November 9, 2020

VIA ONLINE SUBMISSION

BLM California State Office
Attn: Karen Mouritsen, State Director
2800 Cottage Way, Suite W1623
Sacramento, CA 95825

State Director Mouritsen:

The Center for Biological Diversity, California Wilderness Coalition (CalWild), California Wildlife Foundation, Central California Environmental Justice Network, Friends of the Earth U.S., Los Padres ForestWatch, Pacific Environment, the Romero Institute, National Parks Conservation Association, Sierra Club and the Wilderness Society (hereafter, "Citizen Groups") submit the following protest on the December 2020 Competitive Oil and Gas Lease Sale and Environmental Assessment ("EA") DOI-BLM-CA-C060-2020-0120. The Bureau of Land Management's ("BLM") Bakersfield Field Office ("BFO") announced the proposed sale of 7 parcels in Kern County containing 4,133.58 acres on October 8, 2020 and have initiated a 30-day public protest period.

This protest is filed on behalf of Citizen Groups and our members. The mailed address to which correspondence regarding this protest should be directed is as follows:

Diana Dascalu-Joffe, Senior Attorney
Center for Biological Diversity
1536 Wynkoop St., Ste. 421
Denver, CO 80202

We protest the following parcels:

CACA	Corresponding Parcel ID	Acreage	Location	Field Office
059099	CA-2020-12-0001	538.06	Kern County	Bakersfield
059100	CA-2020-12-0007	278.28	Kern County	Bakersfield
059101	CA-2020-12-0002	160	Kern County	Bakersfield
059102	CA-2020-12-0004	957.24	Kern County	Bakersfield
059103	CA-2020-12-0003	920	Kern County	Bakersfield
059104	CA-2020-12-0006	600	Kern County	Bakersfield

059105	CA-2020-12-0005	680	Kern County	Bakersfield

INTERESTS OF THE PROTESTING PARTIES

The **Center for Biological Diversity** ("Center") is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center also works to reduce greenhouse gas emissions to protect biological diversity, our environment, and public health. The Center has over one million members and activists, including those living in California who have visited these public lands for recreational, scientific, educational, and other pursuits and intend to continue to do so in the future, and are particularly interested in protecting the many native, imperiled, and sensitive species and their habitats that may be affected by the proposed oil and gas leasing.

The **California Wilderness Coalition** (CalWild) protects and restores the state's wildest natural landscapes and watersheds on federal public lands. These important wild places provide clean air and water, refuges for wildlife, mitigation against the effects of climate change, and outstanding opportunities for recreation and spiritual renewal for people. CalWild is the only statewide organization dedicated solely to protecting and restoring the wild places and native biodiversity of California's federal public lands.

The **California Wildlife Foundation** works to protect and perpetuate species throughout the state by ensuring sustainable wildlife habitat.

The **Central California Environmental Justice Network** (CCEJN) is a grassroot organization that represents low-income communities of color exposed to environmental toxins, including communities fenceline to oil and gas operations in Kern County. The families we represent already suffer from exposure to toxic air contaminants emitted by existing oil and gas operations, and the nation's worst air quality. These communities are also on the frontline of climate change, impacted first and worst by rising heat, lowered and impaired water tables, out-of-control wildfires and smoke impacts, and COVID-19. The proposed lease sales by the Bureau of Land Management (BLM) will further worsen air and water quality in the region, and will cause irreversible damage to our Earth's climate. Moreover, the Environmental Assessment (EA) for the sale does not properly document these environmental and public health impacts, nor does it consider environmental justice. The Bureau of Land Management (BLM) must not move forward with lease sales based on a legally and morally deficient analysis.

Friends of the Earth is a nonprofit organization with offices in Berkeley, California, and Washington, D.C. For more than 50 years, it has championed the causes of a clean and sustainable environment, protection of the nation's public lands and waterways, and the exposure of political malfeasance and corporate greed. Friends of the Earth's Climate and Energy and Oceans and Vessels Programs work to fight industrialization of the ocean and public lands in all forms, including by fighting to end fossil fuel extraction and reduce greenhouse gas emissions associated with the industry. Friends of the Earth has more than 2 million members and activists

across all 50 states. The organization is part of the Friends of the Earth International federation, a network in 74 countries working for social and environmental justice.

Los Padres ForestWatch protects wildlife, wilderness, water, and sustainable access throughout the Los Padres National Forest and other public lands in California's central coast region, including the Carrizo Plain National Monument and Bitter Creek National Wildlife Refuge. ForestWatch achieves its mission through education, advocacy, and when necessary, legal action for the benefit of our communities, climate, and future generations. ForestWatch has filed comments and protests on several lease sales in California since 2006.

For over 100 years, **National Parks Conservation Association** ("NPCA") has been an independent voice for protecting and enhancing America's National Park System for present and future generations. As a non-partisan, non-profit organization, NPCA has over 1.4 million members and supporters, including nearly 50 thousand members in the state of California. NPCA is actively engaged in protecting our national parks and nearby communities from threats contributing to climate change, air pollution, water pollution, and other impacts.

At **Pacific Environment**, we believe that communities must determine their destinies and that people have a right to meaningfully participate in decisions that affect their lives, their livelihoods and the natural environment. That's why Pacific Environment helps build the global grassroots environmental movement. We achieve this by providing direct financial support, technical and legal expertise, and the know-how to build activist networks. We also fight for systemic changes that complement and can even transform these local efforts. We seek policy reforms, and sometimes revolutions, in international legal regimes that influence what happens locally throughout the world. We win through forceful advocacy, strong coalition-building and grassroots pressure.

The **Romero Institute** is adamantly opposed to expanded oil and gas drilling in Kern County, or anywhere in the world. The climate crisis demands we decarbonize our energy industry immediately in order to avoid the most catastrophic climate change scenarios, and increasing our production and use of oil is completely antithetical to the preservation of a stable climate.

Sierra Club is a national nonprofit organization with sixty-three chapters and more than 778,000 members dedicated to exploring, enjoying, and protecting the wild places of the earth; to practicing and promoting the responsible use of the earth's ecosystems and resources; to educating and enlisting humanity to protect and restore the quality of the natural and human environment; and to using all lawful means to carry out these objectives. Sierra Club's Kern-Kaweah Chapter has approximately 800 members in Kern County. The Sierra Club has been actively working in California, including in Kern County, to address the serious threats to public health and the environment posed by the lack of oversight and safeguards for oil and gas drilling activities, including fracking.

The **Wilderness Society** works to protect our nation's shared wildlands so that all Americans can enjoy the benefits they provide. To do this, it collaborates closely with local

communities to safeguard wild places for future generations. The Wilderness Society fights for legal protections for the nation's wildest places and also champions and defends national policies that give protections for public lands, especially national forests, parks, refuges, and BLM lands.

INTRODUCTORY REMARKS

Citizen Groups strongly object to the proposed lease sale for 7 parcels in Kern County. This lease sale would be the first held in California in eight years, reversing progress for environmental and human health made since the cessation of federal oil and gas leasing in 2012. Resuming federal oil and gas leasing in California would cause irreversible and unacceptable damage to our climate, health, and precious public lands, and should be rejected. Moreover, the EA for the sale is legally deficient and BLM cannot lawfully move forward with the sale. More specifically, the proposed sale would have unexamined and significant impacts on the state's climate, air quality, water quality, wildlife, public health, environmental justice communities, and continues to undermine the protection of our public lands.

Allowing new fossil fuel development exacerbates the negative impacts caused by oil and gas development already present in Kern County, which impacts the most vulnerable communities. Kern County residents consistently experience some of the worst air quality in the country. New oil and gas leasing will further contribute to the high levels of pollution in the region. Yet, BLM fails to address whether the new pollution would conform with nationwide air quality standards set by the Clean Air Act ("CAA"). The county faces severe drought that could have large effects on an economy strongly rooted in agriculture. However, the EA does not properly address the possible impacts on water scarcity and water quality from contamination and spills. The EA also fails to address the long history of detrimental surface expressions and spills in the region and fails to provide guidance for avoiding these environmentally devastating incidents. The EA also fails to address how new development will impact already imperiled species present in the area. In addition to the environmental impacts, the EA fails to address the health impacts caused by oil and gas development on the communities living in the area.

Additionally, the decision to lease for oil and gas on public lands directly conflicts with the best science on climate change. Fossil fuel extraction is the largest driver of climate change, responsible for three-quarters of all greenhouse gas emissions. The world's leading scientists have warned that warming must be limited to no more than 1.5 degrees Celsius to avoid the most catastrophic climate impacts. There is enough oil and gas in already developed fields globally to take the world beyond 1.5 degrees Celsius if it were all extracted and burned, even assuming no further coal use. Selling off publicly owned oil and gas rights for new development is flatly incompatible with meeting our climate goals. Opening up new areas to oil and gas exploration and unlocking new sources of greenhouse gas pollution would only fuel greater warming and

contravenes BLM's mandate to manage the public lands "without permanent impairment of the productivity of the land and the quality of the environment."[1]

According to the EA, hydraulic fracturing or fracking could occur. Therefore, the National Environmental Policy Act (NEPA) documents also must adequately address the foreseeable impacts associated with the process. The EA authorizes fracking based on a Resource Management Plan found to be deficient by a federal court because it failed to adequately address the environmental impacts of fracking. The EA also fails to provide either general or foreseeable site-specific impacts that could result from fracking in this case.

Citizen groups provided comments on September 25, 2020 to highlight these deficiencies, and the BFO has not yet addressed these concerns as required under NEPA.[2] Each of these deficiencies will be discussed in detail below. Unless and until BLM addresses these issues and the site-specific impacts from leasing and development in Kern County, the lease sale cannot go forward. Given these impacts, Citizen groups contend that BLM must prepare an EIS. At a minimum, BLM must prepare a legally adequate EA.

I. BLM Relies on a Deficient Resource Management Plan to Support the Lease Sale

BLM begins its environmental analysis with reliance on the deficient 2014 Bakersfield Field Office Resource Management Plan ("RMP").[3] Because a court concluded the RMP is deficient and both the EA and RMP collectively fail to address the specific impacts associated with fracking, the EA violates NEPA and Federal Land Policy Management Act (FLPMA) and therefore the lease sales cannot go forward.

A. The 2014 BFO RMP is Deficient Because It Fails to Adequately Address the Impacts of Fracking

The EA states that "the seven parcels are within lands identified . . . as open to oil and gas leasing" in the 2014 RMP.[4] Additionally, the EA assumes one well will be hydraulically fractured and approves fracking based on the deficient RMP.[5] Without the proper "hard look" at the environmental impacts of fracking within the NEPA documents, however, the RMP and EA are independently and collectively deficient.

The environmental analysis of the RMP was already found to be deficient by a California District Court because the Final Environmental Impact Statement (FEIS) analyzing the RMP

[1] *See* 43 U.S.C. §§ 1701(a)(7), 1702(c), 1712(c)(1), 1732(a) (emphasis added); *see also id*. § 1732(b) (directing Secretary to take any action to "prevent unnecessary or undue degradation" of the public lands).
[2] 42 U.S.C. § 4332
[3] DOI-BLM-CA-C060-2020-0120-EA December 2020 Oil & Gas Lease Sale (EA) at 2.
[4] *Id.*
[5] *Id.* at 30.

"failed to analyze the environmental concerns unique to fracking."[6] As the court noted, there are "unique risks" associated with fracking that should receive the "hard look" required by NEPA in the environmental documents.[7] Fracking, or hydraulic fracturing, "creates fractures in reservoir rocks in order to enhance the flow of petroleum or natural gases to the well . . . by pumping fluids into a zone of the well until the fluid pressure is sufficient to break the rock."[8] To name a few of the harmful effects of stimulating a well through fracking, fracking results in a higher risk of oil spills, increased volatile organic compounds (VOCs) and methane emissions, increased use of groundwater and higher risk of groundwater contamination, increased seismicity risks, increased wastewater, higher impacts on wildlife, and worse health outcomes for populations living close to oil and gas production, particularly environmental justice communities. The court required that BLM produce a new EIS that analyzes these and other significant impacts.[9]

While BFO did approve a Final Supplemental EIS in 2019 (SEIS) in accordance with the court order,[10] BLM still failed to adequately analyze the impacts of fracking. Currently, the adequacy of the 2019 SEIS is being litigated. As stated in the filed complaint, BLM violated NEPA because the agency again failed to provide a full discussion of the "direct, indirect, and cumulative impacts of fracking,"[11] and that BLM failed to respond to comments.[12] Because the same deficiencies are present in the 2019 SEIS as were present in the 2014 FEIS, the RMP is still deficient.

B. Like the 2014 RMP, the EA Does Not Provide Sufficient Analysis of the Specific Environmental Impacts from Fracking

The EA also fails to adequately address the specific impacts associated with fracking and, under NEPA, cannot support the proposed lease sale. Under NEPA, "to the extent that any relevant analysis in the broader NEPA document is not sufficiently comprehensive or adequate to support further decisions, the tiered NEPA document must explain this and provide any necessary analysis."[13] However, here, BLM failed to supplement the deficient FEIS and SEIS with the requisite analysis of fracking.[14]

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[6] *Los Padres Forest Watch v. United States BLM*, No. CV-15-4378-MWF (JEMx), 2016 U.S. Dist. LEXIS 138782, at *32 (C.D. Cal. Sep. 6, 2016)
[7] *Los Padres Forest Watch v. United States BLM*, No. CV-15-4378-MWF (JEMx), 2016 U.S. Dist. LEXIS 138782, at *34 (C.D. Cal. Sep. 6, 2016)
[8] Advanced Well Stimulation Technologies in California, California Council on Science and Technology Lawrence Berkeley National Laboratory Pacific Institute (July 2016) at 22.
[9] *Los Padres Forest Watch v. United States BLM*, No. CV-15-4378-MWF (JEMx), 2016 U.S. Dist. LEXIS 138782, at *34 (C.D. Cal. Sep. 6, 2016)
[10] EA at 5.
[11] Compl. for Declaratory and Inj. Relief, 21, *Ctr. for Biological Diversity v. U.S. Bureau of Land Management*, Case 2:20-cv-00371 (C.D. Cal. Jan. 24, 2020) (Complaint).
[12] Complaint at 22.
[13] 43 C.F.R. § 46.140(b)
[14] BLM has an obligation to provide analysis of fracking specific to this major federal action described in the EA. Because the EA does not describe the unique effects of fracking for this project, an adequate RMP could not provide support the decision under NEPA. See 40 C.F.R. § 1500.1(b).

While the EA does note that fracking will likely occur at one well within the seven parcels, the concerns are brushed off without taking a "hard look" at the impacts of fracking. NEPA requires that BLM consider the significance of direct, indirect, and cumulative impacts from all proposed activity,[15] but BLM fails to undergo the appropriate analysis in relation to fracking.

First, there is no discussion of what the indirect impacts of contamination from fracking will cause. Under NEPA, direct effects are those caused by the action and "occur at the same time and place" and indirect effects are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable."[16] While the EA does discuss some direct effects of fracking, it fails to extend the analysis to the indirect effects. For instance, the EA discusses the effect of hydraulic fracturing on air quality and the hazardous air pollutants (HAPs) likely to be emitted.[17] The EA determines the emission of HAPs will result in "short term exposures," but fails to discuss what kinds of indirect impacts this may cause to health or the environment. Similarly, the EA discusses possible groundwater contamination by stating that fracking "has the potential to affect groundwater basins through leaks and spills of fluids" and discusses the fact that fracking will use groundwater.[18] The discussion does not describe what will occur because of this contamination nor the impact of using more water in a water scarce region. Without discussing these indirect effects, the EA is insufficient.

Additionally, the EA fails to address the cumulative impacts of fracking the one well proposed here across its lifespan as combined all the fracking occurring in the area. As defined by NEPA, when BLM analyzes cumulative impacts, it must note the "incremental impact of the action when added to other past, present and reasonably foreseeable future actions" and that cumulative impacts "can result from individually minor but collectively significant actions taking place over time."[19] No such consideration is given to the impacts of fracking on the air quality here.

C. BLM Cannot Rely on the Deficient RMP to Support the Lease Sale, Especially Because Fracking Would Be Allowed Without Adequately Analyzing its Impacts

Because it relied on the deficient 2014 RMP and failed to provide the requisite analysis in the EA, BLM violated NEPA and must provide further analysis before moving forward with the lease sale. Case law and NEPA itself make clear that BLM is required to perform and disclose an analysis of environmental impacts *before* issuance of an oil and gas lease.[20] Assessment of all 'reasonably foreseeable' impacts must occur at the earliest, practicable point and "must take place before an irretrievable commitment of resources is made."[21] Courts have established that

[15] *See* 40 C.F.R. § 1508.7 (defining cumulative impacts); 40 C.F.R. § 1508.8 (defining direct and indirect impacts).
[16] 40 C.F.R. § 1508.8
[17] EA at 36.
[18] EA at 43.
[19] 40 C.F.R. § 1508.7
[20] *N.M. ex rel. Richardson v. BLM*, 565 F.3d 683, 716 (10th Cir. 2009).
[21] *Id.* at 718.

issuance of a lease is an "irretrievable commitment of resources."[22] Should the lease sale go through, BLM will have violated its obligation to engage in analysis before it makes an irretrievable commitment of resources under NEPA. Therefore, until BLM complies with NEPA and adequately assesses all impacts from fracking, the lease sale cannot legally continue.

II. BLM Must Consider Recent Climate Science and Quantify and Assess the Impacts of the Greenhouse Gas Emissions that Will Result from the Proposed Lease Sale

BLM must also consider recent climate science, as well as, the indirect and cumulative effects of greenhouse gas emissions that will result from the approval of the lease sale and other past, present, and reasonably foreseeable federal and non-federal California oil and gas production decisions. NEPA specifically requires BLM to consider existing, new, and revised climate science and policy, as well as, quantify and discuss the significance of the direct, indirect, and cumulative greenhouse gases generated by its proposed action.[23] Court decisions clearly establish that NEPA mandates consideration and analysis of the indirect and cumulative climate impacts of BLM fossil fuel production decisions, including at the leasing stage.[24]

Climate change has been intensively studied and acknowledged at the global, national, and regional scales. Climate change is being fueled by the human-caused release of greenhouse gas emissions (GHG), in particular carbon dioxide and methane. Carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are recognized as the key greenhouse gases contributing to climate change. In 2009, the Environmental Protection Agency (EPA) found that these "six greenhouse gases taken in combination endanger both the

[22] *See id*.; *Sierra Club v. Peterson*, 717 F.2d 1409, 1414 (D.C. Cir. 1983); *Pennaco Energy, Inc. v. U.S. Dep't of Interior*, 377 F.3d 1147, 1160 (10th Cir. 2004).

[23] 40 C.F.R. §§ 1500.1 (requiring "high quality information" and "accurate scientific analysis"); 1502.16 (outlining what's required in an impacts analysis); 1508.7 (defining cumulative impacts); 1508.8 (defining direct and indirect impacts).

[24] *Citizens for a Healthy Community v. BLM*, No. 1:17-cv-2519 (D. Colo. March 27, 2019) (holding that "Defendants acted in an arbitrary and capricious manner and violated NEPA by not taking a hard look at the foreseeable indirect effects resulting from the combustion of oil and gas in the EIS and EA. Defendants must quantify and reanalyze the foreseeable indirect effects the emissions.") *See also WildEarth Guardians v. Zinke*, No. CV 16-1724 (RC), 2019 WL 1273181 (D.D.C. Mar. 19, 2019) (invalidating nine BLM NEPA analyses in support of oil and gas lease sales because "BLM did not take a hard look at drilling-related and downstream [greenhouse gas] emissions from the leased parcels and, it failed to sufficiently compare those emissions to regional and national emissions."); *San Juan Citizens All. v. U.S. Bureau of Land Mgmt*., 326 F. Supp. 3d 1227, 1242–43 (D.N.M. 2018) (collecting cases and requiring assessment of greenhouse gas emissions at the lease sale stage); *Western Org. of Res. Councils v. U.S. Bureau of Land Mgmt.*, CV 16-21-GF-BMM, 2018 WL 1475470, (D. Mont. Mar. 26, 2018) (requiring consideration of climate change the RMP stage); *Sierra Club v. Fed. Energy Regulatory Comm'n*, 867 F.3d 1357, 1374 (D.C. Cir. 2017) (requiring quantification of indirect greenhouse gas emissions); *Center for Biological Diversity v. Nat'l Highway Traffic. Admin.*, 538 F.3d 1172, 1215 (9th Cir. 2008) (requiring assessment of the cumulative impacts of climate change).

public health and the public welfare of current and future generations."[25] The D.C. Circuit has upheld this decision as supported by the vast body of scientific evidence on the subject.[26]

In addition to complying with NEPA, BLM must ensure the climate change analysis for this lease sale complies with the Administrative Procedure Act (APA), which provides that agency action can be set aside when it is deemed "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law."[27] An action is arbitrary and capricious "if the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise."[28]

A. Climate Science Has Conclusively Established that GHG Emissions from the Production and Combustion of Fossil Fuels are the Predominant Drivers of Climate Change and Must be Slowed to Prevent Climate Catastrophe

The Intergovernmental Panel on Climate Change (IPCC) is a Nobel Prize-winning scientific body within the United Nations that reviews and assesses the most recent scientific, technical, and socio-economic information relevant to our understanding of climate change. In one of its more recent reports to policymakers in 2014, the IPCC provided a summary of our understanding of human-caused climate change. IPCC AR5, *Summary for Policymakers* (Mar. 2014).[29] Among other things, the IPCC stated:

- Human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems.

- Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea level has risen.

- Anthropogenic greenhouse gas emissions have increased since the pre-industrial era, driven largely by economic and population growth, and are now higher than ever. This has led to atmospheric concentrations of carbon dioxide, methane, and nitrous oxide that are unprecedented in at least the last 800,000 years. Their effects, together with those of other anthropogenic

[25] U.S. EPA, Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496 (Dec. 15, 2009), available at: https://www.epa.gov/sites/production/files/2016-08/documents/federal_register-epa-hq-oar-2009-0171-dec.15-09.pdf.
[26] *See Coal. for Responsible Regulation, Inc. v. EPA.*, 684 F.3d 102, 120-22 (D.C. Cir. 2012).
[27] 5 U.S.C. § 706(2)(A).
[28] Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29, 43 (1983).
[29] IPCC, Climate Change 2014 Synthesis Report, Summary for Policymakers, available at: http://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf.

drivers, have been detected throughout the climate system and are extremely likely to have been the dominant cause of the observed warming since the mid-20th century.

- In recent decades, changes in climate have caused impacts on natural and human systems on all continents and across the oceans. Impacts are due to observed climate change, irrespective of its cause, indicating the sensitivity of natural and human systems to changing climate.

- Continued emission of greenhouse gases will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive, and irreversible impacts for people and ecosystems. Limiting climate change would require substantial and sustained reductions in greenhouse gas emissions which, together with adaptation, can limit climate change risks.

- Surface temperature is projected to rise over the 21st century under all assessed emission scenarios. It is very likely that heat waves will occur more often and last longer, and that extreme precipitation events will become more intense and frequent in many regions. The ocean will continue to warm and acidify, and global mean sea level will continue to rise.

Id. at 2–10.

In October 2018, IPCC expounded on its findings in a special report (hereinafter "IPCC SP15"), noting that the differences between 1.5°C warming and 2.0°C warming are significant and that rapid transition away from fossil fuels is needed if we are to limit the impacts of climate change.[30] Specifically, the IPCC found:

- Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate.

- Warming from anthropogenic emissions from the pre-industrial period to the present will persist for centuries to millennia and will continue to cause further long-term changes in the climate system, such as sea level rise, with associated impacts but these emissions alone are unlikely to cause global warming of 1.5°C.

- Climate models project robust differences in regional climate characteristics between present-day and global warming of 1.5°C, and between 1.5°C and

[30] *See* IPCC SR 15, Global Warming of 1.5°: Summary for Policy Makers (Oct. 2018), available at: http://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf.

2°C. These differences include increases in: mean temperature in most land and ocean regions, hot extremes in most inhabited regions, heavy precipitation in several regions, and the probability of drought and precipitation deficits in some regions.

- On land, impacts on biodiversity and ecosystems, including species loss and extinction, are projected to be lower at 1.5°C of global warming compared to 2°C. Limiting global warming to 1.5°C compared to 2°C is projected to lower the impacts on terrestrial, freshwater, and coastal ecosystems and to retain more of their services to humans.

- Climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth are projected to increase with global warming of 1.5°C and increase further with 2°C.

- Pathways limiting global warming to 1.5°C with no or limited overshoot would require rapid and far-reaching transitions in energy, land, urban and infrastructure (including transport and buildings), and industrial systems. These systems transitions are unprecedented in terms of scale, but not necessarily in terms of speed, and imply deep emissions reductions in all sectors, a wide portfolio of mitigation options and a significant upscaling of investments in those options.[31]

With particular regard to the Southwest Region—which includes Colorado, New Mexico, Utah, Arizona, Nevada, and California—the recently released second volume of the National Climate Assessment included in the following overview:

- Water for people and nature in the Southwest has declined during droughts, due in part to human-caused climate change. Intensifying droughts and occasional large floods, combined with critical water demands from a growing population, deteriorating infrastructure, and groundwater depletion, suggest the need for flexible water management techniques that address changing risks over time, balancing declining supplies with greater demands.

- The integrity of Southwest forests and other ecosystems and their ability to provide natural habitat, clean water, and economic livelihoods have declined as a result of recent droughts and wildfire due in part to human-caused climate change. Greenhouse gas emissions reductions, fire management, and other actions can help reduce future vulnerabilities of ecosystems and human well-being.

- The ability of hydropower and fossil fuel electricity generation to meet growing energy use in the Southwest is decreasing as a result of drought and rising

[31] *Id.* at SPM-4 to SPM-21.

temperatures. Many renewable energy sources offer increased electricity reliability, lower water intensity of energy generation, reduced greenhouse gas emissions, and new economic opportunities.

- Food production in the Southwest is vulnerable to water shortages. Increased drought, heat waves, and reduction of winter chill hours can harm crops and livestock; exacerbate competition for water among agriculture, energy generation, and municipal uses; and increase future food insecurity.

- Heat-associated deaths and illnesses, vulnerabilities to chronic disease, and other health risks to people in the Southwest result from increases in extreme heat, poor air quality, and conditions that foster pathogen growth and spread. Improving public health systems, community infrastructure, and personal health can reduce serious health risks under future climate change.[32]

In particular, California faces major changes to its landscape because of climate change. The California Department of Justice lists the probable impacts of climate change as:

- Sea level rise: The rise in sea level associated with climate change can be expected to impact 85 percent of the population live and work in coastal areas and would put billion dollars in property and infrastructure at risk.

- Losses to Sierra Snowpack: Because the Sierra Nevada snowpack is the state's most important reservoir of water, this could have significant impacts to the states already limited water supply.

- Forestry and higher risk of forest fires: As demonstrated by the recent record-setting and fire season,[33] climate change has already hit the state's forests. Climate change can be expected to continue to increase temperatures, make forests drier, and result in larger forest fires across the state.

- Damages to Agriculture: droughts have the potential to threaten California's $39 billion dollar agriculture industry. This could have impacts on the food supply in California and the nation at large

- Public Health Impacts: Because climate change will result in more smog and hotter temperatures, sensitive populations are at greater risk of respiratory and heart disease and death.

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[32] *See* Patrick Gonzales et al., Chapter 25: Southwest, in U.S. Global Change Research Program, 2018: Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II (Reidmiller, D.R. et al., eds. 2018), available at: https://nca2018.globalchange.gov/chapter/25/.

[33] Andrew Freedman, *California endures record-setting 'kiln-like' as fires rage, causing injuires*, September 6, 2020, available at https://www.washingtonpost.com/weather/2020/09/06/california-wildfires-heat-wave/

- Habitat Destruction and Loss of Ecosystems: California is home to the highest number of unique plant and animal species in the country. Climate change will most certainly have adverse effects on these species and their habitats.[34]

The Council on Environmental Quality (CEQ) has provided guidance on how federal agencies should address climate change in their NEPA analyses through its *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews* (hereafter, "Final Climate Guidance").[35] The Final Guidance applies to all proposed federal agency actions, "including land and resource management actions."[36] In its Final Guidance, the CEQ recognized that:

> Climate change results from the incremental addition of GHG emissions from millions of individual sources, which collectively have a large impact on a global scale. CEQ recognizes that the totality of climate change impacts is not attributable to any single action but is exacerbated by a series of actions including actions taken pursuant to decisions of the Federal Government. Therefore, a statement that emissions from a proposed Federal action represent only a small fraction of global emissions is essentially a statement about the nature of the climate change challenge, and is not an appropriate basis for deciding whether or not to what extent to consider climate change impacts under NEPA. Moreover, these comparisons are also not an appropriate method for characterizing the potential impacts associated with a proposed action and its alternatives and mitigations because this approach does not reveal anything beyond the nature of the climate change challenge itself: the fact that diverse individual sources of emissions each make a relatively small addition to global atmospheric GHG concentrations that collectively have a large impact.[37]

B. NEPA Mandates the Consideration of Direct, Indirect, and Cumulative Climate Impacts from Oil and Gas Leasing in California

Analysis of the direct, indirect, and cumulative climate impacts of BLM oil and gas leasing decisions in California must take into account the exceptional carbon and pollution intensity of California oil fields and their extraction techniques. California produces some of the world's dirtiest, most climate-damaging crude oil. In fact, three-quarters of the oil produced in California is at least as carbon-intensive as Canada's notorious tar sands crude.[38]

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[34] State of California Department of Justice, Climate Change impacts in California https://oag.ca.gov/environment/impact

[35] *See* Council on Envtl. Quality, Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews (Aug. 2016), available at: https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/nepa_final_ghg_guidance.pdf.

