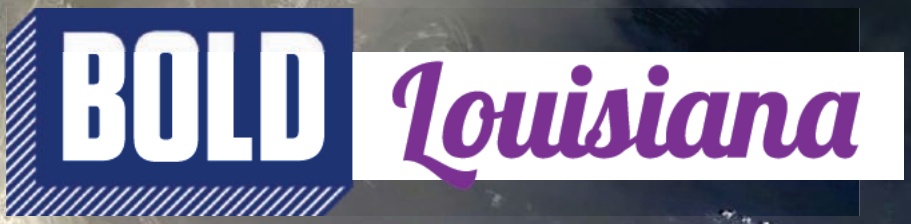
CRITICAL GULF

The Vital Importance of Ending New Fossil Fuel Leases in the Gulf of Mexico

By the Center for Biological Diversity, Friends of the Earth,
Louisiana Bucket Brigade, Bold Louisiana



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Report endorsed by:
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PREFACE

As this report was going to press, a massive storm caused unprecedented flooding in Louisiana, destroying tens of thousands of homes and killing at least 11 people. Thousands of others were forced to evacuate. This is exactly the kind of extreme weather projected to become more severe on the Gulf Coast as the climate crisis intensifies.

And that's what this report is about: the necessity of a rapid and just transition to clean energy to reduce this terrifying threat to the Gulf Coast. We must begin by stopping new fossil fuel leasing in the Gulf of Mexico to prevent offshore drilling and fracking that could ultimately contribute nearly 33 billion tons of carbon dioxide equivalent to global warming.

"Climate change is never going to announce itself by name. But this is what we should expect it to look like," was the first line of a New York Times story about the flood. Indeed climate scientists and meteorologists are linking the Louisiana deluge to a series of extreme floods caused by climate change in the United States over the past two years.

The link between burning fossil fuels and heavy rains is clear and direct. Burning fossil fuels releases greenhouse gases, which warms our atmosphere. "As the atmosphere warms, so does the ocean," climate scientist Katherine Hayhoe explained in a recent Facebook post about the Louisiana flooding. "Evaporation speeds up, making more water available for a storm to pick up and dump as it sweeps through."

The National Weather Service in New Orleans measured record levels of moisture in the air during this storm. More than two feet of rain fell on Baton Rouge and southern Louisiana in under 48 hours, sending most of the region's rivers over their banks on Aug. 17 and flooding thousands of homes. That deluge was the result of a low-pressure storm system that stalled off the coast and kept sucking more moisture from the unusually warm Gulf waters, which will only grow warmer over time.

It's high time the communities of the Gulf Coast cease to be treated as sacrifice zones. They deserve environmental justice and a clean energy future. Turning away from fossil fuel extraction in the Gulf will allow them to weather future storms, help end our dangerous collective reliance on fossil fuels, and dramatically reduce hazards for future generations.

Executive Summary

The vast majority of scientists and global leaders agree that to avert the worst consequences of climate change, the world must limit global warming to 1.5 degrees Celsius by keeping a vast majority of global fossil fuels in the ground. For the United States to fulfill its obligation and meet those goals, we must make significant reductions in our use of fossil fuels rather than developing new supplies.

Yet the United States continues widespread leasing of federally managed fossil fuels on public lands and oceans. Unleased fossil fuels today account for approximately half of the potential greenhouse gas pollution from all remaining fossil fuels in the country. For this report we look specifically at the oil and gas leases in the Gulf of Mexico and the importance of ending new leases. The Gulf dominates U.S. offshore oil and gas production, contributing an average of 96 percent of our nation's federally managed offshore oil and gas.[1]

Technically recoverable oil and gas resources of the Gulf of Mexico that have yet to be leased contain up to 32.81 gigatons of carbon dioxide equivalent (Gt CO_2e) — as much greenhouse gas pollution as 9,500 coal-fired power plants operating for a year.

