/2021/10/epa-agrees-to-investigate-texas-for-alleged-civil-rights-violations-caused-by-air-pollution-from-port-arthur-plant/.

[316] Yukyan Lam et al., *Toxic air pollution in the Houston ship channel: Disparities show urgent need for environmental justice*, NAT. RES. DEF. COUNCIL (Aug. 31, 2021); GREATER HOUSTON PARTNERSHIP, Data, Insight & Analysis, *Chemical Industry Overview* (April 26, 2021), https://www.houston.org/houston-data/chemical-industry-overview.

within two miles of the Houston ship channel had a 56% higher risk of developing acute lymphocytic leukemia than children living more than ten miles from the channel.[317] The toxic pollution from these facilities disproportionately harms people of color, low-income communities, and limited-English speaking households.[318]

Some pollutants of concern in the region are emissions of fine particulate matter (PM2.5), coarse particulate matter (PM10), and volatile organic compounds. Exposure to each of these pollutants has been linked to cardiovascular disease, premature death, and damage to bodily systems and organs.[319] A study of the Houston region found that the amount of each of these pollutants emitted per square mile per year was roughly 50% higher for people living in poverty compared to wealthier communities.[320] For communities of color, the burden of these pollutants was twice as much compared to white communities.[321]

Within the region, some communities are hit particularly hard—in the Harrisburg/Manchester neighborhood, a predominantly Hispanic/Latino neighborhood, one study found that air pollution exceeded safe levels for twelve air pollutants deemed "definite risks."[322] Particulate matter pollution levels in that neighborhood have been found to be fifty to sixty times higher than in the broader region.[323] Another study of the Houston area compared exposure to toxic air pollution and health risk in Harrisburg/Manchester as well as Galena Park, also a primarily Hispanic and low-income community, with Bellaire and West Oaks/Elrdridge, two more affluent communities.[324] The results found that the toxic concentration of 1,3-benzene, a chemical known to cause cancer and other adverse neurological effects, was 174 times higher in Harrisburg/Manchester and 228 times higher in Galena Park than in West Oaks/Eldridge.[325] The study also looked at cancer risk in these four communities. Residents in Harrisburg/Manchester have a 24% and 30% higher cancer risk than residents of Bellaire and West Oaks/Eldridge, respectively.[326] Similarly, in Galena Park, residents face cancer risks 30% and 36% higher than in Bellaire and West Oaks/Eldridge, respectively.[327] These studies highlight how, within the

[317] Younes et al.; Cindy Horswell & Susan Carroll, *Study: Children near ship channel face more risk*, CHRON. (Jan. 19, 2007), https://www.chron.com/news/houston-texas/article/Study-Children-near-Ship-Channel-face-more-risk-1583566.php.
[318] Lam et al.
[319] *Id.*; EPA, *Health and environmental effects of particulate matter (PM)* (2021), https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm; AMERICAN LUNG ASSOCIATION, *Volatile Organic Compounds* (2020), https://www.lung.org/clean-air/at-home/indoor-air-pollutants/volatile-organic-compounds.
[320] Lam et al.
[321] *Id.*
[322] UNION OF CONCERNED SCIENTISTS & TEX. ENV'T JUST. ADVOC. SERIES, Double jeopardy in Houston: Acute and chronic chemical exposures pose disproportionate risks for marginalized communities, at 3 (2016).
[323] *Id.*
[324] Union of Concerned Scientists & Tex. Env't Just. Advoc. Series at 5-6.
[325] *Id.* at 12.
[326] *Id.* at 13.
[327] *Id.* at 14.

same region, communities of color and low-income communities are disproportionately burdened with the harmful impacts of the oil and gas industry.

In addition to the health risks from exposure to air pollution in southeastern Texas, industrial facility accidents in the oil and gas industry also pose significant risks to surrounding communities. In 2017, Hurricane Harvey damaged two ExxonMobil refineries, resulting in a release of hazardous pollutants, including volatile organic compounds and sulfur dioxide.[328] EPA estimates that approximately 150 catastrophic accidents occur at regulated industrial facilities every year, and less severe accidents happen regularly.[329] As with air pollution, the risk of a chemical spill is higher in BIPOC and low-income communities near the fenceline of these facilities.[330]

4. Cultural impacts of coastal land loss

Indigenous communities along the Gulf of Mexico live and rely on the coast for their culture and livelihoods. The intertwined impacts of climate change, oil and gas drilling, and natural and human-caused subsidence—the sinking of land—are resulting in significant loss of community and culture along the Gulf coast.

In the Gulf of Mexico, the oil and gas industry has dug 10,000 miles of canals and navigation channels, cutting through coastal wetlands.[331] Destroying these sensitive ecosystems has allowed for further damage to occur from saltwater intrusion and erosion, while also removing the beneficial storm barrier these environments provide the coast.[332] And oil from the *Deepwater Horizon* disaster accelerated salt marsh erosion even more, leading to large-scale and likely irreversible land loss.[333]

In Louisiana, coastal wetlands are disappearing at a rate of the equivalent of a football field every 100 minutes (or a tennis court every few minutes).[334] Since the 1930s, Louisiana has lost

[328] Steven Mufson, *ExxonMobil refineries are damaged in Hurricane Harvey, releasing hazardous pollutants*, THE WASHINGTON POST (Aug. 29, 2017), https://www.washingtonpost.com/news/energy-environment/wp/2017/08/29/exxonmobil-refineries-damaged-in-hurricane-harvey-releasing-hazardous-pollutants/.
[329] Union of Concerned Scientists & Tex. Env't Just. Advoc. Series at 2-3.
[330] *Id.* at 3.
[331] Marshall, *Losing Ground*.
[332] *Id.*; Coastal Protection and Restoration Authority, "A Changing Landscape," https://coastal.la.gov/whats-at-stake/a-changing-landscape/.
[333] Brian R. Silliman et al., *Thresholds in Marsh Resilience to the* Deepwater Horizon *Oil Spill*, 6 SCI. REPS. at 7-8 (2016).
[334] RESTORE THE MISSISSIPPI RIVER DELTA, "Land Loss," https://mississippiriverdelta.org/our-coastal-crisis/land-loss/; Elizabeth Kolbert, *Louisiana's Disappearing Coast*, THE NEW YORKER, Mar. 25, 2019, https://www.newyorker.com/magazine/2019/04/01/louisianas-disappearing-coast.

more than two thousand square miles of land.[335] It has been estimated that the oil and gas industry is responsible for 36% of Louisiana's coastal land loss between 1932 and 1990.[336]

The United Houma Nation, a state recognized tribe of approximately 17,000 members that live in the bayous and along the canals of Louisiana's southeastern coast, have suffered disproportionately from oil and gas development. Historically, distinct tribal communities have travelled by boat, but due to erosion altering the coastline, historic waterways are now nonexistent or impassable.[337] Additionally, as some waterways are turning into open water, they require larger vessels to travel safely.[338] Because the landscape is changing so rapidly, tribal fishermen can no longer rely on sight to navigate and instead must rely on GPS and radar systems.[339]

In Texas, the cultural heritage of coastal indigenous communities is threatened by the expansion of Enbridge Energy's crude export terminal. In late 2021, Enbridge acquired North America's largest crude oil storage and export terminal, located in the Corpus Christi area.[340] Enbridge is also looking at the possibility of building a pipeline to connect the export hub to Houston.[341] Indigenous communities, including the Karankawa Kadla Tribe, filed a lawsuit alleging the U.S. Army Corps of Engineers improperly approved a permit to allow the crude export terminal to expand operations onto land sacred to the area's native people.[342] Archaeologists have found tens of thousands of Karankawa artifacts on the land near where the expansion is expected and one archaeologist once recommended that the site be listed on the National Register of Historic Places because it contained so many important artifacts.[343]

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[335] RESTORE THE MISSISSIPPI RIVER DELTA.
[336] Shea Penland et al., US DOI, USGS, Louisiana Marine Coastal Geology Program, *Process Classification of Coastal Land Loss Between 1932 and 1990 in the Mississippi River Delta Plain, Southeastern Louisiana*, https://pubs.usgs.gov/of/2000/of00-418/ofr00-418.pdf.
[337] UNITED HOUMA NATION, "About Houma Nation," https://unitedhoumanation.org/about/.
[338] *Id.*; *see also* U.S. Geological Survey, *Louisiana Coastal Wetlands: A Resource at Risk* (describing how coastal erosion and human infrastructure impact sediment transport and exposure of previously protected lands to the effects of open water wave action, storm surge, tidal current, and saltwater intrusion).
[339] *Impact of Climate Change on Louisiana's Houma Tribe*, UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN, NEWS BUREAU, Sept. 27, 2019.
[340] Rithika Krishna & Rod Nickel, *Enbridge Buys N. America's Biggest Oil Export Hub in $3-bln Moda Deal*, REUTERS, Sept. 7, 2021, https://www.reuters.com/business/energy/enbridge-buy-moda-midstream-operating-3-billion-2021-09-07/; Enbridge, *Enbridge Advances U.S. Gulf Coast Strategy with Acquisition of North America's Premier Crude Export Facility*, Sept. 7, 2021, https://www.enbridge.com/media-center/news/details?id=123689&lang=en.
[341] Candice Bernd, *Gulf Coast Tribe Vows to Resist Enbridge's New Pipeline Expansion Plans*, TRUTHOUT, Nov. 18, 2021, https://truthout.org/articles/gulf-coast-tribe-vows-to-resist-enbridges-new-pipeline-expansion-plans/.
[342] *Id.*; Erin Douglas, *The Karankawa were Said to be Extinct. Now They're Reviving their Culture – and Fighting to Protect their Ancestor's Land*, THE TEX. TRIBUNE, Oct. 4, 2021, https://www.texastribune.org/2021/10/04/karankawa-corpus-christi-texas-artifacts/.
[343] Douglas.

In Louisiana, the *Deepwater Horizon* spill destroyed coastal tribes' fishing and shrimping livelihoods and vast tracts of marshland and their wildlife.[344] Harm from the oil and gas industry has continued to accrue, including the inexorable degradation of the lands tribal members live and work on, pollution in sensitive ecosystems they rely on, and the literal addition of fuel to the climate crisis that threatens the future existence of communities.

C. BOEM Has Failed to Fully Consider Environmental and Community Impacts in Cook Inlet, Alaska

BOEM has proposed one lease sale in Cook Inlet, Alaska. *See* Proposed Program at 5. As we have discussed in other comment letters, the region is home to the endangered Cook Inlet beluga whale, sustains valuable commercial fisheries, and supports the traditional practices and subsistence harvests of various indigenous communities.[345] We incorporate those comments by reference into these comments on the proposed program. BOEM has failed to fully account for these considerations in the Proposed Program.

D. BOEM Has Failed to Adequately Consider Environmental and Community Impacts in Other Planning Regions

BOEM is also considering proposing leases in other regions of the Outer Continental Shelf, such as the Pacific, Atlantic, and other Alaskan regions. *See* Proposed Program at 5. As we have discussed in other comment letters on BOEM's national OCS program, various environmental and economic considerations weigh against developing offshore oil and gas reserves in these regions.[346] We incorporate these letters by reference here.

E. BOEM Has Failed to Properly Consider Other Uses of the Gulf of Mexico

OCSLA requires BOEM to consider designation of locations for leasing "with respect to other uses of the sea and seabed, including fisheries, navigation . . . and other anticipated uses of the resources and space of the outer Continental Shelf." 43 U.S.C. § 1344(a)(2)(D). Failure to properly consider the factors required by Section 18(a)(2) will "hinder[ ] Interior's ability to obtain a proper balance of the factors under Section 18(a)(3)." *Center for Biological Diversity v. Dept. of Interior*, 563 F. 3d 466, 488 (D.C. Cir. 2009). Further, BOEM's actions may be deemed arbitrary and capricious if it "entirely failed to consider an important aspect of the problem." 5

[344] Northern Arizona University, Gulf Coast, *Vulnerability of Tribal Coastal Louisiana Tribes in a Climate Change Context* (Sept. 2012), https://www7.nau.edu/itep/main/tcc/docs/tribes/tribes_CoastalLA.pdf.
[345] Letter from Cook Inletkeeper et. al. to Bureau of Ocean Energy Management, *Comments on Draft Environmental Impact Statement for Lease Sale 258* (December 13, 2021) (attached).
[346] Letter from Natural Resources Defense Council to Bureau of Ocean Energy Management, *NRDC Comments for the 2019-2024 Outer Continental Shelf Oil and Gas Leasing Draft Proposed Program* (March 9, 2018) (attached); Letter from Natural Resources Defense Council to Bureau of Ocean Energy Management, *NRDC Comments for the 2017-2022 Outer Continental Shelf Oil and Gas Leasing Proposed Program* (June 16, 2022) (attached).

U.S.C. § 706(2)(A); *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins.*, 463 U.S. 29, 43 (1983).

While BOEM provides a cursory overview of other industries in the Gulf of Mexico, it fails to address how it will site new oil and gas development under the 2023-2028 national program to avoid conflict with other industrial uses in the region. *See* Proposed Program 6-40 – 6-45. Of particular significance are BOEM's failures to discuss how to site oil and gas leases relative to expected developments in offshore wind and aquaculture in the Gulf of Mexico.

BOEM has identified two preliminary wind energy areas in the Gulf of Mexico, off the coast of Lake Charles, Louisiana and Galveston, Texas.[347] BOEM projects that there will be overlap between the OCS GOM program areas and the wind energy call area, but does not address how it plans to navigate potential conflicts between oil and gas development and wind development. *See* Proposed Program Figure 6-14, Proposed Program 6-40 – 6-45. Early stages of developing wind energy in the region will involve surveying the benthic habitat in lease areas, as well as sub-bottom sampling of potential turbine sites and along potential export cable corridors, and conducting biological surveys.[348] Ultimately, there will be construction and operation of wind turbines and the infrastructure needed to carry power back to the mainland. All of these activities could conflict with offshore oil and gas development.

The National Oceanic and Atmospheric Administration (NOAA) is considering designating several "Aquaculture Opportunity Areas" in the Gulf of Mexico and is preparing a programmatic environmental impact statement to evaluate potential alternatives.[349] NOAA is considering designating nine areas off the coasts of Texas, Louisiana, and Florida.[350] It has mapped the locations of these potential areas for aquaculture development.[351] Such areas could be used to raise finfish, seaweed, shellfish, or a combination of species in one facility.[352] NOAA notes that aquaculture development could impact the oil and gas industry, as well as the renewables industry, and that it could also impact biological resources in the area and physical processes.[353]

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[347] *See* United States Department of Interior, *Bureau of Ocean Energy Management, Request for Concurrence on Preliminary Wind Energy Areas for the Gulf of Mexico* (July 20, 2022), https://www.boem.gov/sites/default/files/documents//Draft%20Area%20ID%20Memo%20GOM%20508.pdf.
[348] Bureau of Ocean Energy Management, *Commercial and Research Wind Lease and Grant Issuance and Site Assessment Activities on the Outer Continental Shelf of the Gulf of Mexico: Draft Environmental Assessment* (July 2022) at 3-4 – 9. A-19-20, https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/GOM-Wind-Lease-EA.pdf.
[349] Notice of Intent to Prepare Programmatic Environmental Impact Statement for Identification of Aquaculture Opportunity Areas in Federal Waters of the Gulf of Mexico, 87 Fed. Reg. 33,124 (June 1, 2022) (hereinafter Notice of Intent re: PEIS).
[350] *Id*.
[351] *See* NOAA Fisheries, *Gulf of Mexico Aquaculture Opportunity Area Programmatic Environmental Impact Statement*, https://www.fisheries.noaa.gov/content/gulf-mexico-aquaculture-opportunity-area-programmatic-environmental-impact-statement.
[352] Notice of Intent re: PEIS.
[353] *Id.*

BOEM has failed to discuss how it will navigate any spatial and environmental quality conflicts with future aquaculture developments.

F. BOEM's Environmental Sensitivity Analysis is Flawed

OCSLA requires BOEM to consider "the relative environmental sensitivity and marine productivity of different areas of the outer continental shelf." 43 U.S.C. § 1344(a)(2)(G); *see also Ctr. for Biological Diversity v. Dept. of Interior*, 563 F. 3d 466, 488 (D.C. Cir. 2009) (finding evaluation of only shoreline areas inadequate); *State of Cal. v. Watt*, 668 F. 2d 1290, 1313 (D.C. Cir. 1981) (finding environmental sensitivity analysis inadequate). Failure to conduct a proper environmental sensitivity analysis disrupts BOEM's ability to conduct a proper balancing analysis under Section 18(a)(3). *Ctr. for Biological Diversity*, 563 F. 3d at 488.

While it has made some minor updates, BOEM uses the same methodology as that used in the 2017-2022 program, which relies on a 2014 paper authored by the agency—*A Method for the Evaluation of the Relative Environmental Sensitivity and Marine Productivity of the Outer Continental Shelf: Final Report* (RESA). Proposed Program 7-1 – 2, 12-2. BOEM has acknowledged that there is a need to update BOEM's environmental sensitivity analysis and that its analysis does not fully capture the sensitivities in each particular planning region.[354]

Researchers have expressed concern that BOEM's methodology for assessing environmental sensitivity "may not be spatially disaggregated enough to identify discrete, sensitive areas worthy of increased scrutiny."[355] Dr. Steven Murawski, formerly the Chief Scientist at the National Marine Fisheries Service, has recommended an alternate environmental sensitivity model for modeling the effects of deepwater blowouts, which uses a finer spatial scale to evaluate effects, as well as assigning weights to different attributes (including biological attributes and economic data).[356] Dr. Murawski recommended consideration of additional data sets in future analysis, such as deepwater corals, noncommercial fishes, and locations of renewable energy infrastructure.[357] He also recommends weighting different inputs to better assess impacts, such as prioritizing endangered organisms or higher revenue fisheries.[358] BOEM should use such alternate methodologies to refine its sensitivity analysis.

It is unclear whether BOEM's environmental sensitivity analysis factors into account the additional risks and impacts that will result from continued development in deepwater environments. Researchers have found that with increasing development in ultra-deep water –

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[354] Bureau of Ocean Energy Management, *Updating BOEM's Environmental Sensitivity Methods and Models to Support Oil, Gas, and Wind Energy Development* (July 2022), https://vimeo.com/739053578.
[355] EMILY CHANCELLOR, STEVEN A. MURAWSKI, ET. AL., COMPARATIVE ENVIRONMENTAL SENSITIVITY OF OFFSHORE GULF OF MEXICO WATERS POTENTIALLY IMPACTED BY ULTRA-DEEP OIL WELL BLOWOUTS (2020); *reprinted in* STEVEN A. MURAWSKI, ET. AL., SCENARIOS AND RESPONSES TO FUTURE DEEP OIL SPILLS: FIGHTING THE NEXT WAR 445 (Springer ed., 2020).
[356] CHANCELLOR, MURAWSKI at 445-47, 460-61.
[357] *Id.* at 460-61.
[358] *Id*.

waters deeper than 1500 meters – that the deep-pelagic domain would be the largest ecosystem component affected in any ultra-deep oil spill scenario.[359] Deep-sea ecosystems provide many valuable services, including nutrient cycling, carbon storage and sequestration, waste absorption, and habitat and foraging grounds for various species.[360] A large fraction of the 1500+ known fish species in the Gulf of Mexico exist only in bathypelagic environments.[361] Oil-weathering rates in deep sea environments are much lower than those in warmer, surface waters, creating the potential that deep sea species will be exposed to oil spills for an extended amount of time.[362] Following *Deepwater Horizon*, hydrocarbon compounds, including polycyclic aromatic hydrocarbons (PAHs)—compounds that have lethal and sublethal effects on marine fishes—were found at lethal concentrations throughout the water column a year after the spill.[363] They persisted at least four years after the spill[364], and researchers posit that PAHs from deepwater oil spills could linger for decades following an accidental spill.[365]

Further, the Proposed Program, PEIS, and supplemental information do not state whether potential impacts to Rice's whale were considered in BOEM's environmental sensitivity analysis. The whale should be one of the species considered in the environmental sensitivity analysis, given that it is critically endangered and vulnerable to the various threats posed by oil and gas development. *See*, Section IV.A.3 (regarding Rice's whale). In the PEIS, BOEM notes that Rice's whale is estimated to have only 33 individuals remaining in the population and that "any mortality events could affect the population's survival." PEIS at 105.

We have pointed out other flaws with RESA in past letters, and repeat them again below.

The species, habitat, and impacts inputs and analyses in the Proposed Program are irrational. As we have explained in earlier comment letters on the national program, the species, habitat, and impacts inputs and analyses in RESA are irrational.[366] Overall, the RESA uses an extremely limited number of inputs. The study acknowledges that an ideal model would examine all ecological parameters and all potential impact causing factors, but explains that a limited

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[359] TRACEY SUTTON, ET. AL., AS GULF OIL EXTRACTION GOES DEEPER, WHO IS AT RISK? COMMUNITY STRUCTURE, DISTRIBUTION, AND CONNECTIVITY OF THE DEEP-PELAGIC FAUNA (2020); *reprinted in* STEVEN A. MURAWSKI, ET. AL., SCENARIOS AND RESPONSES TO FUTURE DEEP OIL SPILLS: FIGHTING THE NEXT WAR 404 (Springer ed., 2020).
[360] *Id.*at 404-05.
[361] STEVEN A. MURAWSKI, PERSPECTIVES ON RESEARCH, TECHNOLOGY, POLICY, AND HUMAN RESOURCES FOR IMPROVED MANAGEMENT OF ULTRA-DEEP OIL AND GAS RESOURCES AND RESPONSES TO OIL SPILLS (2020); *reprinted in* STEVEN A. MURAWSKI, ET. AL., SCENARIOS AND RESPONSES TO FUTURE DEEP OIL SPILLS: FIGHTING THE NEXT WAR 513, 519 (Springer ed., 2020).
[362] *Id.*
[363] SUTTON, AS GULF OIL EXTRACTION GOES DEEPER at 412.
[364] *Id.*
[365] *Id.*
[366] Evaluation of the Relative Environmental Sensitivity and Marine Productivity of the Outer Continental Shelf: Final Report. Prepared by URS, Normandeau Associates, RPS ASA, and LGL Ecological Research Associates for the Department of the Interior, Bureau of Ocean Energy Management. Herndon, Virginia. OCS Study BOEM 2014-616. (RESA).

number is used due to feasibility.[367] Although it may not be feasible to compare all ecological parameters and all potential impacts, the RESA provides no explanation as to why more parameters could not be used. Despite the abundant species diversity and habitat importance throughout the planning areas, the RESA selects only a handful of each for comparison between areas. This limits an accurate description of the sensitivity of each area, rendering the RESA misleading.