[36] *Id*. at 9.

[37] *Id.* at 10–11.

[38] Wolf, Shaye & Kassie Siegel, Oil Stain: How Dirty Crude Undercuts California's Climate

As California's oil fields have become depleted over time, much of the remaining oil has become extremely heavy and waterlogged. Oil companies have increasingly used extreme extraction techniques—involving high energy inputs and large volumes of water—to loosen this viscous, heavy crude and push it toward production wells. This makes California's oil very energy-intensive to pump out of the ground, make flow, and refine.

As a result, many California crudes are barrel for barrel, as damaging for the climate as Canadian tar sands crude based on lifecycle GHG emissions produced during upstream production, midstream refining, and downstream end use of refined products. In a ranking of lifecycle emissions of 75 crudes from around the globe, California oils were the only U.S. oils in the top 10.[39] When all California oil field production is considered, three-quarters of California's current crude oil production is very dirty, with GHG emissions comparable to Canada's tar sands crude and diluted bitumen.[40]

Although the Trump Administration has since revoked the CEQ's August 2016 Climate Guidance[41] and BLM revoked IM No. 2017-003 regarding the Guidance on October 24, 2017, BLM is still bound by existing case law applying these documents.[42]

Furthermore, BLM is required to assess recent science and include high quality information in its NEPA analyses. Thus, the BLM must consider the recent information from January 2019 which found that existing fossil fuel reserves would push the world beyond warming of 1.5°C and 2°C above pre-industrial levels.[43] The report specifically found that:

- Between now and 2030, the United States is on track to account for 60 percent of world growth in oil and gas production, expanding extraction at least four times more than any other country. This is the time period over which climate

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Progress, Center for Biological Diversity (Nov. 2017) ("Oil Stain 2017"), available at: https://www.biologicaldiversity.org/programs/climate_law_institute/energy_and_global_warming/pdfs/Oil_Stain.pdf.

[39] The crude from California's largest oil field, Midway-Sunset, ranked third out of 75, making it one of the world's highest greenhouse gas emitters, followed by South Belridge in sixth place and Wilmington in tenth place. Louisiana's Lake Washington Field was the next closest, tied for 17th place. Carnegie Endowment for International Peace, Profiling Emissions in the Supply Chain, http://oci.carnegieendowment.org/#supply-chain (Accessed Sept. 6, 2018).

[40] Oil Stain 2017.

[41] Presidential Executive Order: Promoting Energy Independence and Economic Growth at § 3(c) (Mar. 28, 2017), available at: https://www.whitehouse.gov/presidential-actions/presidential-executive-order-promoting-energy-independence-economic-growth/.

[42] *See Sierra Club v. Fed. Energy Regulatory Comm'n*, 867 F.3d 1357, 1374 (D.C. Cir. 2017); *San Juan Citizens All. v. U.S. Bureau of Land Mgmt.*, No. 16-CV-376-MCA-JHR, 2018 WL 2994406, at *10, n.5 (D.N.M. June 14, 2018) (finding the CEQ Guidance to be persuasive, despite its revocation).

[43] *See* Kelly Trout & Lorne Stockman, Oil Change International, Drilling Toward Disaster: Why U.S Oil & Gas Expansion is Incompatible with Climate Limits, 1, 6, 11 (Jan. 2019), available at: http://priceofoil.org/content/uploads/2019/01/Drilling-Towards-Disaster-Web-v3.pdf.

scientists say global carbon dioxide (CO2) emissions should be roughly halved to stay in line with the 1.5°C target in the Paris Agreement.

- Between 2018 and 2050, the United States is set to unleash the world's largest burst of CO2 emissions from new oil and gas development (Figure ES-2). U.S. drilling into new oil and gas reserves could unlock 120 billion metric tons of CO2 emissions, which is equivalent to the lifetime CO2 emissions of nearly 1,000 coal-fired power plants.

- If not curtailed, U.S. oil and gas expansion will impede the rest of the world's ability to manage a climate-safe, equitable decline of oil and gas production. We find that, under an illustrative 1.5°C pathway for oil and gas taken from the Intergovernmental Panel on Climate Change (IPCC), U.S. production would exhaust nearly 50 percent of the world's total allowance for oil and gas by 2030 and exhaust more than 90 percent by 2050.

In all its decision-making processes, BLM must give meaningful consideration to alternatives that reduce greenhouse gas emissions consistent with 1.5ºC climate targets, including the phase-out of fossil fuel production. Where, as here, the climate consequences of BLM planning and leasing decisions have never been evaluated, the agency must consider the indirect and cumulative effects of oil and gas production, and reasonable alternatives and mitigation measures. Meaningful analysis of these indirect and cumulative impacts must consider all relevant factors, including the life cycle impacts of production, processing, transport, and combustion; market and energy impacts of cumulative BLM leasing and production decisions; effects of methane venting, flaring, and leakage. Further, these indirect and cumulative impacts must be given meaningful context, including national and regional carbon budgets, rather than simply dismissed as insignificant compared to global totals.

Scientific research has established that there is no room in the global carbon budget for new fossil fuel extraction if we are to avoid the worst dangers from climate change. Instead, new fossil fuel production and infrastructure must be halted and much existing production must be phased out to meet the Paris Agreement climate targets and avoid catastrophic climate damages.

The United States has committed to the climate change target of holding the long-term 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" under the Paris Agreement.[44] The Paris Agreement established the 1.5°C climate target given the evidence that

[44] 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), available at: http://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf ("Paris Agreement"). The United States signed the Paris Agreement on April 22, 2016 as a legally binding instrument through executive agreement, and the treaty entered into force on November 4, 2016. Although the Trump administration has announced its intent to withdraw from the agreement, the United States at this time remains a party

2°C of warming would lead to catastrophic climate harms.[45] Scientific research has estimated the global carbon budget—the remaining amount of carbon dioxide that can be emitted—for maintaining a likely chance of meeting the Paris climate targets, providing clear benchmarks for United States and global climate action.[46]

Importantly, a 2016 global analysis found that the carbon emissions that would be released from burning the oil, gas, and coal in the world's currently operating fields and mines would fully exhaust and exceed the carbon budget consistent with staying below 1.5°C.[47] The reserves in currently operating oil and gas fields alone, even excluding coal mines, would likely lead to warming beyond 1.5°C.[48] An important conclusion of the analysis is that no new fossil fuel extraction or infrastructure should be built, and governments should grant no new leases for extraction and infrastructure. Furthermore, many of the world's existing oil and gas fields and coal mines will need to be closed before their reserves are fully extracted in order to limit warming to 1.5°C.[49] In short, the analysis established that there is no room in the carbon budget for new fossil fuel extraction or infrastructure anywhere, including in the United States, and much existing fossil fuel production must be phased out to avoid the catastrophic damages from climate change.[50]

A 2019 analysis underscored that the United States must halt new fossil fuel extraction and rapidly phase out existing production to avoid jeopardizing our ability to meet the Paris

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[45] Intergovernmental Panel on Climate Change, Global Warming of 1.5°C, an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (October 6, 2018), available at: http://www.ipcc.ch/report/sr15/.

[46] The 2018 IPCC special report on Global Warming of 1.5°C estimated the carbon budget for a 66 percent probability of limiting warming to 1.5°C at 420 $GtCO_2$ and 570 $GtCO_2$ from January 2018 onwards, depending on the temperature dataset used. At the current emissions rate of 42 $GtCO_2$ per year, this carbon budget would be expended in just 10 to 14 years. *See* Intergovernmental Panel on Climate Change, Global Warming of 1.5°C, an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (October 6, 2018), at SPM-16.

[47] Oil Change International, The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production (September 2016), available at: http://priceofoil.org/2016/09/22/the-skys-limit-report/ at Table 3. According to this analysis, the CO_2 emissions from developed reserves in existing and under-construction global oil and gas fields and existing coal mines are estimated at 942 Gt CO_2, which vastly exceeds the 1.5°C-compatible carbon budget estimated in the 2018 IPCC report on Global Warming of 1.5°C at 420 $GtCO_2$ to 570 $GtCO_2$.

[48] The CO_2 emissions from developed reserves in currently operating oil and gas fields alone are estimated at 517 Gt CO_2, which would likely exhaust the 1.5°C-compatible carbon budget estimated in the 2018 IPCC report on Global Warming of 1.5°C at 420 $GtCO_2$ to 570 $GtCO_2$.

[49] Oil Change International, The Sky's Limit California: Why the Paris Climate Goals Demand That California Lead in a Managed Decline of Oil Extraction (2018), available at: http://priceofoil.org/ca-skys-limit at 7, 13.

[50] This conclusion was reinforced by the IPCC Fifth Assessment Report which estimated that global fossil fuel reserves exceed the remaining carbon budget (from 2011 onward) for staying below 2°C (a target incompatible with the Paris Agreement) by 4 to 7 times, while fossil fuel resources exceed the carbon budget for 2°C by 31 to 50 times. *See* Bruckner, Thomas et al., 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 (2014), at Table 7.2.

climate targets and avoid the worst dangers of climate change.[51] The analysis showed that the U.S. oil and gas industry is on track to account for 60 percent of the world's projected growth in oil and gas production between now and 2030—the time period over which the IPCC concluded that global carbon dioxide emissions should be roughly halved to meet the 1.5°C Paris Agreement target.[52] Between 2018 and 2050, the United States is poised to unleash the world's largest burst of CO_2 emissions from new oil and gas development—primarily from shale and largely dependent on fracking—estimated at 120 billion metric tons of CO_2 which is equivalent to the lifetime CO_2 emissions of nearly 1,000 coal-fired power plants. Based on a 1.5°C IPCC pathway, U.S. production alone would exhaust nearly 50 percent of the world's total allowance for oil and gas by 2030 and exhaust more than 90 percent by 2050. Additionally, if U.S. coal production is to be phased out over a timeframe consistent with equitably meeting the Paris goals, at least 70 percent of U.S. coal reserves in already-producing mines must stay in the ground. In short, if not curtailed, U.S. fossil fuel expansion will impede the world's ability to meet the Paris climate targets and preserve a livable planet.

These analyses highlight that the United States has an urgent responsibility to lead in the transition from fossil fuel production to 100 percent clean energy, as a wealthy nation with ample financial resources and technical capabilities, and due to its dominant role in driving climate change and its harms. The U.S. is currently the world's largest oil and gas producer and third-largest coal producer.[53] The U.S. is also the world's largest historic emitter of greenhouse gas pollution, responsible for 25 percent of cumulative global CO_2 emissions since 1870, and is currently the world's second highest emitter on an annual and per capita basis.[54] The U.S. must focus its resources and technology to rapidly phase out extraction while investing in a just transition for affected workers and communities currently living on the front lines of the fossil fuel industry and its pollution.[55]

Research on the United States' carbon budget and the carbon emissions locked in U.S. fossil fuels similarly establishes that the U.S. must halt new fossil fuel production and rapidly phase out existing production to avoid the worst dangers of climate change. An analysis of U.S. fossil fuel resources demonstrates that the potential carbon emissions from already leased fossil fuel resources on U.S. federal lands would essentially exhaust the remaining U.S. carbon budget

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[51] Oil Change International, Drilling Toward Disaster: Why U.S. Oil and Gas Expansion Is Incompatible with Climate Limits (January 2019), available at: http://priceofoil.org/drilling-towards-disaster.

[52] Intergovernmental Panel on Climate Change, Global Warming of 1.5°C, an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (2018), available at: http://www.ipcc.ch/report/sr15/ at SPM-15.

[53] Oil Change International, Drilling Toward Disaster: Why U.S. Oil and Gas Expansion Is Incompatible with Climate Limits (January 2019), available at: http://priceofoil.org/drilling-towards-disaster at 5.

[54] LeQuéré, Corinne et al., Global carbon budget 2018, 10 Earth System Science Data 2141 (2018) at Figure 5, 2167; Global Carbon Project, Global Carbon Budget 2018 (published on 5 December 2018), available at: https://www.globalcarbonproject.org/carbonbudget/18/files/GCP_CarbonBudget_2018.pdf at 19 (Historical cumulative fossil CO_2 emissions by country).

[55] Piggot, Georgia et al., Realizing a just and equitable transition away from fossil fuels, Discussion brief, Stockholm Environment Institute (January 2019), available at: https://www.sei.org/publications/just-and-equitable-transition-fossil-fuels/.

consistent with the 1.5°C target. This 2015 analysis estimated that recoverable fossil fuels from U.S. federal lands would release up to 349 to 492 $GtCO_2eq$ of carbon emissions, if fully extracted and burned.[56] Of that amount, already leased fossil fuels would release 30 to 43 $GtCO_2eq$ of emissions, while as yet unleased fossil fuels would emit 319 to 450 $GtCO_2eq$ of emissions. Thus, carbon emissions from already leased fossil fuel resources on federal lands alone (30 to 43 $GtCO_2eq$) would essentially exhaust the U.S. carbon budget for a 1.5°C target (25 to 57 $GtCO_2eq$)[57], if these leased fossil fuels are fully extracted and burned. The potential carbon emissions from unleased federal fossil fuel resources (319 to 450 $GtCO_2eq$) would exceed the U.S. carbon budget for limiting warming to 1.5°C many times over.[58] This does not include the additional carbon emissions that will be emitted from fossil fuels extracted on non-federal lands, estimated up to 500 $GtCO_2eq$ if fully extracted and burned.[59]

In 2018, the U.S. Geological Survey and Department of the Interior estimated that carbon emissions released from extraction and end-use combustion of fossil fuels produced on federal lands alone—not including non-federal lands—accounted for approximately one quarter of total U.S. carbon emissions during 2005 to 2014.[60] This research further establishes that the United States must halt new fossil fuel projects and close existing fields and mines before their reserves are fully extracted to achieve the Paris climate targets and avoid the worst damages from climate change.

Meaningful consideration of greenhouse gas emissions (GHGs) is clearly within the scope of required NEPA review. *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin*., 538 F.3d 1172, 1217 (9th Cir. 2008). As the Ninth Circuit has held, in the context of fuel economy standard rules:

> The impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct. Any given rule setting a CAFE standard might have an "individually minor" effect on the environment, but these rules are "collectively significant actions taking place over a period of time"[61]

The courts have ruled that federal agencies consider indirect GHG emissions resulting from agency policy, regulatory, and leasing decisions. For example, agencies cannot ignore the

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[56] Ecoshift Consulting, et al., The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels, Prepared for Center for Biological Diversity & Friends of the Earth (2015).
[57] Robiou du Pont, Yann et al., Equitable mitigation to achieve the Paris Agreement goals, 7 Nature Climate Change 38 (2017), at Supplemental Table 1.
[58] Ecoshift Consulting, et al., The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels, Prepared for Center for Biological Diversity & Friends of the Earth (2015), at 4.
[59] Ecoshift Consulting, et al., The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels, Prepared for Center for Biological Diversity & Friends of the Earth (2015) at 3 ("the potential GHG emissions of federal fossil fuels (leased and unleased) are 349 to 492 Gt CO2e, representing 46 percent to 50 percent of potential emissions from all remaining U.S. fossil fuels").
[60] Merrill, Matthew D. et al., Federal lands greenhouse gas emissions and sequestration in the United States—Estimates for 2005–14: U.S. Geological Survey Scientific Investigations Report 2018–5131 (2018) at 8.
[61] *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin*., 538 F.3d 1172, 1216 (9th Cir. 2008)(quoting 40 C.F.R. § 1508.7).

indirect air quality and climate change impact of decisions that would open up access to coal reserves.[62]

NEPA requires "reasonable forecasting," which includes the consideration of "reasonably foreseeable future actions…even if they are not specific proposals."[63] That BLM cannot "accurately" calculate the total emissions expected from full development is not a rational basis for cutting off its analysis. "Because speculation is . . . implicit in NEPA," agencies may not "shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as crystal ball inquiry."[64] The D.C. Circuit has echoed this sentiment, rejecting the argument that it is "impossible to know exactly what quantity of greenhouse gases will be emitted" and countering that "agencies may sometimes need to make educated assumptions about an uncertain future" in order to comply with NEPA's reasonable forecasting requirement.[65]

Indeed, the EA for a lease sale in Utah undercuts BLM's assertion here that GHGs cannot be quantified at the leasing stage.[66]

The final CEQ *Guidance on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Review* is dispositive on the issue of federal agency review of greenhouse gas emissions as foreseeable direct and indirect effects of the proposed action. 81 Fed. Reg. 51,866 (Aug. 5, 2016). The CEQ guidance provides clear direction for BLM to conduct a lifecycle greenhouse gas analysis because the modeling and tools to conduct this type of analysis are readily available to the agency:

> If the direct and indirect GHG emissions can be quantified based on available information, including reasonable projections and assumptions, agencies should consider and disclose the reasonably foreseeable direct and indirect emissions when analyzing the direct and indirect effects of the proposed action. Agencies should disclose the information and any assumptions used in the analysis and explain any uncertainties. To compare a project's estimated direct and indirect emissions with GHG emissions from the no-action alternative, agencies should draw on existing, timely, objective, and authoritative analyses, such as those by

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[62] *See Mid States Coal. For Progress v. Surface Transp. Bd.*, 345 F.3d 520, 532, 550 (8th Cir. 2003); *High Country Conservation Advocates v. U.S. Forest Serv.*, 52 F.Supp. 3d 1174, 1197-98 (D.Colo. 2014); *Montana Environmental Information Center v. U.S. Office of Surface Mining*, 274 F. Supp. 3d 1074 (D. Mont. 2017), *amended in part, adhered to in part*, 2017 WL 5047901 (D. Mont. 2017).

[63] *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1079 (9th Cir. 2011) (citation omitted).

[64] *Id.*

[65] *Sierra Club v. Federal Energy Regulatory Commission*, 863 F.3d 1357, 1373-74 (D.C. Cir. 2017).

[66] U.S. Bureau of Land Management, Environmental Assessment for West Desert District, Fillmore Field Office, August 2015 Oil and Gas Lease Sale, pp. 57-58 (Dec. 2015); U.S. Bureau of Land Management, Greenhouse Gases Estimate (West Desert District Nov 2015 Lease Sale), http://www.blm.gov/style/medialib/blm/ut/natural_resources/airQuality.Par; *See High Country Conservation Advocates v. United States Forest Serv.*, 52 F. Supp. 3d 1174, 1196 (D. Colo. 2014) (decision to forgo calculating mine's reasonably foreseeable GHG emissions was arbitrary "in light of the agencies' apparent ability to perform such calculations").

> the Energy Information Administration, the Federal Energy Management Program, or Office of Fossil Energy of the Department of Energy. In the absence of such analyses, agencies should use other available information.[67]

CEQ's guidance even provides an example of where a lifecycle analysis is appropriate in a leasing context at footnote 42:

> The indirect effects of such an action that are reasonably foreseeable at the time would vary with the circumstances of the proposed action. For actions such as a Federal lease sale of coal for energy production, the impacts associated with the end-use of the fossil fuel being extracted would be the reasonably foreseeable combustion of that coal.[59]

Although the 2016 CEQ guidance has been "withdrawn for further consideration,"[68] the underlying requirement to consider climate change impacts under NEPA, including indirect and cumulative combustion impacts foreseeably resulting from fossil fuels leasing decisions, has not changed.[69]

It is reasonably foreseeable, as opposed to speculative, that this lease sale will induce oil and natural gas production, transmission and ultimate end-user climate change impacts. The effects of this induced production must be considered in an EA, and in fact, necessitate a more robust review under an EIS. *See, e.g., N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1081-82 (9th Cir. 2011) (finding that NEPA review must consider induced coal production at mines, which was a reasonably foreseeable effect of a project to expand a railway line that would carry coal, especially where company proposing the railway line anticipated induced coal production in justifying its proposal); *Mid States Coal. for Progress v. Surface Transp. Bd.*, 345 F.3d 520, 549-50 (8th Cir. 2003) (environmental effects of increased coal consumption due to construction of a new rail line to reach coal mines was reasonably foreseeable and required evaluation under NEPA). The development of an area for lease and subsequent oil and gas production would certainly result in combustion of the extracted product. As courts have held in similar contexts, combustion emissions resulting from opening up a new area to development are "reasonably foreseeable," and therefore a "proximate cause" of the leasing. See *Mid States Coal. for Progress v. Surface Transp. Bd*., 345 F.3d 520, 549 (8th Cir. 2003) (holding that agency violated NEPA when it failed to disclose and analyze the future coal combustion impacts associated with the agency's approval of a railroad line that allowed access to coal deposits); *High Country Conserv'n Advocates v. United States Forest Serv.*, 52 F. Supp. 3d 1174, 1197 (D. Colo. 2014) (same with respect to GHG emissions resulting from approval of coal mining exploration project).

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[67] 81 Fed. Reg. 51,866 at 16 (Aug. 5, 2016) (citations omitted).
[68] 82 Fed. Reg. 16,576 (April 5, 2017).
[69] *See S. Fork Band*, 588 F.3d at 725; *Ctr. for Biological Diversity*, 538 F.3d at 1214-15; *Mid States Coalition for Progress*, 345 F.3d at 550; *WildEarth Guardians*, 104 F. Supp. 3d at 1230; *Dine Citizens Against Ruining Our Env't*, 82 F. Supp. 3d at 1201; *High Country Conservation Advocates*, 52 F. Supp. 3d at 1174.

In both *Mid States Coalition* and *High Country*, the courts rejected the government's rationale that increased emissions from combustion of coal was not reasonably foreseeable because the same amount of coal would be burned without opening up the areas at issue to new coal mining. Both courts found this argument "illogical at best" and noted that "increased availability of inexpensive coal will at the very least make coal a more attractive option to future entrants into the utilities market when compared with other potential fuel sources, such as nuclear power, solar power, or natural gas." See *High Country*, 52 F. Supp. 3d at 1197 (quoting *Mid States Coalition*, 345 F.3d at 549). "On similar grounds, the development of new wells over the proposed areas for lease will increase the supply of [oil and natural gas]. At some point this additional supply will impact the demand for [oil and gas] relative to other fuel sources, and [these minerals] that otherwise would have been left in the ground will be burned. This reasonably foreseeable effect must be analyzed, even if the precise extent of the effect is less certain." *Id. See also WildEarth Guardians v. United States Office of Surface Mining, Reclamation & Enf't*, 104 F. Supp. 3d 1208, 1229-30 (D. Colo. 2015) (coal combustion was indirect effect of agency's approval of mining plan modifications that "increased the area of federal land on which mining has occurred" and "led to an increase in the amount of federal coal available for combustion.")[70]

Even if it were true that potential emissions cannot reasonably be estimated, or estimated with a high degree of accuracy, it is possible for BLM to identify significant sources of greenhouse gas emissions, which would enable the identification of specific measures to reduce emissions and an understanding of the extent to which certain emissions are avoidable. The extreme urgency of the climate crisis requires BLM to pursue all means available to limit the climate change effects of its actions. Any emissions source, no matter how small, is potentially significant, such that BLM should fully explore mitigation and avoidance options for all sources.

By delaying quantification until after a lease is issued, BLM may prejudice the consideration of alternatives or leasing stipulations that would avoid or reduce greenhouse gas emissions to an extent not otherwise available after leasing. BLM has long (but incorrectly) maintained that leasing stipulations can only be imposed with the issuance of the lease. Thereafter, purportedly, its authority to condition drilling is limited to "reasonable measures" or "conditions of approval" that may not be "[in]consistent with lease rights granted." 43 C.F.R. § 3101.1-2. Cost-prohibitive measures could therefore potentially be barred. Further, measures to "minimize" impacts may be imposed, but those may not necessarily avoid impacts altogether. *Id.* Waiting until the drilling stage could also be too little too late, as various other actions may occur between leasing and drilling, such as the execution of unit agreements, or construction of roads

[70] *See also*, Council on Environmental Quality's Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews, 81 Fed. Reg. 51,866 at 14 (Aug. 5, 2016)(For example, NEPA reviews for proposed resource extraction and development projects typically include the reasonably foreseeable effects of various phases in the process, such as clearing land for the project, building access roads, extraction, transport, refining, processing, using the resource, disassembly, disposal, and reclamation. Depending on the relationship between any of the phases, as well as the authority under which they may be carried out, agencies should use the analytical scope that best informs their decision making.)

or pipelines, all of which may narrow mitigation options available at the drilling stage. *See William P. Maycock et al.*, 177 I.B.L.A. 1, 20-21 (Dec. Int. 2008) (holding that unit agreements limit drilling-stage alternatives).

However, as explained above, the EA's treatment of greenhouse gas emissions is insufficient and nominal at best. A thorough consideration of greenhouse gas emissions would necessitate a conclusion that this action will have significant environmental effects, requiring the development of an EIS.

Finally, and notably, the BLM must also consider a new study that was published in the journal *Nature* on February 19, 2020, analyzing pre-industrial ice cores to better quantify anthropogenic fossil methane emissions.[71] The results "indicate that anthropogenic fossil [methane] emissions are underestimated by about 38 to 58 teragrams CH4 per year, or about 25 to 40 percent of recent estimates."[72] This "highlights the human impact on the atmosphere and climate, provides a firm target for inventories of the global [methane] budget."[73] The BLM must consider what implications its leasing decisions will have, against this backdrop of new information.

Utilizing BLM's own potential volume data for the this lease sale, the estimated oil volume of almost 1 mmbbl represents lifecycle greenhouse gas emissions of up to 350,311.49 metric tons of CO2e and the estimated gas volume of 3.24 bcf represents lifecycle greenhouse gas emissions of up to 189,813.69 metric tons of CO2e. Potential lifecycle greenhouse gas emissions for resultant oil and gas volumes were generated using a peer-reviewed carbon calculator and lifecycle greenhouse gas emissions model developed by EcoShift consulting.[74] This model is not novel in its development or methodology. Numerous greenhouse gas calculation tools exist to develop lifecycle analyses, particularly for fossil fuel extraction, operations, transport and end-user emissions.[75] Indeed, the Department of Energy has historically utilized these types of lifecycle emissions analyses in NEPA reviews of oil and gas infrastructure projects.[76] Other federal agencies have begun to employ upstream, downstream,

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[71] Benjamin Hmiel et. al, *Preindustrial $^{14}CH_4$ indiciates greater anthropogenic fossil CH_4 emissions*, Nature, 409, 409 (February 19, 2020).
[72] Benjamin Hmiel et. al, Preindustrial 14CH4 indicates greater anthropogenic fossil CH4 emissions, NATURE, 409, 409 (February 19, 2020).
[73] Benjamin Hmiel et. al, Preindustrial 14CH4 indicates greater anthropogenic fossil CH4 emissions, NATURE, 409, 409 (February 19, 2020).
[74] *See* Ecoshift Consulting, The potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels, Center for Biological Diversity and Friends of the Earth (2015), http://www.ecoshiftconsulting.com/wp-content/uploads/Potential-Greenhouse-Gas-Emissions-U-S-Federal-Fossil-Fuels.pdf.
[75] *See* Council on Environmental Quality, Revised draft guidance for greenhouse gas emissions and climate change impacts (2014), https://ceq.doe.gov/current_developments/GHG-accounting-tools.html.
[76] U.S. Department of Energy National Energy Technology Laboratory, Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States, DOE/NETL-2014/1649 (May 29, 2014) *available at* http://energy.gov/sites/prod/files/2014/05/f16/Life%20Cycle%20GHG%20Perspective%20Report.pdf. *See also*, U.S. Department of Energy National Renewable Energy Laboratory, Life Cycle Greenhouse Gas Emissions from Electricity Generation Fact Sheet, Pub No. NREL/FS-6A20-57817 (2013) *available at* http://www.nrel.gov/docs/fy13osti/57187.pdf; U.S. Department of Energy National Energy Technology Laboratory Role of Alternative Energy Sources: Natural Gas Technology Assessment, Pub No. DOE/NETL- 2012/1539 (NETL,

and lifecycle greenhouse gas emissions analyses for NEPA review of energy-related projects.[77] Courts have upheld the viability and usefulness of lifecycle analyses, and adoption of this trend is clearly reflected in the CEQ Guidance on Climate Change . 81 Fed. Reg. 51, 866 at 11 (Aug. 5, 2016) ("This guidance recommends that agencies quantify a proposed agency action's projected direct and indirect GHG emissions. Agencies should be guided by the principle that the extent of the analysis should be commensurate with the quantity of projected GHG emissions and take into account available data and GHG quantification tools that are suitable for and commensurate with the proposed agency action").[78]

2012) *available at* https://www.netl.doe.gov/File%20Library/Research/Energy%20Analysis/Life%20Cycle%20Analysis/LCA-2012-1539.pdf; U.S. Department of Energy National Energy Technology Laboratory, Life Cycle Greenhouse Gas Inventory of Natural Gas Extraction, Delivery and Electricity Production, Pub No. DOE/NETL-2011/1522 (NETL, 2011) *available at* http://www.fossil.energy.gov/programs/gasregulation/authorizations/2013_applications/sierra_club_13-69_venture/exhibits_44_45.pdf; U.S. Department of Energy National Energy Technology Laboratory, Life Cycle Analysis: Natural Gas Combined Cycle (NGCC) Power Plant, Pub No DOE/NETL-403-110509 (Sep 10, 2012) (NETL, 2010) *available at* https://www.netl.doe.gov/energy-analyses/temp/FY13_LifeCycleAnalysisNaturalGasCombinedCycle(NGCC)PowerPlantFinal_060113.pdf.