More leasing in the Gulf of Mexico will deepen the climate crisis and the harms already being felt by people living along the Gulf Coast who face severe storms, rising seas and saltwater intrusion into fresh water. A Gulf Coast community, Isle de Jean Charles, is the first community in the United States forced to move from sinking lands because of climate change. Shrimpers and fishermen have lost their livelihoods. Meanwhile oil-industry pollution makes people sick and causes cancer. It also damages shorelines, disrupts ecosystems and harms sea turtles, whales, dolphins and the wealth of wildlife in the Gulf.

Over the next few months the Obama administration will finalize a nationwide offshore leasing program that includes a vast expansion of leasing in the Gulf of Mexico. The program will set the course for the next wave of new oil and gas development for up to 70 years — well past the point when we need to end our dependence on fossil fuels. Keeping in the ground the oil and gas that remains unleased in the Gulf could save our climate as much as 32.81 Gt CO_2e of greenhouse gas pollution.

Recommendation: President Obama should end new oil and gas leasing and begin a just transition to clean, renewable energy.

Introduction

This report calculates the potential lifecycle greenhouse gas pollution of developing unleased technically recoverable federal oil and gas in the Gulf of Mexico — nearly all of which could soon be available for leasing to industry under Obama administration policies.

If leased and consumed, Gulf of Mexico oil and gas resources have the potential to release significant greenhouse gas emissions:

- The federal unleased areas in the Gulf hold between 27.79 to 32.81 Gt CO_2e of greenhouse gases — the emissions equivalent of more than 9,500 coal-fired power plants operating for a year.
- Developing the entire Gulf of Mexico oil and gas resources would nearly double the greenhouse gas pollution of all fossil fuels currently under federal leases.
- The combined consumption of fossil fuels from the Gulf of Mexico with other leased areas would result in the United States monopolizing 27 percent of the scientifically advised global carbon budget needed to limit global warming to 1.5 degrees Celsius.

Leaving most areas of the Gulf of Mexico unleased would help preserve our nation's ability to avert the worst consequences of climate change.

Greenhouse Gas Pollution From Gulf of Mexico Oil and Gas

Much of the nation's oil and gas comes from the Gulf of Mexico. The Gulf has contributed an average of 96 percent of all oil and gas produced from the Outer Continental Shelf in the United States over the past 10 years.[2] The U.S. Energy Information Administration anticipates that Gulf oil production will reach a record high in 2017.[3]

Developing the Gulf's remaining fossil fuels will significantly increase global greenhouse pollution. Consuming the oil and gas in the unleased areas of the Gulf of Mexico will potentially result in greenhouse gas emissions of 27.8 to 32.8 Gt CO_2e.[4] This is equivalent to the pollution of about 9,500 coal-fired power plants operating for a year. Developing all remaining oil and gas in the Gulf of Mexico would nearly double the potential greenhouse gas emissions from all federal fossil fuels onshore and offshore.[5]

Federal Fossil Fuels in the Gulf of Mexico			Gigatons CO2e		
	Crude Oil (BBbls)	Natural Gas (Tcfg)	Low	Median	High
Leased (20,685,546 acres)	8.34	26.36	4.14	4.39	4.89
Unleased (138,901,296 acres)	56.02	177.01	27.79	29.49	32.81
Total	64.36	203.37	31.93	33.88	37.70

Source: Ecoshift Consulting calculated from Acreage: BOEM, Combined Leasing Report as of July 1, 2016; Inventory: BOEM, 2016 Assessment of Undiscovered Oil and Gas Resources of the Nation's Outer Continental Shelf, 2016; Unleased acreage includes areas in the eastern Gulf of Mexico that are under moratorium until 2022.

In August 2016 and March 2017 the government will hold lease sales offering millions of acres in the western and central Gulf of Mexico.[6] Additionally, this year the Obama administration will finalize a nationwide leasing program for offshore lease sales from 2017 through 2022.[7] The proposed plan offers up nearly all of the Gulf of Mexico save the eastern Gulf, which is under a congressional moratorium until 2022. The U.S. Bureau of Ocean Energy Management predicts that activities under these leases may last 40 to 70 years,[8] committing our nation to decades of oil drilling and its consequences.