The selection and analysis of species is irrational. The selection and analysis of species sensitivity is irrational. First, the RESA's comparison of fish resources is skewed, since no fish resource is identified for the Beaufort and Chukchi Seas. The RESA claims that this is because the area has no federally listed fish species but does not explain why some other factor cannot be used to determine the conservation importance of fish in the region.[368] The model places an undue emphasis on the role that fish species play in commercial fisheries, basing the sensitivity determination for ecological role on abundance as determined by landings and selecting two additional fish species for analysis based on their fisheries importance.[369]

The ecological role for marine mammals is also skewed, since it is based on Stock Assessment Reports, many of which are out of date, and sightings during offshore projects, which are not a reasonable method for determining population numbers.[370] Additionally, the RESA only includes four or fewer species of marine mammals in its analysis of each OCS region.[371] Many dozens of species of marine mammals inhabit and migrate within the Program Areas, including polar bears, many types of whales, dolphins, and seals. Different marine mammals, and different groups of marine mammals, have very different life histories, behaviors, habitat and nutritional needs, and other biological characteristics that could be impacted by this Program in different ways, to different extents, and at different times of year. Thus, the RESA excludes information that is key to understanding where (and under what conditions) oil and gas leasing should occur.

The selection and analysis of habitat sensitivity is irrational. The RESA analysis of habitat is also flawed. First, the RESA assumes, without explanation, that the water column in the marine oceanic component has low sensitivity in all OCS regions.[372] But the deep waters of the Chukchi Sea, for example, may be an important spawning area for Arctic cod and are designated as meeting the IMO PSSA designation criteria of critical habitat, dependency, spawning grounds, fragility, and bio-geographic importance.[373] In the deep waters of the Beaufort Sea, the offshore pack ice support the migrations of beluga and bowhead whales, and are designated as meeting

[367] RESA at 9.
[368] RESA at 19.
[369] RESA at 13.
[370] RESA at 17-18.
[371] RESA at 19-20.
[372] RESA at 21.
[373] AMAP/CAFF/SDWG. Identification of Arctic marine areas of heightened ecological and cultural significance: Arctic Marine Shipping Assessment (AMSA) IIc (2013) at 48 [AMSA IIC Report].

the IMO PSSA designation criteria of critical habitat, dependency, spawning/breeding grounds, and fragility.[374] Given the sensitivity of these areas and others, the RESA should not have dismissed all deep offshore areas out of hand. Second, the selection of habitats is flawed because the selection is based on geophysical features, rather than ecological role. The study admits that this methodology overlooks the importance of certain areas, such as feeding or spawning areas.[375] The RESA should consider ecological factors in its selection of habitat.

The analysis of impacts is irrational. The Proposed Program examines sensitivity by selecting categories of "impact factors" including oil spills, artificial light, collisions with above-surface structures, habitat disturbance, sound/noise, accidental spills, and vessel strikes.[376] Each impact is described in terms of areal range and probable areal range, depth range and probable depth range, impact scale, impact duration, and current level of development. This analysis is flawed in the following ways.

(1) The analysis disregards the many other impact factors that should be considered, such as impacts on water and air quality.

(2) The analysis of impacts from vessel strikes is irrational. For vessel strikes, the RESA assumes that the areal range of the impact is up to 3700m with probable of up to 1500m.[377] The study does not provide an explanation as to how this range was determined, and the number is completely arbitrary, having no relationship to the distance from a ship where the impacts occurs (which is the immediate location of the collision) nor to the distance ships will travel to conduct offshore activities (which can be thousands of miles for drilling in the Arctic, for example). Similarly, the RESA provides no basis for its determination that the impact scale is "moderate" (up to hundreds of kilometers).

(3) The analysis of impacts from oil spills is incomplete and misleading. The study assumes that the maximum areal range is an entire planning area, but the probable areal range is up to 1500m, and the probable depth range is 1500m. The study provides no explanation for these assumptions.[378] Although the study states that "[f]or the purposes of this model we will assume an oil spill as significant as the *Deepwater Horizon* blowout,"[379]the areal and depth ranges bear no relationship whatsoever to the geographical extent of impacts

[374] *Id.* at 59.
[375] RESA at 77.
[376] Proposed Program at 7-7 – 8.
[377] RESA at D-7.
[378] *Id.* at D-10.
[379] *Id.* at D-11.

caused by *Deepwater Horizon* (see Section IV.A.2 for a more detailed discussion of the impacts of the BP disaster).[380]

(4) The analysis of the duration of impacts from oil spills is also irrational. The RESA assumes that the duration of impacts from an oil spill will be moderate, lasting for up to several months.[381] As recent studies have shown, the BP blowout left a 1,235-square-mile "bathtub ring" of oil on the ocean's floor[382] and 6 to 10 million gallons of oil from the spill buried in the seafloor.[383] These impacts are extensive and persistent and must be included in the RESA. As the D.C. Circuit has explained, the risks of spills that must be considered in the Program are not only the likelihood of the spill, but also the damage a spill would inflict, and how the impacts would be different in different areas.[384]

(5) The cumulative impacts assessment in the RESA is inadequate. Cumulative impacts are included as an "assessment of existing BOEM-regulated activities in a planning area or broad OCS region of interest relative to other planning areas or broad OCS regions."[385] Cumulative impacts are "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non- Federal) or person undertakes such other actions."[386] Thus, it is not rational for the RESA to limit its assessment of cumulative impacts solely with reference to existing BOEM-related activities.

In addition, the RESA unreasonably downplays the importance of cumulative impacts in the sensitivity analysis. The overall magnitude of an impact is based on an assessment of the impact duration, scale, and cumulative impact. The model arbitrarily assigns equal weight to impact duration and scale and a much smaller weight to cumulative impacts. The model provides no explanation for why cumulative impacts are considered so insignificant in determining relative environmental sensitivity.

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[380] Deepwater Horizon oil spill: Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement. Retrieved from http://www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan.
[381] RESA at D-11.
[382] David Valentine, et al, *Fallout plume of submerged oil from Deepwater Horizon,* Proceedings of the National Academies of Science, vol. 11 n. 45, Aug. 5, 2014; http://www.pnas.org/content/111/45/15906.abstract
[383] Jeffrey Chanton, et al., *Using Natural Abundance Radiocarbon To Trace the Flux of Petrocarbon to the Seafloor Following the Deepwater Horizon Oil Spill,* Environmental Science and Technology, Dec. 12, 2014; http://pubs.acs.org/doi/abs/10.1021/es5046524?journalCode=esthag.
[384] *See California v. Watt,* 668 F2d at 1308 (stating "For example, an oil spill in an area of high environmental sensitivity would cause greater damage and therefore pose greater environmental risks than an equivalent oil spill in an area of lesser environmental sensitivity.")
[385] RESA at 24, 36.
[386] 40 C.F.R. § 1508.7.

(6) The entire impacts assessment is irrational because it characterizes impacts in terms of duration (short term, moderate, chronic, or permanent) and scale (site specific, small, moderate, and large) without any reference to a development scenario. This is particularly arbitrary since BOEM has conducted extensive studies examining the overall impacts, based on a development scenario, in the planning areas. For example, in BOEM's 2015 supplemental EIS for the Chukchi Sea Lease Sale 193, an assessment of impacts is provided based on a development scenario. As other lease sale EISs in the past have done, the EIS estimates the amount of impacts based on information about the economically recoverable resource potential at an assumed price per barrel of oil. It is irrational for the RESA to ignore this information in its assessment of impacts. As the court in *Watt II* observed, "sensitivity to some environmental effects of OCS development is almost impossible to evaluate without considering the expected level of OCS activities."[387]

(7) Finally, the analysis of seismic impacts is incomplete. BOEM points to its conduct of separate programmatic NEPA reviews for some regions; however, those reviews do not obviate its responsibility to thoroughly assess seismic survey impacts, and acoustic impacts generally, at the present planning stage. In conducting that assessment, BOEM must improve on the scientific validity of its recent Environmental Impact Statements for Atlantic (2014) and Gulf of Mexico (2017) geological and geophysical activities. In those documents, BOEM assumes that deep-penetration seismic airgun blasting impacts marine mammal at much smaller geographic scales than the best available science indicates; claims, without support or analysis, that extensive, repeated behavioral impacts on marine mammals will not affect recruitment and survival in species or populations; and completely discounts impacts on fish and invertebrates and the industries that depend on them. That approach is not supportable.

BOEM does not fully consider industrial noise as a potential stressor on coastal and estuarine, marine benthic, or marine pelagic habitats, suggesting that it will exclude impacts on acoustic habitat as an environmental factor affecting on its leasing decisions. *See* Proposed Program at 7-8, DPEIS at 49. That omission is inconsistent with the best available science.

Sound is widely recognized as an fundamental component of wildlife habitat, often playing a significant role in both marine and terrestrial ecology.[388] This component of habitat can be measured and managed, and, indeed, NOAA, in 2016, identified acoustic

[387] *California v. Watt*, 712 F.2d 584 (D.C. Cir. 1983) (*Watt II*).
[388] See, e.g., Clinton D. Francis, et. al., *A framework for understanding noise impacts on wildlife: an urgent conservation priority*, Frontiers in Ecology and the Environment 11: 305–313 (2013); Nathan D. Merchant, et. al., *Measuring acoustic habitats*, Methods in Ecology and Evolution 6: 257-265 (2015).

habitat as a conservation priority and the focus of a new management effort.[389] As NOAA and the scientific community have repeatedly observed, the degradation of acoustic habitat over large areas can have population-level impacts on marine mammals.[390]

The sound produced by airgun shots, while distinctly impulsive within some kilometers or tens of kilometers of the source, can sound virtually continuous at greater distances due to the effects of reverberation and multi-path propagation, with little diminution of the acoustic signal within the inter-pulse interval.[391] The potentially enormous scale of this acoustic footprint has been confirmed by studies in many regions of the globe, including the Arctic, Australia, the Gulf of Mexico, the northeast Atlantic, and Greenland, where it has been shown to raise ambient noise levels and mask whale calls from distances of thousands of kilometers.[392] This effect is extended further by the scale of the activity itself. In the Atlantic region, for example, the seismic industry submitted applications to shoot more than 90,000 miles of trackline during what would be the initial year of deep-penetration airgun surveys off the east coast, and BOEM, in its related Environmental Impact Statement, has projected the shooting hundreds of thousands of additional track miles, and lease areas, over the next several years.

G. BOEM's Equitable Sharing Analysis is Flawed

OCSLA requires BOEM to consider "an equitable sharing of developmental benefits and environmental risks among the various regions" of the OCS. 43 U.S.C. § 1344(a)(2)(B). Failure to properly consider the factors required by Section 18(a)(2) will "hinder[ ] Interior's ability to obtain a proper balance of the factors under Section 18(a)(3)." *Ctr. for Biological Diversity v. Dept. of Interior*, 563 F. 3d 466, 488 (D.C. Cir. 2009). BOEM's actions may also be deemed arbitrary and capricious if it "entirely failed to consider an important aspect of the problem." 5 U.S.C. § 706(2)(A); *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins.*, 463 U.S. 29, 43

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[389] National Oceanic and Atmospheric Administration, Jason Gedamke, et. al., *Ocean Noise Strategy Roadmap* (2016), https://oceannoise.noaa.gov/sites/default/files/2021-02/ONS_Roadmap_Final_Complete.pdf; Leila Hatch., et al., *Can you hear me here?* (May 31, 2016); https://repository.library.noaa.gov/view/noaa/13755

[390] UNEP, *Scientific synthesis on the impacts of underwater noise on marine and coastal biodiversity and habitats*. Meeting report: Montreal 30 April – 6 May 2012; Gedamke, *Ocean Noise Strategy Roadmap* (2016); Statement from C. Clark and 74 other marine scientists (Mar. 5, 2015).

[391] Melania Guerra, et al., *Quantifying seismic survey reverberation off the Alaskan North Slope*, J. Acoust. Soc. Am. (Nov. 2011); https://pubmed.ncbi.nlm.nih.gov/22087932/; *see also* Sharon L. Nieukirk, et al., *Sounds from airguns and fin whales recorded in the mid-Atlantic Ocean, 1999-2009*, J. Acoust. Soc. Am. (Feb. 2012); https://pubmed.ncbi.nlm.nih.gov/22352485/.

[392] See, e.g., Jason Gedamke, *Ocean basin scale loss of whale communication space*; Nieukirk, *Sounds from airguns and fin whale;*; Sharon Neukirk, et. al., *Low frequency whale and seismic airgun sounds recorded in the mid-Atlantic Ocean*, Acoustical Society of America, 115 (4): 1832-1843 (2004); Ethan Roth., et al., *Underwater ambient noise on the Chukchi Sea continental slope from 2006-2009*, Journal of Acoustical Soc. Of Am. 131, 104 (2012); https://asa.scitation.org/doi/10.1121/1.3664096.

(1983). For the reasons explained below, BOEM has failed to properly consider this factor and it must revise its analysis in the Proposed Program.

When analyzing the equitable sharing factor, BOEM examines the effects of the national program on income, employment, wages, and revenue transfers. Proposed Program at 8-1. BOEM's analysis shows that a no lease program would have a nationwide environmental and social cost of around $9.5 billion, compared to the proposed program. Proposed Program, Table 8-2.[393]

BOEM's analysis in the Proposed Program is erroneous and does not accurately capture the costs and benefits of the no lease program. We outline the flaws below, which are explained fully in the attached report by Laura Zachary.[394]

BOEM arbitrarily ignores its own analysis showing a benefit from the No Sale Option. BOEM's own analysis finds that the No Sale option will result in benefits to the Gulf of Mexico and Cook Inlet, Alaska regions when compared to the Proposed Program – BOEM found that the No Sale option would prevent states around the Gulf of Mexico from experiencing $528 million in environmental and social costs, and that it would prevent Alaskan communities around Cook Inlet from experiencing $19 million in costs.[395] Yet it arbitrarily disregards these findings when concluding that the Proposed Program is more economically beneficial than alternatives.

BOEM erroneously suggests that the costs of the "No Sale" Option are exceeding large. BOEM states that the No Sale option in the Gulf of Mexico and Cook Inlet, compared to the Proposed Program, would result in net costs amounting to around $59 billion nationwide over a 35 to 70 year period.[396] While BOEM uses these figures to argue that the costs of not leasing are too high, when put into perspective, these costs are quite moderate – and these net incremental costs represent 0.0038 percent to 0.008 percent of the U.S. gross domestic product ($21 trillion in 2021), and U.S. GDP typically fluctuates much more within any given year.[397]

BOEM's erroneous production projections skew its economic analysis. BOEM bases its economic analysis in Chapter 8 on the anticipated production figures outlined in Chapter 5. These production projections determine the benefits and risks to each planning region. Therefore, BOEM's erroneous production analysis skews its economic analysis in a variety of ways:

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[393] *See also*, U.S. BUREAU OF OCEAN ENERGY MANAGEMENT, DRAFT ECONOMIC ANALYSIS METHODOLOGY FOR THE 2023-2028 NATIONAL OUTER CONTINENTAL SHELF OIL AND GAS LEASING PROGRAM (July 2022) https://www.boem.gov/sites/default/files/documents/oil-gas-energy/national-program/Draft_Economic_Analysis_Methdology_2023-2028ProposeProgram_July2022.pdf

[394] Laura Zachary, *Review of Economic Impacts of the No Sale Option for the Next Five-Year National Outer Continental Shelf Oil and Gas Leasing Program* (Oct. 5, 2022)(Zachary Report) (attached).

[395] Proposed Program, Table 8-2; Zachary Report at 12.

[396] Proposed Program, Table 8-2; Zachary Report at 12.

[397] US Bureau of Economic Analysis. Real Gross Domestic Product [A191RO1Q156NBEA], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/A191RO1Q156NBEA , June 15, 2022; Zachary Report at 12.

BOEM's assumptions underestimate the expected development activity from existing leases, which means that projected declines in employment, wages, and income from a no lease program are overstated.[398] Because a number of existing leases have yet to be developed, the economic benefits flowing from jobs tied to the oil and gas industry will continue, regardless of the number of new leases issued going forward.[399] Further, the impact to the industry of a no leasing schedule would be gradual over decades, providing plenty of time for the industry and workforce to adjust.[400]

There are over 7.5 million acres of Gulf of Mexico waters that are leased for oil and gas extraction that have yet to be developed.[401] It will take oil and gas companies many more years to develop these areas. In 2019 and 2020, BOEM issued new offshore oil and gas leases on over 2.8 million acres in the Gulf of Mexico.[402] Companies typically wait until near the end of the ten year initial lease term to start development, and the majority of production from federal offshore leases comes more than ten years after a lease is sold.[403] Oil produced from these leases would not reach the pump for over a decade after a lease is sold. Therefore, having a plan with no new leases would have little effect on oil and gas production for the next decade.[404]

If the lease sales mandated by the Inflation Reduction Act (IRA) are held, that will further cushion the existing stockpile of leases and slow down the expected pace of job changes due to no new leases in the next national program.[405] BOEM should analyze these mandated lease sales – failure to include these lease sales overestimates the decline in OCS production, development activity, and subsequent socioeconomic impacts from the no sale option.[406] Failure to do this analysis is arbitrary and capricious.

BOEM must fully account for the economic effects of IRA. BOEM fails to account for the technology and employment shifts that will be produced by IRA, and thus, overestimates the decline of regional industry-related employment, wages, and income under a no sale option.[407] BOEM must also account for the change in demand and shift away from fossil fuels produced by

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[398] Zachary Report at 4.
[399] *Id.*
[400] *Id.*
[401] *See* BUREAU OF OCEAN ENERGY MANAGEMENT, COMBINED LEASING STATUS REPORT (Sep. 2022) https://www.boem.gov/sites/default/files/documents/regions/pacific-ocs-region/oil-gas/Lease%20stats%209-1-22.pdf
[402] Zachary Report at 4.
[403] 10 years is the standard initial lease length of deepwater offshore leases (CBO 2016). Although some offshore leases in shallow water have shorter lease terms (such as 8 years), these account for relatively little of offshore oil and gas development; CONGRESSIONAL BUDGET OFFICE, OPTIONS FOR INCREASING FEDERAL INCOME FROM CRUDE OIL AND NATURAL GAS ON FEDERAL LAND (2016); https://www.cbo.gov/default/files/114th-congress-2015-2016/reports/51421-oil_and_gas_options.pdf; Zachary Report at 4.
[404] Zachary Report at 4.
[405] Zachary Report at 5.
[406] *Id.*
[407] Zachary Report at 7-8.

IRA and other recent and impending changes in transportation policies, as well as corresponding shifts in employment from the oil and gas industry.[408]

BOEM's jobs and direct spending analysis is erroneous. BOEM projects that a no sale plan would have detrimental impacts on employment and other economic indicators – but a more careful evaluation shows that this is not the case.

BOEM states that in 2020, "OCS oil and gas activities sustained approximately 176,000 jobs and generated $20.6 billion of value added (contribution to national GDP)."[409] However, due to the existing stockpile of leases and the long time horizon for developing leases, a no lease program would not have a meaningful impact on jobs and revenues in the near term.[410]

Further, according to literature relied on by BOEM in developing the Proposed Program, pursuing U.S. climate targets and transitioning to a net-zero economy could create around three million energy supply-side jobs – a net increase of 300,000 to 600,000 jobs by 2030.[411] Other researchers have found that there is a high workforce transferability to adjacent energy sectors, such as offshore wind, onshore renewables, and rig decommissioning.[412] Therefore, a no lease program would not have a negative effect on jobs.

BOEM states that oil and gas sector jobs "earn a significant wage premium" and that such jobs earn more than other hourly wage jobs. Proposed Program at 8-7. However, BOEM does not provide data on the wages of jobs in comparable industry jobs, and also fails to provide data on safety risks, job security, and other indications of job quality.[413] BOEM fails to accurately represent current employment patterns in the offshore oil and gas sector – the availability of oil and gas jobs has been shrinking for years, the hours worked in the offshore sector have dropped by more than 40 percent between 2011 and 2019, oil and gas jobs have been in decline since

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[408] *Id.*
[409] Proposed Program at 8-34; Zachary Report at 15.
[410] Zachary Report at 15.
[411] Zachary Report at 15; *citing* Princeton University, "Net-Zero America Project," December 2020, https://acee.princeton.edu/rapidswitch/projects/net-zero-america-project/
[412] Zachary Report at 15; *citing* Energy Transition Institute. 2021. Robert Gordon University. "UK Offshore Energy Workforce Transferability Review." https://www.rgueti.com/wp-content/uploads/2021/05/workforce-transferability-report.pdf
A 2021 analysis of BLS data by the Center for Economic and Policy Research (CEPR) estimates that around 40% of those employed in the US fossil fuel industry have skills that directly transfer to find work in other industries without the need for additional training. Furthermore, of the workers with skills deemed "non-transferable," nearly half are in construction and extraction occupations with skills that can very likely be transferred to other industries with some training. Source: Baker, D., Lee, A. "The Employment Impact of Curtailing Fossil Fuel Use." Center for Economic and Policy Research. (May 26, 2021).
https://cepr.net/report/the-employment-impact-of-curtailing-fossil-fuel-use/
[413] Zachary Report at 15.

2014, and many workers no longer want to return after post-COVID layoffs.[414] It is unclear whether BOEM accounts for these trends in its modeling.[415]

BOEM's revenue analysis is inaccurate. While BOEM projects a no sale plan will lead to significant losses in state revenues, that is not the case. The vast majority – 88 percent – of oil and gas revenues come from production royalties, which will continue to be high for many years, even under a no lease plan.[416] BOEM itself finds that GOMESA revenue sharing caps are likely to be met due to royalties from existing leases alone. Therefore, revenue shared with Gulf states will likely be the same under the Proposed Program or a no sale program.[417] In addition, BOEM's arguments that a no lease plan will negatively affect revenues from income taxes are not supported by substantial evidence.[418]

V. BOEM Fails to Conduct the Proper Balancing of Costs and Benefits

OCSLA requires BOEM, when selecting the timing and location for leasing, "to obtain a proper balance between the potential for environmental damage, the potential for the discovery of oil and gas, and the potential for adverse impact on the coastal zone." 43 U.S.C. § 1344(a)(3). In conducting this analysis, BOEM must consider "environmental and social costs," in "qualitative as well as quantitative terms." *California ex rel. Brown. v. Watt*, 668 F. 2d 1290, 1317 (D.C. Cir. 1981)(*Watt I*). BOEM must fully consider all of the factors set forth in § 1344(a)(2), and failure to do so will prevent completion of a proper balancing analysis under § 1344(a)(3). *See Watt I*, 668 F. 2d at 1318-19. Further, failure to accurately assess the costs and benefits of the program will require remand and revision of the program. *Id.* at 1321. Finally, BOEM's actions will be deemed arbitrary and capricious if it fails to consider important aspects of the offshore oil and gas leasing landscape. *See* 5 U.S.C. § 706(2)(A); *Motor Vehicle Mfrs. Ass'n v. State Farm Mut. Auto. Ins.*, 463 U.S. 29, 43 (1983).