[77] U.S. Bureau of Land Management, Final Supplemental Environmental Impact Statement for the Leasing and Underground Mining of the Greens Hollow Federal Coal Leas Tract, UTU-84102, 287 (Feb 2015) (BLM expressly acknowledged that "the burning of the coal is an indirect impact that is a reasonable progression of the mining activity" and quantified emissions from combustion without any disclaimer about other sources of coal. *Id* at 286. In that same EIS, BLM also acknowledged that truck traffic to haul coal would be extended as a result of the proposed lease approval, and this would generate additional emissions.) *See also*, U.S. Forest Service, Record of Decision and Final Environmental Impact Statement, Oil and Gas Leasing Analysis, Fishlake National Forest, 169 (Aug 2013) (Table 3.12-7: shows GHG emissions from transportation, offsite refining and end use; and total direct and indirect emissions. *See also id*., Appendix E/SIR-2 (more detailed calculations of direct and indirect emissions.)) U.S. Army Corps of Engineers, Final Environmental Impact Statement: Alaska Stand Alone Gas Pipeline, Volume 2 Sec. 5.20-70–71 (Oct. 2012) The Corps, in a 2012 EIS for an intrastate natural gas pipeline in Alaska, estimated downstream emissions from combustion of the natural gas that would be transported, and also discussed the potential for natural gas to displace other, dirtier fuel sources such as coal and oil.) U.S. Department of State, Final Supplemental Environmental Impact Statement for the Keystone XL Project, § 4.14.3, Appendix U (Jan. 2014)(The Department of State, as lead agency on the Keystone XL Pipeline Review conducted a relatively comprehensive life-cycle greenhouse gas analysis for the proposed pipeline, alternatives, and baseline scenarios that could occur if the pipeline was not constructed.) U.S. Environmental Protection Agency Region X, Letter from Dennis McLerran, Regional Administrator, to Randel Perry, U.S. Army Corps of Engineers Seattle District, re Gateway Pacific Projects (Jan 22, 2013) *available* at http://www.eisgatewaypacificwa.gov/sites/default/files/content/files/EPA_Reg10_McLerran.pdf#overlay-context=resources/project-library. (EPA submitted comments on the scope of impacts that should be evaluated in the coal terminal EIS that the Corps is preparing, in which it urged the Corps to conduct a lifecycle emissions analysis of GHG emissions from the coal that would be transported via the terminal.)

[78] *High Country Conservation Advocates v. United States Forest Serv*., 52 F. Supp. 3d 1174 (D. Colo. 2014) (Court held that the agencies' failure to quantify the effect of greenhouse gas (GHG) emissions from the mining lease modifications was arbitrary in violation of NEPA because the social cost of carbon protocol tool existed for such analysis under 40 C.F.R. § 1502.23 but the agencies did not provide reasons in the final EIS for not using the tool; and that the agencies' decision to forgo calculating the foreseeable GHG emissions was arbitrary in light of their ability to perform such calculations and their decision to include a detailed economic analysis of the benefits.) See also, *Dine Citizens Against Ruining Our Env't v. United States Office of Surface Mining Reclamation & Enf't*, 82 F. Supp. 3d 1201, 1213-1218 (D. Colo. 2015) (Court held that the agency failed to adequately consider the reasonably foreseeable combustion-related downstream effects of the proposed action. Also held that that combustion emissions

C. The EA Fails to Adequately Quantify the Cumulative Lifecycle Emissions of Oil and Gas Production from this Lease Sale and Fails to Assign Significance of those Emission on Climate Change

Despite the mandate to address the impacts of climate change, BLM failed to engage in a robust examination of cumulative impacts of oil and gas production. Instead of intense consideration, BLM provides the barebones numbers addressing the expected emission across the life cycle of the wells but fails to engage in any analysis for what the cumulative impact of these wells will be in the region. The EA concludes that the impact of these ten wells is insignificant in relation to total oil and gas production.[69]BLM fails to examine the continuation of production through the lens of climate change nor does it use scientifically accepted models of significance like the social cost of carbon or global carbon budgets.

In the context of this lease sale, BLM's analysis of cumulative impacts should also include use of the Social Cost of Methane (a protocol developed by the Environmental Protection Agency) in order to quantify all of the potential costs of leasing and subsequent development.

The alternatives analysis further highlights the bareness of BLM's analysis. NEPA requires that BLM engage in robust consideration of reasonable alternatives, through evaluation of both short- and long-term climate impacts, and by use of available tools or methods generally accepted in the scientific community to evaluate the impact of GHG emissions, including the social cost of carbon and global carbon budgets. In this case, the EA only discusses one alterative to the proposed action: no action.[70] A discussion of alternatives that would reduce the risks associated with climate change could help demonstrate an agency that is engaging with proper impacts analysis regarding climate.

An agency must "consider every significant aspect of the environmental impact of a proposed action." *Baltimore Gas & Elec. Co. v. Natural Resources Defense Council*, 462 U.S. 87, 107 (1983) (quotations and citation omitted). This includes the disclosure of direct, indirect, and cumulative impacts of its actions, including climate change impacts and emissions. 40 C.F.R. § 1508.25(c). The need to evaluate such impacts is bolstered by the fact that "[t]he harms associated with climate change are serious and well recognized," and environmental changes caused by climate change "have already inflicted significant harms" to many resources around the globe. *Massachusetts v. EPA*, 549 U.S. 497, 521 (2007); *see also id*. at 525 (recognizing "the enormity of the potential consequences associated with manmade climate change."). Failing to perform such analysis undermines the agency's decision-making process and the assumptions made.

NEPA requires federal agencies to prepare an EIS for any "major Federal actions significantly affecting the quality of the human environment." *Montana Envtl. Info. Ctr. v. U.S. Office of Surface Mining*, 274 F. Supp. 3d 1074, 1097 (D. Mont. 2017)(citing 42 U.S.C. §

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associated with a mine that fed a single power plant were reasonably foreseeable because the agency knew where the coal would be consumed).

4332(C)). In preparing an EIS, all agencies must include a detailed statement on (1) the environmental impact of the proposed action, (2) any adverse environmental effects which cannot be avoided should the proposal be implemented, (3) alternatives to the proposed action, (4) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and (5) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented. 42 U.S.C. § 4332(C). Section 4332(C) is an "action-forcing" provision intended as a directive to all agencies to assure consideration of the environmental impact of their actions in decisionmaking. *Kleppe v. Sierra Club*, 427 U.S. 390, 409 (1976). Furthermore, "an EIS must be prepared if substantial questions are raised as to whether a project may cause significant degradation of some human environmental factor…To trigger this requirement a plaintiff need not show that significant effects will in fact occur…raising substantial questions whether a project may have a significant effect is sufficient." *Id*. (citing *Ocean Advocates v. U.S. Army Corps of Eng'rs,* 402 F.3d 846, 864–65 (9th Cir. 2005)). When the court reviews an agency's decision to issue a FONSI, and thus not to prepare an EIS, "the arbitrary and capricious standard under the APA requires a court 'to determine whether the agency has taken a 'hard look' at the consequences of its actions, based [its decision] on a consideration of the relevant factors,' and provided a 'convincing statement of reasons to explain why a project's impacts are insignificant.'" *Id.* (citing *Barnes v. U.S. Dept. of Transp*., 655 F.3d 1124, 1132 (9th Cir. 2011)). The Ninth Circuit held that in order for the court to uphold an agency's finding of no significant impact, the agency must consider the project's potential impact on climate change due to the downstream GHG emissions released as a result of the action. *See Ctr. for Bio. Div*., 538 F.3d at 1223.

According to the IPCC Fifth Assessment (AR5), total cumulative anthropogenic emissions of CO_2 must remain below about 1,000 $GtCO_2$ (equal to 275 GtC) from 2011 onward for a 66 percent probability of limiting warming to 2°C above pre-industrial levels.[71] Specifically, the AR5 states that cumulative CO_2 emissions from all anthropogenic sources must stay below 1 trillion tons of carbon or 1000 GtC (equal to 3670 $GtCO_2$) from 1861-1880 onward for a >66 percent probability of limiting warming to less than 2°C.[72] The AR5 goes on to state that 1000 GtC is reduced to about 790 GtC (2900 $GtCO_2$) when accounting for non-CO_2 forcings. Furthermore, an amount of 515 GtC (1890 $GtCO_2$) was already emitted as of 2011. This leaves a carbon budget of 275 GtC or 1010 $GtCO_2$ from 2011 onward (i.e., 790 GtC minus 515 GtC leaves 275 GtC which equates to 1009 $GtCO_2$).

Given that global CO_2 emissions in 2015 alone totaled 9.8 GtC (36 $GtCO_2$),[73] this carbon budget is being rapidly consumed. The 275 GtC (1010 GtCO2) carbon budget from 2011 onward has been reduced to 232 GtC (850 $GtCO_2$) from 2015 onward.[74]

The cumulative lifecycle emissions from the proposed lease sale should be put in the context of the global and U.S. carbon budgets. The more than 17 million metric tons CO_2 that would result from the lease sale is significant in the scope of national, state, and local level commitments to implementing rapid GHG emissions reductions. As detailed below, the estimated downstream CO_2 emissions that would result from the lease sale comprise a measurable ~0.62 percent of the remaining U.S. carbon budget for staying well below 2°C. At a time when the U.S. must rapidly ratchet down GHG emissions to avoid the worst dangers of

climate change, the BLM should not be committing to new fossil fuel development and infrastructure on our public lands that locks in carbon intensive oil production for years into the future.

A robust body of scientific research has established that most fossil fuels must be kept in the ground to avoid the worst dangers of climate change. Human-caused climate change is already causing widespread damage from intensifying global food and water insecurity, the increasing frequency of heat waves and other extreme weather events, flooding of coastal regions by sea level rise and increasing storm surge, the rapid loss of Arctic sea ice and Antarctic ice shelves, increasing species extinction risk, and the worldwide collapse of coral reefs.[75] The Third National Climate Assessment makes clear that "reduc[ing] the risks of some of the worst impacts of climate change" will require "aggressive and sustained greenhouse gas emission reductions" over the course of this century.[76]

The United States has committed to the climate change target of holding the long-term 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"[77] under the Paris Agreement.[78] The United States signed the Paris Agreement on April 22, 2016 as a legally binding instrument through executive agreement,[79] and the treaty entered into force on November 4, 2016. The Paris Agreement codifies the international consensus that climate change is an "urgent threat" of global concern.[80] The Agreement also requires a "well below 2°C" climate target because 2°C of warming is no longer considered a safe guardrail for avoiding catastrophic climate impacts and runaway climate change.[81]

Immediate and aggressive greenhouse gas emissions reductions are necessary to keep warming well below 2°C rise above pre-industrial levels. The IPCC Fifth Assessment Report and other expert assessments have established global carbon budgets, or the total amount of carbon that can be burned while maintaining some probability of staying below a given temperature target. According to the IPCC, total cumulative anthropogenic emissions of CO_2 must remain below about 1,000 $GtCO_2$ from 2011 onward for a 66 percent probability of limiting warming to 2°C above pre-industrial levels, and to 400 $GtCO_2$ from 2011 onward for a 66 percent probability of limiting warming to 1.5°C.[82] These carbon budgets have been reduced to 850 $GtCO_2$ and 240 $GtCO_2$, respectively, from 2015 onward.[83]

Published scientific studies have estimated the United States' portion of the global carbon budget by allocating the remaining global budget across countries based on factors including equity and economics. Estimates of the U.S. carbon budget vary depending on the temperature target used by the study (1.5°C versus 2°C), the likelihood of meeting the temperature target (50 or 66 percent probability), the equity principles used to apportion the global budget among countries, and whether a cost-optimal model was employed. The U.S. carbon budget for limiting temperature rise to well below 2°C has been estimated at 38 $GtCO_2$, while the estimated budget for limiting temperature rise to 2°C ranges from 34 $GtCO_2$ to 158 $GtCO_2$.

A 2019 study by Stockholm Environmental Institute and others used publicly available data to estimate the difference between fossil fuel volumes and emissions that countries are

currently planning and what the Intergovernmental Panel on Climate Change (IPCC) estimates would be consistent with 1.5°C or 2°C pathways.[84] The analysis shows that countries' current plans and projections for fossil fuel production would lead, in 2030, to the emission of 39 billion tonnes (gigatonnes) of carbon dioxide (GtCO2).[85] That is 13 GtCO2, or 53%, more than would be consistent with a 2°C pathway (with an interquartile range of 11–15 GtCO2) and 120% or 21 GtCO2 (with a range of 18–23 GtCO2) greater than fossil fuel production levels consistent with a 1.5°C pathway.[86] This gap grows wider by 2040, when production levels reach 110% (22 GtCO2, with a range of 18–24) and 210% (28 GtCO2, with a range of 27–31) higher than those consistent with the 2°C and 1.5°C pathways.[87]

Du Pont et al. (2017) averaged across five IPCC-AR5 sharing principles (e.g. capability, equal per capita, greenhouse development rights, equal cumulative per capita, and constant emissions ratio) to estimate the U.S. carbon budget through 2100 based on a cost-optimal model.[88] Du Pont et al. (2017) estimated the U.S. carbon budget at 57 $GtCO_2eq$ (equal to ~ 38 $GtCO_2$)[89] for a 50 percent chance of returning global average temperature rise to 1.5°C by 2100, which is the only target among the studies that is consistent with the well below 2°C temperature commitment of the Paris Agreement. The U.S. carbon budget for a 66 percent probability of keeping warming below 2°C was estimated at 104 $GtCO_2eq$ (equal to ~ 69 $GtCO_2$).[90]

For a 66 percent probability of keeping warming below 2°C, Peters et al. (2015) estimated the U.S. carbon budget at 34 $GtCO_2$ based on an equity approach for allocating the global carbon budget, and 123 $GtCO_2$ under an inertia approach.[91] The "inertia" approach bases sharing on countries' current emissions, while the "equity" approach bases sharing on population size and provides for equal per-capita emissions across countries. Similarly using a 66 percent probability of keeping warming below 2°C, Gignac et al. (2015) estimated the U.S. carbon budget at 78 to 97 $GtCO_2$, based on a contraction and convergence framework, in which all countries adjust their emissions over time to achieve equal per-capita emissions.[92] Although the contraction and convergence framework corrects current emissions inequities among countries over a specified time frame, it does not account for inequities stemming from historical emissions differences. When accounting for historical responsibility, Gignac et al. (2015) estimated that the United States has an additional cumulative carbon debt of 100 $GtCO_2$ as of 2013. Using a non-precautionary 50 percent probability of limiting global warming to 2°C, Raupach et al. (2014) estimated the U.S. carbon budget at 158 $GtCO_2$ based on a "blended" approach of sharing principles that averages the "inertia" and "equity" approaches.[93] Of that 158 $GtCO_2$ budget, 91 $GtCO_2$ was categorized as "committed" emissions from existing CO_2-emitting infrastructure that will continue for infrastructure lifetimes without early retirement.[94] Under any scenario, the remaining U.S. carbon budget consistent with limiting global average temperature rise to 1.5°C or 2°C is extremely small and is rapidly being consumed.

Furthermore, a large body of scientific research has established that the vast majority of global and U.S. fossil fuels must stay in the ground in order to hold temperature rise to well below 2°C.[95] Studies estimate that 68 to 80 percent of global fossil fuel reserves must not be extracted and burned to limit temperature rise to 2°C based on a 1,000 $GtCO_2$ carbon budget.[96] For a 50 percent chance of limiting temperature rise to 1.5°C, 85 percent of known fossil fuel

reserves must stay in the ground.[97] Effectively, fossil fuel emissions must be phased out globally within the next few decades.[98]

A 2016 global analysis found that potential carbon emissions from developed reserves in currently operating oil and gas fields and mines would lead to global temperature rise beyond 2°C.[99] Excluding coal, currently operating oil and gas fields alone would take the world beyond 1.5°C.[100] To stay well below 2°C, the clear implication is that no new fossil fuel extraction or transportation infrastructure should be built, and governments should grant no new permits for new fossil fuel extraction and infrastructure.[101] Moreover, some fields and mines, primarily in rich countries, must be closed before fully exploiting their resources. The analysis concludes that, because existing fossil fuel reserves considerably exceed both the 2°C and 1.5°C carbon budgets, "[i]t follows that exploration for new fossil fuel reserves is at best a waste of money and at worst very dangerous."[102]

According to a U.S.-focused analysis,[103] the United States alone has enough recoverable fossil fuels, split about evenly between federal and non-federal resources, that if extracted and burned, would exceed the global carbon budget for a 1.5°C limit, and would consume nearly the entire global budget for a 2°C limit.[104] Specifically, the analysis found:

> Potential greenhouse gas emissions of federal fossil fuels (leased and unleased) if developed would release up to 492 $GtCO_2e$, representing 46 percent to 50 percent of potential emissions from all remaining U.S. fossil fuels.

Of that amount, up to 450 $GtCO_2e$ have not yet been leased to private industry for extraction. Releasing those 450 GtCO2e (the equivalent annual pollution of more than 118,000 coal-fired power plants) would be greater than any proposed U.S. share of global carbon limits that would keep emissions well below 2°C.105Fracking has also opened up vast resources that otherwise would not be available, increasing the potential for future greenhouse gas emissions.

In sum, the long-lived GHG emissions and fossil fuel infrastructure that would result from this lease sale will contribute to undermining climate commitments and increasing climate change impacts, at a time when there is urgent need to keep most fossil fuels in the ground.

Finally, the EA's climate change analysis should draw upon the 2017 National Climate Assessment's Climate Science Special Report.[106] Key points from this scientific report highlight the urgent need to reduce greenhouse gas emissions to avoid large and irreversible impacts:

- The magnitude of climate change beyond the next few decades will depend primarily on the amount of greenhouse gases (especially carbon dioxide) emitted globally. Without major reductions in emissions, the increase in annual average global temperature relative to preindustrial times could reach 9°F (5°C) or more by the end of this century. With significant reductions in emissions, the increase in annual average global temperature could be limited to 3.6°F (2°C) or less.
- The global atmospheric carbon dioxide (CO2) concentration has now passed 400 parts per million (ppm), a level that last occurred about 3 million years ago, when

> both global average temperature and sea level were significantly higher than today. Continued growth in CO2 emissions over this century and beyond would lead to an atmospheric concentration not experienced in tens to hundreds of millions of years. There is broad consensus that the further and the faster the Earth system is pushed towards warming, the greater the risk of unanticipated changes and impacts, some of which are potentially large and irreversible.[107]

The BLM must consider its action within the context of the climate science as outlined above and assign significance to the emissions that will result from its action. Given this significance, the BLM must prepare an EIS in order to evaluate the severity of the adverse effects of this action.[108]

D. The EA Fails to Adequately Address the Cumulative Impacts of Oil and Gas Production on Climate Change

Despite the mandate to address the impacts of climate change and the scientifically proven effects of oil and gas production on the climate, BLM failed to engage in a robust examination of cumulative impacts of oil and gas production. Instead of intense consideration, BLM provides the barebones numbers addressing the expected emission across the life cycle of the wells,[79] but fails to engage in any analysis for what the cumulative impact of these wells will be in the region. The EA concludes that the impact of these ten wells is insignificant in relation to total oil and gas production.[80] BLM fails to examine the continuation of production through the lens of climate change nor does it use scientifically accepted models of significance like the social cost of carbon or global carbon budgets. In the context of this lease sale, BLM's analysis of cumulative impacts should also include use of the Social Cost of Methane (a protocol developed by the Environmental Protection Agency) in order to quantify all of the potential costs of leasing and subsequent development.

The alternatives analysis further highlights the bareness of BLM's analysis. NEPA requires that BLM engage in robust consideration of reasonable alternatives, through evaluation of both short- and long-term climate impacts, and by use of available tools or methods generally accepted in the scientific community to evaluate the impact of GHG emissions, including the social cost of carbon and global carbon budgets. In this case, the EA only discusses one alternative to the proposed action: no action.[81] A discussion of alternatives that would reduce the risks associated with climate change could help demonstrate an agency that is engaging with proper impacts analysis regarding climate.

E. BLM Must Analyze the "Option Value" of Deferring Leasing

Leasing lands for oil and gas development gives preference to oil and gas development at the expense of other uses while handcuffing BLM's ability to make other management decisions

[79] EA at 39-41.
[80] EA at 40.
[81] EA at 10.

down the road. This is because the presence of oil and gas leases can limit BLM's willingness to manage for other resources in the future.

For example, in the Colorado River Valley RMP, BLM decided against managing lands for protection of wilderness characteristics in the Grand Hogback lands with wilderness characteristics unit based specifically on the presence of oil and gas leases, even though the leases were non-producing:

The Grand Hogback citizens' wilderness proposal unit contains 11,360 acres of BLM lands. All of the proposed area meets the overall criteria for wilderness character…There are six active oil and gas leases within the unit, totaling approximately 2,240 acres. None of these leases shows any active drilling or has previously drilled wells. The ability to manage for wilderness character would be difficult. If the current acres in the area continue to be leased and experience any development, protecting the unit's wilderness characteristics would be infeasible…[82]

Similarly, in the Grand Junction Resource Management Plan, BLM expressly stated that undeveloped leases on low-potential lands had effectively prevented management to protect wilderness characteristics, stating:

133,900 acres of lands with wilderness characteristics have been classified as having low, very low, or no potential…While there is not potential for fluid mineral development in most of the lands with wilderness characteristics units, the majority of the areas, totaling 101,100 acres (59 percent), are already leased for oil and gas development.[83]

The presence of leases can also limit BLM's ability to manage for other important, non-wilderness values, like renewable energy projects.[84] If BLM moves forward with this lease sale, BLM runs a similar risk of precluding future management decisions for other resources and uses, such as bird and other wildlife habitat, wilderness, recreation, and renewable energy development.

In this context, BLM can and should apply the principles of option value or informational values, which permit the agency to look at the benefits of delaying irreversible decisions. A recent New York University School of Law Institute for Policy Integrity report examines the business schemes and practices utilized by private oil and gas companies when leasing public lands.[85] The report found that "[w]hile private companies routinely account for option value, timing their purchasing and development decisions to be privately optimal, BLM fails to account

[82] Proposed Colorado River Valley RMP (2015), p. 3–135.
[83] *Id.*
[84] *See, e.g.*, Proposed White River Resource Management Plan, p. 4–498 ("Areas closed to leasing…indirectly limit the potential for oil and gas developments to preclude other land use authorizations not related to oil and gas (e.g., renewable energy developments, transmission lines) in those areas.").
[85] New York University School of Law; Institute for Policy Integrity, *Look Before You Lease; Reducing Fossil Fuel Dominance on Public Lands by Accounting for Option Value* (2020).

for option value in its land use planning and lease sale processes."[86] It is well established that issuance of an oil and gas lease is an irreversible commitment of resources. As the U.S. Court of Appeals for the D.C. Circuit held in the context of considering the informational value of delaying leasing on the Outer Continental Shelf, "[t]here is therefore a tangible present economic benefit to delaying the decision to drill for fossil fuels to preserve the opportunity to see what new technologies develop and what new information comes to light."[87]

The Institute for Policy Integrity report also proposes recommendations for how BLM can modernize its planning and leasing process to account for option value, using existing legal authority. Recommendations include offering only high-potential lands, if any, in lease sales, increasing minimum bids, and exploring other means of accounting for environmental and social considerations (such as valuing carbon sink attributes).

Thus, in evaluating this lease sale, BLM should evaluate option value—the economic benefits that could arise from delaying leasing and development based on improvements in technology, additional benefits that could come from managing these lands for other uses, additional information on the impacts of climate change, and ways to avoid or mitigate impacts on the environment. BLM must factor in option value to deliver a fair return to the public. BLM has the ability and obligation to undertake an analysis of the benefits of delaying leasing, which can be both qualitative and quantitative, considering both economic and environmental needs.

Overall, BLM has an obligation to utilize the best scientific data and tools available and disclose all climate impacts associated with the proposed project. The agency failed to properly place these new wells in the context of climate change. Without this analysis, the leasing cannot go forward.

III. The EA Fails to Comply with the CAA and FLPMA by Approving Oil and Gas Leasing in the San Joaquin Non-Attainment Zone

The Clean Air Act requires the Environmental Protection Agency ("EPA") to set National Ambient Air Quality Standards ("NAAQS") to protect public health and welfare.[88] After EPA designates NAAQS, states are required to develop State Implementation Plans ("SIPs") to implement, maintain, and enforce the NAAQS.[89]

Federal agency actions must comply with SIPs. Specifically, "[n]o department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve, any activity" that does not conform to an

[86] *Id.* at 4; *see also* Jayni Foley Hein, *Harmonizing Preservation and Production* (June 2015), *available at* https://policyintegrity.org/files/publications/DOI_LeasingReport.pdf ("Option value derives from the ability to delay decisions until later, when more information is available. . . . In the leasing context, the value associated with the option to delay can be large, especially when there is a high degree of uncertainty about resource price, extraction costs, and/or the social and environmental costs of drilling.").
[87] *Center for Sustainable Economy v. Jewell*, 779 F.3d 588, 610 (D.C. Cir. 2015).
[88] 42 U.S.C. § 7409.
[89] *Id.* § 7410(a)(1).

approved state SIP.[90] "The assurance of conformity . . . shall be an affirmative responsibility of the head of such . . . agency."[91] Federal agency actions must not 1) "cause or contribute to any new violation of any [air quality] standard," 2) "increase the frequency or severity of any existing violation of any standard in any area," 3) or "delay timely attainment of any standard or any required interim emission reductions or other milestones in any area."[92]

San Joaquin Valley is currently in extreme nonattainment with the 1997, 2008, and 2015 Ozone NAAQS, Serious nonattainment with the 1997 and 2006 PM2.5 NAAQS, and Moderate nonattainment with the 2012 PM2.5 NAAQS.[93] The San Joaquin Valley's air quality consistently ranks as among the worst in the nation because of these high levels of ozone and particulate matter.[94] Thus, BLM, a federal agency, is prohibited from undertaking any activity in this area that does not conform to San Joaquin Valley's SIP, including actions that increase the frequency and severity of any existing air quality violations or delay timely attainment of any standard.[95]

To determine whether a federal action conforms, BLM must first conduct an "applicability analysis" for ozone and particulate matter.[96] The rules define Direct emissions as those emissions that are caused or initiated by the Federal action and occur at the same time and place as the action and "are reasonably foreseeable."[97] Indirect emissions are defined as those emissions that are caused by the Federal action, but may occur later in time or distance, and are reasonably foreseeable, and which the Federal agency can practically control and will maintain control over.[98] "A Federal agency must make a determination that a Federal action conforms to the applicable implementation plan in accordance with the requirements of this subpart *before* the action is taken."[99]

A. New Oil and Gas Production will Further Contribute to Already High Levels of Air Pollution

It is not a coincidence that Kern County is both one of the highest producers of oil and gas in the state and has some of the nation's worst air quality. [100] Oil and gas production

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[90] 42 U.S.C. § 7506(c)(1).
[91] 42 U.S.C. § 7506(c)(1).
[92] *Id.* § 7506(c)(1)(B).
[93] EA at 15; https://www.epa.gov/green-book.

[94] NDRC, Drilling in California: Who's at Risk?, October 2014, available at https://www.nrdc.org/sites/default/files/california-fracking-risks-report.pdf
[95] 40 C.F.R. § 93.150(a)
[96] 40 C.F.R. § 93.153(b)(1); *See also* U.S. Dep't of the Interior, BLM, *Instruction Memorandum No. 2013-025: Guidance for Conducting Air Quality General Conformity Determinations* (Dec. 4, 2012), https://www.blm.gov/policy/im-2013-025.

[97] 40 C.F.R. § 93.152
[98] *Id.*
[99] *Id.* § 93.150(b) (emphasis added).
[100] Long, Jane C.S. et al., *Chapter 1: Introduction*, California Council on Science and Technology, An Independent Assessment of Well Stimulation in California Volume II: Potential Environmental Impact of Hydraulic Fracturing and Acid Stimulations (July 2015) at 44.

contributes mightily to the county's air pollution, particularly, preproduction emissions including from well pad production, drilling, well stimulation, and completion emit methane, bezene toulene, ethylenzene, xylene, VOCs, NOx, particulate matter, and hydrogen sulfide.[101] In fact, a Kern County forecast found that by 2035 the oil and gas industry would be the biggest source of NOx in the county, accounting for 70% of all emissions.[102] Fracking, allowed in the EA, can have an even greater impact on air quality.