Obama's Next Nationwide Offshore Leasing Program

Obama's nationwide leasing program for 2017 to 2022 proposes to vastly expand oil drilling and industrial infrastructure:

- 10 leases in the Gulf of Mexico
- 71 million acres that are currently unleased will be offered for leasing
- Up to 9.5 billion barrels of oil equivalent will be developed
- Each sale will add approximately 1,000 wells, 150 production facilities, and 1,250 miles of pipeline

Source: Bureau of Ocean Energy Management, 2017–2022 Outer Continental Shelf

The Gulf: People and Place

Offshore drilling in the Gulf of Mexico affects a wide variety of people and places. These communities have a lot at stake from our nation's offshore oil and gas policies. The decisions we make now will have long-term impacts on public health and the environment.

The Gulf South has a rich and diverse culture and history, including many coastal communities involved in the fishing, seafood and tourism industries. The Mississippi River Delta has a unique culture drawing from diverse American Indian, Cajun, European, Islenos and African-American backgrounds. This region has its own music, traditions and food. Many people's lives are connected to the delta and its wildlife. For example, Pointe à la Hache is primarily an African-Amercian fishing village in Plaquemines Parish that depends on healthy oysters, shrimp and fish. The local fishermen were hard hit when the Deepwater Horizon oil spill disrupted their livelihoods, and five years later, in 2015, the oystermen complain that the oyster populations have yet to meaningfully recover.[9]

Hundreds of types of fish and shellfish inhabit the delta and Gulf of Mexico. The warm waters are home to a vast array of wildlife and habitats, including many sensitive animals that are threatened by offshore drilling. There are 3 million acres of wetlands with breeding, foraging and migratory habitat for more than 400 types of birds. The nation's northernmost tropical coral reef lies south of Texas in an area called the Flower Garden Banks. There are five species of endangered sea turtles and important nesting beaches dotting the coast. Whales and dolphins live in the Gulf, which includes core habitat for endangered sperm whales. All of these animals are at risk of injury and death from oil spills, and marine mammals are particularly sensitive to the airgun noise used to survey for oil and gas. Moreover, many of these species, such as corals and sea turtles, are threatened by climate change.

Gulf Coast Communities on the Frontlines

The tribal lands of the Band of Biloxi-Chitimacha-Choctaw are sinking and disappearing as a result of climate change. The people who live here, their children, and their ancestral lands are imperiled.

Isle de Jean Charles in southeastern Louisiana is suffering land loss from coastal erosion, sea level rise, levees and diversions, and destruction from dredging canals. The oil industry canals for pipelines and drilling cause saltwater to flood the freshwater marsh and the canals grow even wider and cause more land loss.

The endangered coastal community of Isle de Jean Charles is the first to receive national disaster resettlement funds to move their community to a safer place.

Aerial photos of Isle de Jean Charles in Louisiana taken 45 years apart shows evidence of the effects of rising seas, sinking land, and human development. The wetlands adjacent to the Isle de Jean Charles community (about 60 miles south of New Orleans) have been disappearing rapidly since the photo on the left was taken in 1963. By 2008, after four major hurricanes, significant erosion, and alteration of the surrounding marsh for oil and gas extraction, open water surrounds the greatly reduced dry land. (Photo credit: USGS) Source: Global Change Research Program, Climate Change Impacts in the United States: The Third National Climate Assessment at 396-417 (2014)

The Gulf of Mexico Sacrifice Zone

The Gulf Coast is a national hub for oil production. The federal government manages 3,400 platforms and 33,000 miles of pipeline in federal waters, the vast majority of which is in the Gulf of Mexico.[10] There are 35 refineries on the Gulf Coast, making up 46 percent of the nation's refinery capacity.[11] This industrial landscape and its onshore support facilities and pipelines pollute the air, land and water, and cause coastal erosion.