As described above, BOEM has failed to adequately consider the factors specified in Section (a)(2). BOEM has also failed to accurately assess the costs and benefits of the program under Section (a)(3) – it continues to rely on flawed modeling, and arbitrarily declines to consider inherent environmental and social costs of the program – which skews its analysis and makes continued offshore leasing appear to have a net benefit. In fact, continued offshore leasing will lead to net costs, and the benefits of additional lease sales do not outweigh the costs. In light of these flaws, BOEM must revise its analysis and recirculate the program for public comment.

A. BOEM continues to rely on a flawed model as a key part of its substitution analysis

BOEM relies on the MarketSim model to estimate substitutions for OCS oil and gas production in the absence of lease sales. *See* Proposed Program at 5-28. MarketSim is a deeply flawed

[414] Zachary Report at 16-17.
[415] *Id.*
[416] Zachary Report at 17.
[417] Zachary Report at 17.
[418] Zachary Report at 17-18.

model that has been criticized and even invalidated by courts on a number of occasions. *See Ctr. for Biological Diversity v. Bernhardt*, 982 F. 3d 723, 738 (9th Cir. 2020); *Sovereign Iñupiat for a Living Arctic v. BLM*, 555 F. Supp. 3d 739, 765 (D. Ala. 2021); *see also, Friends of the Earth v. Haaland*, 583 F. Supp. 3d __ (D.D.C. 2022).

While BOEM has corrected some of the issues with its substitution analysis and MarketSim, many remain.

BOEM's baseline is already significantly outdated.

BOEM's analysis is based on the U.S. Energy Information Administration's (EIA) *Annual Energy Outlook 2022*, which is based on policies current as of November 2021.[419] This does not include policies that will shift U.S. energy use away from fossil fuels and towards renewables, including the Inflation Reduction Act and new clean vehicle standards, including those referenced in Section III above.[420] As the Institute for Policy Integrity (IPI) explains in a recent report, EIA should be releasing an updated forecast by March 2023, which will include these policies, and provide a more accurate representation of energy consumption trends, substitute energy sources, and greenhouse gas emissions.[421]

Other models provide a more accurate substitution analysis.

Other published, peer-reviewed models find that renewables will play a more significant role in the energy mix over time, compared to BOEM's model.[422] For example, in a recent peer-reviewed article in the Journal of the Association of Environmental and Resource Economists, Ph.D. economist Brian C. Prest built his own energy model and estimated how changes in federal resource management affect supply, demand, consumption, and emissions.[423] Prest found a "leakage rate"—meaning the percentage of total emissions from OCS development that merely displace other sources and do not reflect gross emission reductions—of between 52% and 72%.[424] This is substantially lower than BOEM's leakage rate of approximately 77%.[425]

Prest's model—unlike BOEM's—is dynamic, has been subject to peer-review, and is published in the economics literature. BOEM should compare elasticities between the two models and

[419] Proposed Program at 5-28.
[420] *See* Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards, 86 Fed. Reg. 74,434 (Dec. 30, 2021) (EPA rule); Corporate Average Fuel Economy Standards for Model Years 2024-2026 Passenger Cars and Light Trucks, 87 Fed. Reg. 25,710 (May 2, 2022) (NHTSA rule).
[421]Peter Howard, Max Sarinsky, Minhong Xu, *The Real Costs of Offshore Oil and Gas Leasing: A Review of BOEM's Economic Analysis for Its Proposed Five-Year Program* at 3-4, Institute for Policy Integrity, New York University School of Law (September 2022)(IPI); https://policyintegrity.org/files/publications/The_True_Costs_of_Offshore_Leasing.pdf; (attached).
[422] IPI-NYU at 4.
[423] Brian C. Prest, *Supply-Side Reforms to Oil and Gas Production on Federal Lands: Modeling the Implications forCO2Emissions, Federal Revenues, and Leakage*, 9 J. Assoc. of Env't & Res. Economists 681 (2022).
[424] *Id.* at 688; IPI at 4.
[425] IPI at 4.

consider updating its reference case elasticities to more closely reflect the parameters in Prest's model. IPI has found that reducing oil and gas supply elasticities and increasing renewable supply elasticities lowers the substitution rates and results in a higher estimate of net emissions from OCS leasing.[426]

The National Energy Modeling System (NEMS) would also serve as a more accurate modeling system and could be readily adapted to provide the modeling for the national OCS program. NEMS is a more rigorous model than MarketSim and more widely relied upon in the academic community.[427]

IPI has identified various ways in which BOEM's substitution analysis should be improved.[428] BOEM's sensitivity analysis underrepresents uncertainties related to quantities, elasticities, and prices – and IPI explains how existing information and modeling tools would more fully account for these uncertainties.[429] It is also recommended that BOEM recalibrate MarketSim to better model various decarbonization pathways.[430]

B. BOEM significantly underestimates the costs of leasing

1. BOEM fails to include the costs of emissions produced by activities like individual consumption of fossil fuel and refining

While BOEM's draft programmatic environmental impact statement projects substantial amounts of greenhouse gas emissions from "downstream" and "midstream" activities (like consumption of fossil fuels for personal transportation, refining fossil fuels),[431] BOEM arbitrarily chooses not to include the costs of such emissions in its cost-benefit analysis.[432]

By doing so, BOEM fails to consider an important set of costs associated with offshore oil and gas development. These include elevated levels of criteria pollutants and greenhouse gas emissions, which negatively impact community health and exacerbate climate change and the host of problems associated with a warming world. *See* Sections IV.A.1 (discussing impacts of climate change), IV.B (discussing health impacts). By omitting these costs, BOEM also provides an inaccurate picture of the costs and benefits of the proposed program – the costs of

426 IPI at 4.
427 IPI at 22-23.
428 IPI at 6-23.
429 *Id.*
430 *Id.*
431 Bureau of Ocean Energy Mgmt., *2023–2028 National Outer Continental Shelf Oil and Gas Leasing program Draft Programmatic Environmental Impact Statement* C-10 tbl.C-7 (2022) (hereinafter "DPEIS") (projecting a net of 160 million metric tons of midstream and downstream emissions in Gulf of Mexico Program Area 1 and Cook Inlet under mid-activity level).
432 *See* Proposed Program at 5-35.

downstream and midstream emissions are far greater than the costs of direct/upstream emissions that BOEM does include in its analysis.[433] And as IPI notes:

> [W]hile BOEM acknowledges in its environmental analysis that the proposed program would result in billions of dollars in climate damages, its net benefits analysis actually counts climate change as a benefit of the proposed program because it omits emissions from downstream consumption and focuses only on upstream emissions…BOEM should consider the full climate impacts of the proposed program and not focus its net benefits analysis on a small subset of emissions that falsely implies that OCS leasing mitigates climate change.[434]

BOEM argues that *Ctr. for Biological Diversity v. Dept. of the Interior*, 563 F. 3d 466 (D.C. Cir. 2009) prohibits "consideration of the impact of consuming OCS oil and gas" when preparing the national OCS program under OCSLA. Proposed Program at 2-10 - 11. Based on this, BOEM does not consider the impacts of consuming oil and gas produced on the OCS as part of its monetized net benefits analysis. *Id.* at 5-35.

BOEM's reading of *Ctr. for Biological Diversity* is incorrect. In that case, the D.C. Circuit court stated that "the text of OCSLA does not require Interior to consider the impact of *consuming* oil and gas extracted under an offshore Leasing Program." 563 F. 3d at 484. However, the court did not find that OCSLA prohibits consideration of the impacts of consumption. *Id.*

The court based its decision on key directives in OCSLA – designing a leasing program that "will best meet national energy needs," consideration of potential impacts on "the marine, coastal, and human environments," and balancing the potential for discovery of oil and gas against damage to the environment and coastal zone. *Id.* at 484-85, *citing* 43 U.S.C. §§ 1344(a), (a)(1), (a)(3). It concluded that Interior needs to consider the impacts of oil and gas consumption and that OCSLA "concerns the local environmental impact of leasing activities in the OCS." *Id.* at 485.

BOEM has considerable discretion in designing a leasing program that best meets national energy needs. *Watt I*, 668 F. 2d at 1317; *Natural Resources Defense Council v. Hodel*, 865 F. 2d 288, 309 (D.C. Cir. 1988). Evaluating national energy needs, by necessity, requires projecting demand and consumption trends in the U.S. – and BOEM has examined these trends, in the current Proposed Program, as well as past programs. *See* Proposed Program at 1-4 – 8, 6-9 – 20; Bureau of Ocean Energy Management, *2017 – 2022 Outer Continental Shelf Oil and Gas Leasing Proposed Final Program* at 6-5 – 19 (Nov. 2016). Interior has also considered the impacts from consumption as part of its analysis. *See* U.S. Dept. of Interior, *Outer Continental Shelf Natural Gas and Oil Resource Management Comprehensive Program 1992-1997* at 13 (1992), U.S. Dept. of Interior, *Proposed Final Outer Continental Shelf Oil and Gas Leasing*

[433] *Compare* DPEIS at C-9 tbl.C-6 (upstream emissions) *with id.* at C-10 tbl.C-7 (midstream and downstream emissions); IPI at 23-26.
[434] IPI at Executive Summary.

Program 1997 to 2002, at 4, 66, 69 (Aug. 1996). BOEM has the discretion to fully consider the impacts of domestic consumption. Further, it is arbitrary for BOEM to consider demand, but not the effects of such demand when designing a leasing program. *See State Farm.*, 463 U.S. at 43. Further, OCSLA's legislative history demonstrates that BOEM may consider the effects of fuel consumption. *See* IPI at 25-26.

The court in *CBD* noted that Interior need only consider environmental damage on a "localized area basis". *CBD*, 563 F. 3d at 485. Even if BOEM can only consider the local effects from consuming fuel produced on the OCS, it has the ability to evaluate those effects. In *Ctr. for Sustainable Economy v. Jewell*, the D.C. Circuit found that Interior's cost-benefit analysis of forgoing continued OCS production was proper. 779 F. 3d 588, 605 (D.C. Cir. 2015). The court agreed that Interior could "estimate[ ] that a particular program area could produce 25 percent of the natural gas under the leasing program as a whole," and assign to that area "25 precent of the total national environmental and social cost associated with foregoing all OCS gas leasing and instead obtaining substitutes." *Id.* at 605. The court found it reasonable for Interior "to attribute nationwide environmental and social costs to particular OCS areas in proportion to the amount of production expected from each area." *Id.* at 606-07. If BOEM can make those estimates about the costs of foregone production, it can also make those estimates about the costs of continued production on the OCS.

BOEM must ensure that its cost-benefit analysis includes the costs of downstream and midstream activities.

2. BOEM underestimates the social cost of greenhouse gases

While BOEM includes the social cost of upstream greenhouse gas emissions as part of its cost-benefit analysis, it fails to accurately value these costs. Proposed Program at 5-36. When accurately accounting for the social costs, the costs from greenhouse gas emissions are likely to exceed the benefits from continued development in the Gulf of Mexico region.[435]

As IPI explains, BOEM significantly underestimates the social cost of greenhouse gas emissions.[436] BOEM uses only one of the rates proposed by the Interagency Working Group on the Social Cost of Greenhouse Gases – the three percent discount rate – which is a conservative estimate of climate damages.[437] The Working Group has acknowledged that this rate is likely conservative, and other institutions working on valuing the social costs of greenhouse gases, like Resources for the Future, support the use of lower discount rates to better evaluate climate effects.[438]

[435] IPI at 32.
[436] IPI at 28-32.
[437] IPI at 29.
[438] IPI at 29-30.

To better evaluate the social costs of greenhouse gases, BOEM should apply the full range of valuations used by the Working Group.[439] BOEM could also prioritize the Working Group's higher valuations at lower discount rates, as the Office of Management and Budget has done in a recent analysis.[440]

These errors render BOEM's cost-benefit analysis inaccurate. *See Watt I*, 668 F. 2d at 1321.

3. BOEM erroneously omits the cost of catastrophic oil spills

BOEM's Offshore Economic Cost Model (OECM) does not model the costs of catastrophic oil spills – spills greater than 100,000 barrels. Proposed Program at 5-25 - 26. BOEM chose this assumption because "[s]tatistically, the number of catastrophic spills has been small," and quantifying the costs and risks of such spill is difficult. *Id.* at 5-26. However, this fails to fully account for oil spill risks.

While the number of catastrophic oil spills is low, the damage caused by such spills is significant. As Resources for the Future has explained, while spills greater than 1,000 barrels account for only 0.05 percent of spills, they are responsible for nearly 80 percent of the total volume spilled.[441] The 2010 *Deepwater Horizon* disaster – the largest offshore oil spill in U.S. history – spilled over 4 million barrels of oil.[442] As discussed in Section IV.A.2, coastal and marine environments in the Gulf of Mexico have yet to recover from the damage caused by the disaster.

The costs of oil spills have also been increasing over time. Researchers have found that oil spills have become more costly over the decades – oil spills in the 1980s were $191 million higher than those in the 1960s–70s, spills occurring in the 1990s were $255 million higher than those in the 1980s, and oil spills in the 2000s were even more costly.[443] This trend "highlights the fact that although the number of incidents is decreasing, those that do occur are much larger and more important in terms of size and corresponding damage."[444]

Further, as offshore oil production moves into deeper water, the risks will only increase. BOEM notes that in 2021, "existing production and new exploratory efforts mostly focused in deepwater areas." Proposed Program at 7, 5-17 - 18. Production in deep water increases the risk of incidents like blowouts, worker injuries, and oil spills. One study found that each 100 feet of added depth

[439] IPI at 29-32.
[440] IPI at 30.
[441] Resources for the Future, Carolyn Kousky, *Managing the Risks of Deepwater Drilling* (Mar. 15, 2011).
[442] U.S. ENVIRONMENTAL PROTECTION AGENCY, DEEPWATER HORIZON – BP GULF OF MEXICO OIL SPILL, https://www.epa.gov/enforcement/deepwater-horizon-bp-gulf-mexico-oil-spill; NATIONAL ATMOSPHERIC AND OCEANIC ADMINISTRATION, OIL SPILLS, https://www.noaa.gov/education/resource-collections/ocean-coasts/oil-spills
[443] IPI at 38, citing Maria Allo & Maria L. Loureiro, *Estimating a Meta-Damage Regression Model for Large Accidental Oil Spills*, 86 ECOL. ECON. 167 (2013).
[444] IPI at 38.

increases the probability of accident by 8.5 percent.[445] Various factors – increased reservoir pressure and temperature when drilling in deeper water, unstable rock and sediment, and increased stresses on pipeline infrastructure when drilling in deeper water – can increase the risk of blowouts in deepwater drilling environments.[446]

BOEM's analysis must account for the real-world risks of offshore oil and gas development – that catastrophic spills are responsible for most of the damage from offshore development, and that deepwater development comes with increased risk. BOEM's policy judgments will be reviewed to ensure that "the decision is based on a consideration of the relevant factors and whether there has been a clear error of judgment." *Ctr. for Biological Diversity,* 563 F. 3d at 484, *citing Watt I,* 668 F. 2d at 1302. Further, BOEM's actions may be deemed arbitrary and capricious if it "entirely failed to consider an important aspect of the problem." 5 U.S.C. § 706(2)(A); *State Farm,* 463 U.S. at 43.

Decisions in past cases support the position that BOEM must consider the risks from catastrophic oil spills and deepwater development. In *Watt I,* the D.C. Circuit found that Interior's analysis of oil spill risks was faulty. 668 F. 2d at 1308. The court reasoned that "the risk of an oil spill is greatest where the most oil is to be found." *Id.* It also reasoned that "an oil spill in an area of high environmental sensitivity would cause greater damage and therefore pose greater environmental risks than an equivalent oil spill in an area of lesser environmental sensitivity." *Id.; see also, Ctr. for Biological Diversity,* 563 F. 3d at 488 (finding Interior's sensitivity analysis faulty because it only considered oil spill risks to shorelines). Presently, there are heightened risks from large oil spills and deepwater development and they must be accounted for in BOEM's analysis.

IPI identified additional errors with BOEM's omission of large oil spills from its cost-benefit analysis.[447] While BOEM, in some of its analysis underlying the Proposed Program, has estimated significant risks of large spills – a 5.7 percent chance of a spill over 150,000 barrels in the Gulf of Mexico under a mid-level activity scenario and a 2 percent chance of a spill over 10 million barrels in the same region under a mid-level activity scenario – it omits the costs of these risks from its cost-benefit analysis.[448] This is arbitrary and capricious.

BOEM projects that a 10 million barrel spill would cost between $69.8 and $85.4 billion in market costs, not even including costs to wildlife and biodiversity.[449] But it does not include these costs in its cost-benefit analysis. Omitting the costs of large oil spills is inconsistent with

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[445] Lucija Muehlenbachs, et. al., *The impact of water depth on safety and environmental performance in offshore oil and gas production,* 55 Energy Policy 699 (Apr. 2013); https://www.sciencedirect.com/science/article/abs/pii/S030142151201141X; *see also,* Mark Cohen, *Deepwater Drilling: Recommendations for a Safer Future,* Resources for the Future (Apr. 20, 2011); https://www.resources.org/common-resources/deepwater-drilling-recommendations-for-a-safer-future/
[446] MURAWSKI, PERSPECTIVES ON RESEARCH at 518-19.
[447] IPI at 33-41.
[448] IPI at 33.
[449] *Id.*

Circular A-4 from the Office of Management and Budget – a longstanding guidance document on how agencies should conduct cost-benefit analyses, which among other things, provides guidance on how to account for uncertain impacts.[450] IPI notes: "[w]hile there is a range of plausible estimates of the damage from catastrophic oil spills, the proper estimate is 'certainly not zero.'"[451]

Further, BOEM's analysis arbitrarily and capriciously chooses to model the benefits of continued OCS leasing, but not key costs with continued leasing. BOEM arbitrarily chooses to value the economic benefits of OCS leasing, despite such valuations carrying similar uncertainties as those associated with assigning costs to large oil spills.[452] BOEM also arbitrarily models potential impacts and costs from increases in shipping oil by tankers (which BOEM projects will occur under the No Sale option), while choosing to exclude the costs of large spills from offshore oil wells.[453]

BOEM also undervalues spill risks in other ways. The agency fails to recognize that spills have become progressively more costly over time.[454] BOEM undervalues the harm from oil spills by accounting only for resources used or destroyed as a result of spills and the spill response expenses.[455] BOEM does not value irreversible damages to the marine ecosystem, biodiversity, or endangered species; nor does it set forth the costs from harms to human life and health resulting from well-control failure events and resulting oil spills, along with temporary suffering and opportunity costs.[456] BOEM ignores research, including research related to the Exxon Valdez oil spill and the *Deepwater Horizon* disaster, which provide valuation methods for ecosystem damages and health impacts.[457]

For these reasons, BOEM's cost-benefit analysis is inaccurate. *See Watt I*, 668 F. 2d at 1321.

4. BOEM's analysis of uncertainty does not fully account for environmental risks

BOEM does not quantitatively value certain environmental and social costs – like loss of a species or irreversible degradation of an ecosystem.[458] This understates the costs of continued leasing, and skews BOEM's cost-benefit analysis to make continued leasing appear more beneficial. It is erroneous for BOEM to claim that these costs cannot be quantitatively valued. As IPI explains, various methodologies have been used to value such costs, and they could also be

[450] IPI at 36.
[451] *Id.*
[452] IPI at 37.
[453] IPI at 37-38.
[454] IPI at 38.
[455] IPI at 40.
[456] IPI at 40-41.
[457] *Id.*
[458] Proposed Program at 9-9 to -12, IPI at 40.

used in the analysis for the Proposed Program.[459] Without such accounting, BOEM's cost-benefit analysis is inaccurate. *See Watt I*, 668 F. 2d at 1321.

5. BOEM's analysis of energy security is inaccurate

IPI also points out that BOEM's analysis is biased towards correlating continued OCS leasing with greater domestic energy security.[460] BOEM misinterprets a key study it relies upon, where the authors actually concluded that "[o]il conservation is more effective than increased domestic oil production at improving U.S. oil security."[461] In addition, greater dependency on domestically produced fossil fuels could also make the U.S. more vulnerable to price shocks and will decrease energy security.[462]

VI. OCSLA's Fair Market Value Factor Does Not Require Scheduling New Lease Sales

OCSLA states "[l]easing activities shall be conducted to assure receipt of fair market value for the lands leased and the rights conveyed by the Federal Government." 43 U.S.C. § 1344(a)(4). The provision does not "mandate the maximization of revenues, it only requires receipt of a fair return." *California ex rel. Brown. v. Watt*, 712 F. 2d 584, 606 (D.C. Cir. 1983)(*Watt II*); *Natural Resources Defense Council v. Hodel*, 865 F. 2d 288, 312 (D.C. Cir. 1988). Further, the receipt of fair market value is only one of many considerations Interior must consider when developing a national leasing program, and other factors include "economic, social, and environmental values." *Watt v. Energy Action Educational Fd.*, 454 U.S. 151, 164 (1981).

The "fair market value" factor is only relevant if BOEM decides to hold new lease sales. *See* 43 U.S.C. § 1344(a)(4)); 30 C.F.R. § 556.501 (stating BOEM evaluates bids to ensure "fair market value"). BOEM itself notes that fair market value-related components, like bidding systems and lease and fiscal terms, are only assessed at the lease sale stage. Proposed Program at 9-2. And as BOEM acknowledges in the Proposed Program, it has the discretion to design an appropriate bidding system to receive fair market value. Proposed Program 9-19 – 20; *see also, NRDC*, 865 F. 2d at 312 (stating that Interior has the "judgment and expertise" to design bidding system). This factor does not require BOEM to hold new lease sales.

BOEM finds that the option value of proceeding with leasing is high – in other words, it is desirable to have a national program with a range of areas available for leasing. Proposed Program at 9-5. However, other economists have concluded that the option value to delaying leasing is high.[463] Leasing may ultimately have irreversible effects – the extraction and use of

[459] IPI at 43-50.
[460] IPI at 51.
[461] *Id.* at 51-52.
[462] *Id.* at 52.
[463] IPI at 43; *see also,* Rachel Rothschild, Max Sarinsky, *Toward Rationality in Oil and Gas Leasing: Building the Toolkit for Programmatic Reforms* at 26, Institute for Policy Integrity, New York University School of Law (Aug. 2021)(*Toward Rationality*); https://policyintegrity.org/files/publications/Toward_Rationality_in_Oil_and_Gas_Leasing_%282%29.pdf

nonrenewable resources, destruction of habitat necessary for protected species, and the emission of greenhouse gases that further drive global warming.[464] Further, leasing is associated with various uncertainties, including uncertainties about the price of refined products, demand for such products, the evolution of pollution control technology, and effects on ecosystems.[465]

The vast majority of offshore leases are nonproducing – around 80 percent of offshore leases are nonproducing.[466] More than half of onshore leases are nonproducing.[467] If history is any guide, there is no certainty that leasing will lead to the benefits claimed by BOEM, like royalty revenues and local economic benefits. Rather, more leasing could result in lease areas being locked up for private use, or additional environmental and climate risks.