Numerous impacts of fracking and other oil and gas extraction techniques are directly associated with the hundreds of chemical additives employed and the resultant air pollution. These chemicals fall into a number of categories: *breakers* to lower fracking fluid viscosity before fracking fluid flows back, proppants to keep newly-formed fractures open, *gelling agents* to pry open fractures, *biocides* to prevent bacteria from degrading gelling agents, *carriers* for aiding in transport of other fluids, and *crosslinkers* to increase viscosity of fluids to increase fracking effectiveness.[103]

Harmful air pollutants are emitted during every stage of unconventional oil and gas development, including drilling, completion, well stimulation, production, and disposal, as well as from transportation of water, sand, and chemicals to and from the well pad.[104] The well stimulation stage can emit diesel exhaust, VOCs, particulate matter, ozone precursors, silica, and acid mists.[105]

VOCs, NOx, methane, and ethane are potent ground-level (tropospheric) ozone precursors that are emitted by oil and gas drilling and fracking operations.[106] VOCs can form ground-level (tropospheric) ozone when combined with nitrogen oxides ("NO_X") from compressor engines, turbines, other engines used in drilling, and flaring,[107] in the presence of sunlight. This reaction can diminish visibility and air quality and harm vegetation. Many regions around the country with substantial oil and gas operations are now suffering from extreme ozone levels due to heavy emissions of these pollutants.[108] A recent study of ozone pollution in the

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[101] NRDC, Drilling in California: Who's at Risk?, October 2014, available at https://www.nrdc.org/sites/default/files/california-fracking-risks-report.pdf

[102] Kern County Planning and Community Development Department, Final Environmental Impact Report for the Revisions to the Kern County Zoning Ordinance – 2015 (C) Focused on Oil and Gas Permitting, SCH #2013081079 (Nov. 9, 2015) 4.3-120, Table 4.3-42.

[103] Stringfellow, William et al., Identifying chemicals of concern in hydraulic fracturing fluids used for oil production, 220 Environmental Pollution 413 (2017).

[104] McCawley, Michael, Air Contaminants Associated with Potential Respiratory Effects from Unconventional Resource Development Activities, 36 Seminars in Respiratory and Critical Care Medicine 379 (2015); Shonkoff 2014.

[105] *Id.*

[106] U.S. Environmental Protection Agency, Integrated Science Assessment (ISA) for Ozone (O3) and Related Photochemical Oxidants (2013).

[107] *See, e.g.,* U.S. Environmental Protection Agency, Oil and Gas Sector: Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution: Background Technical Support Document for Proposed Standards at 3-6 (July 2011); Armendariz, Al, Emissions for Natural Gas Production in the Barnett Shale Area and Opportunities for Cost-Effective Improvements (2009) ("Armendariz 2009") at 24.

[108] Armendariz 2009 at 1, 3, 25-26; Koch, Wendy, *Wyoming's Smog Exceeds Los Angeles' Due to Gas Drilling*, USA Today (May 9, 2011); Craft, Elena, Environmental Defense Fund, Do Shale Gas Activities Play a Role in

Uintah Basin of northeastern Utah, a rural area that experiences hazardous tropospheric ozone concentrations, found that oil and gas operations were responsible for 98 to 99 percent of VOCs and 57 to 61 percent of NO_X emitted from sources within the Basin considered in the study's inventory.[109]

Experimental studies of air quality in California indicate that current inventory methods underestimate methane and VOC emissions from oil and gas operations.[110] One recent analysis found that NOx emissions from oil and gas operations in Kern County are significantly underestimated.[111] Numerous studies also indicate that methane emissions in California may be underestimated by 30 to 80 percent by the state greenhouse gas inventory.[112] In the Los Angeles Basin, fossil fuel sources are the primary source of methane emissions, estimated to contribute 56 to 70 percent of total methane, with leakage from natural gas infrastructure and local oil and gas operations being the most important contributors.[113] One recent state-wide study estimated that methane emissions from the oil and gas production sector were 3 to 7 times higher than reflected in the state inventory.[114]

Based on reporting requirements implemented by the California South Coast Air Quality Management District, it was shown that at least 38 chemicals known to be air toxics have been used in fracking and other types of unconventional oil and gas recovery in Los Angeles County, California.[115] Through the implementation of these new reporting requirements, it is now known that oil and gas operators have been using millions of pounds each year of air toxics in the region, including crystalline silica, methanol, hydrochloric acid, hydrofluoric acid, and

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Rising Ozone Levels? (2012); Colorado Dept. of Public Health and Environment, Conservation Commission, Colorado Weekly and Monthly Oil and Gas Statistics (July 6, 2012) at 12.

[109] Lyman, Seth & Howard Shorthill, Final Report: 2012 Uintah Basin Winter Ozone & Air Quality Study, Utah Department of Environmental Quality (2013) ("Lyman 2013).

[110] CCST 2015.

[111] Sahu, Ranajit, On the Underestimation of NOx Emissions from Oil Well Drilling Activities in Kern County, CA (2015).

[112] Hopkins, Francesca M. et al., Spatial Patterns and Source Attribution of Urban Methane in the Los Angeles Basin, 121 J. Geophysical Research: Atmospheres 249 (2016) ("Hopkins 2016"); Jeong, Seongeun et al., Estimating Methane Emissions in California's Urban and Rural Regions Using Multitower Observations, 121 J. Geophysical Research: Atmospheres 13031 (2016).

[113] Wennberg, Paul O. et al., On the Sources of Methane to the Los Angeles Atmosphere, 46 Environmental Science & Technology 9282; Peischl, Jeff et al., Quantifying sources of methane using light alkanes in the Los Angeles basin, California, 118 J. Geophysical Research Atmospheres 1 (2013); Hopkins 2016.

[114] Jeong, Seongeun et al., Spatially Explicit Methane Emissions from Petroleum Production and

the Natural Gas System in California, 48 Environmental Science & Technology 5982 (2014).

[115] STAND-LA & Center for Biological Diversity, Danger Next Door: The Top 12 Air Toxics Used for Neighborhood Oil Drilling in Los Angeles, Fleming, John C. & Candice Kim, A STAND-LA report prepared by the Center for Biological Diversity (December 2017).

formaldehyde. Many of these chemicals also appear on the U.S. EPA's list of hazardous air pollutants.[116]

The CCST analysis highlights that while many toxic air pollutants are being used in well stimulation, there are significant information gaps on how much of these chemicals escape into the air, how far they travel, and how big the risk of exposure to those living nearby. Air contaminants known to be emitted during the well-stimulation-enabled oil and gas development in California include toxic BTEX compounds, formaldehyde, hydrogen sulfide, particulate matter, nitrogen oxides, sulfur dioxide, polycyclic aromatic, aliphatic, and aromatic hydrocarbons, and volatile organic compounds.[117] Although many air contaminants used in well stimulation are hazardous to human health, there are no studies of air quality impacts of well stimulation in California,[118] including how much of these chemicals escape into the air.[119] What is known is that people living close to oil and gas production have higher potential exposure to toxic air emissions and higher risk of associated health harms.[120]

Drilling and casing the wellbore require substantial power from large equipment. The engines used typically run on diesel fuel, which emits particularly harmful types of air pollutants when burned. Similarly, high-powered pump engines are used in the fracturing and completion phase. This too can amount in large volumes of air pollution. In total, VOCs emitted by car and truck engines, as well as the drilling and completion stages of oil and gas production, make up about 3.5 percent of the gases emitted by oil or gas operations.[121] Vehicles and equipment are also responsible for generating harmful particulate matter.[122]

Flaring and venting of gas are also potential sources of air emissions. Gas flaring and venting can occur in both oil and gas recovery processes when underground gas rises to the surface and is not captured as part of production. Emissions from flaring typically include carbon monoxide, nitrogen oxides, benzene, formaldehyde and xylene, but levels of these smog-forming compounds are seldom measured directly.[123]

Fugitive emissions can occur at every stage of extraction and production, often leading to high volumes of gas being released into the air. Methane emissions from oil and gas production

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[116] U.S. Environmental Protection Agency, The Clean Air Act Amendments of 1990 List of Hazardous Air Pollutants, Technology Transfer Network Air Toxics Web Site, available at http://www.epa.gov/ttnatw01/orig189.html (accessed July 29, 2015).
[117] CCST 2015 at 410.
[118] CCST 2015 at 250.
[119] CCST 2015 at 183, 250, 409.
[120] CCST 2015 at 44.
[121] Brown, Heather, Memorandum to Bruce Moore, U.S.EPA/OAQPS/SPPD re Composition of Natural Gas for use in the Oil and Natural Gas Sector Rulemaking, July 28, 2011 ("Brown Memo") at 3.
[122] Earthworks, Sources of Oil and Gas Pollution (2011); Bay Area Air Quality Management District, Particulate Matter Overview, Particulate Matter and Human Health (2012).
[123] Physicians for Social Responsibility and Concerned Health Professionals of NY, Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking, Fourth Edition, November 17, 2016 ("PSR 2016").

are as much as 270 percent greater than previously estimated by calculation.[124] Studies show that fugitive emissions from pneumatic valves (which control routine operations at the well pad by venting methane during normal operation) and equipment leaks are higher than EPA estimates.[125] This is of great concern because ground-level ozone can be formed by methane in substantial quantities as it interacts with nitrogen oxides and sunlight.[126] One paper modeled reductions in various anthropogenic ozone precursor emissions and found that "[r]educing anthropogenic CH_4 emissions by 50% nearly halves the incidence of U.S. high-O_3 events . . . ."[127]

Ethane, also a greenhouse gas, breaks down and reacts with sunlight to create smog. Ethane emissions have risen steeply in recent years due to U.S. oil and gas production. A recent study documented that ethane emissions in the Northern Hemisphere increased by about 400,000 tons annually between 2009 and 2014, with the majority coming from North American oil and gas activity, reversing a decades-long decline in ethane emissions.[128] About 60 percent of the drop in ethane levels that occurred over the past 40 years has already been made up in the past five years. At this rate, U.S. ethane levels are expected to hit 1970s levels in about three years. About two percent of global ethane emissions originate from the Bakken Shale oil and gas field alone, which emits 250,000 tons of ethane per year.[129] Because global ethane levels were decreasing until 2009, the U.S. shale gas boom is thought to be responsible for the global increase in levels since 2010.

Fracking can pollute air hundreds of miles from the well pad. For example, ethane pollution in Baltimore, Maryland and Washington, D.C, has been attributed to the rapidly increasing natural gas production in the upwind, neighboring states of Pennsylvania and West Virginia.[130] As a result, Kern county could further contribute to regional haze and impact the state's compliance with its SIP.[131] Regional haze is caused by "emissions of particles and gases

[124] Miller 2013.
[125] Allen, David et al., Measurements of Methane Emissions at Natural Gas Production Sites in The United States, 110 PNAS 17768 (2013) ("Allen 2013"); Harriss, Robert et al., Using Multi-Scale Measurements to Improve Methane Emission Estimates from Oil and Gas Operations in the Barnett Shale Region, Texas, 49 Environ. Sci. Technol. 7524 (2015).
[126] Fiore, Arlene et al., Linking Ozone Pollution and Climate Change: The Case for Controlling Methane, 29 Geophys. Res Letters 19 (2002) ("Fiore 2002"); U.S. Environmental Protection Agency, Oil and Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews Proposed Rule, 76 Fed. Reg 52,738 (Aug 23, 2011).
[127] Fiore 2002; *see also* Martin, Randal et al., Final Report: Uinta Basin Winter Ozone and Air Quality Study Dec 2010 - March 2011 (2011) at 7.
[128] Helmig, Detlev et al., Reversal of Global Atmospheric Ethane and Propane Trends Largely Due to US Oil and Natural Gas Production, 9 Nature Geoscience 490 (2016).
[129] Kort, Eric A. et al., Fugitive Emissions From the Bakken Shale Illustrate Role of Shale Production in Global Ethane Shift. 43 Geophysical Research Letters 4617 (2016).
[130] Vinciguerra,Timothy et al, Regional Air Quality Impacts of Hydraulic Fracturing and Shale Natural Gas Activities: Evidence From Ambient VOC Observations. 110 Atmospheric Environment 144 (2015).
[131] See 40 C.F.R. § 51.302(a)

in the atmosphere that scatter and absorb light," thereby reducing visibility.[132] Particulate matter is the primary cause of regional haze.[133] The regional haze rule requires the state to protect visibility in Federal Class 1 areas.[134] The seven parcels in question are located within 8 miles of the Carrizo Plain National monument, a class 1 area. Accordingly, the EA should determine whether the emissions related to fracking would impact visibility in the national monument and impact the state's conformity with the SIP.

Evaporation from pits can also contribute to air pollution. Pits that store drilling waste, produced water, and other waste fluid may be exposed to the open air. Chemicals mixed with the wastewater—including the additives used to make fracking fluids, as well as volatile hydrocarbons, such as benzene and toluene, brought to the surface with the waste—can escape into the air through evaporation. Some pits are equipped with pumps that spray effluents into the air to hasten the evaporation process. For example, evaporation from fracking waste pits in western Colorado was found to have added tons of toxic chemicals to the air, increasing air pollution in Utah.[135] In Texas, toxic air emissions from fracking waste pits are unmonitored and unregulated.[136] In California, unlined disposal pits for drilling and fracking waste are documented sources of contamination.[137] Even where waste fluid is stored in so-called "closed loop" storage tanks, fugitive emissions can escape from tanks.

Truck traffic related to oil and gas extraction contributes to air emissions. Trucks capable of transporting large volumes of chemicals and waste fluid typically use large engines that run on diesel fuel, also increasing threats of NO_x and PM emissions.

Additionally, BLM uses the deficient standard set in the 2014 RMP to evaluate the likely emissions from fracking. The EA provides an estimated range of criteria pollutant emissions that relies on the SEIS.[138] As discussed above, the 2014 RMP was determined to be deficient because it fails to fully analyze the impacts of fracking and the sufficiency of the SEIS is currently being litigated for the same reasons.

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[132] EPA, Regional Haze Final Guidance at 2, available at https://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf

[133] *Id.*

[134] *Id.*

[135] Maffy, Brian , *Utah grapples with toxic water from oil and gas industry*, The Salt Lake Tribune, August 28, 2014, available at http://archive.sltrib.com/story.php?ref=/sltrib/news/58298470-78/danish-flats-ponds-company.html.csp; The company responsible for the waste pits was found to have operated without a permit, underreported emissions and provided erroneous data to regulators.

[136] Center for Public Integrity. *Open Pits Offer Cheap Disposal for Fracking Sludge But Health Worries Mount*, October 2, 2014.

[137] Stringfellow, William T. et al., Impacts of Well Stimulation on Water Resources, In California Council on Science and Technology, *An Independent Assessment of Well Stimulation in California*, Volume 2, Chapter 2 (2015) ("CCST 2015") at 110-113.

[138] EA at 34 (table 6)

Furthermore, a recent settlement agreement requires EPA to reassess and curb the impacts of ozone from oil and gas production in the Kern County nonattainment area. According to the agreement, EPA will be required to issue a final rulemaking addressing reasonably available control technology ("RACT") control techniques guideline ("CTG") SIPs for oil and gas development in the 2008 ozone Kern County nonattainment area before December 18, 2020.[139] The agreement demonstrates the need to reduce pollution associated with oil and gas development in Kern County. Accordingly, the EA should be completed after the rulemaking goes through to ensure that the new development complies with the latest guidelines from the EPA around the best technology available to reduce the impact of ozone.

B. BLM Fails to Conduct a Conformity Analysis as Required by the Clean Air Act

Despite the air quality impacts of oil and gas production, BLM fails to conduct a conformity analysis. The seven parcels are located within the San Joaquin nonattainment area and is currently in extreme nonattainment with the 1997, 2008, and 2015 Ozone NAAQS, Serious nonattainment with the 1997 and 2006 PM2.5 NAAQS, and Moderate nonattainment with the 2012 PM2.5 NAAQS.[140] BLM fails to complete the applicability analysis as required by the Clean Air Act.[141] Instead, the EA states that a conformity determination will be made at the leasing stage when "new wells or other specific projects are proposed on the new leases."[142] But, a look at the information before the agency belies this argument. Because development in the San Joaquin NAA is well-established and per-well emissions estimates are available, BLM's leasing is clearly a cause of future, reasonably foreseeable indirect emissions that are quantifiable now. Thus, BLM's failure to complete a conformity analysis at the lease sale stage violates the Clean Air Act.

Implementation of the CAA exemplifies cooperative governance between the states and the federal government. The CAA aims "to protect and enhance the quality of the Nation's air resources . . . ."[143] The CAA states that, "No department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve, any activity" that does not conform to an approved state air quality implementation plan.[144] "The assurance of conformity . . . shall be an affirmative responsibility of the head of such . . . agency." To ensure conformity, agency actions must not "cause or contribute to any new violation of any [air quality] standard" or "increase the frequency or severity of any existing violation of any standard in any area."[145] This statute is very broadly applicable.

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[139] Ctr. for Biological Diversity v. Wheeler, Case no. 3:20-cv-00448-VC, ("Consent Decree"), at 6-7, available at https://www.biologicaldiversity.org/programs/environmental_health/pdfs/Ozone-Consent-Decree.pdf
[140] https://www.epa.gov/green-book.
[141] 40 C.F.R. § 93.153(b).
[142] EA at 34.
[143] 42 U.S.C. § 7401(b)(1).
[144] 42 U.S.C. § 7506(c)(1).
[145] *Id.* § 7506(c)(1)(B).

A SIP is a federally approved set of state regulations that are designed to prevent air quality deterioration and to restore clean air in areas that are out of attainment with federal standards. Conformity to a SIP as defined in the CAA,[146] means:

> (A) conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards and achieving expeditious attainment of such standards; and
> (B) that such activities will not—
>
> > (i) cause or contribute to any new violation of any standard in any area;
> > (ii) increase the frequency or severity of any existing violation of any standard in any area; or
> > (iii) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

The "assurance of conformity" to a SIP "shall be an affirmative responsibility" of a federal agency.[147] For Federal actions not related to transportation plans, "a conformity determination is required for each criteria pollutant or precursor where the total of direct and indirect emissions of the criteria pollutant or precursor in a nonattainment or maintenance area caused by a Federal action would equal or exceed. . . 10/25/50/100 [tons/year.]".[148]

There are certain limited exceptions to general conformity requirements under the Clean Air Act, such as when emissions from federal actions are below de minimis thresholds. Portions of federal actions that require a permit under the Clean Air Act's new source review program, as set forth under 42 U.S.C. §§ 7410(a)(2)(c) and 7503, are also not subject to general conformity requirements.[149]

The purpose of general conformity is to "prevent the Federal Government from interfering with the States' abilities to comply with the CAA's requirements."[150] An action "delays attainment only if its implementation *postpones* attainment beyond the date by which it would have been achieved without the project."[151]

Before action is taken, a federal agency must make a determination that the federal action conforms to "certain threshold emission rates set forth in § 93.153(b)."[152] If the action's direct and indirect emissions will exceed *de minimis* levels, then the agency must demonstrate conformity.[153] Because "[n]either the federal nor the state rule identify the form an agency must

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[146] 42 U.S.C. § 7506(c)(1)(AB).
[147] 42 U.S.C. § 7506(c)(1).
[148] 40 C.F.R. § 95.153(b).

[149] *See* 40 C.F.R. § 93.150(d).
[150] *Dep't of Transp. v. Pub. Citizen*, 541 U.S. 752, 758 (2004).
[151] *Nat. Res. Def. Council v. E.P.A.*, 661 F.3d 662, 665 (D.C. Cir. 2011).
[152] *Pub. Citizen*, 541 U.S. at 771.
[153] *Ctr. for Biological Diversity v. Bureau of Land Mgmt*., 833 F.3d 1136, 1148 (9th Cir. 2016); *see also* 40 C.F.R § 93.153(b)(1) (defines de minimis emission rates).

use when deciding whether a project necessitates a full-scale conformity determination," courts have found it sufficient for an agency to explain their conformity decision in a NEPA document.[154] Thus, "[a]n agency need not prepare a stand-alone document explaining such a decision."[155] Likewise, the Federal Land Policy and Management Act (FLPMA) requires the Secretary of the Interior, in developing and revising land use plans, to "provide for compliance with applicable pollution control laws, including State and Federal air, water, noise, or other pollution standards or implementation plans."[156]

As noted above, BLM must assess direct and indirect emissions from the proposed lease parcels. Direct emissions are defined as "those emissions of a criteria pollutant or its precursors that are 1) caused or initiated by the Federal action and 2) originate in a nonattainment or maintenance area and 3) occur at the same time and place as the action and 4) are reasonably foreseeable."[157] Indirect emissions are defined as those emissions 1) "that are caused or initiated by the Federal action," 2) "originate in the same nonattainment or maintenance area but occur at a different time or place as the action," 3) "are reasonably foreseeable," 4) "that the agency can practically control," and 5) "for which the agency has continuing program responsibility."[158] "Reasonably foreseeable emissions are projected future direct and indirect emissions that are identified at the time the conformity determination is made; the location of such emissions is known and the emissions are quantifiable as described and documented by the Federal agency based on its own information and after reviewing any information presented to the Federal agency."[159]

Ozone is a criteria pollutant under the federal Clean Air Act.[160] The Clean Air Act establishes a National Ambient Air Quality Standard ("NAAQS") for each criteria pollutant that represents the maximum allowable concentration of each pollutant that can occur in the air and still protect public health.[161] In 2008, EPA published a final rule strengthening the ozone NAAQS by lowering the 8-hour standard to 0.075 ppm.[162] In response to evolving science and public health needs, in 2015 EPA again lowered the 2008 ozone NAAQS, setting a new, more stringent 8-hour limit of 0.070 ppm.[163] According to EPA, the new limit was necessary "to provide requisite protection of public health and welfare, particularly for at-risk groups including children, older adults, people of all ages with lung diseases such as asthma, and people who are active outdoors, both for recreational and work purposes. It will also improve the health of trees, plants, and ecosystems."[164]

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[154] *California ex rel. Imperial Cty. Air Pollution Control Dist. v. U.S. Dep't of the Interior*, 767 F.3d 781, 799 (9th Cir. 2014).
[155] *Id*.
[156] 43 U.S.C. § 1712(c)(8).
[157] 40 C.F.R. § 93.152.
[158] *Id*.
[159] 40 C.F.R. § 93.152.
[160] 42 U.S.C. § 7408.
[161] *See* 42 U.S.C. § 7409.
[162] 73 Fed. Reg. 16,436 (Mar. 27, 2008).
[163] 80 Fed. Reg. 65,292 (Oct. 26, 2015).
[164] *Id*.

EPA's decision to strengthen the ozone standard was based on numerous human health studies conducted over the past decade documenting the adverse effects of ozone on public health. Ozone concentrations are measured on an hourly basis.[165] An exceedance of the ozone standard occurs if the average of eight consecutive hourly readings exceeds 0.075 ppm, which is the 2008 NAAQS for ozone.[166] A violation of the standard occurs when the "3-year average of the annual fourth-highest 8-hour" ozone concentrations exceeds 0.075 ppm.[167]

When the 3-year average for ozone levels for any given region falls below 0.075ppm, the region is considered to be in attainment with the ozone NAAQS.[168] Conversely, when the 3-year ozone average is above 0.075 ppm, the region is considered a nonattainment area for ozone.[169] EPA promulgated final area ozone designations for California based on the new 2015 ozone NAAQS on June 4th, 2018.[170] The California Air Resources Board will then formally adopt the new designations, implementing the new 2015 ozone standard state-wide. Until the 2015 ozone designation process is complete, the 2008 0.075 ppm standard applies across all air districts in California.

A 2011 interagency guidance memorandum of understanding, signed by the Department of Interior, outlines a commitment by the agency to undergo detailed analyses of air quality compliance, with a particular focus on non-attainment areas. The MOU establishes "a clearly defined, efficient approach to compliance with [NEPA] regarding air quality . . . in connection with oil and gas development on Federal lands."[171] The MOU "provides for early interagency consultation throughout the NEPA process; common procedures for determining what type of air quality analyses are appropriate and when air modeling is necessary; specific provisions for analyzing and discussing impacts to air quality and for mitigating such impacts; and a dispute resolution process to facilitate timely resolution of differences among agencies."[172] The goal of this process is to ensure that "[F]ederal oil and gas decisions do not cause or contribute to exceedances of the National Ambient Air Quality Standards (NAAQS)."[173] The MOU outlines recommended technical, quantitative procedures to follow, which include identifying the reasonably foreseeable number of oil and gas wells and conducting an emissions inventory of criteria pollutants. Further air quality modeling is required if certain criteria are met, based on the

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[165] 40 C.F.R. § 50.15.
[166] *Id*.
[167] *Id*.
[168] 42 U.S.C. § 7407(d)(1)(A)(ii).
[169] 42 U.S.C. § 7407(d)(1)(A)(i).
[170] *See* U.S. Environmental Protection Agency, Additional Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards, 83 FR 25776 (June 4, 2018), available at: https://www.govinfo.gov/content/pkg/FR-2018-06-04/pdf/2018-11838.pdf ; California Air Resources Board, Federal Standard Area Designations (2018), https://www.arb.ca.gov/desig/feddesig.htm.
[171] Memorandum of Understanding Among the U.S. Department of Agriculture, U.S. Department of the Interior, and U.S. Environmental Protection Agency, regarding Air Quality Analyses and Mitigation for Federal Oil and Gas Decisions through the National Environmental Policy Act Process, Preamble (2011), available at https://www.epa.gov/sites/production/files/2014-08/documents/air-quality-analyses-mou-2011.pdf.
[172] *Id*. at 4.
[173] *Id*. at 1, 2.

level of emissions impact and the geographic location of the action.[174] The MOU indicates that "[e]xisting reasonably foreseeable development scenarios can be used to identify the number of wells."[175]

In response to this interagency MOU, BLM implemented internal regulations in 2012 establishing a 10-step process for conducting a general conformity determination in compliance with the Clean Air Act section 176(c).[176] The erroneous and unsubstantiated analysis at issue in the draft Bakersfield EA hinges on BLM's application of IM 2013-025 steps 4-6 which require BLM to:

> 4. Conduct an Air Quality impact analysis. This section should contain estimates of emissions that are caused by the project and located in the nonattainment or maintenance area. According to the EPA rules, the emissions estimates should include all reasonably foreseeable direct and indirect emissions from the proposed action.
> 5. Compare results to applicable SIP provisions and rules. Under this section, the project with its emission estimates and mitigations needs to be compared to the SIP to see if it complies with the provisions of the SIP, including the application of control measures required in the SIP and acquisition of all necessary air permits…
> 6. Write a Conclusion Statement. At this point, a statement needs to be made as to whether the project is in conformity (if not, the project cannot proceed), whether the emissions exceed the de minimus levels (40 CFR 93.153) and a formal determination is necessary, or it is below de minimus levels and no further analysis would be necessary. This statement should also include the mechanism through which any required mitigation will be established and enforced (i.e., in the Record of Decision, the Conditions of Approval (COAs) on an Application for Permit to Drill (APD), etc.).

BLM's criteria pollutant emissions analysis in the EA points directly toward the necessity of a conformity analysis, but then generalizes that the conformity analysis is meaningless at the leasing stage.[177] The emissions for ozone precursors for 10 total wells (9 conventional and 1 hydraulically fractured) are above the de minimus threshold in an extreme non-attainment area, thus triggering a conformity analysis.[178] De minimis levels under EPA's General Conformity regulations are as follows (40 CFR 93.153(b)):

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[174] *Id.* § V.E.1., pg. 9.
[175] *Id*.
[176] U.S. Bureau of Land Management, Instruction Memorandum No. 2013-025, *Guidance for Conducting Air Quality General Conformity Determinations* (Dec. 4, 2012) https://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2013/IM_2013-025.html.
[177] EA at 34.
[178] *Id*.

(1) For purposes of paragraph (b) of this section the following rates apply in nonattainment areas (NAA's):

	Tons/year
Ozone (VOC's or NOX):	
Serious NAA's	50
Severe NAA's	25
Extreme NAA's	10
Other ozone NAA's outside an ozone transport region	100
Other ozone NAA's inside an ozone transport region:	
VOC	50
NOX	100
Carbon Monoxide: All maintenance areas	100
SO2 or NO2: All NAA's	100
PM10:	
Moderate NAA's	100
Serious NAA's	70
PM2.5 (direct emissions, SO2, NOX, VOC, and Ammonia):	
Moderate NAA's	100
Serious NAA's	70
Pb: All NAA's	25

(2) For purposes of paragraph (b) of this section the following rates apply in maintenance areas:

	Tons/year
Ozone (NOX), SO2 or NO2:	
All maintenance areas	100
Ozone (VOC's)	
Maintenance areas inside an ozone transport region	50
Maintenance areas outside an ozone transport region	100
Carbon monoxide: All maintenance areas	100
PM10: All maintenance areas	100
PM2.5 (direct emissions, SO2, NOX, VOC, and Ammonia)	100
All maintenance areas	100
Pb: All maintenance areas	25

In the EA, the NOx emissions estimate of 5.59 tons per year and the VOC/ROG estimate of 16.59 tons per year are above the de minimus threshold for an extreme NAA.[179] NOx and ROGs/VOCs are pre-cursors that form ground-level ozone, therefore the agency must demonstrate that additional emissions of either NOx or VOCs meet the NAAQS. BLM has utterly failed its affirmative duty to demonstrate to the public that health-protective air quality standards will be met with approval of increased oil and gas leasing and development in the area.

The need for BLM to ensure conformity is underscored by the fact that California is failing to bring the San Joaquin Valley ozone "extreme" nonattainment area into attainment with

[179] EA at 34.

the 2008 0.075 ppm ozone NAAQS. Given the inability of the current San Joaquin ozone air quality plan to ensure attainment with the ozone NAAQS, as required by the Clean Air Act, it appears clear that the BLM's decision will not only cause or contribute to violations of the NAAQS, but increase their severity and frequency; not to speak of the more stringent 0.070 ppm ozone standard adopted by EPA in 2015. The San Joaquin Air Resources Control Board acknowledges that meeting the new more stringent ozone NAAQS means "NOx emissions reductions in the Valley must be reduced by an additional 90% in order to attain the latest federal ozone and PM2.5 standards that now encroach on natural background levels. This air quality challenge is unmatched by any other region in the nation."[180] A conformity determination is especially necessary in this case. BLM must prove to the public that their estimated emission calculations are accurate, justified and enforceable, and that any approval of new oil and gas leasing and development will meet federal health and air quality standards.