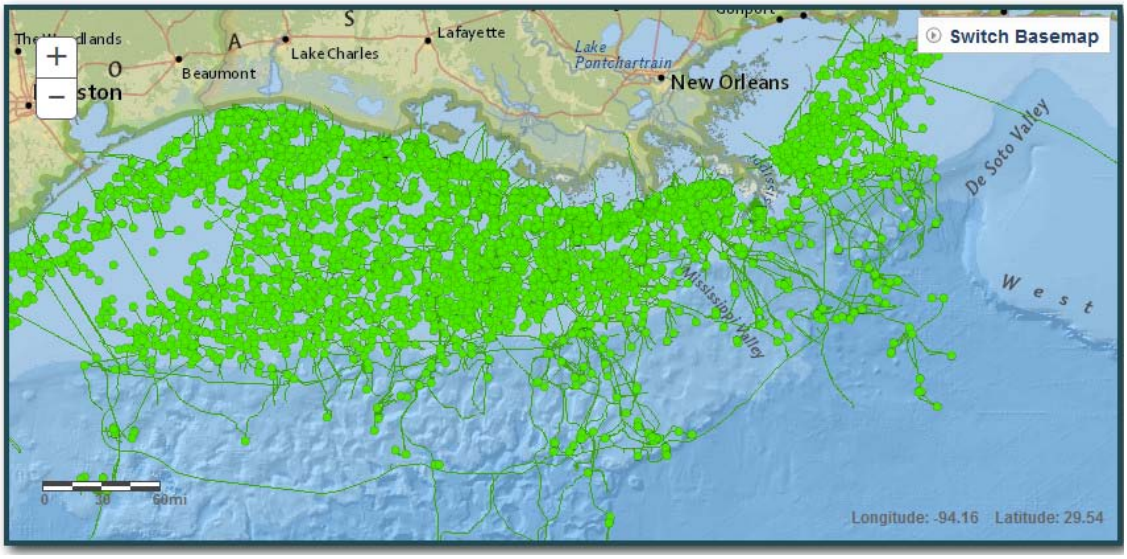


Figure 1. Oil and gas platforms and pipelines in the Gulf of Mexico.
Source: NOAA http://service.ncddc.noaa.gov/website/google_maps/FGB/mapsFGB.htm (GIS data from Bureau of Ocean Energy Management).

Offshore drilling takes a heavy toll on Gulf Coast communities and the environment. The industry's negative impacts include oil spills, pollution and wetlands loss, and contribute to climate change.

Oil spills

The oil industry has a dirty track record of oil spills in the Gulf — just this year a pipeline leaked nearly 90,000 gallons of oil. In 2010 the Deepwater Horizon disaster spilled 206 million gallons of oil into the Gulf. Following the spill the Gulf experienced the longest mortality event recorded for marine mammals and sea turtles. Unfortunately, oil spills are routine; the U.S. Coast Guard documented 42,041 oil spills in the Gulf of Mexico between 1973 and 2011.[12]

Petroleum pipelines are also dangerous. Federal records show nearly 8,000 significant incidents with U.S. pipelines, involving death, injury, and economic and environmental damage, between 1986 and 2013 — more than 300 per year.[13]

Oil spills cause irreversible damage by injuring and killing wildlife such as seabirds, dolphins and sea turtles. They also make people sick, sully habitat and shorelines, and harm fisheries and tourism.

Pollution

The industry is also dangerous for offshore-oil workers, whose risk of fatality is seven times higher than the national average,[14] and the welfare of Gulf communities. Refineries and other petroleum facilities in Alabama, Louisiana, Mississippi and Texas reported 422.98 million pounds of toxic chemical releases from 2004 to 2014, most of which was air and water pollution. Some of the most commonly released hazardous chemicals included xylene, cyanide and toluene that are toxic to humans and harm the central nervous system, among other effects.