This factor does not require lease sales in the Proposed Program; and for the reasons outlined above, full consideration of all the OCSLA factors requires BOEM to issue a program with no leases.

VII. BOEM Has Failed to Comply With NEPA

A. NEPA Legal Requirements

NEPA is our "basic national charter for the protection of the environment."[468] NEPA was enacted by Congress "[t]o declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; [and] to enrich the understanding of the ecological systems and natural resources important to the Nation."[469] NEPA "is a procedural statute intended to ensure environmentally informed decision-making by federal agencies."[470] The purpose of NEPA is to "ensure that federal agencies are informed of environmental consequences before making decisions and that the information is available to the public."[471]

To achieve these purposes, NEPA requires all federal agencies to prepare a "detailed statement" discussing the environmental impacts of, and reasonable alternatives to, all "major Federal actions significantly affecting the quality of the human environment."[472] This statement is commonly referred to as an environmental impact statement (EIS).[473] Courts have held that "NEPA has two aims .... it places upon an agency the obligation to consider every significant

[464] *Toward Rationality* at 26.
[465] *Toward Rationality* at 26.
[466] *Toward Rationality* at 27; *see also* IPI at 44-45.
[467] *Id.*
[468] 40 C.F.R. § 1500.1. Consistent with the Draft Programmatic Environmental Impact Statement (DPEIS), these comments also cite to and rely on the 2014 CEQ regulations. *See* DPEIS at 3.
[469] 42 U.S.C. § 4321.
[470] *Tillamook County v. U.S. Army Corps of Eng'rs*, 288 F.3d 1140, 1142 (9th Cir. 2002).
[471] *Citizens to Preserve Better Forestry v. U.S.D.A.*, 341 F.3d 961, 970-71 (9th Cir. 2003).
[472] 42 U.S.C. § 4332(2)(C).
[473] 40 C.F.R. § 1502.

aspect of the environmental impact of a proposed action," and "it ensures that the agency will inform the public that it has indeed considered environmental concerns in its decision-making process."[474]

An EIS must "provide full and fair discussion of significant environmental impacts and shall inform decision-makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment."[475] This discussion must include an analysis of "direct effects," which are "caused by the action and occur at the same time and place," in addition to "indirect effects which . . . are later in time or farther removed in distance, but are still reasonably foreseeable."[476] An EIS is also required to consider the cumulative impacts of the proposed federal agency action in conjunction with past, present and reasonably foreseeable future actions, including all federal and non-federal activities.[477] Additionally, an EIS must "rigorously explore and objectively evaluate all reasonable alternatives" to the proposed project.[478]

Courts reviewing agency action for compliance with NEPA seek to determine "whether agencies have taken a 'hard look' at the environmental consequences of their decisions."[479] "[T]he comprehensive 'hard look' mandated by Congress and required by the statute must be timely, and it must be taken objectively and in good faith, not as an exercise in form over substance, and not as a subterfuge designed to rationalize a decision already made."[480] Additionally, an EIS must be "clear, and to the point, and . . . supported by evidence that the agency has made the necessary environmental analyses."[481]

In this case, NEPA requires that BOEM's Draft Programmatic Environmental Impact Statement (DPEIS) evaluate reasonable alternatives to and environmental consequences of the 2023-2028 Program.[482] The DPEIS must "present the environmental impacts of the proposal and the alternatives in a comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public."[483] The DPEIS must analyze the direct, indirect, and cumulative effects of the proposed project and of each reasonable alternative in order to adequately evaluate the Program's environmental impacts.

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[474] *Wyoming v. U.S. Dep't of Agric.* , 661 F.3d 1209, 1236–37 (10th Cir. 2011) (citation and internal quotation marks omitted).
[475] 40 C.F.R. § 1502.1.
[476] 40 C.F.R. § 1508.8.
[477] 40 C.F.R. § 1508.7.
[478] 40 C.F.R. § 1502.14(a).
[479] *Utah Physicians for a Healthy Env't v. U.S. Bureau of Land Mgmt.*, 528 F. Supp. 3d 1222, 1227 (D. Utah 2021) (citing *Sierra Club v. U.S. Dep't of Energy*, 867 F.3d 189, 196 (D.C. Cir. 2017)).
[480] *Metcalf v. Daley*, 214 F.3d 1135, 1142 (9th Cir. 2000).
[481] 40 C.F.R. § 1502.1.
[482] 40 C.F.R. §§ 1502.14, 1502.16.
[483] 40 C.F.R. § 1502.14.

For the reasons stated below, the DPEIS for the 2023-2028 Program is legally and technically flawed because BOEM failed to adequately consider the Program's direct, indirect, and cumulative impacts, provided an insufficient notice and comment period, did not consider a reasonable range of alternatives, and did not propose or analyze appropriate mitigation measures. We request that BOEM fully and completely address the following concerns and re-issue the DPEIS for further public comment.

B. The DPEIS' Purpose and Need Statement is Flawed

NEPA's implementing regulations explain that the purpose and need statement shall "specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action."[484] The agency's stated project goal is critical, as it "necessarily dictates the range of 'reasonable' alternatives."[485] Courts have explained, "[a]n agency may not define the objectives of its action in terms so unreasonably narrow that only one alternative from among the environmentally benign ones in the agency's power would accomplish the goals of the agency's action, and the EIS would become a foreordained formality."[486] More specifically, "an agency cannot define its objectives in unreasonably narrow terms" and satisfy NEPA.[487] Furthermore, agencies must "provide full and fair discussion" of the "reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment."[488]

BOEM's purpose and need statement is arbitrarily narrow and is based on an irrational assumption about the nation's energy needs. BOEM states that "[t]he need for the Proposed Action is to provide opportunity for oil and gas leasing, exploration, and development on the OCS to meet national energy needs in compliance with the OCS Lands Act."[489] This statement is biased towards the assumption that oil and gas development is the only means of achieving national energy needs and does not consider the nation's commitment to transition to net-zero renewable energy sources and to reduce dependence on oil and gas.

BOEM's purpose and need statement should reflect the clean energy goals articulated in various recent Executive Orders issued by President Biden and enshrined in the Paris Agreement. In his Executive Order on *Tackling the Climate Crisis at Home and Abroad*, President Biden directed the federal government to "drive assessment, disclosure, and mitigation of climate pollution and climate-related risks in every sector of our economy" and further directed all agencies to "to combat the climate crisis" by "implement[ing] a Government-wide approach that reduces climate

[484] 40 C.F.R. § 1502.13.
[485] *Carmel-by-the-Sea v. U.S. Dep't of Transp.*, 123 F.3d 1142, 1155 (9th Cir. 1997).
[486] *Friends of Se's Future v. Morrison*, 153 F.3d 1059, 1066 (9th Cir. 1998).
[487] *Carmel-by-the-Sea*, 123 F.3d at 1155*; see also Colo. Envtl. Coal. v. Dombeck*, 185 F.3d 1162, 1175 (10th Cir. 1999) ("the statements of purpose and need drafted to guide the environmental review process" may not be "unreasonably narrow").
[488] 40 C.F.R. § 1502.1.
[489] DPEIS at 7.

pollution…"[490] President Biden has also set a goal of deploying 30 gigawatts of offshore wind by 2030 through the Federal-State Offshore Wind Implementation Partnership.[491] This partnership will boost the offshore wind industry by promoting development in the Gulf of Mexico and Southeast.[492] *See e.g.,* Section III (discussing energy needs). The U.S.' commitment under the Paris Agreement further requires it to strengthen its response to the threat of climate change by, "[h]olding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels."[493] *See* Section IV.A.1 (discussing threats from climate change). The U.S. must stop new offshore oil and gas extraction and quickly transition away from reliance on existing production and infrastructure to meet our obligations under the Paris Agreement and reduce our contribution to global climate change.

BOEM's purpose and need statement is lacking because its objective excludes renewable energy sources as a potential reasonable alternative to the Program. *See* Section III. To satisfy NEPA, BOEM should update and broaden its purpose and need statement so that it allows for net-zero energy alternatives.

C. The DPEIS Includes an Inadequate Analysis of Direct, Indirect, and Cumulative Impacts

The DPEIS must include a "full and fair discussion" of the direct, indirect, and cumulative effects of the proposed action and reasonably foreseeable alternatives to comply with NEPA.[494] ***Direct effects*** are defined as those "caused by the action and occur at the same time and place," and ***indirect effects*** "are later in time or farther removed in distance, but are still reasonably foreseeable."[495] ***Cumulative effects*** are impacts "on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable" federal or non-federal activities.[496]

[490] Exec. Order No. 14,008, 86 Fed. Reg. 7619 (Jan. 27, 2021).
[491] WHITE HOUSE, FACT SHEET*: Biden Administration Launches New Federal-State Offshore Wind Partnership to Grow American-Made Clean Energy* (June 23, 2022), https://www.whitehouse.gov/briefing-room/statements-releases/2022/07/20/fact-sheetpresident-bidens-executive-actions-on-climate-to-address-extreme-heat-and-boost-offshore-wind/.
[492] *Id.*
[493] United Nations Framework Convention on Climate Change, Conference of the Parties, Nov. 30-Dec. 11, 2015, Adoption of the Paris Agreement Art. 2, U.N. Doc. FCCC/CP/2015/L.9 (December 12, 2015), http://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf.
[494] 40 C.F.R. § 1502.1; *see also N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1076 (9th Cir. 2011).
[495] 40 C.F.R. § 1508.8 (emphasis added).
[496] 40 C.F.R. § 1508.7.

1. The DPEIS Does Not Adequately Discuss the Impacts of Greenhouse Gas Emissions and Climate Change

The DPEIS does not sufficiently discuss the indirect or cumulative impacts the Program will have on downstream GHG emissions. In Appendix C, BOEM provides estimates of downstream emissions for leasing and no leasing scenarios by region and estimates of emissions by activity level.[497] The Appendix summarizes data in the tables, stating "[m]idstream and downstream emissions resulting from the Leasing scenario are higher than those estimated for the No Leasing scenario for all planning areas at all three activity levels."[498] This conclusory statement does not constitute an adequate impacts analysis under NEPA.

CEQ guidance explains that downstream emissions should be accounted for in a NEPA analysis.[499] CEQ recommends that rather than engaging in analysis supported by speculative downstream emissions, agencies should "consider all reasonably foreseeable effects that may result from their proposed actions using reasonable temporal and spatial parameters in their NEPA analyses."[500] For example, the Ninth Circuit has determined that "[t]he impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct."[501] Numerous courts have also held that agencies must consider downstream emissions.[502] BOEM should revise the DPEIS to include a thorough analysis of the downstream GHG emissions of the Program.

The DPEIS omits an indirect impacts analysis of the short-lived climate pollutants that will be emitted by all of the Program's proposed alternatives and at all phases of oil and gas development. ***Short-lived climate pollutants (SLCPs)*** are defined as "gases and warming aerosols with atmospheric lifetimes of days to 15 years, specifically methane, black carbon soot, hydrofluorocarbons (HCFS), and tropospheric ozone."[503] The DPEIS briefly mentions black carbon as a contributor to climate change but fails to evaluate its probability of occurrence and

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[497] Appendix at C-8, C-10.
[498] Appendix at C-9.
[499] U.S. COUNCIL ON ENVTL. QUALITY, Revised Draft Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews, 79 Fed. Reg. 77,802, 77,825-26 (Dec. 24, 2014) [hereinafter Revised Draft Climate Guidance].
[500] Revised Draft Climate Guidance at 77805.
[501] *Center for Biological Diversity v. NHTSA*, 538 F.3d 1172, 1217 (9th Cir. 2008).
[502] See *N. Plains Res. Council, Inc. v. Surface Transp. B*d., 668 F.3d 1067, 1080 (9th Cir. 2011); *S. Fork Band Council of W. Shoshone of Nev. v. U.S. Dep't of Interior*, 588 F.3d 718, 725 (9th Cir. 2009); *Mid States Coal. for Progress v. Surface Transp. Bd*., 345 F.3d 520, 549 (8th Cir. 2003); *WildEarth Guardians v. Office of Surface Mining, Reclamation & Enf't*, No. CV 14-103-BLG-SPW, 2015 WL 6442724 (D. Mont. Oct. 23, 2015), report and recommendation adopted in part, rejected in part sub nom. *Guardians v. Office of Surface Mining, Reclamation & Enf't*, No. CV 14-103-BLG-SPW, 2016 WL 259285 (D. Mont. Jan. 21, 2016); *Din´e Citizens Against Ruining Our Env't v. Office of Surface Mining, Reclamation & Enf't*, 82 F. Supp. 3d 1201 (D. Colo. 2015); *WildEarth Guardians v. Office of Surface Mining, Reclamation & Enf't*, 104 F. Supp. 3d 1208, 1230 (D. Colo. 2015); *High Country Conservation Advocates v. U.S. Forest Serv*., 52 F. Supp. 3d 1174 (D. Colo. 2014).
[503] Xiaopu Sun et al., *Fast action on short-lived climate pollutants and nature-based solutions to help countries meet carbon neutrality goals*, 13 ADVANCES IN CLIMATE CHANGE RESEARCH 564, 565 (2022).

potential impact in the context of the Program.[504] Additionally, the DPEIS fails to adequately analyze the climate impacts of methane. The DPEIS discusses the general and non-project specific concerns of methane and briefly states that the "social cost of methane" was factored into the social cost of GHG estimates.[505] This discussion is insufficient and fails to analyze the specific climate impacts of methane that will occur under all leasing scenarios.

As compared to CO_2, SLCPs are more potent in warming the atmosphere even though they have shorter atmospheric lifetimes.[506] A recent study analyzing shallow water offshore oil and gas platforms in the GOM found that "methane loss rate from these shallow water sources is significantly higher than typical onshore production and disproportionally contributes to climate change."[507] Researchers observed that specific types of offshore equipment—including tanks, satellite wells, pipelines, and vent booms—were "responsible for a majority of the methane released into the atmosphere."[508] In addition to releases that occur during production, it's been noted that "[m]ethane leaks occur at various stages of the supply chain, including when it is extracted, processed, and transported."[509]

CEQ regulations requires agencies to analyze indirect effects, "which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."[510] "Indirect effects may include . . . effects on air and water and other natural systems, including ecosystems."[511] Courts have determined that an "environmental effect is 'reasonably foreseeable' if it is 'sufficiently likely to occur that a person of ordinary prudence would take it into account in reaching a decision.'"[512] The emission of methane and other SLCPs are a foreseeable result of the Program. The DPEIS should therefore study and include an indirect impact analysis of the quantitative and qualitative impacts of the Program's emission of SLCPs, including black carbon and methane.

The DPEIS fails to adequately analyze the cumulative impacts of the Program's GHG emissions as required by NEPA.[513] Numerous federal courts have determined that these

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[504] DPEIS at 29.
[505] DPEIS at 38; Appendix at C-18.
[506] Sun at 565.
[507] CARBON MAPPER, *Study suggests offshore oil and gas production in Gulf of Mexico has higher methane loss rates than typical onshore production* (Aug. 11, 2022), https://carbonmapper.org/study-suggests-offshore-oil-and-gas-production-in-gulf-of-mexico-has-higher-methane-loss-rates-than-typical-onshore-production/; see also Alana K. Ayasse et al., *Methane remote sensing and emission quantification of offshore shallow water oil and gas platforms in the Gulf of Mexico*, 17 ENVIRON. RES. LETT. 084039 (2022).
[508] *Id.*
[509] CLIMATE AND CLEAN AIR COALITION, *The first measurements of methane emissions from oil and gas platforms in the Gulf of Mexico are released* (Mar. 9, 2020), https://www.ccacoalition.org/en/news/first-measurements-methane-emissions-oil-and-gas-platforms-gulf-mexico-are-released.
[510] 40 C.F.R. § 1508.8.
[511] *Id.*
[512] *Mid St. Coal. Progress V. Surface Transp. Bd*, 345 F.3d 520, 549 (8th Cir. 2003) (citing *Sierra Club v. Marsh*, 976 F.2d 763, 767 (1st Cir. 1992)).
[513] *Ocean Advocates. v. U.S. Army Corps of Eng'rs*, 402 F.3d 846, 868 (9th Cir. 2005); 40 C.F.R. §§ 1508.7, 1508.8.

impacts include GHG emissions, which are a contributing factor to global climate change.[514] Agencies are required under NEPA to "provide the necessary contextual information about [an action's] cumulative and incremental environmental impacts."[515] Courts have characterized analyses as inadequate when agencies do not evaluate the "incremental impact that [a proposed project's] emissions will have on climate change or on the environment more generally in light of other past, present, and reasonably foreseeable actions."[516] For example, one court acknowledged the concept of climate tipping points, explaining that the "climate system involves many processes and feedbacks that interact in complex non-linear ways. This interaction can give rise to thresholds in the climate system that can be crossed if the system is perturbed sufficiently."[517]

Other courts have required that agencies communicate the actual environmental effects resulting from GHG emissions.[518] In *California v. Bernhardt*, the district court found that "[m]ere quantification [of GHG emissions] is insufficient," explaining that an agency "must communicate the actual environmental effects resulting from emissions of greenhouse gas, not just quantify them."[519] Similarly, the court in *WildEarth Guardians v. U.S. Bureau of Land Management* stressed that in order for an agency to "determine the true impact of its projects on climate change," it must "look[] at [similar] projects in combination with each other…"[520] The court underscored that "the large-scale nature of environmental issues like climate change show why cumulative impacts analysis proves vital to the overall NEPA analysis."[521] NEPA's "cumulative impacts analysis was designed precisely to determine whether 'a small amount here, a small amount there, and still more at another point could add up to something with a much greater impact.'"[522] *California* and *WildEarth Guardians* emphasize NEPA's requirement that agencies explain the impacts of their projects/programs on GHG emissions within the context of climate science and national emission goals because mere percentages cannot convey a program's contribution to global climate change. To that end, agencies are not absolved of their duties to evaluate reasonably foreseeable significant adverse effects even if there is incomplete

[514] *See Ctr. for Biological Diversity v. Bernhardt*, 982 F. 3d 723, 737-740 (9th Cir. 2020); *see also Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172 (9th Cir. 2008); *see also Sierra Club v. Fed. Energy Reg. Comm'n*, 867 F. 3d 1357, 1374 (D.C. Cir. 2017).
[515] *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1217 (9th Cir. 2008); *see also Klamath-Siskiyou Wildlands Ctr. v. Bureau of Land Mgmt.*, 387 F.3d 989, 995 (9th Cir. 2004) (agencies must analyze the "degree that each [environmental factor] will be impacted").
[516] *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1216 (9th Cir. 2008).
[517] *Id.* at 1222 (quoting IPCC Working Group I, Climate Change 2001: The Scientific Basis, Technical Summary at 53 (2001)) (alterations omitted).
[518] *California v. Bernhardt*, 472 F. Supp. 3d 573, 623 (N.D. Cal. 2020) ("[Agencies] must communicate 'the actual environmental effects resulting from . . . emissions' of greenhouse gas, not just quantify [those emissions].") (citing *Nat'l Highway Traffic Safety Admin.*, 538 F.3d at 1216).
[519] 472 F. Supp. 3d at 623 (internal quotation marks and alterations omitted).
[520] *Wildearth Guardians v. U.S. Bureau of Land Mgmt.*, 457 F. Supp. 3d 880, 894 (D. Mont. 2020).
[521] *Id.*
[522] *Id.* (citing *Klamath-Siskiyou Wildlands Ctr. v. BLM*, 387 F.3d 989, 994 (9th Cir. 2004)).

or unavailable information.[523] Instead, agencies are required to evaluate the program's "impacts based upon theoretical approaches or research methods generally accepted in the scientific community."[524]

The cumulative effects analysis in the DPEIS compares the anticipated impacts of the Program among the proposed alternatives and regions using general and broad terms.[525] To comply with recent court interpretations of NEPA's requirement to analyze GHG emissions, BOEM should more intentionally explain the implications of the various alternatives. For example, BOEM could describe whether and how each alternative furthers or conflicts with national emission goals. In taking a "hard look" at the adverse environmental impacts of the Program, BOEM should also report on the capacity each alternative has to contribute to climate change.

BOEM's social cost of greenhouse gases analysis should fully disclose the costs and benefits of the Program. Though NEPA does not require an explicit cost-benefit analysis, courts have held that when such an analysis is provided, it "cannot be misleading."[526] The court in *Utah Physicians* held that BLM's GHG analysis was arbitrary and capricious because it qualitatively addressed the effects of GHGs on the climate but did not quantify the economic costs of GHG emissions and because BLM separated the discussion of GHGs throughout the FEIS.[527] The court stated that "[t]he socioeconomics section may not lay out the economic benefits from the proposal without analyzing the socioeconomic costs of GHGs *together with* climate change."[528] The court further said that "it is unacceptable for the information and analysis that is included on the topic to be spread out and disjointed in such a way that the public is unlikely to find the related pieces and put them together or to have confidence that the agency considered the interrelated qualitative and quantitative information as a whole."[529]

Similarly in *High Country Conservation Advocates*, the court determined the Forest Service's GHG analysis was arbitrary and capricious because it did not discuss the impacts caused by methane gas emissions.[530] The court also determined that the Forest Service's cost benefit analysis was arbitrary and capricious because the FEIS quantified the benefits anticipated from the coal lease modification but not its contribution to the costs of GHG emissions.[531] The court

[523] 40 C.F.R. § 1502.21(c)(3) & (4).
[524] 40 C.F.R. § 1502.21(c)(4).
[525] *See generally* DPEIS, at chapter 4.
[526] *High Country Conservation Advocates v. U.S. Forest Serv.*, 52 F. Supp. 3d 1174, 1182 (D. Colo. 2014); *see also, Utah Physicians for a Healthy Environment v. U.S. Bureau of Land Management*, 528 F. Supp. 3d 1222, 1231-32 (D. Utah 2021) (finding agency analysis arbitrary and capricious for failure to quantify socioeconomic costs from greenhouse gases and climate change); *Mont. Env't Info. Ctr. v. U.S. Off. of Surface Mining*, 274 F. Supp. 3d 1074, 1098 (D. Mont. 2017) (finding that it was arbitrary and capricious to consider the benefits, but not the costs of coal mining project).
[527] 528 F. Supp. 3d at 1232.
[528] *Id.* (emphasis in original).
[529] *Id.*
[530] 52 F. Supp. 3d at 1190.
[531] *Id.* at 1191.

explained "[i]t is arbitrary to offer detailed projections of a project's upside while omitting a feasible projection of the project's costs."[532] The court further summarized its position: "In a nutshell, the agencies cannot claim that they are unable to predict the impacts of methane emissions because activities occurring under the rule are too speculative and then turn around and calculate down to the job and the nearest $100,000 the economic impacts of the rule."[533] The court in *Montana Environment Information Center* also found the Office of Surface Mining's NEPA analysis deficient because it failed to "consider the cost of greenhouse gas emissions from coal combustion."[534] As a result, the court determined that the agency "failed to adequately address the indirect and cumulative impacts of greenhouse gas emissions."[535]

Appendix C of the DPEIS provides estimates of the "social cost of full life cycle domestic consumption and production [of] GHG emissions with and without leasing."[536] Appendix C also provides estimates for the social cost of carbon from new leasing by region.[537] While these data tables are essential to understanding the social costs of the proposed alternatives, the DPEIS does not adequately discuss these numbers or the varied implications they may have on the Program. Without this qualitative interpretation, the public is not able to readily distinguish between the costs and benefits of the different leasing scenarios. Moreover, this information is separated across the DPEIS and Appendix in such a way that it is not immediately clear how different cost and benefits data interact. In other words, cost and benefit information is not presented in such a way that the public has confidence that BOEM analyzed both the qualitative and quantitative information critical to the Program.[538] Additionally, the Appendix explains that BOEM monetized damages using a "social cost of greenhouse gases" metric, which it describes as the combination of "social cost of carbon" (SCC), "social cost of nitrous oxide" (SCN), and "social cost of methane" (SCM).[539] While this aggregated value is useful, it would also be important to see the distinct social costs of carbon, nitrous oxide, and methane individually, in addition to the combined GHG value. Without providing a distinction for each of these gases, the individual contribution of these costs for various planning and activity levels is unclear and the overall social cost metrics are misleading. BOEM should provide a more thorough analysis of both the social costs and benefits of the Program.