NEPA regulations repeatedly emphasize the need for effective and accurate public notice and involvement. NEPA procedures must ensure "environmental information is available to public officials and citizens before decisions are made and before actions are taken."[181] NEPA regulations make it crystal clear that "[T]he information must be of high quality. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA."[182] Accordingly, "agencies shall to the fullest extent possible…encourage and facilitate public involvement in decisions."[183]

NEPA's implementing regulations require that the agency "shall identify any methodologies used and shall make explicit reference by footnote to the scientific and other sources relied upon for conclusions," and shall ensure the scientific accuracy and integrity of environmental analysis.[184] The agency must disclose if information is incomplete or unavailable and explain "the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts."[185] The agency must also directly and explicitly respond to dissenting scientific opinion.[186]

Courts interpret these regulations as requiring a high level of accuracy in the information provided to the public, and the burden falls on the agency to meet this high standard. "[W]ith respect to public involvement, the way in which the information is provided is less important than that a sufficient amount of environmental information – *as much as practicable* – be provided so that a member of the public can weigh in on the significant decision that the agency will make in preparing the EIS.[187] It is the agency's duty to provide clear, consistent and accurate

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[180] San Joaquin Valley Air Pollution Control District, 2016 Plan for the 2008 8-Hour Ozone Standard, at ES-5 (June 16, 2016), http://www.valleyair.org/Air_Quality_Plans/Ozone-Plan-2016.htm.
[181] 40 C.F.R. § 1500.1(b).
[182] *Id*.
[183] *Id*. § 1500.2(d) (emphasis added).
[184] *Id*. § 1502.24.
[185] *Id*. § 1502.22(b)(1).
[186] *Id*. § 1502.9(b).
[187] *WildEarth Guardians v. Mont. Snowmobile Ass'n,* 790 F.3d 920, 926 (9th Cir. 2015) (quoting *Native Ecosystems Council v. U.S. Forest Serv*., 418 F.3d 953, 964 (9th Cir. 2005) (citing 40 C.F.R. § 1500.1(b)("To take the required

information so that the public is fully informed of the scope of the agency action. BLM utterly failed to meet this fundamental pillar of NEPA review.

In addition to NEPA information accuracy requirements, courts also interpret EPA CAA General Conformity regulations to include the latest, most accurate information. In *Border Power Plant Working Group v. DOE*, the Court clarified the legal standard for general conformity determinations, stating that a Federal action's conformity determination must rely "on the most recent estimates of emissions," (42 U.S.C. § 7506(c)(1)) and that the EPA requires "the latest and most accurate emission estimation techniques available . . . (2) such as actual stack test data from stationary sources which are part of the conformity analysis." 467 F. Supp. 2d 1040, 1054 (S.D. Cal. 2006) (quoting 40 C.F.R. § 51.859(b)(2)). BLM offered absolutely no analysis as the basis for the potential emissions listed in Tables 4.5-1 and 4.5-2, and Appendix K, and proceeds to exempt itself from a full conformity determination based on said non-existent analysis. BLM's failure to meet both NEPA information accuracy and CAA conformity requirements are clear in the RMP on which this EA relies.

Additionally, BLM is not clear whether the air emissions estimates reflect direct or indirect air emissions or both. Direct emissions alone are not the basis for a requirement to perform a conformity determination. A general conformity determination is required if indirect emissions would also exceed 10 tons per year of target pollutants in extreme non-attainment areas. 40 CFR § 93.153(b)(1). Indirect emissions are defined as those:

> (1) That are caused or initiated by the Federal action and originate in the same nonattainment or maintenance area but occur at a different time or place as the action;
> (2) That are reasonably foreseeable;
> (3) That the agency can practically control; and
> (4) For which the agency has continuing program responsibility.[188]

BLM can practically control those emissions in a number of ways including, but not limited to, by choosing not to lease certain areas or by including stipulations that require limits on emissions or emitting practices. The agency has continuing program responsibility for those emissions, both through subsequent permit actions and ongoing inspection and enforcement oversight. BLM provides no emissions inventory or analysis of potential direct and indirect emissions based on oil and gas industry standards for development, operations and ongoing maintenance. Again, BLM fails to document or provide sources for their potential emissions tables, in violation of CAA general conformity requirements.

'hard look' at a proposed project's effects, an agency may not rely on incorrect assumptions or data in an EIS. It surely follows that the data the Forest Service provides to the public to substantiate its analysis and conclusions must also be accurate. If the wolverine habitat prediction map does not accurately depict the big game winter range, and the Forest Service ultimately worked from a different, accurate map, then it is the accurate map that must be disclosed to the public.")(internal quotations omitted).

[188] 40 C.F.R. § 93.152.

Mitigation measures outlined in the draft RMP EIS are vague and inadequate to address the principle sources of ozone emissions from future oil and gas operations.[189] BLM asserts that it will analyze additional mitigation measures at the project development stage.[190] BLM's attempt to "kick the can down the road" runs afoul of the 9th circuit decision in *Conner v. Burford*. The court there held that the "government's inability to fully ascertain the precise extent of the effects of mineral leasing [in an EIS]…is not, however, a justification for failing to estimate what those effects might be before irrevocably committing to the activity."[191] Indeed, the court specifically denounced BLM's "approve now and ask questions later" approach as blatantly incompatible with the purpose and spirit of NEPA.[192]

Finally, BLM's estimate of the number of new wells expected is unsupported. The potential for far greater expansion and intensification of oil and gas activity has been studied and documented, as discussed below. The artificially low number of expected wells projected in the RMP/FEIS also improperly reduces the air emission impacts. Each should be reevaluated in light of the studies provided.

C. BLM Fails to Comply with FLPMA

In addition to the Clean Air Act, BLM must comply with FLPMA. FLPMA requires that the Secretary of Interior manage public lands "in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values."[193] To achieve this, "[t]he Secretary [of the Interior] shall, with public involvement and consistent with the terms and conditions of this Act, develop, maintain, and, when appropriate, revise land use plans which provide by tracts or areas for the use of the public lands."[194] Additionally, the secretary must "take any action necessary to prevent unnecessary or undue degradation of the lands."[195]

FLPMA's unnecessary and undue degradation requirements are distinct from requirements under NEPA. "A finding that there will not be significant impact [under NEPA] does not mean either that the project has been reviewed for unnecessary and undue degradation or that unnecessary or undue degradation will not occur."[196]

D. New Oil and Gas Production Will Exacerbate Effects on At-Risk Communities Already Experiencing the Negative Health Impacts from Highly Polluted Air

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[189] FEIS 4.5-7-11.
[190] FEIS 4.5-7.
[191] *Conner v. Burford*, 836 F.2d 1521 at 1531 (9th Cir. 1988).
[192] *Id*.
[193] 43 U.S.C. § 1701(a)(8).
[194] *Id.* § 1712(a).
[195] 42 U.S.C. § 1732(b).
[196] *Ctr. for Biological Diversity v. United States DOI,* 623 F.3d 633, 645 (9th Cir. 2009) (quoting *Kendall's Concerned Area Residents,* 129 I.B.L.A. 130, 140 (1994)).

Many adverse health impacts are the result of toxic air pollutants emitted from oil and gas operations at every stage of production. Hundreds of chemicals with known human health effects are involved in the production of oil and gas, and those pollutants can travel far from the well to nearby homes and other sensitive receptors.

Californians breathe some of the dirtiest air in the nation. The top five oil-producing counties in California (Kern, Los Angeles, Ventura, Monterey, and Fresno) each received an 'F' grade for particle pollution air quality in the American Lung Association's 2020 State of the Air report.[197] The two largest oil and gas-producing regions in California are in the San Joaquin and South Coast air basins, which are classified as "extreme" nonattainment areas for ozone.[198]

Wells are disproportionally located in low-income and communities of color already suffering from some of the worst air quality in the nation. Of the statewide population living within one mile of oil and gas development and in communities identified as most vulnerable by CalEPA's CalEnviroScreen 2.0, nearly 92 percent are people of color (69 percent Hispanic/Latino, 10 percent African American, 11 percent Asian, and 2 percent Other).[199] In Kern County, there are 16,690 active oil and gas production wells (roughly a quarter of all active wells in Kern) located in census blocks with median household incomes of less than 80% of Kern's area median income (AMI). By one estimate, 5,229 active, idle, and newly permitted wells are located within 2,500 feet of sensitive receptors in low-income communities.[200]

An independent analysis by the California Council on Science and Technology (CCST) determined that fracking in California occurs disproportionally in areas already suffering from serious air quality problems. The two largest oil and gas-producing regions in California are in the San Joaquin and South Coast air basins which are classified as "extreme" nonattainment areas for ozone.[201] According to an analysis by the CCST, in the San Joaquin Valley, oil and gas facilities "emit significant air toxics," including 30 percent of sulfur oxides, 70 percent of hydrogen sulfide, and 8 percent of anthropogenic VOCs, which in turn react with nitrogen oxides (NOx) to create ozone.[202] Another study estimated that 22 percent of VOCs in the San Joaquin Valley came from petroleum operations, which was higher than the state inventory.[203] In Kern County, oil and gas production is the dominant sources of hydrogen sulfide (96 percent) and a

[197] American Lung Association, State of the Air 2020 (2020), http://www.stateoftheair.org/assets/SOTA-2020.pdf.
[198] Long, Jane C.S. et al., *Chapter 1: Introduction*, California Council on Science and Technology, An Independent Assessment of Well Stimulation in California Volume II: Potential Environmental Impact of Hydraulic Fracturing and Acid Stimulations (July 2015) at 44.
[199] Natural Resources Defense Council, Drilling in California: Who's at risk? (October 2014).
[200] Ferrar, Kyle, Impact of a 2,500' Oil and Gas Well Setback in California, FracTracker Alliance (July 2, 2019), Informational Table at 2.
[201] Long, Jane C.S. et al., Introduction, In California Council on Science and Technology, *An Independent Assessment of Well Stimulation in California*, Volume 2, Chapter 1 (2015) ("CCST 2015") at 44.
[202] CCST 2015 at 42.
[203] Gentner, Drew et al., Emissions of Organic Carbon and Methane from Petroleum and Dairy Operations in California's San Joaquin Valley, 14 Atmospheric Chemistry and Physics 4955 (2014).

major contributor to emissions of benzene (9 percent), formaldehyde (26 percent), hexane (11 percent), and xylene (14 percent).[204]

Fracking, in particular, has detrimental effects on public health. Many chemicals emitted during fracking are designated as Hazardous Air Pollutants (HAPs), which can enter the air during the venting of gases during fracking or the evaporation of chemicals from fracking and produced fluids, leading to dangerous human exposures.[205] For instance, ethylbenzene, formaldehyde, and methylene chloride are all known or suspected carcinogens, while methanol is linked to reproductive harm, and hydrochloric acid and hydrofluoric acid can cause both eye irritation and respiratory harm.[206] Therefore, being in close proximity to fracking operations can lead to serious health effects. Some of the same chemicals are used in both fracking and conventional oil and gas operations, so some risks posed by fracking are also found with conventional methods.[207]

There are also emissions from other aspects of the oil and gas extraction process, including the emission of natural gas itself, in forms such as methane (predominantly) and ethane. For instance, hydrogen sulfide is contained in natural gas, with long-term exposure to hydrogen sulfide linked to respiratory infections, eye, nose, and throat irritation, breathlessness, nausea, dizziness, confusion, and headaches.[208] Also, the diesel equipment used to pump the fracking fluids into the well produces nitrogen oxide ("NOx") and particulate matter ("PM") emissions. Additionally, some volatile organic compounds ("VOCs"), such as the BTEX compounds (benzene, toluene, ethylbenzene, and xylene), when exposed to light can transform into PM. When gases are flared instead of vented, the combustion during flaring may cause emissions of PM and NOx.[209] NOx and PM are both criteria pollutants which must be regulated

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[204] Shonkoff, Seth & Donald Gautier, A Case Study of the Petroleum Geological Potential and Potential Public Health Risks Associated with Hydraulic Fracturing and Oil and Gas Development in The Los Angeles Basin, In California Council on Science and Technology, *An Independent Assessment of Well Stimulation in California*, Volume 3, Chapter 4 (2015).at 268.

[205] Sierra Club et al. comments on New Source Performance Standards: Oil and Natural Gas Sector; Review and Proposed Rule for Subpart OOOO (Nov. 30, 2011) ("Sierra Club Comments") at 13.

[206] Agency for Toxic Substances and Disease Registry (ATSDR), ATSDR A-Z Index, https://www.atsdr.cdc.gov/az/a.html (last visited on July 12, 2018) ("ASTDR A-Z Index"); Californians Against Fracking, Fracking and Dangerous Drilling in California, Briefing Book, Center for Biological Diversity (Accessed July 13, 2018), https://www.biologicaldiversity.org/campaigns/california_fracking/pdfs/fracking-and-drilling-in-california.pdf.

[207] Stringfellow, William et al., Comparison of chemical use between hydraulic fracturing, acidizing, and routine oil and gas development, 12 PLoS One 4 (2017).

[208] U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Report to Congress on Hydrogen Sulfide Air Emissions Associated with the Extraction of Oil and Natural Gas (EPA-453/R-93-045) at i (Oct. 1993) ("USEPA 1993").

[209] California Council on Science and Technology, Advanced Well Stimulation Technologies in California (2016) ("CCST 2016"), http://ccst.us/publications/2014/160708-blm-report.pdf, at 248; McKenzie, Lisa M. et al., Human Health Risk Assessment of Air Emissions From Development of Unconventional Natural Gas Resources, 424 Science of the Total Environment 79 (2012) ("McKenzie 2012); Shonkoff, Seth B.C. et al., Environmental Public Health Dimensions of Shale and Tight Gas Development, 122 Environmental Health Perspectives 787 (2014) ("Shonkoff 2014").

under the National Ambient Air Quality Standards (NAAQS) due to their potential to cause primary and secondary health effects. They both contribute to the formation of ozone, another criteria pollutant.[210]Concentrations of these criteria pollutants along with two others, carbon monoxide and sulfur dioxide, have been shown to increase in regions where unconventional oil and gas recovery techniques are permitted. Criteria pollutants are associated with an array of health impacts:[211]

> *Nitrogen oxides* (NOx) react with ammonia, moisture, and other compounds to form small particles. These small particles penetrate deeply into sensitive parts of the lungs and can cause or worsen respiratory diseases, such as emphysema and bronchitis, and can aggravate existing heart disease, leading to increased hospital admissions and premature death. NO_x and volatile organic compounds react in the presence of heat and sunlight to form ozone.
>
> *Particulate matter* (PM) - especially fine particles - contains microscopic solids or liquid droplets that are so small that they can get deep into the lungs and cause serious health problems. Numerous scientific studies have linked particle pollution exposure to a variety of problems, including: premature death in people with heart or lung disease, increased mortality, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.[212]
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> *Sulfur Dioxide* (SO_2) – has been shown to cause an array of adverse respiratory effects including bronchoconstriction and increased asthma symptoms.[213] Studies also show a connection between short-term exposure and increased visits to emergency departments and hospital admissions for respiratory illnesses, particularly in at-risk populations including children, the elderly, and asthmatics.[214]
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> *Carbon Monoxide* (CO) can cause harmful health effects by reducing oxygen delivery to the body's organs (like the heart and brain) and tissues. At extremely high levels, CO can cause death.[215] Exposure to CO can reduce the oxygen-carrying capacity of the blood. People with several types of heart disease already have a reduced capacity for pumping oxygenated blood to the heart, which can

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[210] United States Environmental Protection Agency (U.S. EPA), Criteria Air Pollutants, https://www.epa.gov/criteria-air-pollutants (last visited on July 10, 2018.)
[211] United States Environmental Protection Agency (U.S. EPA), Criteria Air Pollutants, https://www.epa.gov/criteria-air-pollutants (last visited on July 10, 2018.)
[212] U.S. Environmental Protection Agency, Particulate Matter, (PM) https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm (Accessed July 13, 2018); Ostro, Bart et al., Long-term Exposure to Constituents of Fine Particulate Air Pollution and Mortality: Results from the California Teachers Study, 118 Environmental Health Perspectives 3 (2010)
[213] U.S. Environmental Protection Agency, Sulfur Dioxide https://www.epa.gov/so2-pollution/sulfur-dioxide-basics#effects, available at (accessed July 13, 2018).
[214] *Id.*
[215] U.S. Environmental Protection Agency, Carbon Monoxide, available at https://www.epa.gov/co-pollution/basic-information-about-carbon-monoxide-co-outdoor-air-pollution#Effects (accessed July 13, 2018).

cause them to experience myocardial ischemia (reduced oxygen to the heart), often accompanied by chest pain (angina), when exercising or under increased stress.[216] For these people, short-term CO exposure further affects their body's already compromised ability to respond to the increased oxygen demands of exercise or exertion.[217]

Ozone (O_3) can trigger or worsen asthma and other respiratory ailments.[218] It has been linked to pneumonia, COPD, asthma, bronchitis, emphysema, and premature death. Ground level ozone can have harmful effects on sensitive vegetation and ecosystems. Ozone may also lead to loss of species diversity and changes to habitat quality, water cycles, and nutrient cycles.

Likewise, the BTEX compounds, which contribute to the formation of criteria pollutants, pose great potential harms. Benzene, for instance, is a known human carcinogen that has been linked to blood disorders such as leukemia, immune system damage and chromosomal mutations. The other BTEX compounds (toluene, ethylbenzene, xylene) have varying effects, including damage to the brain and nervous system, kidneys, and liver, with symptoms of exposure including fatigue, drowsiness, headaches, dizziness, confusion, eye and respiratory tract irritation, and loss of muscle coordination.[219]

The potential harms resulting from increased exposure to the dangerous air pollutants from unconventional oil and gas development are serious and wide-ranging. A growing body of scientific research has documented adverse public health impacts from unconventional oil and gas development, including studies showing air pollutants at levels associated with reproductive and developmental harms and the increased risk of morbidity and mortality.[220] A comprehensive review of the risks and harms of fracking to public health came to several key findings related to air pollution: (1) "drilling and fracking emissions contribute to toxic air pollution and smog (ground-level ozone) at levels known to have health impacts," (2)"public health problems associated with drilling and fracking, including reproductive impacts and occupational health and

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[216] *Id.*
[217] *Id.*
[218] U.S. Environmental Protection Agency, Health Effects of Ozone Pollution, available at https://www.epa.gov/ozone-pollution/health-effects-ozone-pollution (accessed July 10, 2018).
[219] Suh, H. H., Bahadori, T., Vallarino, J., & Spengler, J. D. (2000). Criteria air pollutants and toxic air pollutants. *Environmental Health Perspectives*, *108*(Suppl 4), 625;
Agency for Toxic Substances and Disease Registry (2015, November 4). *ATSDR A-Z Index.* Retrieved from https://www.atsdr.cdc.gov/az/a.html ;
Jia, C., & Batterman, S. (2010). A critical review of naphthalene sources and exposures relevant to indoor and outdoor air. *International Journal of Environmental Research and Public Health*, *7*(7), 2903-2939.

[220] Hays, Jake & Seth B.C. Shonkoff , Towards an Understanding of the Environmental and Public Health Impacts of Unconventional Natural Gas Development: A Categorical Assessment of the Peer-Reviewed Scientific Literature, 11 PLoS ONE e0154164 (2016); Shonkoff 2014; Webb, Ellen et al., Developmental and reproductive effects of chemicals associated with unconventional oil and natural gas operations, 29 Rev Environ Health 307 (2014); McKenzie 2012; Clean Air Task Force, Fossil Fumes: A Public Health Analysis of Toxic Air Pollution From the Oil and Gas Industry, June 2016, available at http://www.catf.us/resources/publications/files/FossilFumes.pdf.

safety problems, are increasingly well documented"; and (3)"fracking infrastructure poses serious potential exposure risks to those living near it."[221]

The range of illnesses that can result from the wide array of air pollutants from fracking were summarized in a study by Dr. Theo Colburn, which charts which chemicals have been shown to be linked to certain illnesses.[222] This study analyzed air samples taken during drilling operations near natural gas wells and residential areas in Garfield County, Colorado and detected 57 chemicals between July 2010 and October 2011, including 44 with reported health effects.[223] For example:

> Thirty-five chemicals were found to affect the brain/nervous system, 33 the liver/metabolism, and 30 the endocrine system, which includes reproductive and developmental effects. The categories with the next highest numbers of effects were the immune system (28), cardiovascular/blood (27), and the sensory and respiratory systems (25 each). Eight chemicals had health effects in all 12 categories. There were also several chemicals for which no health effect data could be found.[224]

The study found extremely high levels of methylene chloride, which may be used as cleaning solvents to remove waxy paraffin that is commonly deposited by raw natural gas in the region. These deposits solidify at ambient temperatures and build up on equipment.[225] While none of the detected chemicals exceeded governmental safety thresholds of exposure, the study noted that such thresholds are typically based on "exposure of a grown man encountering relatively high concentrations of a chemical over a brief time period, for example, during occupational exposure."[226] Consequently, such thresholds may not apply to individuals experiencing "chronic, sporadic, low-level exposure," including sensitive populations such as children, the elderly, and pregnant women.[227] For example, the study detected polycyclic aromatic hydrocarbon (PAH) levels that could be of "clinical significance," as recent studies have linked low levels of exposure to lower mental development in children who were prenatally exposed.[228] In addition, government safety standards do not take into account "the kinds of effects found from low-level exposure to endocrine-disrupting chemicals…, which can be particularly harmful during prenatal development and childhood.[229]

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[221] Physicians for Social Responsibility and Concerned Health Professionals of NY, Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking, Fourth Edition, November 17, 2016 ("PSR 2016").
[222] Colborn 2011; Colborn 2012;*see* note 120 & accompanying text below.
[223] Colborn 2012 at pp. 21-22 (pages refer to page numbers in attached manuscript and not journal pages).
[224] Colborn 2012 at 11.
[225] *Id*. at 10.
[226] *Id*. at 11-12.
[227] *Id*. at. 12.
[228] *Id*. at 10-11.
[229] *Id*. at 12.

Adverse health impacts documented among residents living near drilling and fracking operations include reproductive harms, increased asthma attacks, increased rates of hospitalization, ambulance runs, emergency room visits, self-reported respiratory problems and rashes, motor vehicle fatalities, trauma, and drug abuse. A 2016 review concluded:

> By several measures, evidence for fracking-related health problems is emerging across the United States. In Pennsylvania, as the number of gas wells increase in a community, so do rates of hospitalization. Drilling and fracking operations are correlated with elevated motor vehicle fatalities (Texas), asthma (Pennsylvania), self-reported skin and respiratory problems (southwestern Pennsylvania), ambulance runs and emergency room visits (North Dakota), infant deaths (Utah), birth defects (Colorado), high risk pregnancies (Pennsylvania), premature birth (Pennsylvania), and low birthweight (multiple states). Benzene levels in ambient air surrounding drilling and fracking operations are sufficient to elevate risks for future cancers in both workers and nearby residents, according to studies. Animal studies show that two dozen chemicals commonly used in fracking operations are endocrine disruptors that can variously disrupt organ systems, lower sperm counts, and cause reproductive harm at levels to which people can be realistically exposed.[230]

A rigorous study by Johns Hopkins University, which examined 35,000 medical records of people with asthma in Pennsylvania, found that people who live near a higher number of, or larger, active gas wells were 1.5 to 4 times more likely to suffer from asthma attacks than those living farther away, with the closest groups having the highest risk.[231] Relatedly, in a 2018 study of pediatric asthma-related hospitalizations, it was found that children and adolescents exposed to newly spudded unconventional natural gas development wells within their zip code had 1.25 times the odds of experiencing an asthma-related hospitalization compared to children who did not live in these communities. Furthermore, children and adolescents living in a zip code with any current or previous drilling activity had 1.19 times the odds of experiencing an asthma-related hospitalization compared to children who did not live in these communities. Amongst children and adolescents (ages 2-18), children between 2 and 6 years of age had the greatest odds of hospitalization in both scenarios.[232]

A recent Yale University study identified numerous fracking chemicals that are known, probable, or possible human carcinogens (20 air pollutants) and/or are linked to increased risk

[230] PSR 2016 at 93.

[231] Rasmussen, Sara G. et al., Association Between Unconventional Natural Gas Development in the Marcellus Shale and Asthma Exacerbations, 176 JAMA Internal Medicine 1334 (2016).

[232] Willis, Mary D. et al., Unconventional natural gas development and pediatric asthma hospitalizations in Pennsylvania, 166 Environmental Research 402 (2018).

for leukemia and lymphoma (11 air pollutants), including benzene, 1,3-butadiene, cadmium, diesel exhaust, and polycyclic aromatic hydrocarbons.[233]

In a 2018 study by McKenzie et al. conducted in the Denver Julesberg Basin on the Colorado Northern Front Range (CNFR), it was found that the currently established setback distance of 152 m (500 ft) does little to protect people in that proximity. In analyses of nonmethane concentrations from 152 to >1600 m from oil and gas facilities, it was found that the EPA's minimum cumulative lifetime excess cancer risk benchmark of 1 in a million was exceeded. Cumulative lifetime excess cancer risk increased with decreasing distance from the nearest oil and gas facility. Residents living within 610 m of and oil and gas facility had an overall cancer risk in excess of the EPA's upper bound for remedial action of 1 in 10,000. Furthermore, residents within 152 m of an oil and gas facility had an overall excess cancer risk of 8.3 in 10,000, along with an increased likelihood of neurological, hematological, and developmental health effects. Over 95% of the total risk was due to benzene, with additional risk due to the presence of toluene, ethylbenzene, xylene, and alkanes.[234]

Numerous studies also suggest that higher maternal exposure to fracking and drilling can increase the incidence of high-risk pregnancies, premature births, low-birthweight babies, and birth defects. A study of more than 1.1 million births in Pennsylvania found evidence of a greater incidence of low-birth-weight babies and significant declines in average birth weight among pregnant women living within 3 km of fracking sites.[235] The study estimated that about 29,000 U.S. births each year occur within 1 km of an active fracking sties and "that these births therefore may be at higher risk of poor birth outcomes." A study of 9,384 pregnant women in Pennsylvania found that women who live near active drilling and fracking sites had a 40 percent increased risk for having premature birth and a 30 percent increased risk for having high-risk pregnancies.[236] Another Pennsylvania study found that pregnant women who had greater exposure to gas wells -- measured in terms of proximity and density of wells -- had a much higher risk of having low-birthweight babies; the researchers identified air pollution as the likely route of exposure.[237] In rural Colorado, mothers with greater exposure to natural gas wells were associated with a higher risk of having babies with congenital heart defects and possibly neural tube defects.[238] In California, studies have demonstrated that women with the highest exposure

[233] Elliot, Elise G. et al., A Systematic Evaluation of Chemicals in Hydraulic-Fracturing Fluids and Wastewater for Reproductive and Developmental Toxicity, 27 Journal of Exposure Science and Environmental Epidemiology 90 (2016).

[234] McKenzie, Lisa et al., Ambient Nonmethane Hydrocarbon Levels Along Colorado's Northern Front Range: Acute and Chronic Health Risks, 52 Environmental Science & Technology 4514 (2018).

[235] Currie, Janet et al., Hydraulic fracturing and infant health: New evidence from Pennsylvania, 3 Science Advances e1603021 (2017).

[236] Casey, Joan A., Unconventional Natural Gas Development and Birth Outcomes in Pennsylvania, USA, 27 Epidemiology 163 (2016).

[237] Stacy, Shaina L. et al., Perinatal Outcomes and Unconventional Natural Gas Operations in Southwest Pennsylvania. 10 PLoS ONE e0126425 (2015).

[238] McKenzie, Lisa M., Birth Outcomes and Maternal Residential Proximity to Natural Gas Development in Rural Colorado, 122 Environmental Health Perspectives 412 (2014).

to wells had a 8-14 percent increased risk of spontaneous pre-term birth compared to women who were not exposed to oil and gas production.[239] Also, California women living within 10 km of at least one production well in rural areas were at a 40 percent higher risk of being born low weight and 22 percent higher risk of being small for their gestational age.[240]

Other studies have found that residents living closer to drilling and fracking operations had higher hospitalization rates[241] and reported more health symptoms including upper respiratory problems and rashes.[242]

Workers suffer high risks from toxic exposure and accidents.[243] One study of the occupational inhalation risks caused by emissions from chemical storage tanks associated with fracking wells found that chemicals used in 12.4 percent of wells posed acute non-cancer risks, chemicals used in 7.5 percent of wells posed acute cancer risks, and chemicals used in 5.8 percent of wells posed chronic cancer risks.[244] As summarized below:

> Drilling and fracking jobs are among the most dangerous jobs in the nation with a fatality rate that is five times the national average and shows no sign of abating. Occupational hazards include head injuries, traffic accidents, blunt trauma, burns, inhalation of hydrocarbon vapors, toxic chemical exposures, heat exhaustion, dehydration, and sleep deprivation. An investigation of occupational exposures found high levels of benzene in the urine of wellpad workers, especially those in close proximity to flowback fluid coming up from wells following fracturing activities. Exposure to silica dust, which is definitively linked to silicosis and lung cancer, was singled out by the National Institute for Occupational Safety and Health as a particular threat to workers in fracking operations where silica sand is used. At the same time, research shows that many gas

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[239] Gonzalez, D.J.X., Sherris, A.R., Yang, W., Stevenson, D.K., Padula, A.M., Baiocchi, M., Burkee, M., Cullen, M.R., Shaw, G.M. (2020). Oil and gas production and spontaneous preterm birth in the San Joaquin Valley, CA. Environmental Epidemiology, 4(4). https://journals.lww.com/environepidem/Fulltext/2020/08000/Oil and gas production and spontaneous preterm.1.aspx?context=LatestArticles.