Toxic pollution from these refineries and petroleum facilities disproportionately impact low-income neighborhoods and communities of color. For example, Port Arthur, Texas is home to two facilities that refine more than 900,000 barrels of crude per day.[15] Port Arthur is located within Jefferson County, which ranks among the worst in the nation for emissions of chemicals known to cause cancer, birth defects and reproductive disorders. Data collected by the Texas Cancer Registry indicate that cancer rates among African Americans in Jefferson County are roughly 15 percent higher than they are for the average Texan, and the mortality rate from cancer is more than 40 percent higher.[16]

Loss of wetlands

The oil industry's own studies have acknowledged its significant contribution to coastal destruction, making the region more vulnerable to storms and hurricanes. From 1932 to 2010, coastal Louisiana lost about 1.2 million acres, equating to coastal wetlands disappearing at a rate of about one football field per hour.[17] The oil and gas industry admits that it is responsible for at least 36 percent of the total loss of this area, though the Department of the Interior has stated that the industry could be responsible for as much as 59 percent of the loss.[18] And scientists say that at current rates, coastal erosion and sea-level rise will lead to nearly all of southeast Louisiana to be under water by 2100.[19] The problem is so severe that the Louisiana Flood Authority sued the oil and gas industry for destroying wetlands.[20]

Climate change

Gulf Coast communities are on the frontlines of climate change, with rising seas and severe storms like Hurricane Katrina displacing people. Residents of Isle de Jean Charles in Louisiana are among the nation's first climate migrants — peoples displaced as a direct result of climate change. More than 90 percent of the island's original landmass has already washed away,

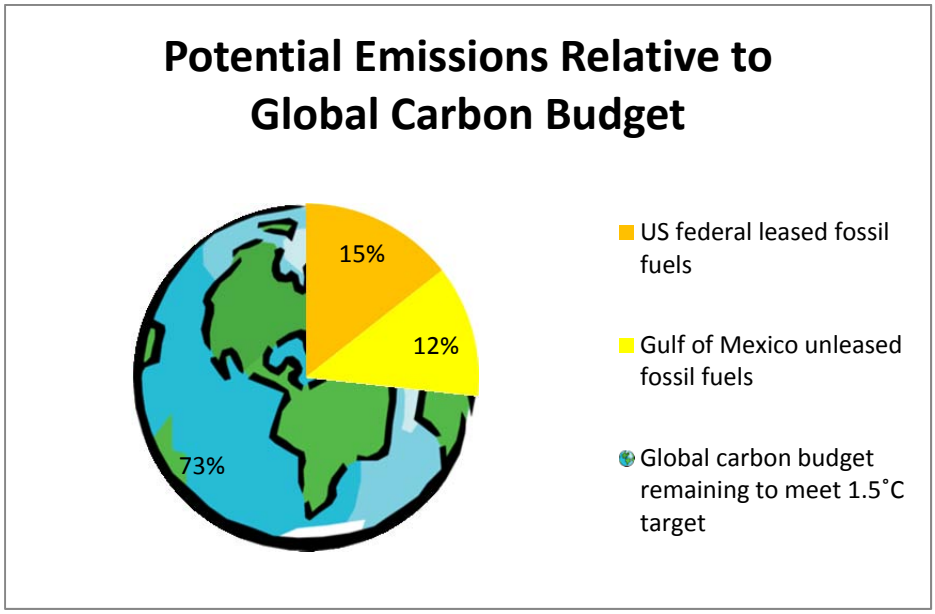
threatening the very way of life of the Biloxi-Chitimacha-Choctaw, the tribe to which most Isle de Jean Charles residents belong. Climate change is also threatening the region's biological diversity. Ocean warming and acidification are changing habitat and making it more difficult for coral reefs, shellfish and other species to survive.