BOEM's incremental net benefit analysis is also deficient because it omits critical cost and benefit factors. For example, the DPEIS acknowledges that the analysis "does not quantitatively

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[532] *Id.* at 1195.; *see Scientists' Inst. for Pub. Info., Inc. v. Atomic Energy Comm'n*, 481 F.2d 1079, 1097 (D.C.Cir.1973); *Sierra Club v. Sigler,* 695 F.2d 957, 979 (5th Cir.1983) ("There can be no 'hard look' at costs and benefits unless all costs are disclosed.").
[533] *Id.*
[534] *Mont. Envtl. Info. Ctr. v. U.S. Office of Surface Mining,* 274 F. Supp. 3d 1074, 1099 (D. Mont. 2017).
[535] *Id.*
[536] DPEIS, app. C, at C-19.
[537] *See* DPEIS, at 31.
[538] *See Utah Physicians for a Healthy Environment v. U.S. Bureau of Land Management,* 528 F. Supp. 3d 1222, 1232 (D. Utah 2021)
[539] DPEIS, app. C, at C-18.

address environmental impacts related to the construction and operation of onshore infrastructure to support OCS activities" and "does not include the emissions associated with the downstream consumption of produced oil and natural gas."[540] The DPEIS should holistically assess the costs of GHG emissions generated from all steps of the Program, from the construction and operation of onshore infrastructure to the quantification of downstream emissions. Additionally, BOEM should present this information clearly and logically to ensure that the public is confident BOEM assessed the qualitative and quantitative information as a whole. Currently, the DPEIS does not contain the entire net benefit analysis but includes a bare-bones three-point bulleted list summarizing the unquantified costs and benefits in the analysis.[541] Instead, a partial analysis is contained in the Appendix and additional details are located in a separate document entirely.[542] BOEM further buried information relevant to the Program by separating non-monetized costs and benefits into a separate chapter of the DPEIS and in a variety of other documents.[543] BOEM insufficiently disclosed critical cost and benefit information and should more clearly present this information in the DPEIS.

BOEM's decision to exclude estimates of upstream and midstream GHG emissions resulting from higher foreign oil production is arbitrary and capricious. More specifically, BOEM's modeling contravenes its obligation under NEPA to make reasonable assumptions supported by the best available information and analysis.[544] The Ninth Circuit and the District Court for the District of Alaska have found arbitrary and capricious the MarketSim model and assumptions similar to BOEM's.[545] In *Liberty*, BOEM utilized the MarketSim model to estimate the downstream indirect emissions from foreign oil consumption in its No Action alternative for a proposed drilling project.[546] Although the EIS estimated that the no-action alternative would result in a reduction in oil consumption, BOEM did not discuss the impacts on GHG emissions that would result from those reductions. [547] BOEM justified its decision not to include this analysis by determining that it "did not have sufficiently reliable information on foreign emissions factors and consumption patterns."[548] The Ninth Circuit found BOEM's determination to be arbitrary and capricious, holding that BOEM "'should have either given a quantitative estimate of the downstream greenhouse gas emissions' that will result from consuming oil abroad, or 'explained more specifically why it could not have done so,' and provided a more

[540] DPEIS, at 23.
[541] *See* DPEIS, at 22-23.
[542] DPEIS, at 21; *see* Proposed Program, sec. 5.3; *see* DPEIS, app. C.
[543] DPEIS, at 22 ("Non-monetized costs and benefits not presently captured in the cost benefit model are described qualitatively in Chapter 4 and also in Industrial Economics Inc. and SC&A (2018a; 2018b) and BOEM (2022b).").
[544] *See e.g., Balt. Gas & Elec. Co.*, 462 U.S. at 105 (1983) (stating that agency's assumptions in NEPA review must reflect "reasoned decision-making" and "consider[] the relevant factors").
[545] *See Ctr. for Biological Diversity v. Bernhardt*, 982 F.3d 723 (9th Cir. 2020) [hereinafter "Liberty"]; *see also Sovereign Inupiat for a Living Arctic v. Bureau of Land Mgmt.*, 555 F. Supp. 3d 739, 754 (D. Alaska 2021) [hereinafter "Willow"].
[546] *Liberty*, 982 F.3d at 736.
[547] *Id.* at 737.
[548] *Id.* at 737 (internal quotations omitted).

thorough discussion of how foreign oil consumption might change the carbon dioxide equivalents analysis."[549]

Similarly in *Willow,* BLM offered parallel reasons as BOEM has here for its decision to exclude foreign GHG emissions estimates.[550] BLM stated that the single project would have a negligible impact on global GHG emissions and "contended it lacked sufficiently reliable data on foreign emissions factors and consumption patterns."[551] The court found BLM's exclusion of foreign emissions in its alternatives analysis arbitrary and capricious because it did not "cite any materials in support of [its] statements nor describe the research it relied upon to reach these conclusions" or "address the studies that were [also] in the agency record in *Liberty.*"[552]

Most recently, in *Friends of the Earth,* the court found BOEM's decision to exclude the foreseeable and quantifiable change in foreign consumption from its total quantitative emissions calculation arbitrary because it "'entirely failed to consider an important aspect of the problem.'"[553] The court noted that the record included estimations for the reduction in foreign demand for barrels of oil as well as a methodology and application describing how to convert those numbers into emissions.[554] The court in *Friends of the Earth* found the case analogous to *Sierra Club (Southeast Market),* reiterating that BOEM "should have either given a quantitative estimate of the downstream greenhouse emissions that will result from" the reduced foreign consumption "or explained more specifically why it could not have done so."[555]

Just as in the cases above, the DPEIS states that "BOEM anticipates increased foreign consumption, resulting in an increase in GHG emissions from overseas oil consumption" and then in the very next sentence explains, "[u]pstream and midstream GHG emissions resulting from higher foreign oil production with new leasing currently are not quantified due to lack of sufficient data regarding where the production would occur and appropriate emissions factors to apply to an upstream analysis."[556] NEPA requires that agencies include in the EIS a statement explaining that "information relevant to reasonably foreseeable significant adverse impacts cannot be obtained."[557] The DPEIS satisfies this requirement. However, BOEM is also required to provide the following, in addition to this statement: "[a] summary of existing credible scientific evidence that is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment; and [t]he agency's evaluation of such impacts based upon

[549] *Id.* at 740 (quoting *Sierra Club (Southeast Market*), 867 F.3d at 1374).
[550] *Willow*, 555 F. Supp. 3d at 763–64.
[551] *Id.* at 764.
[552] *Id.* at 765.
[553] *Friends of the Earth v. Haaland*, No. CV 21-2317 (RC), 2022 WL 254526, at *14 (D.D.C. Jan. 27, 2022) (quoting *Motor Vehicle Ass'n v. State Farm Mut. Auto. Ins*., 463 U.S. 29, 43 (1983)).
[554] *Id.* at 15.
[555] *Id.* at *11 (citing Sierra Club (Southeast Market), 867 F.3d at 1374).
[556] DPEIS at 32.
[557] 40 C.F.R. § 1502.21(c)

theoretical approaches or research methods generally accepted in the scientific community."[558] BOEM must substantiate its conclusions regarding upstream and midstream GHG emissions by summarizing relevant scientific evidence and evaluating the impacts based on methodologies accepted in the scientific community in order to comply with NEPA.

The DPEIS relies on the flawed GLEEM Model, which creates a misleading narrative of foreign GHG emissions. The DPEIS provides that the GLEEM model "takes the annual change in foreign oil consumption from MarketSim and applies an emissions factor attributable to combusted oil…"[559] The DPEIS states that for the Proposed Program, it departed from traditional practice which consisted of using a "a range of emissions factors that correspond to the different end uses of petroleum products after oil refining."[560] Instead, "BOEM applied the emissions factor to all overseas combusted oil due to a lack of information about the end petroleum products consumed in foreign markets."[561] BOEM should cite to evidence in support of this conclusion and further explain its reasoning. Later, BOEM states that it used the U.S. market to base its estimate for non-combustion uses of oil and adds that "[t]his method is unlikely to change the results significantly, as the amount of oil used in non-combustion products is small globally."[562] Again, BOEM should describe the research relied upon to reach this conclusion.[563]

BOEM's application of the GLEEM model does not satisfy NEPA's requirements because it does not provide sufficient supporting evidence for its conclusions. CEQ regulations address "such situations, where 'incomplete or unavailable information' impedes the agency's ability to evaluate a 'reasonably foreseeable significant adverse effect[ ]' of the project."[564] "The regulation requires the agency to include a statement explaining that the information is lacking, its relevance, a summary of any existing credible evidence evaluating the foreseeable adverse impacts, and the agency's evaluation of the impacts based upon 'theoretical approaches or research methods generally accepted in the scientific community.'"[565] CEQ's "requirements are read 'in the context of the more general requirements for preparation of an EIS,' including the 'rigorous evaluation' of the indirect, direct, and cumulative effects of the selected alternatives."[566] Courts have recognized that "[s]ome 'educated assumptions are inevitable in the NEPA process,' and the 'effects of assumptions on estimates can be checked by disclosing those assumptions so that readers can take the resulting estimates with the appropriate amount of

[558] 40 C.F.R. 1502.21(c)(3)-(4).
[559] DPEIS, app. C, at C-12.
[560] *Id.*
[561] *Id.*
[562] *Id.*
[563] BOEM does cite to one source on this point.
[564] *Ctr. for Biological Diversity v. Bernhardt*, 982 F. 3d 723, 739 (9th Cir. 2020) (citing 40 C.F.R. § 1502.22.).
[565] *Id.* at 739-40 (citing 40 C.F.R. § 1502.22(b)(1)).
[566] *Id.*; *see also* 40 C.F.R. §§ 1502.16(a)–(b), 1508.8(b).

salt.'"[567] BOEM's general application of a single emissions factor for all overseas combusted oil is misleading because BOEM does not support its decision with sufficient evidence.

Additionally, BOEM does not provide an adequate explanation for its stance that the global amount of oil used in non-combustion products is "small." BOEM must comply with CEQ regulations and provide a summary of credible evidence and an evaluation of the foreseeable adverse impacts of foreign emissions.

The DPEIS' assumption that GHG emissions would occur at a similar rate for both the leasing and no leasing scenarios is arbitrary and capricious. BOEM's GHG emission estimates are based on the same flawed assumption prevalent throughout the DPEIS- that the differences in the full lifecycle GHG emissions between leasing and no leasing scenarios would be "very small for the Alaska, Pacific, and GOM planning areas."[568] This rationale does not adequately distinguish between the GHG emissions that would occur under *any* additional lease sale scenarios as compared to the decreased emissions that would occur under a no-lease-sale scenario. Moreover, BOEM acknowledges that its decision to commit to this line of reasoning is arbitrary as the DPEIS caveats that "slightly different assumptions from the models could yield reversed results."[569] To comply with NEPA, BOEM should explain its rationale and underlying assumptions it relied on to reach this conclusion.

BOEM's discussion of economic costs and benefits is misleading because it does not accurately compare the economic benefits of the Program against the economic costs to the climate, the environment, or other industries. Several of the major deficiencies and omissions are listed below:

- The DPEIS discusses the employment and income associated with OCS-related oil and gas activities.[570] However, BOEM does not disclose the current or forecasted jobs or wages from other replacement industries in either GOM, Atlantic, Pacific or Alaska regions.
- Additionally, the DPEIS does not discuss the economic effects the Program could have on subsistence communities.
- As noted above, it also does not discuss the socioeconomic costs and benefits associated with the GHG emissions produced by any of the alternatives.
- The DPEIS also separates the discussion of costs and benefits illogically throughout the document and across various other documents.

[567] *Id.* at 740 (citing *Sierra Club*, 867 F.3d at 1374).
[568] DPEIS, app. C, at C-11.
[569] *Id.*
[570] DPEIS at 64.

- Finally, having chosen to incorporate a social cost of carbon analysis, BOEM should monetize additional major costs and benefits in addition to employment and revenue and clearly explain its methodology.

2. The DPEIS Fails to Adequately Analyze Impacts of Oil Spills

The DPEIS declines to consider the cumulative impacts of oil spills.[571] The DPEIS states that "[a]ccidental spills are non-routine events—with uncertain frequency and size" and thus "could mask the …. incremental contribution of other OCS and non-OCS routine activities."[572] This logic contravenes BOEM's obligation under NEPA to assess cumulative impacts, which are "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions…"[573] CEQ regulations further that state that "[c]umulative impacts can result from individually minor but collectively significant actions taking place over a period of time."[574] The DPEIS must therefore include a cumulative effects analysis of accidental oil spills. Furthermore, the DPEIS' assessment of accidental oil spill events for the Program is flawed, including because it underestimates the magnitude of impact. *See* sections IV.A.2, IV.F (discussing oil spill risks). The DPEIS does not sufficiently address the spill frequency or magnitude likely to occur as a result of the Program. Absent an adequate analysis of spill frequencies and magnitudes, BOEM cannot sufficiently consider the impacts of potential spills on the Program.

The DPEIS also declines to consider the impact of catastrophic discharge events. BOEM declines to consider catastrophic discharge events (CDEs) "because of [their] low probability of occurrence and the many factors that determine the severity of potential impacts."[575] However, NEPA requires consideration of "all foreseeable direct and indirect impacts."[576] Additionally, CEQ regulations provide that "[i]f the incomplete but available information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives, and the overall costs of obtaining it are not unreasonable, the agency shall include the information in the environmental impact statement."[577] The regulations explain that "reasonably foreseeable" "includes impacts that have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason."[578] BOEM should refer to the plethora of available credible scientific evidence describing the impacts of CDEs on the marine environment, marine organisms, water and air quality, and coastal communities. *See* Section IV.A.2, IV.F (discussing oil spill effects) As described above,

[571] DPEIS at 230.
[572] DPEIS at 230.
[573] 40 C.F.R. § 1508.7 (emphasis added).
[574] 40 C.F.R. § 1508.7.
[575] DPEIS, app. G, at G-1.
[576] *N. Alaska Env't. Ctr. v. Kempthorne*, 457 F3d 969, 975 (9th Cir. 2006); *see also* 40 C.F.R. §§ 1508.7, 1508.8.
[577] 40 C.F.R. § 1502.21(b).
[578] 40 C.F.R. § 1502.21(d)

CEQ regulations provide that even if the probability of a catastrophic occurrence is low, agencies must nonetheless discuss these impacts. To comply with NEPA, BOEM should analyze the direct and indirect impacts of CDEs in the DPEIS.

The DPEIS failed to discuss the impacts of failed and corroded infrastructure components or the impacts of potential oil spill response techniques. The DPEIS does not discuss the failure rates of pipeline infrastructure components. Without data on this point, BOEM neglected to include an analysis on the probability of spills resulting from component failures. The DPEIS also neglects to provide any data or analysis on the impact of corrosion on oil rig infrastructure.[579] As a result, the DPEIS does not discuss the risk of oil spills resulting from various types of corrosion, such as stress corrosion cracking (SCC), on offshore oil platform infrastructure.

Corrosion "is the destructive attack of a material by reaction with its environment and a natural potential hazard associated with oil and gas production and transportation facilities."[580] Degradation of materials used in oil and gas production "results in the loss of mechanical properties like strength, ductility, impact strength, and so on."[581] Over time, this "could lead to costly catastrophic failures with severe consequence to human life and the environment."[582] The GAO reported in 2021 that "[c]orrosion is the largest cause of pipeline failures, which can result in leaks, in offshore oil and gas pipelines in the Gulf of Mexico Region."[583] Even non-catastrophic corrosion-induced events are significant, as slow pipeline leakages nonetheless "poses the risk of exposing deep-sea fauna to potentially damaging pollution."[584] There are numerous types of corrosion that degrade materials used in oil and gas applications including sweet (CO_2) and sour (H_2S) corrosion, galvanic corrosion, oxygen corrosion, crevice erosion, erosion corrosion, microbiologically induced corrosion, and SCC.[585]

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[579] DPEIS at 83. The DPEIS only raises the issue of corrosion in the context of discussing the adverse effects of ocean acidification on Alaska's commercial fisheries and coastal communities

[580] Lekan Taofeek Popoola et al., *Corrosion problems during oil and gas production and its mitigation*, 4 INTERNATIONAL JOURNAL OF INDUSTRIAL CHEMISTRY 1 (2013), https://link.springer.com/article/10.1186/2228-5547-4-35.

[581] *Id.*

[582] Mariano Iannuzz, Afrooz Barnoush & Roy Johnsen, *Materials and corrosion trends in offshore and subsea oil and gas production*, 1 NPJ MATERIALS DEGRADATION 1 (2017), https://www.nature.com/articles/s41529-017-0003-4.

[583] UNITED STATES GOVERNMENT ACCOUNTABILITY OFFICE, UPDATED REGULATIONS NEEDED TO IMPROVE PIPELINE OVERSIGHT AND DECOMMISSIONING 1, 5 (Mar. 2021) [hereinafter GAO Report: Decommissioning], https://www.gao.gov/products/gao-21-293.

[584] Erik E. Cordes et al, *Environmental Impacts of the Deep-Water Oil and Gas Industry: A Review to Guide Management Strategies*, 16 FRONT. ENVIRON. SCI. 1, 9 (2016), https://www.frontiersin.org/articles/10.3389/fenvs.2016.00058/full.

[585] *See generally* Lekan Taofeek Popoola et al., *Corrosion problems during oil and gas production and its mitigation*, 4 INTERNATIONAL JOURNAL OF INDUSTRIAL CHEMISTRY 1 (2013), https://link.springer.com/article/10.1186/2228-5547-4-35.

In addition to these omissions, the DPEIS further fails to analyze the impacts of various types of oil spill responses. The DPEIS only discusses spill responses a handful of times: it mentions the potential impact to land use from spill response infrastructure and summarizes the duties of the Bureau of Safety and Environmental Enforcement (BSEE) under the Oil Pollution Act of 1990.[586] These references do not amount to an adequate discussion, much less an analysis, of oil spill response techniques and their impacts.

Agencies are required to analyze "reasonably foreseeable" adverse environmental effects if they are sufficiently likely to occur.[587] The court in *Hodel* recognized that even at the programmatic stage, an agency "must proceed on 'the best "existing information" available…'"[588] The failure of offshore oil and gas well components over an asset's lifetime are reasonably foreseeable. Additionally, the scientific evidence described above confirms that corrosion and the resulting degradation of materials is foreseeable and likely to lead to discharges. Finally, numerous studies have examined the benefits and disadvantages of various types of response procedures in the wake of a spill event. BOEM should therefore update the DPEIS to analyze the impacts of these issues. For example, BOEM should analyze how various types of corrosion may increase the likelihood of a leak or spill event. BOEM should also address the inevitable corrosion that will occur to oil rig materials, estimate how this electrochemical reaction will degrade structural materials, and analyze the increased likelihood of a spill that may result. These considerations are critical to estimating the long-term severity of spill events on the marine environment.

3. The DPEIS Fails to Adequately Analyze Impacts to Threatened and Endangered as well as to Other Marine Species

a. Threatened and Endangered Marine Species

The DPEIS lacks information about the Program's impacts to threatened, endangered, and sensitive species, which must be disclosed and analyzed under NEPA and the ESA. Agencies are required to analyze impacts to species protected as threatened or endangered under the Endangered Species Act (ESA).[589] The DPEIS states that it does not list all threatened, endangered, and sensitive ("TES") species that will be affected by the Program, but instead chose to include "species groups, representative species, and particularly sensitive species."[590] This decision is arbitrary and does not fulfil BOEM's requirement to analyze impacted species under the ESA and NEPA. The DPEIS has inadequately addressed the numerous impacts of the Program on these species. These species will be seriously threatened by all phases of oil and gas exploration, development, operation, and production under each of the Program's proposed

[586] DPEIS at 273; *id.*, app G, at G-3.
[587] *Mid States Coalition for Progress v. Surface Transportation Board*, 345 F.3d 520, 549 (8th Cir. 2003).
[588] *Nat. Res. Def. Council, Inc. v. Hodel*, 865 F.2d 288, n.21 (D.C. Cir. 1988) (citing California v. Watt, 668 F.2d 1290, 1313 (D.C. Cir.1981) (quoting 43 U.S.C. § 1344(a)(2)(A)).
[589] 16 U.S.C. §§ 1531-1544.
[590] DPEIS, app. D, at D-1.

alternatives. BOEM has not met its requirements under NEPA or the ESA to analyze impacts to these species.

The DPEIS arbitrarily restricts the environmental analysis of TES species within a limited boundary. The DPEIS defines the "program area" as an "area within which one or more lease sales is proposed at any stage of National Outer Continental Shelf Oil and Gas Leasing Program development; a program area may include all of or portions of a [BOEM] planning area."[591] This definition severely limits the scope of BOEM's analysis regarding the migratory movements of TES species.