[240] Tran, K.V., Casey, J.A., Cushing, L.J., Morello-Frosch, R. (2020). Residential Proximity to Oil and Gas Development and Birth Outcomes in California: A Retrospective Cohort Study of 2006–2015 Births. Environmental Health Perspectives, 128(6). https://doi.org/10.1289/EHP5842.

[241] Jemielita, Thomas et al., Unconventional Gas and Oil Drilling Is Associated with Increased Hospital Utilization Rates. 10 PLoS ONE e0131093 (2015).

[242] Rabinowitz, Peter M. et al., Proximity to Natural Gas Wells and Reported Health Status: Results of a Household Survey in Washington County, Pennsylvania, 123 Environmental Health Perspectives 21 (2015).

[243]Esswein, Eric J. et al., Occupational Exposures to Respirable Crystalline Silica During Hydraulic Fracturing, 10 Journal of Occupational and Environmental Hygiene 347 (2013); Esswein, Eric et al., Evaluation of Some Potential Chemical Exposure Risks during Flowback Operations in Unconventional Oil and Gas Extraction: Preliminary Results, 11 Journal of Occupational and Environmental Hygiene D174 (2013), Harrison, Robert J. et al., Sudden Deaths Among Oil and Gas Extraction Workers Resulting from Oxygen Deficiency and Inhalation of Hydrocarbon Gases and Vapors — United States, January 2010–March 2015. 65 MMWR Morb Mortal Wkly Rep 6 (2016); PSR 2016.

[244] Chen, Huan & Kimberly E. Carter, Modeling potential occupational inhalation exposures and associated risks of toxic organics from chemical storage tanks used in hydraulic fracturing using AERMOD, 224 Environmental Pollution 300 (2017).

> field workers, despite these serious occupational hazards, are uninsured or underinsured and lack access to basic medical care.[245]

Methods of collecting and analyzing emissions data often underestimate health risks by failing to adequately measure the intensity, frequency, and duration of community exposure to toxic chemicals from fracking and drilling; failing to examine the effects of chemical mixtures; and failing to consider vulnerable populations.[246] Of high concern, numerous studies highlight that health assessments drilling and fracking emissions often fail to consider impact on vulnerable populations including environmental justice communities[247] and children.[248] For example, a recent analysis of oil and gas development in California found that 14 percent of the state's population totaling 5.4 million people live within a mile of at least one oil and gas well. More than a third of these residents, totaling 1.8 million people, also live in areas most burdened by environmental pollution.[249]

The EA must address the disproportionate health impacts on at-risk communities already encumbered by one the largest oil and gas-production regions in the state.

E. New Oil and Gas Production Will Create Conditions That Will Amplify the Risks Associated with COVID-19

Moreover, the COVID-19 pandemic has shown just how deadly oil industry pollution is and has made the need for protection all the more urgent. Multiple studies found that exposure to higher amounts of air pollution also increases a population's vulnerability to the coronavirus.

A major study of air pollution and COVID-19 mortality in the United States found that exposure to even a small increase in fine particulate matter ($PM_{2.5}$) was linked to an 8% greater chance of dying from COVID-19.[250]

A second study in Europe found that populations exposed to higher levels of nitrogen dioxide (NO_2) experienced higher rates of mortality during the coronavirus pandemic and

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[245] PSR 2016 at 80

[246] Brown, David et al., Understanding Exposure From Natural Gas Drilling Puts Current Air Standards to the Test. 29 Reviews on Environmental Health 277 (2014).

[247] NRDC [Natural Resources Defense Council], Drilling in California: Who's At Risk?, October 2014 ("NRDC 2014"); Clough, Emily & Derek Bell, Just Fracking: A Distributive Environmental Justice Analysis of Unconventional Gas Development in Pennsylvania, USA, 11 Environmental Research Letters 025001 (2016); McKenzie, Lisa M. et al., Population Size, Growth, and Environmental Justice Near Oil and Gas Wells in Colorado, 50 Environmental Science & Technology 11471 (2016).

[248] Webb, Ellen et al., Potential Hazards of Air Pollutant Emissions From Unconventional Oil and Natural Gas Operations on The Respiratory Health of Children And Infants. 31 Reviews on Environmental Health 225 (2016).

[249] NRDC 2014.

[250] Xiao 2020; see also https://www.nytimes.com/2020/04/07/climate/air-pollution-coronavirus-covid.html.

concluded "long-term exposure to this pollutant may be one of the most important contributors to fatality caused by the COVID-19 virus in these regions and maybe across the whole world."[251]

A study in England found that higher levels of ozone (O_3), nitrogen oxide (NO), and NO_2 are significantly associated with COVID-19 deaths.[252] Similarly, a study in Italy concluded that air pollution should be considered an additional co-factor in the high level of COVID-19 mortality in Northern Italy, noting that people living in areas with high pollution levels are more likely to develop chronic respiratory conditions and are more vulnerable to infective agents.[253]

Two studies from China found that short term exposure to higher concentrations of air pollutants including $PM_{2.5}$, PM_{10}, CO, NO_2 and O_3 is associated with an increased risk of COVID-19 infection.[254]

Additionally, COVID-19 has had and continues to have a greater impact on the health and livelihood of people of color and people living in poverty. The California Department of Public Health has stated that health outcomes "are affected by forces including structural racism [and] poverty."[255] According to the Department's statistics, people of color "are dying at disproportionately higher levels" from the virus.[256]

COVID-19 has already made a huge impact on the state of California. There have been over 760,000 cases and over 14,000 deaths in the state as a result of the disease.[257] Continued oil and gas production worsens the health of our citizens and BLM must consider this in its decisionmaking.

IV. BLM Must Fully Consider and Prevent Methane Waste

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[251] Ogen, Yaron, Assessing Nitrogen Dioxide (NO2) Levels As a Contributing Factor to Coronavirus (COVID-19) Fatality, 720 Science of the Total Environment 138605 Adv. Online Pub. (July 15, 2020) ("Ogen 2020"), https://doi.org/10.1016/j.scitotenv.2020.138605.

[252] Travaglio, Marco et al., Links Between Air Pollution and COVID-19 in England, medRxiv (April 28, 2020), https://doi.org/10.1101/2020.04.16.20067405.

[253] Conticini, Edoardo et al., Can Atmospheric Pollution Be Considered a Co-factor in Extremely High Level of SARS-CoV-2 Lethality in Northern Italy?, 261 Environmental Pollution 114465 (June 2020), https://doi.org/10.1016/j.envpol.2020.114465.

[254] Tian, Huaiyu et al., Risk of COVID-19 is Associated with Long-term Exposure to Air Pollution, medRxiv (April 24, 2020), https://doi.org/10.1101/2020.04.21.20073700; Zhu, Yongjian, Association between short-term exposure to air pollution and COVID-19 infection: Evidence from China, 727 Science of the Total Environment (April 2020) https://doi.org/10.1016/j.scitotenv.2020.138704.

[255] COVID-19. Cal. Dept. of Pub. Health (June 3, 2020), State Officials Announce Latest COVID-19 Facts (News Release No. NR20-111), https://www.cdph.ca.gov/Programs/OPA/Pages/NR20-111.aspx.

[256] *Id.*

[257] California Dept. of Health, COVID-19 Updates, California COVID-19 by the numbers (accessed on Sept. 15, 2020), available at https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Immunization/ncov2019.aspx#COVID-19%20by%20the%20Numbers

BLM has the authority and obligation to prevent the waste of methane. The MLA directs the Department of the Interior to require "all reasonable precautions to prevent waste of oil or gas developed in the land," 30 U.S.C. § 225, and mandates that "[e]ach lease shall contain provisions for the prevention of undue waste." *Id.* § 187. The MLA also requires BLM to consider not just private oil and gas interests, but also the "interests of the United States" and the "public welfare" when leasing and regulating publicly owned oil and gas resources. *Id.* § 187. In addition, FLPMA's mandates to prevent unnecessary or undue degradation and to manage for multiple use and sustained yield and in a manner that protects environmental, air, and atmospheric values likewise require BLM to regulate and limit natural gas waste and its significant contributions to climate change and associated degradation of public lands resources. 43 U.S.C. §§ 1701(a)(8), 1702(c), 1732(b).

The release of methane from oil and gas operations due to its venting, flaring, or leaking—also referred to as waste—is a significant issue for both loss of revenue and climate change impacts. Between 2009 and 2015, 462 billion cubic feet (Bcf) of natural gas from federal leases was vented or flared – enough to serve 6.2 million households for a year.[258] In 2008 "the economically recoverable volume represented about $23 million in lost Federal royalties and 16.5 million metric tons of carbon dioxide equivalent (CO2e) emissions."[259] The agency found that in 2013, 98 Bcf of natural gas was vented and flared from Federal and Indian leases. This volume had a sales value of $392 million and would have generated royalty revenues in excess of $49 million. Of the 98 Bcf of gas, it is estimated that 22 Bcf was vented and 76 Bcf was flared.[260] Methane is 86 times more potent than carbon dioxide as a GHG,[261] thus it is especially important to avoid or reduce methane emissions in limiting impacts to the climate.

The MLA's use of "all" to modify the term "reasonable precautions" shows that Congress intended BLM to aggressively control waste. The agency may not forego reasonable and effective measures limiting venting, flaring, and leaks for the sake of administrative convenience or to enhance the bottom lines of operators. *See Halliburton, Inc. v. Admin. Review Bd*., 771 F.3d 254, 266 (5th Cir. 2014) (ruling that statutory term "all relief necessary" authorized broad remedies against defendant because "we think Congress meant what it said. All means all" (internal quotation omitted)). The obligation to "use all reasonable precautions to prevent waste" applies to leases and lease sale regardless of any national waste rules that may currently apply. Consequently, BLM must exercise its authority to minimize waste of publicly owned natural gas from all leases issued in this sale and should do so by incorporating waste minimization stipulations as lease notices in the lease terms.

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[258] Waste Prevention, Production Subject to Royalties, and Resource Conservation, 81 Fed. Reg. 83,008 (Nov. 18, 2016).
[259] U.S. Bureau of Land Management, *Regulatory Impact Analysis for: Revisions to 43 CFR 3100 (Onshore Oil and Gas Leasing) and 43 CFR 3600 (Onshore Oil and Gas Operations) Additions of 43 CFR 3178 (Royalty-Free Use of Lease Production) and 43 CFR 3179 (Waste Prevention and Resource Conservation)*, at 2 (Nov. 10, 2016).
[260] *Id.* at 3.
[261] Gayathri Vaidyanathan, *How Bad of a Greenhouse Gas is Methane?*, SCIENTIFIC AMERICAN (Dec. 22, 2015), https://www.scientificamerican.com/article/how-bad-of-a-greenhouse-gas-is-methane/.

V. BLM Fails to Address the Cumulative Impacts to Water from Oil and Gas Development

California, and Kern County specifically, faces extreme water scarcity. Climate change will only reduce the water available in the state. BLM must consider the particular impacts that oil and gas production and, specifically, fracking will have on the quality and quantity of surface water and groundwater in California.

A. Kern County Already Faces Water Scarcity

BLM must account for the state of the water in the area around the new oil and gas leases for impacts to water are more significant here. Annually, Kern County receives an average of 6 inches of rainfall, which means that the surface water is insufficient to meet the needs of region.[262] To compensate for the lack of surface water, the county has developed a complex system that relies on a combination of importing water and pumping/storing groundwater to meet water needs.[263] The county has already spent hundreds of millions of dollars to provide and protect potable water for its citizens.[264] Largely, the money was spent to invest in a groundwater banking structure that spans across the entire county, this account for the largest source of water for the county.[265] In addition to the groundwater banking, Kern relies on the California aqueduct, the Kern River and Federal Canals.[266]

B. Oil and Gas Production Will Have Negative Impacts on Both Surface Water and Groundwater

Further oil and gas production is likely to cause contamination of both surface water and groundwater, which accounts for most of the region's freshwater supply. In a December 2016 report from the US EPA, the following factors were found to potentially impact water quality: (1) Water withdrawals for fracking in times or areas of low water availability; (2) Spills during the management of fracking fluids and chemicals or produced water; (3) Injection of fracking fluids into wells with inadequate mechanical integrity; (4) Injection of fracking fluids directly into groundwater resources; (5) Discharge of inadequately treated fracking wastewater to surface water resources; and (6) Disposal or storage of fracking wastewater in unlined pits. In fact, the compilation of this list was based on studies that found impacts to wastewater from the listed activities.[267]

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[262] Kern County Water Agency, Agency Function, https://www.kcwa.com/agencyfunction/.
[263] AP, Court Strikes Down Kern County's Industry-Friendly System for Approving Oil Drilling, Los Angeles Times, Feb. 26, 2020
[264] Kern County Water Agency, Agency Function, https://www.kcwa.com/agencyfunction/.
[265] *Id.*
[266] Water Association of Kern County, Water in Kern County https://www.wakc.com/water-overview/kern-county/
[267] U.S. EPA, Hydraulic fracturing for oil and gas: impacts from the hydraulic fracturing water cycle on drinking water resources in the United States (Final Report). U.S. Environmental Protection Agency, Washington DC, USA (2016)("EPA 2016 HF Study"), p. ES-3.

The potential for water quality impacts is because hydraulically fractured oil and gas production wells can be located near or within sources of drinking water. Between 2000 and 2013, about 3,900 public water systems were estimated to have had at least one fracked well in one mile of their water source. These public water systems served more than 8.6 million people year-round in 2013. Another 3.6 million people were estimated to have gotten drinking water from non-public water supply wells with at least one fracked well.[268] This is of great concern given the harmful chemicals found associated with fracking. Many toxic chemicals used in fracking and oil and gas extraction are water soluble and pose a threat to the water we drink. For example, hydrochloric acid is used to initiate rock fractures, ethylene glycol is used to prevent scale deposits in pipes, and glutaraldehyde is used to eliminate bacteria from produced water.[269] There are also chemicals that are directly associated with fossil fuels and produced water, such as the BTEX chemicals. This suite of chemicals, both from fracking fluids and fossil fuels, poses threats to virtually all systems of the body including the sensory, gastrointestinal, immune, reproductive, cardiovascular, endocrine, and nervous systems.[270]

These chemicals can be mobilized in a number of ways, one of which is spills. Several studies have noted spills of fracking fluids or additives, most of which were caused by equipment failure or human error. For instance, an EPA analysis characterized 151 spills of fracking fluids or additives on or near well sites in 11 states between January 2006 and April 2012. Of the total, 34% of the spills were due to equipment failure, 25% were due to human error, and more than 30% of the spills were from fluid storage units.[271] Similarly, in a study of spills reported to the Colorado Oil and Gas Conservation Commission, of 125 spills during well stimulation between January 2010 and August 2013, 51% were caused by human error, and 46% were caused by equipment failure. Furthermore, of the 151 spills analyzed by the EPA, the spill amount ranged from 5 gallons up to 19,320 gallons. Thirteen of the 151 spills reached a surface water body, with the largest spill volume reported reaching a water body being 7,350 gallons.[272] Also reported were spills reaching Pennsylvania surface waters between January 2008 and June 2013 with volumes ranging from 3,400 gallons to 227,000 gallons.[273] Such noted mobility of spill waters ultimately poses a threat to both surface and ground beneficial use waters. Similar threats are posed by spills of produced water as well.

Another way in which chemicals can be mobilized is through unintended flow pathways in the subsurface resulting from fracking. A well with insufficient mechanical integrity (e.g. due to well casing and tubing leaks, uncemented annulus, gaps in cement, gaps between casing and cement) can allow unintended fluid movement. Also, the fracture network produced during fracking could intersect sources of groundwater or surface water constituting a conduit for

[268] EPA 2016 HF Study, p. ES-8.
[269] CCST 2016 at 381.
[270] Yost, Erin et al., Estimating the Potential Toxicity of Chemicals Associated with Hydraulic Fracturing Operations Using Quantitative Structure-Activity Relationship Modeling, 50 Environmental Science and Technology 14 (2016).
[271] EPA 2016 HF Study, p. ES-22.
[272] *Id.* at ES-23.
[273] *Id.* at ES-24.

fracking water to flow. Finally, there have been instances where fracking one well has affected a nearby oil and gas well or its fracture network, resulting in spills of the nearby well.[274]

Perhaps the best examples of unwanted fluid migration are found in Pennsylvania. For example, an abandoned well in Pennsylvania produced a 30-foot geyser of brine and gas for more than a week after the fracking of a nearby gas well.[275] In another example, in 2009, shortly after drilling and fracking in the Marcellus Shale, residents near the township of Dimock, Pennsylvania reported that natural gas was appearing or increasing in their water wells.[276] As of 2016, over 1,000 fracking water contamination complaints had been filed from 17 of 40 fracking counties in Pennsylvania.[277] However, evidence of fluid migration has been observed in many other settings, including the Raton Basin of Colorado and Parker County, Texas, posing risks to drinking water and ultimately public health.[278]

Traditionally, it has been difficult to determine how significant the contamination of groundwater near oil and gas development has been because of poor baseline monitoring before the onset of production, particularly in the United States.[279] However, a recent study in Germany found that methane increased in groundwater near wells that engaged in fracking, providing hard evidence to explain the common story of explosive water in homes near fracking sites.[280] In a region that primarily relies on groundwater, and has invested over $300 million in infrastructure to store and transport groundwater, contamination from fracking would have a huge impact on the county.

While the EA provides cursory analysis about the possibility of surface water and groundwater contamination, there is no discussion of the particular risks associated from fracking. BLM must address the risk that the county's water faces from oil and gas development.

C. Contamination and Loss of Water Affects At-Risk Populations Who Rely on Ground Water

As discussed above, people of color are at the greatest risk of contamination from oil and gas production. To reiterate, of those living near wells, 92 percent are people of color (69 percent Hispanic/Latino, 10 percent African American, 11 percent Asian, and 2 percent Other).[281] In addition, the county faces a high level of poverty. According to a Census Bureau estimate, 22.6 percent of the county lives below the poverty line, well above the 12.3 percent national rate.[282]

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[274] EPA 2016 HF Study.
[275] *Id.* at ES-32.
[276] EPA 2016 HF Study, p. 6-11.
[277] Peltier, Laurel, Pennsylvania Fracking Water Contamination Much Higher Than Reported. EcoWatch, February 4, 2016. https://www.ecowatch.com/pennsylvania-fracking-water-contamination-much-higher-than-reported-1882166816.html. (Accessed July 12, 2018).
[278] EPA 2016 HF Study, p. ES-45.
[279] *Id.*
[280] *Id.*
[281] Natural Resources Defense Council, Drilling in California: Who's at risk? (October 2014).
[282] Census Bureau, https://datausa.io/profile/geo/kern-county-ca#economy

Loss of water would have a dramatic impact on the county's largest industry and source of employment: agriculture.[283] In 2018, Kern County estimated that the gross value of agricultural commodities was $7,466,152,000.[284] In addition, the industry accounts for 10.6 percent of employment, the largest in the county.

Agriculture uses a large amount of water in the county and in the state. The county estimates that ag uses 2,294,000 acre-feet of water per year.[285] Statewide, irrigation for crops accounts of 60.7 percent of California's water use.[286] Water is highly necessary for some of Kern County's top crops. In 2018, the most popular crops were grapes, almonds, and pistachios, which are all high consumers of water.[287] If there is a loss of water, it could have tremendous effects on the county's largest industries and further harm a community facing a high poverty rate.

D. The EA Fails to Adequately Address the Risk to the County's Water Supply

BLM must take a "hard look" at the direct, indirect, and cumulative impacts of the lease sale on water useable and water quality. Courts have found that agencies must take a hard look at environmental consequences before taking a major federal action.[288] In the case of water, a hard look requires that BLM examine "the current state of water, potential risks associated with its leasing decision, mitigation measures, and prospective monitoring of water quality."[289] The EA fails to adequately address each of these features and fails to provide a system to monitor the quality of the water.

In addition, BLM must consider the cumulative impacts resulting from the lifespan of the well and the impact of all wells in the area.[290] As the Tenth Circuit determined, a NEPA document is not adequate unless it quantifies the cumulative impacts of reasonably foreseeable water use.[291] Because the surrounding area is populated with oil and gas development, BLM has a pool of evidence it can draw on to develop reasonable estimates of the water use and water contamination that would likely result from leasing these seven parcels. It also demonstrates that water use and contamination is a reasonably foreseeable outcome of the leasing.

VI. The EA Lacks Basic Required Information Regarding Groundwater Depth and Quality

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[283] *Id.*
[284] 2018 Kern County Agricultural Crop Report, at i, available at http://www.kernag.com/caap/crop-reports/crop10_19/crop2018.pdf
[285] Water Association of Kern County, Water in Kern County https://www.wakc.com/water-overview/kern-county/
[286] Congressional Research Service, California Agricultural Production and Irrigated water Use, at 20, available at https://fas.org/sgp/crs/misc/R44093.pdf
[287] *2018 Kern County Agricultural Crop Report,* at 1, *available at http://www.kernag.com/caap/crop-reports/crop10_19/crop2018.pdf*
[288] *Baltimore Gas & Electric Company v. Natural Resources Defense Council,* 462 U.S. 87, 97 (1983).
[289] *San Juan Citizens Alliance v. United States Bureau of Land Management*, 326 F.Supp.3d 1227, 1255 (D.N.M 2018).
[290] *See Diné Citizens Against Ruining Our Environment v. Bernhardt, 923 F.3d 831 (10th Cir. 2019).*
[291] *Id.*

The EA notes that "[t]he parcels along the west side of the valley do not have, [sic] the Corcoran clay or similar barrier to movement of water into the deep groundwater."[292] It also notes that "[t]he groundwater quality is already poor."[293] But the EA does not disclose the numerical quality of water underlying drilling locations, and therefore does not take into account whether water containing less than 10,000 ppm TDS would be at risk. Indeed, the EA entirely fails to disclose basic groundwater information that would allow BLM to determine the risk to groundwater from the oil and gas development it is authorizing. BLM has data necessary to undertake a more specific analysis at this leasing stage, including records showing aquifer depth and quality in the areas where the leases are located, records of existing wells drilled in the area, and information on which parcels may be at higher risk from fracking. Indeed, it has included some of this required information for other lease sales.[294] Its failure to analyze the impacts to groundwater given the information before it constitutes a failure to take a hard look under NEPA.[295]

A. The EA fails to Take a Hard Look at Impacts to Water Scarcity

The EA notes that "[g]round water [sic] consumption (use) may also occur as a result of hydraulic fracturing."[296] It predicts that "the development of 10 wells (including the potential for up to one hydraulically fractured well) may have an additional effect [on groundwater scarcity], however any effect would be difficult to distinguish from existing effects."[297] This analysis is insufficient to constitute a hard look at water scarcity impacts. The EA compares the 200,000 gallons needed for each fracked well to the total water consumption of Kern County overall. But the EA makes no attempt to analyze the cumulative impacts of this water withdrawal with other water uses in the area on the *local communities affected*. But as the CCST report has explained, these impacts could be significant to the small communities and domestic users that rely on local groundwater:

> Most of the hydraulic fracturing in California takes place in the San Joaquin Valley, where groundwater has been over-drafted by agriculture for over 80 years, causing a host of problems, including subsidence of the land surface. The 8-meter drop in the land surface near Mendota, California, is among the largest ever that has been attributed to groundwater pumping.[298] New water demands on top of already high competition for water could further deplete the region's aquifers, as has been observed in other water-scarce regions of the U.S. where hydraulic fracturing is occurring.[299] *This could cause concern for smaller communities and*

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[292] EA at 42.
[293] *Id.*
[294] See, e.g., Appendix H for Final EA for BLM Montana March 2020 Lease sale (Exhibit __) (including a map of lease parcels comparing depths of targeted formations to depths of existing water wells).
[295] Wildearth Guardians v. U.S. Bureau of Land Mgmt., No. CV-18-73-GF-BMM, 2020 WL 2104760, at *6 (D. Mont. May 1, 2020).
[296] EA at 43.
[297] EA at 43.
[298] (Galloway et al., 1999).
[299] (Reig et al., 2014).

> *domestic users that rely on local groundwater*. In the San Joaquin Valley, farmers and communities also depend on imported water delivered by canals, deliveries of which have become increasingly unreliable in recent years.[300]

Thus, to rationally determine whether water use will cause a significant impact, the EA must evaluate the impact on the scale of the local effected community, rather than compared to Kern County's water use overall.

B. The EA Fails to Take a Hard Look at Impacts to Groundwater

The EA notes that "[t]he potential to harm groundwater on the western side of the Kern Sub-basin from surface spills is due to the lack of a clay layer like the Corcoran Clay."[301] But it then concludes that "Parcel 5 (Poso Unit) impacts are expected to be minimized by applying protective Oil & Gas Guideline stipulations such as those in Appendix D to minimize the risk of contamination from accidental releases, in addition to fulfilling all laws, regulations, State and Federal Clean Water Acts, and BLM policies."[302] But the EA fails to rationally explain *which* of the protective stipulations will "*minimize*" the risk of contaminations and how, and whether even with the stipulations in place the risk of groundwater contamination will be still be significant.

The EA also refers to best management practices from the Draft Environmental Impact Report to conclude that "[c]ompliance with applicable laws, regulations and standards will reduce potential surface water quality impacts from contact with drilling muds or fluids during drilling and construction to less than substantial levels. In the western part of the Kern Sub-basin this will protect groundwater. In the eastern part of the basin drinking water supplies will be protected."[303] But that Draft EIR similarly failed to adequately consider risks to groundwater, and substantial questions remain as to whether current best practices are adequate to protect groundwater.[304] As the Ninth Circuit has explained, an "EIS must be prepared as long as 'substantial questions' remain as to whether the measures will completely preclude significant environmental effects. . . . Thus, even if there is a chance that regulation of surface-disturbing activities will render insignificant the impacts of those activities, that possibility does not dispel substantial questions regarding the government's ability to adequately regulate activities which it cannot absolutely preclude."[305] BLM must accordingly prepare an EIS to take a hard look at potential groundwater impacts.

C. BLM Should Consider Alternatives that Would Protect Groundwater

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[300] (DWR, 2014a). CCST 2015 Vol II at p. 65 (Exhibit __) (emphasis added).
[301] EA at 43.
[302] *Id*.
[303] EA at 42 (quoting Draft Environmental Impact Report (Kern County, 2020)).
[304] See CBD et al., *Comments on the Draft Supplemental Recirculated Environmental Impact Report for Revisions to Title 19-Kern County Zoning Ordinance (2020-A) Focused on Oil and Gas Local Permitting (SCH # 2013081079)* (September 16, 2020) (Exhibit __).
[305] *Conner v. Burford*, 848 F.2d 1441, 1450 (9th Cir. 1988).

NEPA unambiguously requires BLM to consider a reasonable range of alternatives.[306] Here, BLM must consider alternatives that would protect usable groundwater.[307] Specifically, BLM should consider not leasing parcels within areas where there is inadequate vertical separation between the oil and gas formations likely to be targeted and any groundwater aquifer with 10,000 ppm TDS or less. BLM should also analyze an alternative whereby parcels would not be leased in areas overlying usable groundwater and surface water, where there is no Corcoran clay or similar barrier to movement of water into the deep groundwater, and an alternative that includes other measures to ensure that all usable groundwater zones are protected. This might involve pre-leasing groundwater testing and adding a lease stipulation or lease notice requiring specified casing and cementing depths. Alternatively or additionally, BLM should consider requiring a lease stipulation or lease notice requiring the lessee to perform groundwater testing prior to drilling to identify all usable water, and consultation with the U.S. Geological Survey and other agencies to identify those waters with up to 10,000 ppm TDS.

VII. BLM Must Analyze the Impacts of Well Stimulation and Enhanced Oil Recovery Techniques

Well stimulation techniques are different techniques used to increase the flow capacity to a well. The three main techniques used are (1) hydraulic fracturing; (2) acid fracturing; and (3) matrix acidizing. "Hydraulic fracturing creates fractures in reservoir rocks in order to enhance the flow of petroleum or natural gases to the well...This is accomplished by pumping fluids into a zone of the well until the fluid pressure is sufficient to break the rock…Acid fracturing accomplishes the same goal as hydraulic fracturing by injecting low pH fluids instead of proppants into a created fracture…Matrix acidizing is the process of injecting strong acids into the formations around a well at pressures below the fracturing pressure of the rock."[308] The EA states that hydraulic fracturing is likely to occur in one well but must disclose whether any of other well stimulation techniques will be used for developing either of the projects at issue, and if so, BLM must analyze their direct, indirect, and cumulative impacts.