Federal Fossil Fuel Leasing: The Climate Problem and Solution

The business-as-usual leasing strategy in the Gulf of Mexico is incompatible with our nation's international pledge to reduce greenhouse gas emissions to limit warming to 1.5 degrees Celsius. The 2015 Paris Agreement recognized that climate change is an "*urgent and potentially irreversible threat to human societies and the planet*," [21] and it commits 197 signatory countries to hold temperatures "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."[22] Scientists note that this means leaving the vast majority of fossil fuels in the ground.[23]

There is a finite amount of greenhouse gas that the United States can emit and still meet its goals. According to the Intergovernmental Panel on Climate Change, carbon dioxide emissions must remain below about 1,000 Gt CO_2 from 2011 onward for a 66 percent probability of limiting warming to 2 degrees Celsius above preindustrial levels, and below 400 Gt CO_2 from 2011 onward for a 66 percent probability of limiting warming to 1.5 degrees Celsius above preindustrial levels.[24] These carbon budgets have been reduced to 850 Gt CO_2 and 240 Gt CO_2, respectively, from 2015 onward.[25]

Developing the Gulf's remaining unleased technically recoverable oil and gas would result in 27.8 to 32.8 Gt CO_2e emissions. All currently leased federal fossil fuels, including onshore and offshore, represent from 30 to 43 Gt CO_2e. New leasing of the entire Gulf of Mexico fossil fuels would bump that contribution to 27 percent of the entire global carbon budget. Holding temperature rise below 2 degrees Celsius requires ending fossil fuel emissions almost entirely by midcentury,[26] and the federal government acknowledges that 2017-2022 Gulf of Mexico leases would result in fossil fuel production "40 –70 years into the future."[27]



The already severe impacts of global warming on the Gulf Coast and the rest of the world from *current* atmospheric carbon dioxide levels highlight the urgency of staying below the 1.5 degrees Celsius target.[28] Already the effects of global warming are apparent. Extreme weather events such as severe droughts, floods and heat waves, along with other climate disruptions, are responsible for an estimated 400,000 deaths globally each year on average, with hundreds of millions of additional people adversely affected.[29] Arctic sea-ice loss, rising seas, growing food insecurity, bleaching of coral reefs, and biodiversity loss are mounting worldwide.[30]

Gulf Coast communities have already suffered harm from sea-level rise and severe hurricanes; meanwhile climate change destroys wildlife habitat and imperils species in the Gulf of Mexico. The damage from climate change is already being felt across the United States, with coastal communities and the country's most vulnerable populations of the poor, the elderly, the sick and children bearing the brunt of public-health effects, property damage and food insecurity.[31] Indeed the U.S. Environmental Protection Agency concluded in April 2009, and reaffirmed in July 2016, that "the evidence provides compelling support for finding that greenhouse gas air pollution endangers the public welfare of both current and future generations. The risk and the severity of adverse impacts on public welfare are expected to increase over time."[32]

<u>Recommendations</u>

The nation's current energy path is one that will deepen the climate crisis. We call on President Obama to take key actions to end new leases and ensure a just transition for Gulf communities:

1. Cancel lease sales scheduled for 2016 and 2017, including Lease Sales 248 (Western Gulf), 244 (Cook Inlet, AK) and 247 (Central Gulf);
2. Remove all new offshore lease sales proposed in the 2017 - 2022 Outer Continental Shelf Oil and Gas Leasing Program;[33]
3. Withdraw from oil and gas leasing availability all unleased areas of the Outer Continental Shelf;[34] and
4. Create and fund an independent regional advisory council of people living in the Gulf and environmental stakeholders who are affected by Gulf of Mexico offshore drilling that is charged with overseeing industry safety and developing a strategy for a just transition to clean energy, safer jobs and cleaner air and water.

Ending new oil and gas leases is consistent with the federal government's mandate to ensure that offshore oil and gas development is balanced "with protection of the human, marine, and coastal environments."[35] The federal government has the legal authority to end all new fossil fuel leasing on public lands, onshore and offshore.[36] The Obama administration should recognize that it has not only the authority but also the duty to keep fossil fuels in the ground for the sake of our climate and future generations.