NEPA and the ESA require BOEM to assess impacts to protected species. Formal consultation under § 7(a)(2) of the ESA requires consideration of the effects in the "action area," which includes "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action."[592] Additionally, NEPA's "hard look" standard requires agencies to analyze all cumulative impacts from the Program, regardless of where these effects occur.[593] For example, "[t]he Supreme Court has held that, under NEPA, proposals for . . . related actions that will have cumulative or synergistic environmental impact upon a region concurrently pending before an agency must be considered together. Only through comprehensive consideration of pending proposals can the agency evaluate the different courses of action."[594]

The court in *Hodel* found that the "Secretary did not consider the effect of simultaneous inter-regional development on migratory species" and listed numerous suggestions the agency could make to improve its analysis.[595] The court suggested that the agency "examine cumulative impacts of simultaneous inter-regional OCS development in a single, coherent section rather than fragment his analysis by area" and then "identify the various migratory species and the full range of their routes of migration, describe the OCS and non-OCS activities along those routes, and state the synergistic effect of those activities on the migratory species."[596] In addition, the agency could "could support such a presentation with references to scientific studies and other materials so that a decisionmaker would have ready access to the information underlying the Secretary's findings and conclusions" and "consistent with NEPA's requirement that he consider alternatives to the proposed action, examine alternatives to simultaneous development that would mitigate any synergistic impacts on migratory species, such as staggering development."[597]

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[591] DPEIS, app. K, at K-10.
[592] 50 C.F.R. § 402.02.
[593] *See generally Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989); *see also Nat. Res. Def. Council, Inc. v. Hodel*, 865 F.2d 288, 297 (D.C. Cir. 1988) (stating "NEPA, as interpreted by the courts, and CEQ regulations both require agencies to consider the cumulative impacts of proposed actions.").
[594] *Id.*; see *Kleppe v. Sierra Club*, 427 U.S. 390, 410 (1976).
[595] *Nat. Res. Def. Council, Inc. v. Hodel*, 865 F.2d 288, 297 (D.C. Cir. 1988).
[596] *Id.* at 299–300.
[597] *Id.*

Here, BOEM should evaluate the cumulative effect of inter-regional development on migratory species proposed in the Program's alternatives. To support its findings, BOEM should refer and cite to scientific evidence concerning migratory species in the Program regions. Equipped with this information, BOEM should then re-examine the alternatives and mitigate measures to minimize impacts for specific species. Constraining the analysis of the Program's environmental consequences violates NEPA and the ESA and prevents the agency from considering some of the Program's worst environmental impacts to migratory species.

The revised DPEIS/FEIS and future Biological Assessment must adequately analyze the unique and specific impacts for each of the TES species that will be affected by the Program. NEPA requires that BOEM analyze direct, indirect, and cumulative impacts.[598] BOEM has not identified the amount of TES habitat that will be temporarily and permanently impacted by the Program. This includes habitat affected by oil and gas infrastructure assets, including but not limited to drilling platforms, terminals, pipelines, storage facilities, and processing plants. Direct effects of oil and gas exploration include physical disturbances to the ocean floor and an increase in local sedimentation caused by the placement of "anchor chains, drill cuttings, and drilling fluids."[599] For example, anchors used to moor semi-submersible drilling rigs to the seabed cause damage to benthic organisms and scar the seafloor.[600] Additionally, impacts that flow from these infrastructure assets are considered *connected actions* under NEPA and the ESA as they are "interdependent parts of a larger action and depend on the larger action for their justification."[601] The effects of the Program on TES habitats must therefore be considered.

Additionally, BOEM has not provided data or analysis on the effects of oil spills & CDEs to listed species. The discussion of oil spills in Section 4.6 of the DPEIS is deficient because it fails to discuss the unique impacts of these events on listed species. CEQ guidance explains that "NEPA law directs federal agencies to analyze the effects of proposed actions to the extent they are reasonably foreseeable consequences of the proposed action, regardless of where those impacts might occur."[602] Oil spills and CDEs are reasonably foreseeable consequences of the Program. BOEM must analyze the effects of these occurrences on listed species.

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[598] *Ocean Advocates v. U.S. Army Corps of Eng'rs*, 402 F.3d 846, 868 (9th Cir. 2005); 40 C.F.R. §§ 1508.7, 1508.8.
[599] Erik E. Cordes et al, *Environmental Impacts of the Deep-Water Oil and Gas Industry: A Review to Guide Management Strategies*, 16 FRONT. ENVIRON. SCI. 1, 5 (2016).
[600] *Id.* at 9.
[601] 40 C.F.R. § 1508.25(a)(1)(iii) (Connected actions include "interdependent parts of a larger action and depend on the larger action for their justification").
[602] Council on Environmental Quality Guidance on NEPA Analyses for Transboundary Impacts, at 2 (July 1, 1997) [hereinafter Transboundary Impacts Guidance], https://ceq.doe.gov/docs/ceq-regulations-and-guidance/memorandum-transboundary-impacts-070197.pdf.

b. Marine Wildlife

The DPEIS fails to adequately evaluate the direct, indirect, and cumulative impacts of oil spills to marine mammals, fish, migratory birds, and invertebrates. The DPEIS groups marine mammals, fish, migratory birds, and invertebrates into broad resource categories that include thousands of species. This grouping makes it impossible to determine whether certain impacts will be more or less significant for specific species. For example, the discussion of oil spill impacts on marine mammals is only two paragraphs in length and only discusses general oil exposure concerns for a handful of species.[603] This section does not identify many of the dozens of marine mammals that inhabit and will migrate across the Program's regions. Moreover, there are numerous species listed under the ESA as endangered or threatened that BOEM neglected to discuss in the section analyzing oil spill impacts on marine mammals. BOEM's hollow analysis of the impacts of oil spills on fish, migratory birds, and invertebrates does not satisfy NEPA's requirement to provide a "detailed statement . . . on the environmental impact of the proposed action."[604]

The DPEIS further fails to analyze the broader impacts on marine mammals, fish, migratory birds, and invertebrates from oil released and transported by tidal currents, ocean currents, and wind to areas beyond the Program's proposed boundaries. *See* Sections IV.A.2, IV.F (discussing oil spill risks. As the *Deepwater Horizon* spill demonstrated, the cascading effects of oil spills inflict catastrophic consequences on marine resources, habitats, and ecosystems far beyond the precise location of the initial spill event. *See id*.

A fundamental defect of the DPEIS' oil spill analysis is that it generalizes the potential impacts to marine species across all the proposed programmatic areas. These areas cover hundreds of thousands of miles, and each contain diverse habitat and ecosystem-types occupied with similarly diverse marine species populations.[605] The DPEIS does not consider the impacts in specific locations or make clear which species might be impacted more severely than others.

Relatedly, the DPEIS also does not sufficiently discuss the marine environmental effects of applying dispersants or chemical emulsifiers to oil spills in the event of an accidental discharge.

The DPEIS briefly reviews the general effects of dispersants, citing to a study on northern GOM deepwater corals which found "much greater health declines in response to chemical dispersants and oil dispersant mixtures than to oil-only treatments, which did not result in mortality."[606] Though the DPEIS also acknowledges that "[d]eepwater benthic habitats may be smothered by the sinking oil or particles and experience long-term exposure to hydrocarbons," it does not

[603] DPEIS, at 273.
[604] 42 U.S.C. § 4332(C)(i).
[605] *See generally* DPEIS, at 270.
[606] DPEIS, at 271.

mention or analyze the effects of this exposure on species or habitats.[607] Studies have demonstrated that "[c]hemically-dispersed oil is known to reduce larval settlement, cause abnormal development, and produce tissue degeneration in sessile invertebrates."[608] Moreover, "[d]ispersant exposure alone has proved toxic to shallow-water coral larvae and deep-sea octocorals."[609] The toxic substances in dispersants have been found to endure in marine environments for years after the initial discharge.[610]

BOEM should expand its discussion about the direct, indirect, and cumulative effects of the program on specific species. NEPA requires agencies to analyze the "environmental impacts of the proposed action," which includes impacts that may extend beyond the Program's boundary arbitrarily determined by an agency.[611] BOEM's "hard look" analysis should include a discussion of oil spill impacts as well as a discussion of the known toxic effects of dispersants and the resulting environmental contamination caused by high concentrations of hydrocarbons.[612]The DPEIS' analysis of direct, indirect, and cumulative impacts to marine species is overly vague and insufficient.

The DPEIS does not adequately analyze the impacts of anthropogenic noise that will result from the Program's activities. The DPEIS discusses general noise concerns associated with vessel traffic but fails to analyze the impacts of these concerns to specific marine mammal species. The Appendix further suggests that BOEM "*may* employ acoustic modeling and other methods to predict the number of acoustic exposures for different marine mammal species."[613] Sound disturbances during the exploration and operation phases are indirect effects of the Program, which requires a NEPA analysis.[614] The acoustic disturbances produced from oil and gas development will harm and threaten the existence of many marine mammals across programmatic areas. For example, studies assessing acoustic disturbances in marine mammals have found "disruption of behavior (e.g., feeding, breeding, resting, migration), masking of sounds used for communication and navigation, localized displacement, physiological stress, as well as physical injury including temporary or permanent hearing damage."[615] Though the effects of sound on fish and invertebrates are understudied, one assessment recorded that "significant developmental delays and body malformations …. in scallop larvae exposed to seismic pulses."[616] Noise pollution from seismic surveys, vessel traffic, pile driving, dredging and other activities associated with oil and gas development will negatively affect marine

[607] DPEIS, at 271.
[608] Cordes at 14.
[609] *Id.*
[610] *Id.*
[611] 42 U.S.C. § 4332(C)(i).
[612] *See generally* Cordes at 14.
[613] Appendix at B-10 (emphasis added).
[614] Cordes at 5.
[615] *Id.* at 7.
[616] *Id.*

mammals' communication and echolocation, contribute to stress, and may lead mammals to abandon their habitat.

We strongly suggest that BOEM discuss acoustic modeling techniques in later analyses, but not too far into subsequent stages such that the findings are rendered unserviceable to marine species. The EIS should include the effects of seismic surveys, infrastructure construction, vessel traffic and other activities associated with implementing the Program. BOEM should (1) analyze each distinct activity that will contribute to noise pollution in each programmatic area; (2) assess these activities cumulatively, which include comparing the proximity and timing of frequencies, together with similar offshore wind development-related activities; (3) survey and analyze the best available scientific data on the sound-sensitivity of specific marine mammal populations, such as Rice's whale; and finally (4) combine these analyses to create conclusions about the impacts noise pollution will have on specific marine mammal species.

The DPEIS is particularly inadequate with respect to Rice's whale. The DPEIS identifies habitat for Rice's whale and acknowledges the species' sensitivity to sound.[617] The DPEIS also suggests the population "may be impacted by increased noise from vessels or seismic airguns in this area."[618] *See* Section IV.A.3. The DPEIS never evaluates the full range of the Program's impacts to the Rice's whale, not the cumulative and synergistic impacts of the Program in conjunction with other activities, such as offshore wind development. BOEM's mere listing of facts regarding the Rice's whale habitat and sensitivities does not qualify as a cumulative impacts analysis and falls short of NEPA's "hard look" requirement. The court in *Blue Mountains Biodiversity Project v. Blackwood* provided that "general statements about possible effects and some risks do not constitute a hard look absent a justification regarding why more definitive information could not be provided."[619] Here, BOEM has failed to provide a justification for its decision to omit critical information concerning Rice's whale. BOEM's omission of an analysis about the actual harm that is likely to occur to Rice's whale violates NEPA's hard look requirement.[620]

The DPEIS's analysis of the Proposed Program's impacts to invertebrates and crustaceans is impermissibly deficient. The DPEIS' discussion of the Proposed Program's impacts on crustaceans is insufficient. The DPEIS does not do much beyond report basic and generalized facts about crustacean habitat and the consumption of crustacean by prey species.[621] The DPEIS

[617] Appendix at I-11; DPEIS at 106.
[618] DPEIS at 193.
[619] 161 F.3d 1208, 1213 (9th Cir. 1998).
[620] *See Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1213 (9th Cir. 1998); *Alaska Wilderness League v. Kempthorne*, 548 F.3d 815, 827 (9th Cir. 2008) (holding that an agency violates NEPA when it merely mentions the possibility for increased impacts on listed species, but fails to take a hard look at whether the magnitude of the specific proposal will have significant impacts on those species); *N. Plains Res. Council, Inc. v. Surface Transp. Bd*., 668 F.3d 1067, 1084-1085 (9th Cir. 2011) (holding that a recitation of mitigation measures is not sufficient to meet the agency's NEPA obligations).
[621] DPEIS at 93, 124.

provides similar notations about invertebrates and contains conclusory anecdotal information about the potential impact of oil spills on invertebrates.[622] These discussions are cursory and do not demonstrate that BOEM has taken a hard look at the impacts the Program will have on these families of species.

c. The DPEIS Does Not Adequately Analyze Impacts on Coastal and Estuarine Ecosystems

The DPEIS does not adequately analyze impacts of the Program to nearshore ecosystems including estuaries, salt marshes, mangrove forests, streams, and wetlands. The DPEIS describes major ecosystem types prevalent in the coastal environment that will be affected by the Program.[623] The DPEIS also acknowledges that "oil spills may also destroy coastal or marine habitats and contaminate or deplete food in those environments, and these indirect impacts on marine organisms and resources may persist for months to years," but then states that "[f]urther analyses of potential impacts on ecosystems are completed at the lease sale stage."[624]

BOEM does not describe the direct, indirect, and cumulative impacts the Program will have on these unique ecosystems as required by NEPA. The DPEIS must provide a "full and fair discussion of significant environmental impacts" to "inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment."[625] NEPA also requires that BOEM issue a DPEIS that takes a "hard look" at the cumulative impacts of the 2023-2029 Program.[626] To comply with NEPA, BOEM must provide of a discussion of the significant environmental impacts to these coastal and estuarine ecosystems. As part of NEPA's hard look mandate, BOEM must address the cumulative impacts the Program will have on these already burdened ecosystems. *See* Section IV (discussing ecosystem impacts).

The DPEIS fails to consider the long-lasting cumulative impacts of *Deepwater Horizon* on the 2023-208 Program. *See* Section IV.A.2. In the wake of the *Deepwater Horizon Oil Spill*, federal and state natural resource trustee agencies (Trustees) released the *Deepwater Horizon Oil Spill: Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement* which considered the "programmatic alternatives to restore natural resources, ecological services, and recreational use services injured or lost as a result of the Deepwater Horizon oil spill.[627] The document concludes that the "Deepwater Horizon oil spill affected a wide array of linked resources over a large area, and that the effects must be described as an ecosystem-level injury."[628] In addition to this conclusion, the document

[622] DPEIS at 272.
[623] DPEIS at 76.
[624] DPEIS at 270.
[625] 40 C.F.R. § 1502.1.
[626] *Id.* §§ 1502.1; 1502.16; 1508.7; and 1502.14.
[627] DPEIS at 257-58; *see* (Deepwater Horizon Natural Resource Damage Assessment Trustees 2016).
[628] *Id.*

"included a comprehensive, integrated ecosystem restoration plan with a portfolio of restoration types to address the diverse suite of injuries that occurred at both regional and local scales."[629]

Despite the wealth of data and analysis on the effects of *Deepwater Horizon* such as the Trustees' report, BOEM fails to include a comprehensive cumulative impacts analysis that sufficiently addresses concerns widely accepted by the scientific and regulatory community. The DPEIS recognizes the existence of past, current, and future pressures of oil and gas activities in these ecosystems and cautions that "[p]ersistent long-term effects of the Deepwater Horizon oil spill, such as shoreline vegetation loss, may continue in coastal and estuarine wetlands."[630] Despite this stated awareness, BOEM fails to conduct a meaningful analysis of these effects on the vast and diverse variety of ecosystem types that will be affected by the Program. These omissions do not satisfy NEPA's requirement to take a hard look at the environmental impacts of the Program.

d. The DPEIS Fails to Adequately Analyze the Cumulative Impacts of Other Natural-Resource-Based Industries in the Program's Proposed Areas

NEPA requires that BOEM prepare an EIS that takes a "hard look" at the cumulative impacts of the 2023-2028 Program.[631] A complete cumulative impacts analysis must analyze "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions."[632] CEQ regulations provide that "[c]umulative impacts can result from individually minor but collectively significant actions taking place over a period of time."[633] Finally, the EIS must be "clear, and to the point, and . . . supported by evidence that the agency has made the necessary environmental analyses."[634]

The DPEIS fails to consider the cumulative impacts of the expanding aquaculture industry. The DPEIS does not accurately portray the significant aquaculture development planned for the OCS. The DPEIS states that aquaculture development is "occurring in some regions and expected to continue into the future."[635] It then suggests that "[s]uch activities may increase air and marine traffic, noise, emissions, fuel spills, bilge water discharges, wildlife disturbance, and accidental releases of hazardous materials that may impact offshore resources."[636]

[629] DPEIS at 257-58.
[630] DPEIS at 111.
[631] 40 C.F.R. §§ 1502.1, 1502.16, 1508.7, 1502.14.
[632] *Id.* § 1508.7.
[633] *Id.* § 1508.7 (emphasis added).
[634] *Id.* § 1502.1.
[635] DPEIS at 46.
[636] *Id.*

These statements underreport the significant aquaculture development planned for the GOM Program area. For example, E.O. 13921 issued in May 2020 directed NOAA to lead efforts to identify ten Aquaculture Opportunity Areas (AOAs) in the GOM.[637] In June 2022, NOAA Fisheries opened the public scoping period announcing its intent to develop a PEIS to consider potential AOAs in the GOM.[638] The Notice of Intent lists an array of biological and physical resources that may be affected by offshore aquaculture development and states that the forthcoming PEIS may consider the following impacts of such development:

> protected species interactions (*e.g.*, entanglement, vessel strikes); alteration to habitats; disease transmission risk; escapement risk (*e.g.*, genetic impacts); water quality changes (*e.g.*, nutrients, contaminants); habitat displacement and fragmentation; gear failure risk (*e.g.*, storm risk, operator error); marine debris; impacts to essential fish habitat; ecosystem impacts (*e.g.*, alteration of predator prey interactions, broodstock sourcing, fish aggregating device effects); and noise, lighting and visual disturbance.[639]

Taken together, E.O. 13,921 and NOAA Fisheries' Notice of Intent demonstrate that (1) aquaculture development in the GOM is reasonably foreseeable and (2) numerous biological and physical resources will be impacted by the industry's presence. In addition to these concerns, aquaculture industry presence in the GOM will also pose unique space-use conflicts that the DPEIS has not thoroughly discussed. Merely mentioning the potential impacts of the aquaculture industry in broad and generalized terms does not pass muster under NEPA. BOEM must instead analyze the cumulative impacts of aquaculture development in the context of the 2023-2028 Program.

The DPEIS fails to consider the cumulative impacts of offshore wind development. The DPEIS does not sufficiently discuss offshore wind energy development anticipated in the Program area. The DPEIS states that "[o]ffshore wind farms will be constructed in the coming years along the coast of the North and Mid-Atlantic Planning Areas, which may affect a variety of biological and sociocultural resources."[640] BOEM adds, "[l]and disturbance, noise, visible infrastructure, space-use conflicts, and other impacts associated with offshore wind turbines could also affect the human environment, marine resources, or coastal communities."[641] BOEM lists the locations of several wind energy leases it has issued, provides that it has "plans to potentially hold up to seven new offshore lease sales by 2025 in the Gulf of Maine, New York

[637] Exec. Order No. 13,921, 85 Fed. Reg. 28,471 (May 7, 2020).
[638] Notice of Intent to Prepare Programmatic Environmental Impact Statement for Identification of Aquaculture Opportunity Areas in Federal Waters of the Gulf of Mexico; 87 Fed. Reg. 33124 (June 1, 2022). NOAA Fisheries is currently developing a public scoping summary discussing the comments it received from the public.
[639] *Id.* at 33127.
[640] DPEIS at 236.
[641] *Id.* at 46.

Bight, Central Atlantic, and offshore the Carolinas" and suggests that offshore renewable energy activities may affect land use.[642] The references in the DPEIS to the offshore wind industry do not amount to a cumulative impacts analysis under NEPA and do not adequately demonstrate the scale at which the wind industry is expected to grow.

The expansion of offshore wind in the GOM region is imminent. In July 2022, Michael Celata, Regional Director for BOEM's Gulf of Mexico Regional Office issued a memorandum to BOEM Director Amanda Lefton requesting concurrence on his recommendation of opening 734,668 acres of preliminary wind energy areas in the GOM area.[643] That same month, BOEM issued a Draft Environmental Assessment on the *Commercial and Research Wind Lease and Grant Issuance and Site Assessment Activities on the Outer Continental Shelf of the Gulf of Mexico*.[644] The Draft EA lists several foreseeable activities in the GOM call area, stating that a "wind energy lease would be located in an area within the GOM Call Area" and that BOEM "would issue up to 18 leases which would average 80,000 acres each." [645] The Draft EA raises numerous environmental impacts that will occur as a result of offshore wind development. For example, the Draft EA identifies noise-generating activities and equipment involved with development which include, "high-resolution geophysical survey equipment and vessel engines during site characterization surveys; and meteorological buoy(s) installation, operations and maintenance, and decommissioning."[646] The Draft EA also identifies "[r]easonably foreseeable non-routine and low-probability events and hazards that could occur during site characterization and site assessment related activities" such as "(1) unintentional releases into the environment, such as fuel spills and trash and debris; (2) strikes and collisions (including entanglement); and (3) response activities such as spill response and lost equipment recovery."[647] During the construction and operation phase, lessees are required to submit to BOEM a construction and operations plan describing resources and conditions that may be affected by the proposed activities.[648] Lessees are required to describe the following:

> [H]azard information (i.e., meteorology, oceanography, sediment transport, geology, and shallow geological or manmade hazards); water quality; biological resources (including threatened or

[642] *Id.* at 127.
[643] UNITED STATES DEPARTMENT OF THE INTERIOR, MEMORANDUM: REQUEST FOR CONCURRENCE ON PRELIMINARY WIND ENERGY AREAS FOR THE GULF OF MEXICO AREA IDENTIFICATION PROCESS PURSUANT TO 30 C.F.R. § 585.211(B) (July 20, 2022), https://www.boem.gov/sites/default/files/documents//Draft%20Area%20ID%20Memo%20GOM%20508.pdf.
[644] BOEM, DRAFT ENVIRONMENTAL ASSESSMENT: COMMERCIAL AND RESEARCH WIND LEASE AND GRANT ISSUANCE AND SITE ASSESSMENT ACTIVITIES ON THE OUTER CONTINENTAL SHELF OF THE GULF OF MEXICO (July 2022), https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/GOM-Wind-Lease-EA.pdf.
[645] *Id.* at 3-4.
[646] *Id.* at 3-4.
[647] *Id.* at 3-6.
[648] *Id.* at A-20.

> endangered species and sensitive biological resources or habitats); archaeological resources; social and economic resources; coastal and marine uses; consistency certification from any affected coastal states; and any other resources, conditions, and activities as identified by BOEM.[649]

The above documents demonstrate that (1) it is reasonably foreseeable that BOEM will designate acreage in the GOM region for offshore wind development and that (2) BOEM is not only aware of, but also, requires reporting on the environmental impacts resulting from offshore wind development, such as noise disturbances, spill events, marine debris, entanglements, water quality issues, and impacts to biological resources. *See* Sections IV.A and IV.E (discussing burdened Gulf ecosystem and other uses of Gulf of Mexico). BOEM must address the cumulative impacts of offshore wind development on the Program.

The DPEIS does not sufficiently consider the cumulative impacts of other oil and gas assets utilized at various stages of the oil and gas development process. For example, the DPEIS does not consider the environmental impact of very large crude carriers (VLCCs) used to transport oil and gas. It also does not discuss the impacts of liquid natural gas (LNG) export terminals, which are present in Lake Charles, Louisiana, and Galveston, Texas.