Notably, in *Los Padres Forest Watch*, the court rejected BLM's argument that "its analysis of the environmental impact of fracking is subsumed under its analysis of the impact of *all* oil and gas development," because "a 'hard look' at the environmental impacts of fracking necessarily requires the Bureau to address the unique risks and concerns associated with

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[306] *See, e.g., Muckleshoot Indian Tribe v. U.S. Forest Serv.*, 177 F.3d 800, 813 (9th Cir. 1999) ("Forest Service failed to consider an adequate range of alternatives" when the "EIS considered only a no action alternative along with two virtually identical alternatives"); *Nat. Res. Def. Council v. U.S. Forest Serv.*, 421 F.3d 797, 813 (9th Cir. 2005) (holding that the Forest Service had unlawfully failed to consider an alternative to a timber program that would have provided greater protection for old-growth habitat); *Colorado Envtl. Coal. v. Salazar*, 875 F. Supp. 2d 1233, 1248 (D. Colo. 2012) (holding that BLM unlawfully failed to consider an alternative to oil and gas leasing that would have involved minimal surface disturbance); *Wilderness Soc., Ctr. For Native Ecosystems v. Wisely*, 524 F. Supp. 2d 1285, 1312 (D. Colo. 2007) (holding that BLM should have considered a "potentially appealing middle-ground compromise between the absolutism of the outright leasing and no action alternatives" that would have reduced environmental impacts).

[307] *See WildEarth Guardians*, 2020 WL 2104760, at *8.

[308] Advanced Well Stimulation Technologies in California, California Council on Science and Technology Lawrence Berkeley National Laboratory Pacific Institute (July 2016) at 22.

fracking."[309] Fracking impacts include greater fracking chemical use and related health and wildlife impacts, a higher risk of spills from increased handling and storage of chemicals and produced water, increased VOC and methane emissions, greater freshwater consumption, increased risk of well leakage and groundwater contamination, and induced seismicity risks from both fracking and underground waste disposal.

In addition, the EA or EIS must disclose whether enhanced oil recovery, which is commonly used throughout the planning area. Enhanced oil recovery (EOR) "is the most common oil recovery practice in the U.S., accounting for an estimated 60% of total crude oil production."[310] Enhanced oil recovery techniques include:

> Waterflooding: The injection of water underground to push oil through the formation and into an oil well — accounts for approximately 50% of total U.S. crude oil production.
>
> CO2-EOR: The injection of CO2 to mix with oil to aid in recovery — accounts for approximately 5% of total U.S. crude oil production.
>
> Thermal EOR: The injection of steam underground to increase the flow of heavy oil — accounts for approximately 4% of total U.S. crude oil production.
>
> Chemical EOR: The injection of bacteria or added chemicals in water for oil recovery — accounts for less than 1% of total U.S. crude oil production. Note: the use of chemicals is not unique to chemical EOR. Oil companies often use chemical additives in other EOR and oil production processes.[311]

Over half of all EOR injection wells occur in California and Texas, including over 54,000 wells in California as of 2015.[312] Both waterflooding and steam injection are widely used in the Bakersfield Field Office, and thus, EOR must be analyzed in an EIS.

EOR injection and operations involve many of the same risks as fracking, including increased water depletions, produced water spills and contamination, and groundwater contamination. In addition, surface spills or "surface expressions" have recently come to light as another serious risk of EOR thermal operations. The EA must address whether the projects will employ these techniques and their impacts.

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[309] *Los Padres Forest Watch v. United States BLM*, No. CV-15-4378-MWF (JEMx), 2016 U.S. Dist. LEXIS 138782, at *34 (C.D. Cal. Sep. 6, 2016) (emphasis in original).

[310] Clean Water Action, The Environmental Risks and Oversight of Enhanced Oil Recovery in the United States: An overview of Class II well trends and regulations in EPA's Underground Injection Control Program (2017) ("EOR Report 2017") at p. 5, available at: https://www.cleanwateraction.org/sites/default/files/docs/publications/Environmental%20Risks%20and%20Oversight%20of%20Enhanced%20Oil%20Recovery%2011.08.17a.pdf.

[311] Clean Water Action, Enhanced Oil Recovery: A Threat to Drinking Water ("EOR Factsheet"), available at: https://www.cleanwateraction.org/sites/default/files/docs/publications/EOR%20Risk%20and%20Oversight%20Factsheet_0.pdf.

[312] EOR Report 2017 at pp. 5, 38.

In addition, enhanced oil recovery operations may rely on produced water for injection to enhance oil recovery.[313] The increased injection, handling, transport, and storage of produced water for these operations will increase the risk of spills and leaks. Produced water is highly saline and laced with an array of toxic substances; its accidental release could result in contamination of streams and groundwater. The EA must address the possible impact

A. BLM Must Assess the Risk of Surface Spills Associated with Well Stimulation and Enhanced Recovery Techniques

High chronic rates of accidents in Kern County illustrate that spills are unavoidable, especially when wells utilize well stimulation and enhanced recovery techniques. According to the Office of Emergency Services, between January 2009 and December 2014, a total of 575 produced water spills and thirty-one chemical spills were reported in California, equivalent to ninety-nine produced water spills per year.[314] Moreover, nearly eighteen percent of produced water spills and ten percent of chemical spills affected waterways.[315] There were thirty-one chemical spills in oil fields, nine of them acid spills.[316] One acid spill ruptured beyond a secondary containment apparatus and spilled 5,500 gallons of hydrochloric acid.[317] Kern County has the highest concentration of produced water spills (fifty-five percent) and chemical spills (forty-two percent) of any county in the state.[318] The number of incidents reported is likely smaller than the number of actual spills and leaks, either because they have not yet been discovered, or operators have not reported them.

This unacceptably high surface spill rate is highlighted by the recent Chevron oil spill in Kern County starting in May 2019, where a surface expression resulted in 1.3 million gallons of liquid, including about 400,000 gallons of crude oil that spilled into a dry wash channel near the town of McKittrick at the Cymric oil field.[319] They flow finally stopped in early August, 2019. State regulators had to intervene to issue a notice of violation and halt some oil extraction. The incident took place in an area where steam injection is widely used.[320] In August 2019, another expression in the same oilfield resulted in nearly 300,000 gallons of fluid flowing to the surface, including 82,000 gallons of oil. In October 2019, two new surface expressions in the same oil field resulted in over 10,000 more gallons of oil released in the area.[321] Oil from this spill

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[313] EOR Report 2017 at p. 16; CCST 2015 Vol II at p. 58.
[314] CCST 2015 Vol II, at 345.
[315] *Id*. at 345.
[316] *Id*. ar 127.
[317] *Id*. at 128.
[318] *Id*. at 345.
[319] Goldberg, Ted, Chevron Faces New Demands From Regulators as Kern County Oil Releases Continue, KQED, Sept. 10, 2019, available at: https://www.kqed.org/news/11773382/chevron-faces-new-demands-from-regulators-as-kern-county-oil-releases-continue.
[320] Goldberg, Ted, State Orders Chevron to Stop Massive Crude Oil Release from Kern County Well, KQED, July 13, 2019, available at: https://www.kqed.org/news/11761141/state-orders-chevron-to-stop-massive-crude-oil-release-in-kern-county-oil-field.
[321] Goldberg, Ted, New Chevron Crude Spills Emerge in Kern County Oil Field, KQED, available at https://www.kqed.org/news/11780057/new-chevron-crude-spills-emerge-in-kern-county-oil-field

reached the nearby streambed, contaminating surface water.[322] The spills occurred after CalGEM established "strengthened regulations" intended to prevent surface expressions.[323] In this one oilfield alone, between July 2019 and November 2019, there have been more than 2.7 million gallons of oil, water, and mud released from at least 6 surface expressions.[324] Since 2003, when there was a large surface expression, the estimate of total spillage is 82 million gallons in the Cymric oilfield.[325]

Reportedly, most of the spills in this area occurred where CalGEM (previously DOGGR) did not require comprehensive project approvals before the permits were issued,[326] for cyclic steam operations. "Cyclic steam is a risky but profitable technique used in areas where thick, gooey oil is difficult to dislodge by conventional drilling. Cycles of steam are blasted down special boreholes to thin the crude oil. A Chevron manager died in 2011 in a different Kern County oil field after falling into a boiling sinkhole of liquids created by steam injection."[327] Surface expressions can occur when pressurized steam breaks loose from the targeted area underground.[328] Currently, experts from the Lawrence Berkeley and Lawrence Livermore National Laboratories are investigating surface expressions and their exact cause.

Further, in 2013 a "high energy flow" surface expression of 230 barrels of fluid, including 3 barrels of oil, occurred on a federal lease in the Bakersfield Field Office.[329] The suspected cause was a steam injection well operated by Freeport McMoRan. DOGGR (now CalGEM) disallowed steaming operations on this well until it approved a new steam plan.

However, there is still question about how these surface expressions occurred. CalGEM recently called for a conference to address the "root cause" of the surface expressions in Kern County.[330] It appears that CalGEM has yet to establish the cause of these environmental catastrophes, let alone regulate the cause.

B. BLM Provided Inadequate Analysis of the Risk of Spills Associated with Enhanced Recovery Techniques

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[322] *Id.*
[323] California Dept. of Conservation, Oil Filed Expressions, https://www.conservation.ca.gov/calgem/Pages/Chevron-Cymric-oil-spill.aspx
[324] Klein, Kerry, Millions of Gallons of Oily Water Have Surfaced in A Kern County Oil Field, and More Keeps Coming, NPR for Central California, available at https://www.kvpr.org/post/millions-gallons-oily-water-have-surfaced-kern-county-oil-field-and-more-keeps-coming
[325] *Id.*
[326] *Wilson, Janet, California presses Chevron for data on oil field where 8 spills have happened since April, Palm Springs Desert Sun, September 11, 2019, available at: https://www.desertsun.com/story/news/environment/2019/09/11/california-regulators-chevron-data-cymric-surface-expression-oil-spills/2276867001/.*
[327] *Id.*
[328] *Id.*
[329] DOGGR, Freeport McMoRan Oil and Gas Surface Expression.
[330] *Id.*

While BLM states that spills are possible, the EA fails to address the increased impact from well stimulation and enhanced recovery techniques and relies on regulations that have been proven not to prevent dangerous surface expressions to reduce the risk of spills.

The EA fails to address the risks associated with well stimulation before the lease sale goes through. Instead, it states that these well stimulation techniques will be discussed in the "[t]hird level, site-specific analysis."[331] As discussed above, the issuance of a lease is an "irretrievable commitment of resources."[332] The impacts of all "reasonably foreseeable" impacts as a result of these leases must therefore be discussed before the lease sale goes through.[333] It is reasonably foreseeable that well stimulation will occur and the EA must address the possible environmental impacts including an increased risk of spills.

There is no discussion of enhanced recovery techniques. The EA must address the possibility that these commonplace techniques will be used and that spills may occur as a result.

When the EA does address the possibility of general spills of hazardous materials, it does not engage in the proper analysis required under NEPA. Instead, the EA simply states that spills may impact groundwater,[334] surface water,[335] soil,[336] and species.[337] When discussing the possibility of spills, the EA doesn't discuss what the impacts of the spill will be, but suggests that "spills should be cleaned up quickly,"[338] or that the contaminant must comply with the Environmental Protection Agency's Spill Prevention, Control and Countermeasure regulations.[339] As demonstrated by the large spills that continue to occur in Kern County despite the best efforts of regulators to control them, this is insufficient analysis. BLM must address the impacts that occur because of these large surface expressions before the lease sale may be approved.

VIII. The EA Fails to Take a Hard Look at Public Health and Safety Impacts, Particularly on Local Environmental Justice Communities

The EA completely fails to analyze or even mention impacts to public health and safety due to the proposed lease sale, despite substantial evidence of the health and safety impacts associated with oil and gas development and fracking in the area. The EA estimates criteria pollutant and hazardous air pollutant (HAP) emissions for the sale, for example, but does not disclose or analyze the impacts of those increased emissions on workers and local

[331] EA at 4.
[332] *Sierra Club v. Peterson*, 717 F.2d 1409, 1414 (D.C. Cir. 1983); *Pennaco Energy, Inc. v. U.S. Dep't of Interior*, 377 F.3d 1147, 1160 (10th Cir. 2004).
[333] *N.M. ex rel. Richardson v. BLM*, 565 F.3d 683, 718 (10th Cir. 2009)
[334] EA at 21, 42.
[335] EA at 44.
[336] EA at 41, 47.
[337] EA at 49, 50.
[338] EA at 44.
[339] EA at 83.

communities.[340] The EA also acknowledges the proposed parcels are located near communities like Bakersfield and Maricopa already overburdened with air and water quality problems, yet cursorily concludes any exposure to hazardous substances "are considered unlikely to cause a substantial short-term impact."[341] BLM therefore failed to properly evaluate whether local communities face increased public health and safety risks from the oil and gas development it is authorizing.

A. The EA Fails to Address the Many Ways Oil and Gas Production Is Likely to Impact Public Health

Indeed, the EA entirely fails to disclose the impacts of increased air pollution from chemical usage during oil and gas development and fracking. Drilling and fracking activity release increased toxic compounds that pollute air and water, including methane; non-methane volatile organic compounds (VOCs), including numerous toxic air contaminants (TACs); benzene, toluene, ethylbenzene, and xylene (BTEX); nitrogen oxides (NOx); fine particulate matter (PM2.5); hydrogen sulfide; and silica dust. These air pollutants cause a range of illnesses, with numerous studies indicating damage to the brain and nervous system, increased asthma attacks and other respiratory issues, birth defects, and cancer. [342]

Toxic chemicals present in fracking fluid and wastewater produced in the drilling and fracking process also threaten water resources in the area. A systematic evaluation of 240 chemicals regularly found in fracking fluids and/or wastewater reported that 43 percent are associated with reproductive toxicity, 40 percent are associated with developmental toxicity, and 17 percent have been shown to cause both developmental and reproductive harms.[343] The study identified 781 other chemicals found in fracking fluid and wastewater which lacked toxicity information and thus could not be evaluated, but which may pose similar risks. Another recent analysis of 111 chemicals routinely found in fracking fluids and wastewater found that 44 percent are known, probable, or possible human carcinogens, and seventeen are linked to increased risk for leukemia and lymphoma, including 1,3-butadiene, cadmium, ethanol, ethylene oxide, and formaldehyde.[344] The suite of chemicals used in oil and gas development poses threats to virtually all systems of the body including the sensory, gastrointestinal, immune, reproductive, cardiovascular, endocrine, and nervous systems.[345]

In California, a study of Kern County produced water found high concentrations of benzene, a known carcinogen. In some samples, benzene concentrations were as high as 18.0

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[340] EA at 34-36.
[341] EA at 31, 36.
[342] *See* Section III, subsections A, D, E for a discussion of health impacts
[343] Elliott, Elise G., et al., A systematic evaluation of chemicals in hydraulic-fracturing fluids and wastewater for reproductive and developmental toxicity, 27 Journal of Exposure Science and Environmental Epidemiology 90 (2016).
[344] Elliott, Elise G. et al., Unconventional oil and gas development and risk of childhood leukemia: Assessing the evidence, 576 Science of the Total Environment 138 (2017).
[345] Yost, Erin et al., Estimating the Potential Toxicity of Chemicals Associated with Hydraulic Fracturing Operations Using Quantitative Structure-Activity Relationship Modeling, 50 Environmental Science and Technology 14 (2016).

mg/L, thousands of times above safe levels for drinking water.[346] Another recent California study reported that produced water from 95 percent of 630 fracked wells contained measurable, and sometimes elevated, concentrations of toxic BTEX (benzene, toluene, ethylbenzene and xylene) and PAH (polycyclic aromatic hydrocarbon) compounds.[347] The findings of such studies do not fully capture the extent of the risks because of industry under-reporting of chemical usage. In a recent evaluation of chemicals in fracking fluids in California, the publicly reported data represented only one-fifth to one-third of the fracking treatments during the 3-year study period, demonstrating that the amount and identity of chemicals used in fracking fluids is significantly under-reported.[348]

Furthermore, even of the chemicals that are reported, key information is often missing that would be necessary to evaluate their toxicity and potential health and environmental impacts. Of 316 chemicals used in hydraulic fracturing and acid treatments reported by oil and gas production operators in California, 40 percent lacked environmental impact or toxicity data. Of that, 38 percent also lacked a CASRN number which serves as a unique numerical identifier of chemical substances. Only 55 percent of the reported chemicals had a CASRN, impact or toxicity data, and quantity of use or amount of emissions, all of which are necessary in assessing the chemical burden imposed by a given substance.[349]

Recovered and produced water can also contain harmful constituents that are naturally-occurring in oil and gas formations such as TDS, trace elements (e.g. boron), heavy metals (e.g. arsenic, lead, cadmium, mercury), organics (e.g. benzene) and naturally-occurring radioactive materials (NORM; e.g. K-40, U-238, Ra-226).[350] Similar to chemical additives, these naturally-occurring substances likewise have been linked to adverse impacts on the various systems of the human body.[351]

Spills and leaks occur with troubling regularity in California. The CCST reported that there were 575 spills of produced water from 2011 to 2014, and 18 percent of those spills affected waterways.[352] There were thirty-one chemical spills in oil fields, nine of them acid spills.[353] One acid spill ruptured beyond a secondary containment apparatus and spilled 5,500 gallons of hydrochloric acid.[354] More than two dozen spills have occurred in Kern County alone

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[346] California Department of Conservation, Division of Oil, Gas & Geothermal Resources, Benzene in water produced in Kern County oil fields containing fresh water (1993) at pp. 3-4.
[347] Chittick, Emily A. & Tanja Srebotnjak, An analysis of chemicals and other constituents found in produced water from hydraulically fractured wells in California and the challenges for wastewater management, 204 Journal of Environmental Management 502 (2017).
[348] Stringfellow, William et al., Identifying chemicals of concern in hydraulic fracturing fluids used for oil production, 220 Environmental Pollution 413 (2017) ("Stringfellow 2017-2").
[349] California Council on Science and Technology, Volume II, Potential Environmental Impacts of Hydraulic Fracturing and Acid Stimulations (2015) ("CCST 2015 Vol II") at p. 17.
[350] CCST 2015 Vol. II, at pp. 92-97.
[351] Agency for Toxic Substances and Disease Registry (ATSDR), ATSDR A-Z Index, https://www.atsdr.cdc.gov/az/a.html (last visited on Sept. 22, 2020) ("ASTDR A-Z Index").
[352] CCST 2015 Vol. II, at p. 127.
[353] *Ibid.*
[354] *Id.* at p. 128.

since just last year.[355] These high rates of accidents illustrate that spills are unavoidable. The number of incidents reported is likely smaller than the number of actual spills and leaks, either because they have not yet been discovered, or operators have not reported them.[356] By not fully assessing the chemicals that could be present in fracking and associated fluids, the EA fails to take a hard look at the risks that these chemicals pose to local communities' water resources. The EA must therefore include a health impact assessment or equivalent analyzing the impacts of the proposed sale on human health and nearby communities.

B. The Impacts Will Be Felt by Environmental Justice Communities

The EA also fails to analyze any of the health and safety impacts in the context of the environmental justice communities in and near the proposed lease sale parcels. The EA acknowledges that "Kern County qualifies as an environmental justice population given 53 percent of residents are Hispanic/Latino" and that "Kern County is also an environmental justice population based on its low-income status."[357] The EA's analysis ends there, however, pointing to the 2019 SEIS to conclude only "negligible" environmental justice impacts would be expected.[358] The EA fails to map the location of these nearby communities or use readily available tools like CalEnviroScreen to otherwise identify and locate these communities.[359] This failure is all the more apparent given BLM identified that the proposed lease parcels are located near communities like Bakersfield, where expanded oil and gas development will compound existing air and water pollution burdens.[360]

The cities likely to be most impacted by the leasing are Maricopa, Derby Acres, McKittrick, as well as the nearby Bakersfield.[361] Each of these communities already faces high rates of poverty.[362] The region is home to a large population of people of color, for instance, 33.2 percent of the Bakersfield population is Hispanic.[363] It is well-established that people of color

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[355] Wilson & Younes, *Oil Companies Are Profiting From Illegal Spills. And California Lets Them*, Desern Sun & ProPublica (Sept. 18, 2020), https://www.propublica.org/article/oil-companies-are-profiting-from-illegal-spills-and-california-lets-them.
[356] *Ibid.*
[357] EA at 12-13.
[358] EA at 31.
[359] Cal. Office of Environmental Health Hazard Assessment, *About CalEnviroScreen* (last visited Sept. 22, 2020), https://oehha.ca.gov/calenviroscreen/about-calenviroscreen.
[360] EA at 31. *See Cal. v. Bernhardt*, No. 4:18-cv-05712-YGR, 2020 WL 4001480, at *34 (N.D. Cal. July 15, 2020) ("[U]nder NEPA, BLM must not only disclose through the rulemaking process that certain communities and localities are at greater risk, but must also fully assess these risks.").
[361] See Center Map.
[362] Census Data, Maricopa CA(poverty rate estimated to be 36.6 percent); Census data, Hazelton, CA (poverty rate estimated to be 25.1 percent); Census Data, Derby Acres, CA; (poverty rate estimated to be 25.1 percent) Census Data, Mckittrick, CA, Census Data (poverty rate estimated to be 11.2 percent); Census Data, Bakersfield, CA (poverty rate is estimated to be 19.2 percent).
[363] Census Data, Bakersfield, CA.

and people living below the poverty line have shouldered the burden of environmental degradation,[364] and this is true of the folks living near the project area.[365]

Indeed, the proposed lease sale parcels are located in areas with severe air and water quality problems and disproportionately impacted by pollution from industrial agriculture, heavy diesel truck traffic, and intensive oil and gas development in the region. Increased fracking and oil and gas development will only exacerbate these disproportionately high and adverse impacts on environmental justice communities. In fact, the San Joaquin Valley has some of the nation's worst air quality, and fails to meet health-protective standards for ozone and particulate matter pollution.[366] The American Lung Association's State of the Air report for 2016 reports that the counties in San Joaquin Valley have the highest asthma rate for children in the nation.[367] Over 550,000 Valley residents have asthma, and of those 105,000 are children.[368] One in six children in the San Joaquin Valley has asthma, the highest level in the state.[369]

In addition, the San Joaquin Valley is disproportionately impacted by drinking water contamination. About half of all failing water systems are in the San Joaquin Valley; these failing systems are mostly in small towns and unincorporated communities—isolated areas where migrant farmworker communities are likely to be concentrated.[370] As of May 2018, 185,000 Valley residents were served by water systems deemed out of compliance by the state water board.[371] The region has some of the highest rates of nitrate contamination in the nation, a problem linked to the widespread application of fertilizer and the runoff from livestock operations.[372] Excess levels of arsenic, uranium, and toxic chemicals known as trihalomethanes have also been detected in these water systems.

In Kern County alone—where the parcels are located—35 percent of the county's residents (290,000) live within a mile of at least one oil or gas well. Roughly 25 percent of Kern County wells are located in low-income communities; and of those wells, a significantly higher percentage are located within 2,500 feet from sensitive receptors than is the case elsewhere in

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[364] American Lung Association, *Disparities in the Impact of Air Pollution*, available at https://www.lung.org/clean-air/outdoors/who-is-at-risk/disparities

[365] Nate Berg, *Breathless in Bakersfield: Is the Worst Air Pollution in the US about to Get Worse*, The Guradian, available at https://www.theguardian.com/cities/2017/feb/14/bakersfield-california-bad-air-pollution-us

[366] United States Environmental Protection Agency, San Joaquin Valley, *available at*: https://www.epa.gov/sanjoaquinvalley.

[367] *Id*.; American Lung Association, San Joaquin Valley Regional Summary(2016), *available at*: https://www.lung.org/local-content/california/documents/state-of-the-air/2016/sota-2016_ca_san-joaquin-fact.pdf.

[368] State of the Air, Valley's air quality in the 2016 (Apr, 30, 2016), *available at*: https://bazallergy.com/2016-state-air-report/.

[369] California Department of Public Health, California Breathing, County Asthma Data Tool, available at: https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHIB/CPE/Pages/CaliforniaBreathingCountyAsthmaProfiles.aspx; Childers, Linda, Driven By High Asthma Rates, Central Valley Tries to Improve Indoor Air Quality, California Health Report (Mar 23, 2017).

[370] Del Real, Jose A., They Grow the Nation's Food, but They Can't Drink the Water, New York Times (May 21, 2019), *available at*: https://www.nytimes.com/2019/05/21/us/california-central-valley-tainted-water.html.

[371] Kasler, Dale, 360,000 Californians have unsafe drinking water. Are you one of them?, Sacramento Bee (June 1, 2018), *available at*: https://www.sacbee.com/news/state/california/water-and-drought/article211474679.html.

[372] *Id*.

California.[373] And of those living within 2,500 feet in Kern County, 43 percent are Hispanic.[374] Residents in the area already experience the highest rates of cardiovascular disease and low birth weights, both of which are linked to exposure to pollution. The vast majority of residents in the area also already drink water that is contaminated by chemicals or bacteria, and Kern County in particular has the second highest number of community water systems that rely on contaminated groundwater. The EA fails to address any of these issues.

Instead, the EA points to the 2012 FEIS and 2019 SEIS as sufficient to cover any environmental justice analysis of health and safety impacts, despite neither of these documents actually including this analysis. In fact, both the FEIS and SEIS claim this analysis would be conducted at the later site-specific stage. Yet now at the leasing stage, BLM claims any environmental justice impacts "would be considered and mitigated as needed on a project basis at the development application stage."[375] BLM's decision to continue punting this analysis is arbitrary and capricious.[376]

BLM also has an obligation to consider the environmental and human health impacts of its actions on low-income communities and communities of color in its NEPA analyses.[377]

IX. BLM Fails to Address the Long-Term Impact of the Wells

Californians also face health and safety risks from the toxic legacy of past oil and gas projects. An independent scientific study found that there are thousands of deserted "orphan" wells and more than 17,000 long-term idle wells in California.[378]

These unattended wells can act as conduits for gas and fluids to migrate into groundwater or collect at the surface, causing water contamination, toxic air emissions, and explosions.[379] CalGEM acknowledges that deserted and idle wells "present several hazards to the environment

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[373] FracTracker Alliance (Apr. 2, 2020). *California Setback Analyses Summary*. https://www.fractracker.org/2020/04/california-setback-analysis-summary/ (FracTracker April).
[374] *Id.*
[375] EA at 31.
[376] *See N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1079 (9th Cir. 2011) ("Because speculation is implicit in NEPA, [a court] must reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as crystal ball inquiry."). *See also Bernhardt*, 2020 WL 4001480 at *33 (NEPA does not allow "for an abdication of an analysis, especially where increased harm on certain populations living near active oil and gas development on federal and tribal lands is acknowledged and the potential for alternative approaches exists.").
[377] Executive Order 12898, 59 Fed. Reg. 7,629 (Feb. 16, 1994); Council on Environmental Quality, Environmental Justice Guidance under the National Environmental Policy Act, 1997.
[378] California Council on Science and Technology, Orphan Wells in California: An Initial Assessment of the State's Potential Liabilities to Plug and Decommission Orphan Oil and Gas Wells (2018); California Department of Conservation, Division of Oil, Gas, and Geothermal Resources, Idle Well Program Report on Idle & Long-Term Wells in California, Reporting Period: Jan. 1, 2018 to Dec. 31, 2018 (July 2019) ("CalGEM Idle Well Report"), https://www.conservation.ca.gov/calgem/idle_well/Pages/idle-well-program-report.aspx.

[379]California Council on Science and Technology, Orphan Wells in California: An Initial Assessment of the State's Potential Liabilities to Plug and Decommission Orphan Oil and Gas Wells (2018)

as well as public health and safety. Deteriorating wells can create a conduit for contaminants such as hydrocarbons, lead, salt, and sulfates to enter freshwater aquifers and pose potential risks to surface water, air quality, soils and vegetation."[380]Additionally, when wells are not properly plugged at the end of its Lifecyle, there can be a continued leakage of oil, methane, and other VOCs even though the well has ceased production.[381]

Despite the serious problems associated with orphan wells and the prominence of these abandoned wells in the state of California, the EA fails to address the end of the well's lifecycle. BLM must have a plan for the proper plugging of these wells if they hope to offer the leases for development.

X. BLM Must Adequately Analyze the Impact of Oil and Gas Production on Wildlife in Compliance with the ESA

The EA must adequately analyze the projects impacts on wildlife. The U.S. Fish and Wildlife Service (FWS) developed a recovery plan for upland species of the San Joaquin Valley, California in 1998.[382] The San Joaquin kit fox, California condor, blunt-nosed lizard, giant kangaroo rat, San Joaquin antelope squirrel and many others are included in this Recovery plan. Recovery plans outline reasonable actions that FWS believes are required to recover or protect listed species.[383] The EA must disclose potential impacts, including indirect and cumulative impacts,[384] on these species and their recovery efforts.

The EA fails to address the specific impacts on these species that can be expected because of continued oil and gas development in Kern County. Below, three species are discussed in more detail.

A. California Condor

Condors are especially vulnerable to oil and gas sites and the EA fails to address some key risks to the species. Oil wells and equipment are known hazards to condor both because they obstruct habitat use and because they can be an attractive nuisance drawing condor into harm's way. Despite the species' extensive range, the EA states that the Crocker Flat unit is the only location the species could occur because it could provide potential foraging habitat.[385] However, condors are known to use a wide acreage of habitat; they separate their nesting area from their

[380] CalGEM Idle Well Report.