[1] Bureau of Ocean Energy Management, Outer Continental Shelf Oil and Gas Production (July 1, 2016).
[2] *Id*.
[3] US Energy Information Administration, Oil production in federal Gulf of Mexico projected to reach record high in 2017 (Feb. 2016), http://www.eia.gov/todayinenergy/detail.cfm?id=25012.
[4] For methods on calculating the life-cycle greenhouse gas emissions for oil and natural gas *see* Mulvany, Dustin, et al., The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels (Aug. 2015).
[5] *Id*. (estimated greenhouse gas emissions are 29.96 to 42.69 Gt CO2e from all leased federal fossil fuels, both onshore and offshore).
[6] Bureau of Ocean Energy Management, Gulf of Mexico OCS Oil and Gas Lease Sale: 2016 Western Planning Area Lease Sale 248 Final Supplemental Environmental Impact Statement (2016); Bureau of Ocean Energy Management, Gulf of Mexico OCS, Oil and Gas Lease Sales: 2016 and 2017, Central Planning Area Lease Sales 241 and 247, Eastern Planning Area Lease Sale 226, Final Supplemental Environmental Impact Statement (2015).
[7] Bureau of Ocean Energy Management, 2017–2022 Outer Continental Shelf (OCS) Oil and Gas Leasing Proposed Program (Mar. 2016).
[8] Bureau of Ocean Energy Management (2016), supra note 6.
[9] Gray, Steven, Is It Twilight for Louisiana's Black Oystermen? Time Magazine (June 8, 2010); Turner, Tyrone, Struggling to Survive When the Oysters Have Gone, National Geographic (Apr. 20, 2015).
[10] Bureau of Ocean Energy Management, 2017-2022 Multilease Sale Scoping Presentation (May 2015).
[11] US Energy Information Administration 2016, supra note 3.
[12] US Coast Guard, Polluting Incidents In and Around U.S. Waters, A Spill/Release Compendium: 1969-2011 (Dec. 2012).
[13] Stover, Richard, America's Dangerous Pipelines (2015); http://www.biologicaldiversity.org/campaigns/americas_dangerous_pipelines/.
[14] Centers for Disease Control and Prevention, Fatal Injuries in Offshore Oil and Gas Operations — United States, 2003–2010, Morbidity and Mortality Weekly Report (Apr. 26, 2013).
[15] *See e.g.*, NRDC, Port Arthur, Texas: American Sacrifice Zone (Aug. 26, 2013); http://archive.onearth.org/articles/2013/08/if-built-the-keystone-xl-pipeline-will-end-in-one-toxic-town.
[16] O'Rourke, et al., Just Oil? The Distribution Of Environmental And Social Impacts Of Oil Production And Consumption, Annu. Rev. . Resour. 2003. 28:587–617 (2003); Environmental Integrity Project, Breakdowns in Air Quality (Apr. 27, 2016); Earthjustice, Community Impact Report: The Toll of Refineries on Fenceline Communities (Oct. 2014); Southwest Workers Union, The Oil Industry in the Gulf of Mexico: A history of Environmental injustices, Aug. 2003; Environmental Integrity Project, ACCIDENT PRONE: Malfunctions and "Abnormal" Emission Events at Refineries, Chemical Plants, and Natural Gas Facilities in Texas, 2009-2011 (July 18, 2012).
[17] Bureau of Ocean Energy Management, Gulf of Mexico OCS Oil and Gas Lease Sales: 2017-2022 Gulf of Mexico Lease Sales 249,250,251,252,253,254,256,257,259, and 261 Draft Environmental Impact Statement at 3-188 (2016); Nathaniel Rich, The Most Ambitious Environmental Lawsuit Ever, NY Times (Oct. 02, 2014), http://www.nytimes.com/interactive/2014/10/02/magazine/mag-oil-lawsuit html?_r=0.
[18] Marshall, Bob, et al. Losing Ground: Southeast Louisiana is Disappearing, Quickly, Scientific America (Aug. 28, 2014); http://www.scientificamerican.com/article/losing-ground-southeast-louisiana-is-disappearing-quickly/.
[19] *Id*.
[20] *Board of Commissioners of the Southeast Louisiana Flood Protection Authority v. Tennessee Gas Pipeline Company, L.L.C., et al*., Case No. 15-30162 (5th Cir. filed Feb. 24, 2015)
[21] Paris Agreement, Decision, Art. 4(3); Recitals.
[22] *Id.*, Art. 2 (emphasis added).
[23] Bruckner T. et al. 2014. 2014: Energy Systems. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, at Table 7.2, http://ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter7.pdf.