Of particular significance, the DPEIS does not sufficiently discuss the (1) the impacts of the decommissioning process and (2) the impacts of abandoned and derelict infrastructure on the marine environment. The DPEIS reports that the decommissioning process may "affect fish assemblages," "lead to the reduction or displacement of fish and bivalve biomass and production," and "likely have localized, short-duration impacts on the benthic ecosystem."[650] The DPEIS also suggests that explosives used during decommissioning "presents a high risk due to the intensity of the sounds" and provides that "it is possible that marine mammals could experience mortality, [permanent threshold shift], or [temporary threshold shift]…."[651] The DPEIS summarizes the primary impact producing factors that may occur during the decommissioning process: "noise, traffic, bottom/land disturbance, emissions, lighting, and space-use conflicts"[652]

This discussion falls far short of an adequate accounting of the enormous scope and magnitude of decommissioning and its impacts. The GAO reported that "[s]ince the 1960s, BSEE has authorized industry to leave over 97 percent of pipeline mileage (almost 18,000 miles) on the

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[649] *Id.* at A-20.
[650] DPEIS at 189; Appendix at A-10; DPEIS at 94.
[651] *Id*. at 158. "Anthropogenic sounds may lead to various behavioral reactions in marine mammals. Some documented responses include the following: North Atlantic right whales changing diving behavior [], beaked whales rapidly swimming away [], humpback whales changing migration speed or direction [], sperm whales reducing foraging activity [], and walrus stampeding at haulouts []."
[652] DPEIS at 153.

Gulf of Mexico seafloor following the conclusion of their active use."[653] This high approval rate for decommissioning pipelines in place "indicates that this is not an exception but rather the norm." [654] As of April 2022, approximately 58% of wells in the OCS are "permanently or temporarily abandoned" and "are at high risk of leaking and spilling oil or gas into the environment."[655] Additional issues arise when offshore wells are not properly plugged and abandoned.[656] Researchers found that "[a]s of the end of 2020, approximately 22,000 offshore oil and gas wells in the United States were not permanently [plugged and abandoned]."[657]

Orphaned and abandoned infrastructure pose significant environmental risks, as "oil and gas wells can contaminate ground water, release dangerous air pollutants and, in some cases, lead to explosions."[658] According to officials at the Bureau of Safety and Environmental Enforcement (BSEE) and BOEM, "pipelines decommissioned-in-place will eventually corrode and, if not properly cleaned, could release hazardous materials, such as hydrocarbons and chemicals that are toxic to a wide range of organisms."[659] Studies also reveal that orphaned offshore wells "can contribute between 3 thousand to 17 thousand metric tons of methane emissions annually—the carbon dioxide equivalent of approximately 16,000 to 91,500 gas-powered cars driven annually."[660]

In addition to these known concerns, the GAO recently reported that the BSEE—the agency charged with oversight of the safety and environmental compliance of OCS operations—"does not ensure that decommissioning activities are conducted in accordance with regulatory standards because the bureau does not observe any pipeline decommissioning activities, inspect pipelines after their decommissioning, or verify most of the pipeline decommissioning evidence submitted." [661] As a result, the GAO determined that "BSEE does not have a robust process to address the safety and environmental risks posed by leaving decommissioned pipelines in place

[653] GAO Report: Decommissioning, at 12.
[654] GAO Report: Decommissioning, at 13.
[655] Zainab Mirza, Miriam Goldstein, and Say Sanchez, *Fixing Abandoned Offshore Oil Wells Can Create Jobs and Protect the Ocean*, CENTER FOR AMERICAN PROGRESS (Apr. 20, 2022), https://www.americanprogress.org/article/fixing-abandoned-offshore-oil-wells-can-create-jobs-and-protect-the-ocean/.
[656] Mark Agerton et al., *Considering a Federal Program to Permanently Plug and Abandon Offshore Oil and Gas Wells*, COLUMBIA CENTER ON GLOBAL ENERGY POLICY 1, 6 (Apr. 18, 2022).
[657] Agerton at 6.
[658] Jillian Neuberger, Tom Cyrs, and Devashree Saha, *How the US Can Address Legacy Fossil Fuel Sites for a Clean Energy*, FUTURE WORLD RESOURCES INSTITUTE (Sept. 27, 2021), https://www.wri.org/insights/addressing-us-legacy-fossil-fuel-infrastructure.
[659] GAO Report: Decommissioning at 17.
[660] Mirza, *Fixing Abandoned Offshore Oil Wells*.
[661] GAO Report: Decommissioning at 18; *see* DPEIS at 4. "BSEE's functions include development and enforcement of safety and environmental regulations; permitting OCS exploration, development, and production activities (e.g., drilling permits, OCS pipelines, structure installation, decommissioning); conducting inspections; and ensuring that industry is prepared to respond to oil spills. BSEE regulations related to OCS oil and gas operations are found primarily in 30 CFR parts 250–254."

on the seafloor due to the cumulative effects of oversight gaps before, during, and after the decommissioning process."[662]

The DPEIS has not sufficiently analyzed the full lifecycle of oil and gas development. Specifically, BOEM has not analyzed the cumulative impacts of various phases of development, including the transportation, storage, refining, and decommissioning processes. Prior practices indicate that decommissioning in-place protocols are the status quo. Scientific evidence further demonstrates that these abandoned assets result in significant adverse environmental effects and that these impacts are reasonably foreseeable in the future. Moreover, research shows that neither BSEE or BOEM practice adequate record-keeping regarding the present and future risks and impacts of decommissioning in place practices, despite the frequent rate at which such assets are authorized for abandonment. Given the high number of decommissioned wells currently abandoned in the OCS as well as evidence indicating that such practices will continue, BOEM should address the cumulative impacts of these aging structures. To satisfy NEPA, BOEM should update the DPEIS so that it analyzes the environmental, spill, and emissions risks of the transportation, receiving, storage, refining, and decommissioning phases of development.

Additionally, the DPEIS does not adequately analyze the cumulative impacts associated with carbon capture and sequestration in the OCS. Instead, BOEM merely states in the DPEIS that capture and sequestration (CCS) is "another potential activity reasonably foreseeable on the OCS" and in the Appendix that CCS is an "approach being aggressively pursued."[663] The Appendix adds that "[t]he technology is relatively new, and though the OCS may play a role in CCS, efforts are currently in their infancy."[664] These statements minimize the expected growth of CCS in the OCS and do not amount to an environmental impacts analysis under NEPA.

BOEM and the BSEE are indeed aggressively pursuing CCS development in the OCS. The Infrastructure Investment and Jobs Act was signed into law in November 2021 and granted the Secretary of the Interior authority to grant an easement, lease or right of way on the OCS for the purpose of supporting long-term carbon sequestration into sub-seabed geologic formations.[665] The Act further directs the Secretary of the Interiority to promulgate regulations. As of September 2022, BOEM and the BSEE are collaborating to draft these regulations.[666] BOEM has also hosted several presentations about carbon sequestration on the OCS in the last several months indicating that environmental conditions and risk assessment and management will be part of the rulemaking.[667]

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[662] GAO Report at 12.
[663] DPEIS at 46; Appendix at C-17.
[664] Appendix at C-17.
[665] *See* Infrastructure Investment and Jobs Act, Pub. L. No. 117-58, § 22411, 135 Stat. 429, 742 (2021) (codified at 49 U.S.C. § 20103(d)(4)(A)).
[666] BOEM, CARBON SEQUESTRATION, https://www.boem.gov/about-boem/regulations-guidance/carbon-sequestration (last visited Sept. 23, 2022).
[667] *Id.*

Although the environmental effects of sub-seabed geological storage—the method by which CCS is accomplished—are understudied, available research establishes that marine biota may be adversely impacted by CO_2 leakages at injection sites.[668] More specifically, dissolved CO_2 alters marine carbonate chemistry and "typically results in hypercapnia (i.e., elevated CO_2 levels) and ocean acidification (i.e., decreased pH levels)."[669] Studies have demonstrated that "hypercapnia causes physiological challenges to marine organisms by inducing respiratory stress and suppressing metabolisms due to acidosis of intra- and extracellular fluids of the organisms."[670] Additionally, "[c]alcifying organisms (e.g., corals, coccolithophores, and coralline algae) decrease calcification rates and the saturation states of the mineralogical forms of their calcium carbonate (CaCO3) shells."[671] Ocean acidification affects phytoplankton by disrupting physiological processes, such as photosynthesis and elevated CO_2 levels can "affect natural phytoplankton assemblages and shift community composition."[672] Other marine organisms also experiences changes in behavior as a result of elevated CO_2 levels, as studies have found that "marine gastropods showed increased avoidance behaviors in response to predators and clownfish larvae showed restrained discriminatory behaviors from olfactory cues."[673]

The installation of infrastructure required for CCS will also impose significant adverse effects to nearshore and upland ecosystems and vulnerable coastal communities. CCS deployment is of particular concern for environmental justice advocates, as many have expressed that expansion of CCS will perpetuate and reinforce environmental harms and risks to overburdened and vulnerable communities.[674] Naomi Yoder, staff scientist at Healthy Gulf in New Orleans, stated that "[p]ipelines are environmentally racist in the Gulf South….Pipelines have always been, and continue to be, sited and located disproportionately in communities with lower income and higher minority populations, and higher Indigenous populations."[675] Taken together, the impacts of increased CCS development and any leasing scenario under the 2023-2028 Program will significantly harm the health and wellness of vulnerable coastal communities. *See* Section IV.B (discussing community health harms).

The DPEIS should discuss the impacts of CCS development given (1) BOEM's plans to expand these projects in the OCS and (2) the available scientific literature demonstrating the numerous adverse impacts CO_2 leakages may have on marine species and communities. It is insufficient for

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[668] Hyewon Kim et al., *Development of environmental impact monitoring protocol for offshore carbon capture and* storage (CCS): A biological perspective, 57 Environmental Impact Review Assessment 139, 140 (2016); *see also* INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, IPCC SPECIAL REPORT ON CARBON DIOXIDE CAPTURE AND STORAGE 243 (Bert Metz, Ogunlade Davidson, Heleen de Coninck, Manuela Loos and Leo Meyer eds. 2005).
[669] *Id.*
[670] *Id.*
[671] *Id.*
[672] *Id.*
[673] *Id.*
[674] Jen Chemnick, *EJ communities are wary as CCS racks up policy wins,* E&E NEWS (Sept. 7, 2022, 7:05 AM), https://www.eenews.net/articles/ej-communities-are-wary-as-ccs-racks-up-policy-wins/.
[675] *Id.*

BOEM to explicitly acknowledge that CCS is "reasonably foreseeable," yet fail to analyze the impacts of this process. [676] BOEM must take a "hard look" at the cumulative impacts of CCS taken together with the impacts of the Program.[677]

4. The DPEIS Fails to Adequately Analyze Deepwater Impacts

An EIS must include a "full and fair discussion" of direct and indirect environmental impacts, which includes consideration of "all foreseeable direct and indirect impacts."[678] NEPA also requires consideration of reasonably foreseeable cumulative impacts in combination with the proposed action.[679]

The DPEIS fails to analyze the direct, indirect, and cumulative impacts of the Program will have on deepwater marine environments, such as deepwater fishes, corals, and canyon habitats. BOEM acknowledges the significance of deepwater habitats for marine species, stating that "[r]ocky benthic habitats in deeper waters are home to species such as sea urchins, deepwater corals and sponges, Pacific octopus, and California spiny lobsters."[680] The DPEIS adds that "[d]eepwater assemblages of hard corals are particularly important, because they create complex habitat and …. some types of corals (including black corals and sea fans) add significant community structure and support high community diversity."[681] The DPEIS also notes in passing a few impacts that oil and gas development may impose on deepwater communities, explaining that "[d]isturbance from pipeline laying, anchoring, offshore construction, and other OCS activities may lead to mortality and loss of sensitive benthic ecosystems, such as live hard bottom and deepwater coral communities."[682] In the event of an oil spill, "[d]eepwater benthic habitats may be smothered by the sinking oil or particles and experience long-term exposure..."[683] Similarly, "[r]outine discharges are potentially significant for water quality in all GOM planning areas. Protected areas and sensitive habitats (such as areas with the shallow and deepwater coral reefs that are common throughout the region) may be particularly impacted by degraded water quality."[684]

Despite BOEM's apparent awareness of the unique threats oil and gas development will have on deepwater environments, BOEM does not discuss how these impacts will be exacerbated or avoided by the Program. Although BOEM states that it "expects fewer new facilities across the GOM shelf and deepwater environment in future National OCS Programs compared to previous

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[676] *See* DPEIS at 46.
[677] 40 C.F.R. §§ 1502.1; 1502.16; 1508.7; and 1502.14.
[678] *Id*. § 1502.1; *N. Alaska Env't. Ctr. v. Kempthorne*, 457 F3d 969, 975 (9th Cir. 2006).
[679] *N. Plains Res. Council, Inc*., 668 F.3d at 1076.
[680] DPEIS at 93.
[681] *Id.* at 262.
[682] *Id.* at 196.
[683] *Id.* at 271.
[684] *Id.* at 195.

programs," it does not provide a rationale for this expectation.[685] NEPA regulations specify that when an agency lacks information about reasonably foreseeable significant adverse effects, "the agency shall always make clear that such information is lacking."[686] BOEM must more fully address the foreseeable direct, indirect, and cumulative impacts of the Program on deepwater environments and benthic communities to comply with NEPA.

The DPEIS does not sufficiently analyze the impacts and risks of deepwater and ultra-deepwater drilling. The DPEIS fails to analyze the unique risks posed by drilling and development at varying water depths, including in ultra-deep environments. Researchers have found that "deep water platforms have a much higher probability of an incident (such as a spill, accident, or injury) reported."[687] In fact, "company-reported incidents (such as blowouts, fires, injuries, and pollution) increase with water depth…. Controlling for these and other characteristics, for an average platform, each 100 feet of added depth increases the probability of a company-reported incident by 8.5%."[688] *See* Section IV.F (discussing need to account for additional risks of development in deep water). Drilling in deepwater and ultra-deep water are reasonably foreseeable for all leasing scenarios proposed by the Program. BOEM's omission of a drilling depth analysis does not meet NEPA's "hard look" requirement.

5. The DPEIS Fails to Adequately Analyze Transboundary Impacts

The DPEIS fails to adequately analyze the transboundary impacts of the Program. The DPEIS does not discuss the Program's transboundary oil spill impacts or the transboundary impacts to migratory species. BOEM avoids a transboundary impacts analysis by instead conducting a "***cross-boundary***" analysis, which it defines as "impacts from activities in one planning area that affect resources in other planning areas."[689] The DPEIS adds that certain wildlife species have habitat in and migrate across boundaries and raises the Atlantic puffin, blue whales, green turtles, and a handful of fish species as examples.[690] It adds that some bird species "may experience cross-boundary impacts from oil and gas activities," describing the ESA-listed California least tern as an example which, "winters in Mexico but breeds on beaches along the California Coast."[691] These examples demonstrate that the Program will have international transboundary impacts on migratory species, though BOEM fails to analyze in any meaningful detail the implications the Program will have on these species. More specifically, BOEM fails to

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[685] *Id.* at 240.
[686] 40 C.F.R § 1502.22.
[687] Lucija Muehlenbachs, et. al., *The impact of water depth on safety and environmental performance in offshore oil and gas production*, 55 ENERGY POLICY 699, 700 (Jan. 17, 2013).
[688] *Id.* at 704.
[689] DPEIS at 208. "Cross-boundary impacts occur in two ways: (1) an IPF (such as noise or spilled oil) may spread into an adjacent planning area and affect the species and habitats there, or (2) migratory species may experience effects from oil and gas activities occurring in a particular planning area and be impacted as they migrate through the affected planning area to another area."
[690] *Id.* at 226, 228, 90.
[691] *Id.* at 223.

explain how the Program's operations will affect the transboundary habitat of migratory species or will disrupt migratory patterns for specific species. In addition to these concerns, the DPEIS does not adequately discuss the transboundary impacts an oil spill may have on areas outside the U.S. For example, the DPEIS does not analyze the long-term impacts that transboundary pollution will have on wildlife, habitat, water quality, and communities, such as in the event of an unanticipated event such as oil spill or catastrophic discharge event.

BOEM is required under NEPA to analyze the trans-boundary impacts of the Program.[692] CEQ guidance explains that "NEPA law directs federal agencies to analyze the effects of proposed actions to the extent they are reasonably foreseeable consequences of the proposed action, regardless of where those impacts might occur."[693] This analysis must also include "reasonably foreseeable transboundary effects."[694] CEQ cautions that "[a]gencies should be particularly alert to actions that may affect migratory species, air quality, watersheds, and other components of the natural ecosystem that cross borders, as well as to interrelated social and economic effects."[695] Courts have held that agencies must consider the trans-boundary impacts of projects in Canada and Mexico.[696] Additionally, E.O. 12,114: *Environmental effects abroad of major Federal actions*, requires agencies to analyze in NEPA documents major Federal actions significantly affecting the environment outside the U.S.[697]

There are numerous transboundary impacts the DPEIS should consider, including oil spill risks and the risks to migratory species. It is well understood that "[i]n the case of the USA and Mexico, spills close to their maritime boundaries doubtlessly will impact and require multinational responses..."[698] The DPEIS even explicitly states that activities from the 2023-2028 Program "may affect resources outside of the planning area where the activities occur."[699] Pursuant to CEQ regulations, BOEM must conduct an analysis of the transboundary impacts of the Program on areas outside the U.S.. BOEM should also discuss the adverse cumulative environmental effects of the Program with respect to migratory species. Courts have characterized NEPA analyses as deficient when it failed to "consider the effect of simultaneous *inter*-regional development on migratory species."[700] Simply listing facts about the

[692] *See* 40 C.F.R. §1508. CEQ regulations explicitly require that an EIS assess a project's cumulative impacts when added to "all other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."
[693] Transboundary Impacts Guidance at 2.
[694] *Id.*
[695] Transboundary Impacts Guidance at 2.
[696] *Gov't of the Province of Manitoba v. Salazar*, 691 F. Supp. 2d 37, 51 (D.D.C. 2010); *Border Power Plan Working Group v. Department of Energy*, 260 F.Supp.2d 997 (S.D. Calif. 2003).
[697] Exec. Order No. 12,114, 44 Fed. Reg. 1957 (Jan 4, 1979).
[698] Steven A. Murawski et al., *Introduction to the Volume, in* SCENARIOS AND RESPONSES TO FUTURE DEEP OIL SPILLS FIGHTING THE NEXT WAR 6, 4-15 (Steven A. Murawski ed., 2020).
[699] DPEIS at 208.
[700] *Nat. Res. Def. Council, Inc. v. Hodel*, 865 F.2d 288, 297 (D.C. Cir. 1988).

transboundary movement of wildlife species does not satisfy NEPA's requirement to analyze transboundary effects.

D. The DPEIS' Environmental Justice Analysis Should be Revised

Executive Order (E.O.) 12898 directs federal agencies to address the impacts of their actions on environmental justice (EJ) communities and to promote nondiscrimination principles in federal programs.[701] President Biden declared his administration's commitment to EJ in E.O. 14,008, *Tackling the Climate Crisis at Home and Abroad*.[702] E.O. 14,008 established several new EJ initiatives involving BOEM, including the Justice40 Initiative and the Climate and Economic Justice Screening Tool (CEJST), a mapping tool used to identify "disadvantaged communities that are marginalized, underserved, and overburdened by pollution."[703] In addition to identifying disadvantaged communities, the CEJST also "provides socioeconomic, environmental, and climate information to inform decisions that may affect these communities."[704] BOEM should update its "vulnerable coastal communities" analysis to reinforce the EJ principles contained in these E.O.s.. Additionally, BOEM should utilize data contained in the CEJST to address the unique concerns for distinct vulnerable coastal communities that will be adversely impacted by the Program.

BOEM should revise its "vulnerable coastal communities" analysis to discuss the human health, socioeconomic, and cultural vulnerabilities of specific communities that will be impacted by the Program. The DPEIS identifies various environmental impacts expected to affect vulnerable coastal communities.[705] However, BOEM's grouping of *all* disadvantaged coastal communities into one category is overly broad as there are numerous distinct communities that will be impacted differently by the Program. For example, the CEJST currently identifies at least a dozen disadvantaged communities along the coast of southeast Texas alone.[706] The impacts experienced by disadvantaged communities in southeast Texas will likely vary from those impacts experienced by communities in the Eastern & Central GOM, as well as those near the Alaska, Atlantic, and Pacific regions. BOEM should identify and distinguish these communities.

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[701] Exec. Order No. 12,898, 59 Fed. Reg. 7629 (Feb. 11, 1994); *see also* 42 U.S.C. § 2000d.
[702] Exec. Order No. 14,008, 86 Fed. Reg. 7619 (Jan. 27, 2021).
[703] WHITE HOUSE, *Justice40*, https://www.whitehouse.gov/environmentaljustice/justice40/ (last visited Sept. 12, 2022); *see also* CEQ AND OMB, CEQ/OMB INTERIM IMPLEMENTATION GUIDANCE FOR THE JUSTICE40 INITIATIVE (July 20, 2021); WHITE HOUSE, *CEQ Publishes Draft Climate and Economic Justice Screening Tool, Key Component in the Implementation of President Biden's Justice40 Initiative* (Feb. 18, 2022), https://www.whitehouse.gov/ceq/news-updates/2022/02/18/ceq-publishes-draft-climate-and-economic-justice-screening-tool-key-component-in-the-implementation-of-president-bidens-justice40-initiative/.
[704] Climate and Economic Justice Screening Tool (Beta), https://screeningtool.geoplatform.gov/en/about (last visited Sept. 12, 2022) [hereinafter CEJST].
[705] *See generally* DPEIS at 63.
[706] *See generally* CEJST.

In 2016, the Federal Interagency Working Group on Environmental Justice & NEPA Committee issued a report titled *Promising Practices for EJ Methodologies in NEPA Reviews* (*Promising Practices*), providing agencies with recommendations for conducting environmental justice analyses for NEPA reviews.[707] The report suggests that agencies consider the following conditions for minority populations and low-income populations:

(1) human health vulnerabilities (e.g., heightened disease susceptibility, health disparities);
(2) socioeconomic vulnerabilities (e.g., reliance on a particular resource that may be affected by the proposed action, disruptions to community mobility and access as a result of infrastructure development); and
(3) cultural vulnerabilities (e.g., traditional cultural properties and ceremonies, fish consumption practices).[708]

The DPEIS should explicitly discuss the distinct vulnerabilities for each disadvantaged coastal community.

The DPEIS should analyze the Program's contributing stressors that will aggravate existing health conditions in minority and low-income communities. The DPEIS does not analyze the existing baseline health conditions and vulnerabilities for distinct coastal communities. For example, Port Arthur is ranked as a hot spot for cancer-causing industrial pollution and is listed as a disadvantaged community in CEJST with marked high rates of health burdens.[709] John Beard Jr., founder and CEO of the Port Arthur Community Action Network (PACAN), said that the industry's emissions are fatal to the predominantly Black community and stated that

> [w]e challenge any and all expansions of the industry -- whether it be by pipeline or new petrochemical facilities, or LNG facilities -- we challenge their air permits…. We also challenge them, with regard to their federal permitting on the environmental level and on the environmental justice level, as well as the community impact.[710]

The pre-existing conditions and concerns in the Port Arthur community likely differs from the conditions and concerns in other communities that will be affected by the Program. Without discussing the existing health burdens, vulnerabilities, and viewpoints of disadvantaged communities, the DPEIS is not able to capture the aggravating harms attributable to the Program.

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[707] PROMISING PRACTICES FOR EJ METHODOLOGIES IN NEPA REVIEWS, FEDERAL INTERAGENCY WORKING GROUP ON ENVIRONMENTAL JUSTICE & NEPA COMMITTEE (Mar. 2016) [hereinafter Promising Practices]; *see also* COMMUNITY GUIDE TO ENVIRONMENTAL JUSTICE AND NEPA METHODS, FEDERAL INTERAGENCY WORKING GROUP ON ENVIRONMENTAL JUSTICE & NEPA COMMITTEE (Mar. 2019).
[708] Promising Practices at 18-9.
[709] Epiphany La'Sha, "Sacrifice Zone:" Port Arther in Path of Industrial Pollution, PUBLIC NEWS SERVICE (Apr. 21, 2022), https://www.publicnewsservice.org/2022-04-21/environmental-justice/sacrifice-zone-port-arthur-in-path-of-industrial-pollution/a78780-1; *see* CEJST.
[710] *Id.*

These considerations are also relevant to the NEPA process. *Promising Practices* advises that agencies should "be mindful" when conducting cumulative impacts analyses for disadvantaged populations under NEPA, as these communities: "may be differently affected by past, present, or reasonably foreseeable future impacts than the general population."[711] The report recommends that agencies "consider (among other existing conditions) chemical and non-chemical stressors that could potentially amplify impacts from the proposed action to the health of minority populations and low-income populations in the affected environment."[712] BOEM should update the DPEIS analyzing (1) the baseline conditions of vulnerable coastal communities and (2) the additional stressors the Program will have on these conditions.

The DPEIS should describe all reasonably foreseeable direct, indirect, and cumulative beneficial impacts to minority populations and low-income populations. Although the DPEIS touches on several environmental impacts to vulnerable coastal communities, it does not apply this analysis to all reasonably foreseeable direct, indirect, and cumulative adverse impacts. *Promising Practices* proposes that

> [a]gencies may consider describing all reasonably foreseeable direct, indirect and cumulative adverse impacts to minority populations and low-income populations in the affected environment that may result from a change to the environment or exposure to environmental contaminants (e.g., chemical, biological, physical, or radiological) or arising from related ecological, aesthetic, historic, cultural, economic, social, or health consequences of the proposed action to the community.[713]

BOEM should revise the NEPA analysis to identify and describe the consequences of the Program on disadvantaged communities. *Promising Practices* further explains that "pursuant to NEPA, determining whether an impact is significant requires consideration of both context (i.e., society as a whole, the affected region, the affected interests, and the locality) and intensity (i.e., the severity of the impact)."[714] The report cautions that "[a]n assessment of an impact's significance to the general population without consideration of the impact to minority populations and low-income populations in the affected environment may not be adequate."[715] To ameliorate flaws in the DPEIS, BOEM should re-examine the significance of anticipated impacts, emphasizing considerations relevant to disadvantaged coastal communities.

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[711] Promising Practices at 32-3.
[712] *Id.* "Non-chemical stressors can include current health status (e.g., pre-existing health conditions) and past exposure histories, and social factors such as community property values, sources of income, level of income, and standard of living."
[713] *Id.* at 38-9.
[714] *Id.* at 35; *see* 40 C.F.R. §1508.27(a)-(b)).
[715] *Id.*

BOEM should publish an environmental justice technical report identifying impacts to the minority and low-income populations that will be affected by the Program. Separately, BOEM should more thoroughly discuss mitigation and monitoring measures in the revised DPEIS or FEIS. *Promising Practices* advises that "[a]gencies may wish to identify mitigation and monitoring measures designed specifically to address impacts to minority populations and low-income populations in the affected environment separately in the NEPA decision document and also separately in an environmental justice technical report."[716] This technical report should be developed in partnership with vulnerable coastal communities.

BOEM should solicit opposing views from minority and low-income populations regarding the Program's impact on the environment and analyze them in a revised DPEIS. *Promising Practices* provides that "[m]inority populations and low-income populations in the affected environment may hold an opposing technical or scientific view (which can be based on several sources, including the community) from agencies regarding specific impacts and/or methods of analysis."[717] BOEM should engage with disadvantaged coastal communities to identify their views on impacts or methods of analysis. NEPA also requires that agency include in its FEIS "any responsible opposing view raised by the community which was not adequately discussed in the draft statement and indicate the agency's response to the issues raised."[718] To comply with NEPA, BOEM must incorporate these opposing views into the revised DPEIS.

BOEM should update the proposed mitigation measures to highlight the interests and concerns of vulnerable coastal communities. CEQ EJ guidance provides that "[m]itigation measures identified in an EIS … should reflect the needs and preferences of affected low-income populations, minority populations, or Indian tribes to the extent practicable."[719] CEQ guidance further urges agencies to, "carefully consider community views in developing and implementing mitigation strategies" and "elicit the views of the affected populations" on mitigation measures, and agencies should do so throughout the public participation process.[720] In addition to complying with these CEQ directives, BOEM should follow the recommendations contained in *Promising Practices,* which suggests that agencies "…identify and analyze mitigation measures for impacts to minority populations and low-income populations in the affected environment."[721] The report clarifies that "[t]his includes appropriate mitigation measures not already included in the proposed action or alternatives and any additional means to mitigate (if not fully covered under 40 CFR §1502.14(f)) for each identified disproportionately high and adverse impact to

[716] *Id.* at 50.
[717] *Id.*
[718] *Id.* at 32; *see* 40 C.F.R. §1502.9(b).
[719] COUNCIL ON ENVIRONMENTAL QUALITY, *Environmental Justice Guidance Under the National Environmental Policy Act*, at 6 (Dec. 10, 1997).
[720] *Id.*
[721] Promising Practices at 51; *see also* 40 C.F.R. §§ 1502.14, 1502.16, 1502.14(f), 1502.16(h).

minority populations and low-income populations."[722] *See* Section VII.G (discussing mitigation measures).

BOEM should systematically review each impact identified in the DPEIS and re-issue a revised menu of mitigation measures that avoid or minimize harm to vulnerable coastal communities. The DPEIS identifies numerous disproportionately high impacts that the Program's activities will impose on vulnerable coastal communities. These impacts, among others, include water pollution, "onshore and offshore noise from oil and gas activities," "increased traffic volume and patterns," emissions, visible infrastructure, space-use conflicts, and routine discharges.[723] *Promising Practices* suggests that an agency should mitigate and monitor those impacts it determines will have disproportionately high and adverse impacts to minority and low-income populations.[724] The report further advocates that agencies apply the following five mitigation methods when considering each identified potential impact:

1. Avoiding an impact by not taking a certain action or parts of an action.
2. Minimizing an impact by limiting the degree or magnitude of the action and its implementation.
3. Rectifying an impact by repairing, rehabilitating, or restoring the affected environment.
4. Reducing or eliminating an impact's frequency over time, such as through preservation and maintenance operations during the life of the action.
5. Compensating for a an [sic] impact by replacing or providing substitute resources or environments.[725]

BOEM should reevaluate potential impacts using the above five mitigation methods and make correlated revisions to the proposed mitigation measures. *See* Section VII.G (discussing mitigation measures).

E. The Public Notice and Comment Period was Insufficient

A critical component of NEPA is the public's meaningful participation in the decision-making process. Pursuant to NEPA's regulations, agencies shall "make diligent efforts to involve the public in preparing and implementing their NEPA procedures."[726] Agencies are required to "hold or sponsor public hearings or public meetings whenever appropriate" and "provide public notice

[722] *Id.*
[723] DPEIS at 43, 159, 161, 166, 168, 169, 179.
[724] Promising Practices at 51.
[725] *Id.*
[726] 40 C.F.R. § 1506.6(a).

of NEPA-related hearings, public meetings, and the availability of environmental documents so as to inform" persons interested in the proposed action.[727]

BOEM's public notice and comment period was insufficient. NEPA regulations require agencies to "make diligent efforts" to engage the public in the EIS process and provide an opportunity for public comment.[728] The minimum allowable period for public review and comment of a DEIS is 45 days. For decisions with particular significance, agencies have extended the public comment period for more than 45 days. For example in the past, DOI extended the public comment period to 180-days for a past offshore oil and gas leasing program to "give states, stakeholders, and affected communities the opportunity to provide input on how, whether, and where the Nation's offshore areas should be considered as part of the Nation's energy strategy."[729] For the 2022-2028 Program, BOEM has only provided the public with 90 days to comment. Ninety days is insufficient for the public to provide meaningful comment on the Program and the DPEIS, particularly given the national scope and substantial impacts it will have on the environment and climate change. The public has not been provided a meaningful opportunity to participate due to BOEM's arbitrary decision to limit the comment period.

BOEM's DPEIS must be revised and updated to take into considerations new obligations/considerations under the Inflation Reduction Act. The IRA became law on August 16, 2022, which was over halfway through the public comment period for the 2023-2028 Program. Implementation of IRA will result in significant new impacts to the resources and marine environment that are slated for oil and gas development under the Program. For example, IRA's provisions link oil and gas sales with offshore wind lease sales in a manner that the DPEIS does not anticipate. Future activities undertaken to fulfil IRA's provisions will have impacts in many programmatic areas. In addition, IRA mandates lease sales that could increase the oil and gas supplied from the Outer Continental Shelf, therefore affecting the analysis BOEM has conducted about oil and gas supply, consumer demand, and resulting economic and environmental effects.

Due to the timing of the bill becoming law, the Proposed Program and the PEIS did not consider and analyze the environmental consequences that may result from IRA. Due to the implications IRA will have on the 2023-2028 Program, BOEM must reissue the Proposed Program and DPEIS and provide opportunity for public comment to explicitly discuss the interaction between the Program and the IRA as well as the environmental and climate impacts that result from implementation of the law.

F. The DPEIS Fails to Consider a Reasonable Range of Alternatives

[727] *Id.* §§ 1506.6(c), 1506.6(b).
[728] *Id.* § 1506.6(a).
[729] 74 Fed. Reg. 3631 (Mar. 4, 2009).

NEPA requires a "detailed statement" of "alternatives to the proposed action."[730] The agency is required to "rigorously explore and objectively evaluate all reasonable alternatives to a proposed action" in the alternatives analysis.[731] In determining whether an alternative is reasonable, "an agency should always consider the views of Congress, expressed, to the extent that the agency can determine them, in the agency's statutory authorization to act, as well as in other congressional directives."[732] The alternatives analysis is considered the heart of the EIS.[733] Courts have explained that that this directive was intended "to insist that no major federal project should be undertaken without intense consideration of other more ecologically sound courses of action, including shelving the entire project, or of accomplishing the same result by entirely different means."[734] Courts have cautioned that "[t]he existence of a viable but unexamined alternative renders an [EIS] inadequate."[735] The analysis "should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public."[736]

BOEM failed to consider a reasonable range of alternatives. BOEM considered only five alternatives: (a) no action alternative; (b) six planning areas; (b(a)) 11 planning areas; (c) nine planning areas; (d) twenty-five planning areas. However, BOEM failed to consider a renewable energy alternative that could contribute to national energy needs.[737] *See* Section III (discussing the nation's energy needs). For example, BOEM did not thoroughly consider the potential contribution of renewable wind and solar energy, coupled with energy storage, and supported by improved grid and efficiency technologies. Instead, BOEM argues that "an alternative that considers renewable energy sources as a complete or partial substitute for OCS oil and gas resources would not meet the purpose of the Proposed Action," adding that its purpose "is to set a schedule of OCS oil and gas lease sales for 2023–2028."[738] BOEM's rationale for excluding an alternative that considers renewable energy is seriously flawed and logically inconsistent. In short, BOEM is arguing that it could not consider a renewable energy alternative because of its requirement to support continued oil and gas leases. However, if this limitation was true, then BOEM would not have been able to consider Alternative A—the no action alternative—at all. BOEM should consider a full range of alternatives, including a renewable energy alternative.

The DPEIS does not adequately distinguish between Alternative B and Alternative B(a). Alternative B and Alternative B(a) are very similar—the former includes six planning areas

[730] 42 U.S.C. § 4332(2)(c).
[731] *Southeast Alaska Conservation Council v. FHA*, 649 F.3d 1050, 1056 (9th Cir. 2011) (quoting 40 C.F.R. § 1502.14(a)) (internal quotation marks and alterations omitted).
[732] *Citizens Against Burlington v. Busey*, 938 F.2d 190, 196 (D.C. Cir. 1991); *League of Wilderness Defs. v. U.S. Forest Serv.*, 689 F.3d 1060, 1070 (9th Cir. 2012).
[733] 40 C.F.R. § 1502.14.
[734] *Environmental Defense Fund v. Corps of Engineers*, 492 F.2d 1123, 1135 (5th Cir. 1974).
[735] *Ala. Wilderness Recreation & Tourism Ass'n v. Morrison*, 67 F.3d 723, 729 (9th Cir. 1995) (citations omitted)
[736] *Id.*
[737] *Id.*
[738] DPEIS at 19.

while the second includes eleven. However, BOEM does not explain why it chose to analyze these two distinct alternatives as "subalternatives" of each other."[739] Even if the Program areas between these two alternatives overlap, BOEM is nonetheless required under NEPA to fully analyze impacts of each alternative separately. It has failed to do so.

G. The DPEIS Fails to Adequately Consider Mitigation Measures

NEPA regulations require agencies to include mitigation measures in an EIS.[740] Mitigation measures are defined by the CEQ as acts taken to avoid, minimize, rectify, reduce, or eliminate impacts as well as to effects to "compensate[e] for the impact by replacing or providing substitute resources or environments."[741] These measures "must be supported by analytical data demonstrating their effectiveness."[742] Although courts have determined that agencies need not devise detailed mitigation plans or commit to specific actions, agencies must nonetheless discuss mitigation for unavoidable impacts in appropriate detail.[743] For example, courts have held that an agency's "perfunctory description of mitigating measures is inconsistent with the 'hard look' it is required to render under NEPA."[744] Agencies must discuss mitigation "in sufficient detail to ensure that environmental consequences have been fairly evaluated."[745] "A mere listing of mitigation measures is insufficient to qualify as the reasoned discussion required by NEPA."[746]

CEQ EJ guidance further encourages agencies to "carefully consider community views in developing and implementing mitigation strategies" and "elicit the views of the affected populations" throughout the public participation process.[747]

BOEM's discussion of mitigation measures is inadequate.[748] The only practical mitigation measure thoroughly analyzed in the DPEIS are lease stipulations.[749] There are a host of other

[739] *Id.* at 17.
[740] 40 C.F.R. §§ 1502.14(f), 1502.16(h).
[741] *Id.* § 1508.20.
[742] Executive Office of the President of the United States, Report Regarding the Mineral's Management Service's National Environmental Policy Act Policies, Practices, and Procedures as They Relate to the Outer Continental Shelf Oil and Gas Exploration and Development 25 (2010) (referencing *Nat'l Parks and Conservation Ass'n v. Babbitt*, 241 F.3d 722, 734 (9th Cir. 2001)).
[743] *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 351 (1989); s*ee also, Okanogan Highlands All. v. Williams*, 236 F. 3d 468, 473 (9th Cir. 2000).
[744] *See Neighbors of Cuddy Mountain v. U.S. Forest Serv.*, 137 F. 3d 1372, 1380 (9th Cir. 1998).
[745] *Neighbors of Cuddy Mountain v. U.S. Forest Serv*., 137 F. 3d 1372, 1380 (9th Cir. 1998) (quoting *Carmel-By-the-Sea v. U.S. Dep't of Transp*., 123 F.3d 1142, 1154 (9th Cir. 1997) (quoting *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 353 (1989)) (internal citations omitted).
[746] *Northwest Indian Cemetery Protective Ass'n. v. Peterson*, 795 F.2d 688, 697 (9th Cir. 1986), rev'd on other grounds, 485 U.S. 439 (1988).
[747] COUNCIL ON ENVIRONMENTAL QUALITY, ENVIRONMENTAL JUSTICE: GUIDANCE UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT, 16 (Dec. 10, 1997).
[748] Appendix at F-1.
[749] *Id.*

mitigation strategies that BOEM has not fully considered, including activity management, spatial management, and temporal management.[750]

Activity management restricts or bans certain practices or discharges, "or certain technologies are employed to reduce the environmental impact of operations."[751] **BOEM should consider implementing activity management approaches such as:**

- Phasing out the use of drilling muds that have toxic chemical compositions[752]
- Implementing protocols to reduce adverse acoustic impacts to marine mammals, such as "'soft-start' or 'ramp-up' rules that require air gun power to be slowly increased to allow marine mammals to vacate the area before the full power is reached;''[753]
- Prohibiting disused infrastructure from being dumped or left in place and instead requiring equipment be disposed of onshore.[754]

Temporal management is "intended to reduce impacts on the breeding, feeding, or migration of fish, marine mammals, and seabirds."[755] **BOEM should consider implementing the following temporal management approaches:**

- Restricting seismic operations "along marine mammal migration routes or within known feeding or breeding grounds …. during aggregation or migration periods in order to reduce the probability of marine mammals being present in the area during the survey."[756]
- Using soft-start procedures during daylight hours to ensure observers can monitor the area for species[757]
- Delaying drilling near reefs during spawning periods[758]
- Responding to oil spill emergencies more quickly during spawning seasons[759]

Spatial management "prohibits particular activities from certain areas, for example where sensitive species or habitats are present."[760] **BOEM should consider the following spatial management approaches:**

- Excluding oil and gas development in particularly vulnerable areas

[750] Cordes at 15.
[751] *Id.*
[752] *Id.*
[753] *Id.*
[754] *Id.*
[755] *Id.*
[756] *Id.*
[757] *Id.*
[758] *Id.*
[759] *Id.*
[760] *Id.*

- Using available technology such as "mapping through remote sensing, habitat suitability models, and ground-truthing by seafloor observations and collections" to map sensitive and biologically abundant areas and then avoid deploying oil and gas assets in these environments.[761]
- Establishing and monitoring regional reference sites to identify "'normal' benthic conditions" to compare the effects to sites with drilling operations.[762]

In addition to the above mitigation measures, BOEM should add protective lease stipulations that aim to minimize a project's adverse impacts to the marine environment and climate change. Examples of such lease stipulations could include:

a) Requiring lessees to report on the project's emissions during all phases of development. For example, BOEM could mandate that lessees report on its emissions using a decision-support tool called the Climate Test, which "proposes a set of quantitative metrics to assess whether, and to what degree, a project is consistent with the constraints and characteristics of a 1.5C decarbonizing world, using known data, and, where necessary, representative assumptions from literature."[763] This standardized nation-wide reporting mechanism would improve the agency's internal record-keeping and would track the climate impacts for individual leases.
b) Mandating that lessees agree to a decommissioning agreement whereby lessees agree to (1) permanently plug oil and gas wells using the best available technology either at the time the infrastructure is no longer producing or at the end of the lease term, whichever is earlier, (2) safely dismantle, remove, and repurpose or dispose of assets onshore, (3) report on the environmental, climate, and emissions impacts of the decommissioning process. Pursuant to this stipulation, lessees would be further required to submit payments into a BOEM-managed fund that covers unfunded liabilities to ensure effective implementation of this decommissioning program.

BOEM should include specific mitigation measures to minimize harm to Rice's whale. The Program's alternatives and mitigation measures are insufficient to prevent harm to Rice's whale. BOEM should minimize impacts that degrade the population and otherwise adversely impact Rice's whale.

BOEM should meaningfully engage with EJ communities and co-develop mitigation measures that explicitly address impacts to vulnerable coastal communities. BOEM should review each of the Program's reasonable alternatives to determine how vulnerable communities will be impacted by the Program. BOEM should confer with vulnerable communities to hear

[761] *Id.* at 17.
[762] *Id.*
[763] Michele Bustamante, Ann Alexander, Christina Swanson, *From Status Quo to Climate Goals: Advancing the State of Energy Infrastructure Project Reviews with Science-Based Climate Test Tool*, AGU Fall Meeting 2021 (Dec. 2021).

their perspectives on these impacts. *See* Section VII. D (discussing environmental justice). Next, BOEM should use the following EJ-focused mitigation techniques identified in *Promising Practices* to reduce adverse impacts to vulnerable coastal communities:

- identify alternate locations or sites
- alter the timing of activities to account for seasonal dependencies on natural and human resources
- incorporate pollution prevention practices and policies to reduce the size or intensity of an action or its impacts
- include additional benefits to the community incorporate other measures proposed by the community, including changing specific aspects of the project
- do not implement the proposed action or action alternative.[764]

Working together with vulnerable coastal communities, BOEM should develop revised mitigation measures that consider the impacts to these demographics. BOEM should also create an environmental justice technical report proposing mitigation measures for impacts to vulnerable coastal communities and identifying their concerns.[765] BOEM should engage with vulnerable coastal communities adjacent to the Program's planning areas when creating this technical report. All mitigation measures proposed in the technical report should also be addressed in subsequent NEPA documents.

Finally, once BOEM reconsiders mitigation measures for impacts to minority and low-income populations, it should "develop an adaptive management plan and conduct implementation and effectiveness monitoring."[766] *Promising Practices* explains that "[m]onitoring implementation of mitigation measures can inform an agency and community whether the measures are on schedule and when they have been completed."[767] With this monitoring data, BOEM and vulnerable coastal communities can track whether "mitigation measures are providing the predicted outcomes."[768] The adaptive management plan will give BOEM "a means for taking corrective action if mitigation implementation or effectiveness monitoring indicates the measures are not achieving the intended outcomes."[769] BOEM should regularly engage with vulnerable coastal communities throughout the lifetime of the Program to ensure the goals in the adaptive management plans are being fulfilled.

[764] *See* Promising Practices at 21-2.
[765] *See Id.* at 50.
[766] *Id.*
[767] *Id.*
[768] *Id.*
[769] *Id.*

VIII. Conclusion

For the foregoing reasons, the Proposed Program is legally and analytically flawed and must be revised. BOEM should recirculate for public comment a Proposed Program and select as the preferred alternative a program with no new lease sales. The agency has the discretion to do so and the current landscape – which includes ample energy reserves to meet the nation's energy needs, as well as the high environmental and social costs of continued development in the Gulf of Mexico – requires a program with no new lease sales.

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