[24] International Panel on Climate Change, Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change at 63-64 & Table 2.2 (2014).

[25] S*ee* Table 2 in Rogelj, J. et al. 2016. Differences between carbon budget estimates unraveled. Nature Climate Change 6: 245-252.

[26] Rogelj, J. et al. 2015. Energy system transformations for limiting end-of-century warming to below 1.5ºC. Nature Climate Change 5: 519-528.

[27] Bureau of Ocean Energy Management (2016), supra note 6 at 1-3.

[28] A target of 1.5°C, while obviously more protective of the climate than a 2°C target, may itself be too high. Dr. James Hansen and colleagues have recommended limiting warming to 1°C to "stabilize climate and avoid potentially disastrous impacts on today's young people, future generations, and nature". *See* Hansen, J.M. *et al.*, Assessing "dangerous climate change": required reduction of carbon emissions to protect young people, future generations and nature, 8 PLoS ONE 8 e81648 (2013).

[29] DARA and the Climate Vulnerability Forum, *Climate Vulnerability Monitor, 2nd Edition:* A Guide to the Cold Calculus of a Hot Planet (2012); http://www.daraint.org/wp-content/uploads/2012/10/CVM2-Low.pdf.

[30] Melillo, Jerry M., Climate Change Impacts in the United States: The Third National Climate Assessment, Terese (T.C.) Richmond, and Gary W. Yohe, Eds., U.S. Global Change Research Program (2014).

[31] Watt, N. et al.,Health and climate change: policy responses to protect public health. The Lancet 386: 1861-1914 (2015); US Global Change Research Program, The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment (2016); http://dx.doi.org/10.7930/J0R49NQX.

[32] Environmental Protection Agency, Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496, 66,498-99 (Dec. 15, 2009); Environmental Protection Agency, Finding that Greenhouse Gas Emissions from Aircraft Cause or Contribute to Air Pollution that May Reasonably Be Anticipated to Endanger Public Health and Welfare, EPA-HQ-OAR-2014-0828 (July 25, 2016).

[33] Bureau of Ocean Energy Management, 2017–2022 Outer Continental Shelf (OCS) Oil and Gas Leasing Proposed Program (Mar. 2016).

[34] *See* Saul, Michael, Petition to End Federal Offshore Oil and Gas Leasing of the United States Outer Continental Shelf to Address Climate Change (Mar. 29, 2016).

[35] 43 U.S.C. § 1802(2).

[36] Outer Continental Shelf Lands Act, 43 U.S.C. §§ 1341 & 2344; 30 U.S.C. § 201(a)(1), 226(a), 241(a)(1), 352; *see also Udall v. Tallman*, 380 U.S. 1, 4 (1965); *United States ex rel. McLennan v. Wilbur*, 283 U.S. 414, 417 (1931); *Arnold v. Morton*, 529 F.2d 1101 (9th Cir. 1976); *see generally* Michael Saul et al., Grounded: The President's Power to Fight Climate Change and Protect Public Lands by Keeping Publicly Owned Fossil Fuels in the Ground 8-11 (Center for Biological Diversity Sept. 2015), available at https://www.biologicaldiversity.org/campaigns/keep_it_in_the_ground/pdfs/Grounded.pdf