[381] Anthony Ingraffea, "Fluid Migration Mechanisms due to Faulty Well Design And/or Construction: An Overview and Recent Experiences in the Pennsylvania Marcellus Play," 2013, physicians, Scientists and Engineers for Healthy Energy

[382] *See generally* Recovery Plan for Upland Species of the San Joaquin Valley (Recovery Plan) (USFWS 1998), available at https://ecos.fws.gov/docs/recovery_plan/980930a.pdf

[383] U.S. EPA, Endangered Species Facts, San Joaquin Kit Fox, (Feb. 2010).

[384] *See* 40 C.F.R. § 1508.7 (defining cumulative impacts); 40 C.F.R. § 1508.8 (defining direct and indirect impacts).

[385] EA at 49.

foraging areas and have been known to fly more than 200 km and traverse their entire habitat range in one day.[386]

There is ample evidence that condors have been injured by oil and gas operations. Oil development poses a serious threat to California condors because condors enter oil fields and through their various activities in the oil field (roosting, bathing, etc.) become tainted with oil. Condors have landed on well pads and oil pumps and have been injured by oil and microtrash at these sites.[387] They are also attracted to standing water or pools of oil that may result from spills.[388] Historically, a significant amount of condor habitat has been lost or has severely degraded due to oil and gas projects. A National Wildlife Refuge that allowed oil and gas development, FWS estimated that 63 percent of critical condor habitat was lost.[389] The EA or EIS needs to disclose these potential impacts on condors and all other species, and identify mitigation for preventing harm to the species due to these inherent risks.

The federal and state government have a significant interest in protecting the condor. In the year 2009 alone, the recovery program has cost the federal government $4,730,000, and the funding continues.[390]

B. San Joaquin Kit Fox

The EA fails to fully address the potential impacts to the listed species. As noted, the San Joaquin kit fox (SJKF) could possibly be found in any of the lease locations.[391]

Historically, there was a huge population of kit foxes throughout the grassland, scrubland, and wetland communities in the San Joaquin Valley, but agricultural, urban, and industrial (including oil and gas) development has led to the decline in the kit fox population.[392] In 1975, the population was estimated to be 6,961 foxes, which suggests a possible decline of 20% to 43%.[393]Because much of SJKF habitat has been developed, the species existing habitat is a "highly fragmented landscape of scattered remnants of native habitat and adoptable, altered lands within and on the fringe of development. The largest extant populations are in western Kern County on and around the Elk Hills and Buena Vista Valley. . . ."[394] However, in the 30 years since the kit fox has been listed, there "has never been a comprehensive survey of its entire historic range."[395] There is still much to learn about this desert species.

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[386] Meretsky, Vicky J. et al., Demography of the California Condor: Implication for Reestablishment, 14 Conservation Biology 4: 957-967 (2000) ("Meretsky 2000"), available at: http://www.biologicaldiversity.org/species/birds/California_condor/pdfs/conbio-condorarticle.pdf.
[387] Los Padres Forest Watch, Documented Impacts of Oil Development on Endangered California Condors (2016) at 2-19.
[388] *Id*. at 2, 4-6, 8, 12
[389] *Id. at 5*.
[390] USFWS, Spotlight Species Action Plan 2010-2014, at 8.
[391] EA at 50.
[392] Recovery Plan at 129.
[393] Recovery Plan
[394] U.S. EPA, Endangered Species Facts, San Joaquin Kit Fox, (Feb. 2010).
[395] Recovery Plan at 124.

Despite lacking a complete understanding of the species and the total impacts of human activity on their population, BLM states that "kit foxes can adapt to oil field activities."[396] While direct mortality from oil and gas development may be rare, oil infrastructure poses a threat to the species. For instance, samples of blood from SJKF living in the Midway-Sunset oil field were found to have a higher instance of immature red blood cell circulation compared to members of their species living outside of oilfields.[397] Additionally, continued oil and gas development will result in further degradation to the SJKF habitat. Construction of roads, well pads, pipelines and other oil and gas infrastructure will not only directly impact local biological resources but will also increase habitat fragmentation. In addition, road construction often affects downstream water resources negatively through detrimental runoff. Also, traffic from construction and maintenance activities and general public access have also been documented to impact kit foxes by roadkill.

C. Blunt-nosed Leopard Lizard

According to the EA, the blunt-nosed leopard lizard may occur within all but one of the lease locations.[398] Habitat loss and fragmentation is one of the biggest negative impacts on the species continued survival.[399] The EA fails to address the effect of habitat loss from oil and gas development. The lizard's habitat has rapidly declined, even after the species was listed.[400] According to a 2010 status review of the species, the Forest Service alone had authorized the take of about 21,000 acres of the species habitat.[401] A result of the continued take and fragmentation of the species is a genetically homogenous population. Recent genetic data analysis indicates population isolation which could lead to genetic inbreeding which is detrimental to species.[402] Oil and gas development has and will continue to contribute to the species fragmentation.[403]

Oil and gas development also has direct effects on the species. For instance, "[d[irect mortality can occur from facility construction, . . . associated roads and vehicular traffic, or oil leakage."[404] If members of the species survive these periods, they may be displaced and "unable to survive in adjacent habitat if it is unsuitable, there are insufficient corridors, or if the habitat is already saturated."[405]

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[396] EA at 52.
[397] Charlton, K. G. (2001). Trace metal concentrations in San Joaquin kit foxes from the southern San Joaquin Valley of California. *California Fish & Game, 87,* 45-50.
[398] EA at 49.
[399] Recovery Plan at 118.
[400] USFWS, Species Status Assessment for the Blunt-nosed leopard lizard, at 40 (2020), (SSA) available at https://www.fws.gov/cno/Science/Review%20PDFs/2020/Comments/blunt_nosed_leopard_lizard_ssa_2020-06_comments.pdf
[401] SSA at 40.
[402] SSA at 40.
[403] SSA at 43.
[404] SSA at 43.
[405] SSA at 43.

XI. BLM failed to Analyze the Impacts of Oil and Gas Production on the Imperiled Temblor Legless Lizard, Whose Restricted Range Overlaps the Proposed Lease Sale Area.

The EA failed to analyze the impacts of the project's oil and gas development on the imperiled Temblor legless lizard whose range overlaps the proposed lease sale area. The Temblor legless lizard *Anniella alexanderae* is a rare species with a restricted range in western Kern County. It is listed as Species of Special Concern in California and has been recommended by scientific experts for federal listing under the Endangered Species Act. Oil and gas development poses the primary threat to the Temblor legless lizard, and the proposed lease sale would further jeopardize this imperiled species.

A. The Temblor legless lizard Anniella alexanderae is its own species

The Temblor legless lizard *Anniella alexanderae* is in the genus *Anniella*, known as the American legless lizards. *Anniella* was discovered to science in 1852 by Dr. J.A. Gray,[406] and originally described as two species: one that ranges throughout most of California (*A. pulchra*) and another that occurs in Baja California, Mexico (*A. geronimensis*). *Anniella pulchra* was already listed as a Species of Special Concern in California[407] when it was split into five distinct species in 2013: *Anniella alexanderae* (Temblor legless lizard), *Anniella campi* (Southern Sierra legless lizard), *Anniella grinnelli* (Bakersfield legless lizard), *Anniella pulchra* (Northern California legless lizard), and *Anniella stebbinsi* (Southern California legless lizard).[408]

Anniella alexanderae is legless and differentiated physically from snakes by their eyelids and detachable tail, used to foil predators. The lizard has no external ear openings and senses vibrations through the sand. It is approximately 4 to 7 inches long from snout to vent, excluding tail, with smooth shiny scales and a blunt tail.[409] Legless lizards are the only sand swimming specialists in California.[410]

While there are limited differences in scalation among *Anniella* species,[411] *Anniella alexanderae* can be differentiated from others by ventral and dorsum coloration, vertebral counts, and scale counts.[412] *A. alexanderae* has a higher dorsal scale and vertebral count, with light grey

[406] Miller, C.M. 1944. Ecological Relations and Adaptions of the Limbless Lizards of the Genus Anniella. Ecological Monographs: 271-289, at 273 ("Miller").
[407] Jennings, M.R. and M.P. Hayes. 1994. Amphibian and Reptile Species of Special Concern in California. Prepared for California Department of Fish and Game, at 111.
[408] Papenfuss, T.J. and J.F. Parhum. 2013. Four New Species of California Legless Lizard (*Anniella*). Breviora Museum of Comparative Zoology: 536, at 2 ("Papenfuss and Parhum").
[409] Miller at 276-80.
[410] Evelyn, C.J. and S.S. Sweet. 2018. California Legless Lizard (*Anniella pulchra*) sensu lato: Draft Species Account and Evaluation Form for Pacific Southwest Region Management Plan. Prepared for USDA Forest Service, Pacific Southwest Region, p. 6.
[411] Papenfuss and Parhum at 3.
[412] Parham, J.F., M.S. Koo, W.B. Simison, A. Perkins, T.J. Papenfuss, and E.N. Tennant. 2019. Conservation Assessment of the California Legless Lizard (*Anniella*). Prepared for California Department of Fish and Wildlife, at 22.

ventral coloring from the lower jaw to the end of the tail.[413] The dorsum is a pale olive with orange sides. There is a mid-dorsal black stripe present from the parietals to the tip of the tail, and lateral black stripes from the eye to the top of the tail.[414] Where other species show clear subclades and genetic diversity, *A. alexanderae* has limited variation, making the morphological characteristics the best way to identify the lizard from others.[415]

B. Temblor legless lizards are microhabitat specialists: disturbances that alter soil structure, soil moisture or plant makeup of the lizard's habitat – such as oil and gas development –can cause local population extirpations

Temblor legless lizards are fossorial lizards that build burrows in soil with high sand friction,[416] and "swim" through the dry, loose sand with lateral undulations.[417] They are rarely active on the surface beyond feeding and mating[418] and are sensitive to noise and light pollution,[419]which can affect their hunting.[420] These lizards have been found at varying soil depths, from a couple of inches to almost two feet,[421] but they usually reside in depths from one to four inches.[422] They are not known to move or emigrate far and have a high site fidelity, so populations are localized.[423]

Due to its specific requirements for burrowing, the Temblor legless lizard is a microhabitat specialist.[424] The Temblor legless lizard prefers warm, loose soil with moderate plant cover; moisture and soil density are essential to their survival.[425] If the sand is too dry, recently shed skin could stick to the new skin and the head may not shed at all – which makes the use of the eyes and feeding difficult, sometimes leading to starvation.[426] If the soil has too much clay or adobe, the legless lizard cannot penetrate deep enough for survival[427] and the clay content can plug their nostrils, resulting in death due to suffocation.[428] Loose soil and high sand friction also help in the construction of their burrows.[429]

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[413] Papenfuss and Parhum at 7-8.
[414] *Id.* at 5, 7.
[415] Parham et al., at 22.
[416] Jennings and Hayes, at 108.
[417] Stebbins, Robert C. and Samuel M. McGinnis, Field Guide to Amphibians and Reptiles of California, University of California Press (2012), p. 333
[418] Thomson, R.C., A.N. Wright, and H.B. Shaffer. 2016. California Amphibian and Reptile Species of Special Concern: 186-191, at 188.
[419] Miller, C.M. 1944. Ecological Relations and Adaptions of the Limbless Lizards of the Genus Anniella. Ecological Monographs: 271-289, at 289.
[420] Thomson, R.C., A.N. Wright, and H.B. Shaffer. 2016. California Amphibian and Reptile Species of Special Concern: 186-191, at 189, 190.
[421] *Id.* at 188.
[422] Miller at 289.
[423] *Id.* at 288; Jennings and Hayes at 110.
[424] Thomson at 188.
[425] Jennings and Hayes at. 111.
[426] Miller at 277.
[427] *Id.* at 288.
[428] Evelyn and Sweet at 6-7.
[429] Jennings and Hayes at 108.

Importantly, disturbances that alter the soil structure, soil moisture or plant makeup of the lizard's habitat – such as oil and gas development – degrade their habitat and could cause local population extinctions.[430]

C. The Temblor legless lizard is imperiled and meets Endangered Species Act listing criteria

The Temblor legless lizard is imperiled and meets the listing criteria of the Endangered Species Act. As detailed further below, the species is immediately threatened by oil and gas development, which is the top threat to this lizard. The Temblor legless lizard is also threatened by habitat loss from urban development, wildfires, invasive species, and anthropogenic climate change. Oil and gas development under the proposed lease sale would further jeopardize this imperiled species.

The Temblor legless lizard is currently listed as Species of Special Concern in the state of California. Importantly, in a 2019 conservation assessment prepared for the California Department of Fish and Wildlife, expert scientists recommend federal endangered species protection for the Temblor legless lizard.[431]

The Temblor legless lizard is further designated as vulnerable by the International Union for Conservation of Nature (IUCN), and is on the IUCN Red List due to its narrow range and imminent threats.[432] NatureServe classified the Temblor legless lizard as a G1 and S1 critically imperiled global and state ranking status (respectively).[433] NatureServe defines its G1 and S1 categories as "critically imperiled – at very high risk of extinction due to extreme rarity (often five or fewer populations), very steep declines, or other factors" and "factor(s) such as very steep declines making it especially vulnerable to extirpation from the state."[434]

The Temblor legless lizard is restricted to an exceedingly small area on the southeast side of the Temblor Mountains, from the western edge of Kern County north to western Fresno County. The species' entire range is a single narrow strip less than 200 kilometers long, between the Temblor Range and Highway 33. It is currently only known to exist at only four sites.[435] Thus, scientists consider it rare and to have a small population density.[436]

Importantly, the Temblor legless lizard cannot persist in habitat where the soil has been disturbed and therefore much of its historical habitat has been degraded by oil and gas

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[430] Thomson et al. at 189.
[431] Parham et al. at 24.
[432] Hammerson, G.A. 2019. *Anniella alexanderae*. The IUCN Red List of Threatened Species 2019: https://dx.doi.org/10.2305/IUCN.UK.2019-2.RLTS.T89929911A89929920.en, p.2.
[433] NatureServe Explorer. 2020. *Anniella alexanderae*: Temblor Legless Lizard. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.960627/Anniella_alexanderae.
[434] *Id.*
[435] Parham et al. at 11, 14.
[436] Papenfuss and Parhum at 14.

development and urbanization and is no longer suitable.[437] Of the four plotted locations where the lizard has been identified, two are surrounded by oil and gas development. Only two are on protected lands: a 5-acre parcel on the Palo Prieto Conservation Bank and the 1,200-acre Pleasant Valley Ecological Reserve, which is surrounded by the Guijarral Hills and Pleasant Valley oil fields. Over 90% of the Temblor legless lizard's range has already been developed with a projected 7% increase over the next 30 years,[438] leaving little room for the species.

D. Oil and gas development is the primary threat to the Temblor legless lizard

The IUCN recently concluded that oil and gas development that could propel the Temblor legless lizard to Critically Endangered or Extinct status in the near future.[439] Key threats to the Temblor legless lizard from oil and gas development include habitat loss, fragmentation, and degradation; oil and chemical spills; noise, light, and air pollution; human disturbance; increased climate disruption; and decreased water quality and quantity. Disturbance from oil and gas activities also removes the duff and litter layer the lizards require.

The Temblor legless lizard has already suffered significant habitat loss and fragmentation from oil and gas development in its restricted range.[440] Habitat loss and fragmentation from the construction of well pads, roads, pipelines, and other linear corridors impede wildlife movement and dispersal, reduce home range size and patch size, and increase habitat isolation,[441] leading to fragmented habitat. Reptiles such as the Temblor legless lizard that have a lower mobility and specialized microhabitats are likely to be more vulnerable to local extinction.[442] Fragmentation creates "habitat islands" that can disrupt migration and dispersal instability[443] and erode genetic variation in small populations and promote inbreeding.[444] Currently the Temblor legless lizard is known to persist at only four widely separated sites.[445] Since the Temblor legless lizard has a high site fidelity and small home range habitat fragmentation can prevent the lizard from dispersal to maintain genetic variation and expand populations.[446]

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[437] Thomson et al. at. 189
[438] International Union for the Conservation of Nature (IUCN). 2020. The IUCN Red List of Threatened Species 2020: https://www.iucnredlist.org/search.
[439] Hammerson at 2, 6.
[440] *Id.* at 2; Parham et. al. at 5.
[441] Brittingham, M.C., K.O. Maloney, A.M. Farag, D.D. Harper, and Z.H. Bowen. 2014. Ecological Risks of Shale Oil and Gas Development to Wildlife, Aquatic Resources and their Habitats. Environmental Science and Technology: 11034-11047 at 11034; Souther, S., M.W. Tingley, V.D. Popescu, D.T.S. Hayman, M.E. Ryan, T.A. Graves, B. Hartl, and K. Terrell. 2014. Biotic Impacts of Energy Development from Shale: Research Priorities and Knowledge Gaps. Frontiers in Ecology and the Environment: 330-338, at 330; Allred, B.W., W.K. Smith, D. Twidwell, J.H. Haggerty, S.W. Running, D.E. Naugle, and S.D. Fuhlendorf. 2015. Ecosystem Services Lost to Oil and Gas in North America. Science: 401-402, at 402.
[442] MacNally R. and G.W. Brown. 2001. Reptiles and Habitat Fragmentation in the Box-ironbark Forests of Central Victoria, Australia: Predictions, Compositional Change and Faunal Nestedness. Oecologia: 116-125, at 116-17.
[443] *Id.* at 116.
[444] Templeton, A.R., K. Shaw, E. Routman, and S.K. Davis. 1990. The Genetic Consequences of Habitat Fragmentation. Annals of the Missouri Botanical Garden: 13-27.
[445] Papenfuss et al. at. 11, 13.
[446] Miller at 288; Jennings and Hayes at. 110.

Oil and gas extraction techniques are also energy and water intensive, causing a wide range of harms to species and ecosystem functions. They require pumping large volumes of water, steam, sand and chemicals at high pressures into rock formations, causing them to crack and release oil and gas.[447] With the Temblor legless lizard's high susceptibility to mechanical disturbances and need for loose, friable sand for burrowing, oil and gas development is a threat to the lizard's habitat.[448]

Fiehler and Cypher found that native species in heavily impacted saltbush scrub habitat in San Joaquin Valley declined with increasing oil field development, and most of the species were no longer detected in areas with 70 percent habitat disturbance or more.[449] For a microhabitat specialist such as the Temblor legless lizard, which requires sandy soil for burrowing and does not respond well to disturbed soil moisture levels or compacted soil,[450] oil and gas development in their habitat has severe negative consequences.

Fracking is also a significant threat. A 2014 review of fracking's ecological impacts identify key harms such as habitat loss and fragmentation; surface and groundwater contamination; localized air, noise and light pollution; climate change; and other cumulative impacts.[451] A review of the impacts of fracking concluded that species and habitats with limited ranges, small population size, specialized habitat requirements, and high sensitivity to disturbance are at particular risk,[452] all factors of concern for the temblor legless lizard. Fracking and other extraction methods have ecological effects on wildlife and cause widespread mortality to trees and damage to surface soil.[453]The California Council on Science and Technology concluded that the vast majority of habitat loss and fragmentation in the state due to fracking is in Kern County.[454]

As mentioned previously, the lizard is a micro-habitat specialist that relies on specific moisture levels for its life cycle[455] and has been shown to be sensitive to noise and light.[456] It is restricted to a narrow range, hampered by the encroachment of oil and gas development and urbanization. [457]Habitat loss due to oil and gas infrastructure can impede movement and dispersal of wildlife species, reduce home range and patch size below what is needed for foraging and activities, facilitate the spread of invasive species, and lead to habitat isolation.[458] As discussed

[447] Wolf, S. and K. Siegel. 2017. Oil Stain: How Dirty Crude Undercuts California's Climate Progress. Center for Biological Diversity, at 5.
[448] Miller at 280; Thomson et al. at 188
[449] Fiehler, C.M. and B.L. Cypher. 2011. Ecosystem Analysis of Oilfields in Western Kern County, California. Prepared for U.S. Bureau of Land Management, at 21.
[450] Thomson et. al. at 188, 189.
[451] Souther et al. at 330.
[452] Brittingham et al. at. 11034.
[453] Adams, M.B. 2011. Land Application of Hydrofracturing Fluids Damages a Deciduous Forest Stand in West Virginia. Journal of Environmental Quality: 1340-1344.
[454] CCST at 399.
[455] Thomson et. al. at 188.
[456] Miller at 277, 284, 285, 288.
[457] Thomson et al. at 188, 189; Hammerson art 6.
[458] Brittingham et al. at 11034-11043.

in the section on distribution and range, this lizard has a high-site fidelity,[459] and inhabits a reduced range with limited opportunity for expansion or movement due to impeding oil and gas exploration.[460]

Satellite imagery indicates that oil and gas development is destroying and degrading 50-90% of the Temblor lizard's range.[461] As oil extraction is ongoing throughout these areas, it serves as a consistent threat to the lizard and its habitat. Legless lizards are sensitive to noise and light pollution, changes in soil moisture, reduced water quality, temperature changes, and loss of plant life,[462] all effects of oil and gas development. Warm, loose sand and high friction aids in movement and burrow construction and the compaction from construction and other oil and gas development activity would severely limit their movement.[463] Road density in oil and gas development is also a concern, since oil and gas roads increase soil compaction and lessen habitat quality by lessening the amount of loose substrate for the lizard to move through.

The Temblor legless lizard can sense vibrations through the ground and has a keen sense of mechanical disturbances, as discussed in the section on the lizard's biology.[464] The lizard uses this sense to follow their prey from below and come up ahead of the prey and catch it.[465] Oil and gas development create significant intermittent and chronic noise pollution due to construction, drilling, fracking, truck transport, compressors, human activity and other sources, and noise pollution from drilling and well stimulation is particularly significant.[466] During spills, oil companies will utilize strobe lights and propane cannons through the night to ward off wildlife. These vibrations and noise disturbances would affect their ability to hunt.[467]

Oil and chemical spills also adversely affect the Temblor legless lizard. Kern County has the highest concentration of produced water spills (55 percent) and chemical spills (42 percent) of any county in the state.[468] Produced water spills related to oil production adversely affect habitat suitability for the Temblor legless lizard by altering soil and moisture content. The Temblor legless lizard is dependent on specific moisture levels and sand consistency, as discussed in the section on habitat requirements.[469] Since these lizards are usually found from a couple inches to a couple feet deep in the soil,[470] water spills would have a negative effect on the Temblor legless lizard's life cycle and habitat.

There are currently four active oil spills in the legless lizard habitat range and 22 that

[459] Miller at 288; Jennings and Hayes at 110.
[460] Hammerson at 6.
[461] *Id.*
[462] Miller at 285, 288, 289.
[463] Jennings and Hayes at 108.
[464] Miller at 280.
[465] *Id.*
[466] California Department of Conservation (CDC). 2015. SB4 Environmental Impact Report. Chapter 7: Description of the Project, Analysis of Oil and Gas Well Stimulation Treatments in California: 7-30.
[467] Thomson et. al. at 189, 190.
[468] CCST at. 161.
[469] Miller at 277, 288; Evelyn and Sweet at 6-7.
[470] Thomson et al. at 188.

have been controlled just in the past year.[471] In the Cymric oil field, a surface spill caused by steam injection led to the release of 31,903 barrels (1,339,926 gallons) of oil and water over 113 days in 2019 over a milelong stretch of seasonal streambed.[472] Four oiled birds—three barn owls and a lesser nighthawk—were recovered.[473] The Oil and Gas Supervisor determined that the surface expressions presented a significant threat of harm to human health and the environment.[474] Another surface expression in the Cymric oil field, GS-5, has spilled tens of millions of gallons of fluid intermittently for 16 years. The Temblor legless lizard is a small, reclusive reptile that would not be readily visible during oil spill cleanup. They would be entombed by fast-rising crude oil from underground, making it impossible to document. Without focused surveys it would it be unknown if any legless lizards were killed in an oil spill. The process of cleaning up an oil spill, involving removal of significant amounts of soil during a clean-up, could easily wipe out an entire legless lizard population. An oil spill during the legless lizard breeding season from early spring to July could also wipe out breeding populations.[475]

Pollution and contaminants from oil and gas production are threats as well. All reptiles are sensitive to contaminants and accumulate and magnify them to levels equal or greater than those reported for mammals and birds.[476] Injected water that helps generate fractures for oil extraction returns to the surface and can contain hydraulic fracturing fluids, radioactive materials, heavy metals and other compounds such as polycyclic aromatic hydrocarbons, alkenes, alkanes and other volatile and semi-volatile organics.[477] Some of these pollutants are known to be toxic or carcinogenic in the environment, while others are endocrine disruptors.[478] A reptile's endocrine system controls nearly every aspect of its life and is instrumental in regulating processes such as metabolism, development, reproduction, tissue function and behavior.[479] Disruption of these processes can sabotage sexual development, sex ratio and metabolic compensation for environmental stress; in combination with other stressors such as habitat loss and global climate change, it can contribute to local extinctions.[480] Studies have shown that endocrine disruptors can affect reptile testosterone levels, gonad size, population levels, energy levels related to reproduction and growth, hatching and developmental abnormalities, and mortality.[481] Only a modest amount of information is available on the exposure of these

[471] California Department of Conservation (CDC) CalGEM. 2020. Oil Field Surface Expressions. https://www.conservation.ca.gov/calgem/Pages/Chevron-Cymric-oil-spill.aspx.
[472] https://calspillwatch.wordpress.com/tag/cymric-oil-field-incident/
[473] *Ibid.*
[474] https://www.conservation.ca.gov/calgem/Documents/Orders/1163.pdf
[475] Jennings and Hayes at 110.
[476] Crain, D.A. and L.J. Guilette, Jr. 1998. Reptiles as Models of Contaminant-Induced Endocrine Disruption. Animal Reproduction Science, 77-78.
[477] Pichtel, J. 2016. Oil and Gas Production Wastewater: Soil Contamination and Pollution Prevention. Applied and Environmental Soil Science, at 1.
[478] *Id.* at 2.
[479] Norris, D.O. and K.H. Lopez. 2011. Hormones and Reproduction of Vertebrates: Reptiles. Chapter 14: Endocrine Disruption of Reproduction in Reptiles, 373.
[480] Cheek, A.O. 2006. Subtle Sabotage: Endocrine Disruption in Wild Populations. Revista de Biologia Tropical, at 1.
[481] Gibbons, J.W., D.E. Scott, T.J. Ryan, K.A. Buhlmann, T.D. Tuberville, B.S. Metts, J.L. Greene, T. Mills, Y. Leiden, S. Poppy, and C.T. Winne. 2000. The Global Decline of Reptiles, Déjà vu Amphibians. Bioscience, R 657;

compounds on lizards and, while specific impacts to the Temblor legless lizards are not yet known due to its fossorial and cryptic nature and lack of focused monitoring, there is enough information to show that the survival of the Temblor legless lizard is threatened.[482]

E. At least one lease sale parcel is within the Temblor legless lizard's known range, and the species would be harmed by spills, increased traffic, and human disturbance on other lease sale parcels

At least one proposed lease sale parcel, parcel 7, falls directly within the Temblor legless lizard's known range, as shown in the map below. The oil and gas development proposed for parcel 7 would jeopardize the remaining populations and habitat of this imperiled lizard in this region. Furthermore, other proposed parcels would harm the lizard through foreseeable increases in traffic, oil spills, chemical spills, and other disturbances resulting from oil and gas development on these parcels, as described above.

F. BLM failed to analyze the impact of the proposed lease sale on the Temblor legless lizard

The EA improperly failed to analyze the impacts of the project's oil and gas development on the imperiled Temblor legless lizard, despite the fact that the proposed lease sale occurs in the species' range. The EA must disclose potential impacts, including indirect and cumulative impacts, on this species.

XII. BLM Should Follow its Commitment to Apply Long-standing NEPA Laws and Policies

BLM states on E-planning that it will use the previous CEQ regulations for this NEPA process: "As this environmental review was underway prior to the effective date of the new regulations, the BLM will process the environmental review under the prior regulations, which is specifically allowed for in 40 CFR 1506.13."[483]

BLM can and should continue this ongoing process under the prior CEQ regulations. Since 1978, regulations promulgated by the Council on Environmental Quality (CEQ) have guided every federal agency's implementation of NEPA, our nation's environmental "Bill of Rights." 40 C.F.R. Part 1500 (1978). These regulations codified early judicial opinions based on language of the statute, provided the basis for a substantial body of judicial precedent spanning over four decades, and formed the foundation for more specific regulations and policies enacted by individual agencies to implement their particular missions. BLM's NEPA procedures are at 43 C.F.R. part 46, Department of the Interior Manual 516 DM 11, and BLM Handbook H-1790-

Zychowski, G.V. and C.A.J. Godard-Codding. 2016. Reptilian Exposure to Polycyclic Aromatic Hydrocarbons and Associated Effects. Environmental Toxicology and Chemistry, AT 26; Crain and Guillette at 77-86.

[482] Zychowski and Godard-Codding at 28, 29.

[483] Land Use Plan Information, DOI-BLM-CA-C060-2020-0120-EA, BLM National NEPA Reg., https://eplanning.blm.gov/eplanning-ui/project/2000634/600 (last updated Aug. 26, 2020).

1. Notably, the Interior Department regulations specifically incorporate CEQ's 1978 regulations.[484]

Over the vociferous objections of states, members of Congress, myriad conservation, environmental justice, and public health organizations, and the general public, on July 16, 2020, CEQ issued a final rule rewriting the entirety of its 1978 regulations.[485] The final CEQ rule upends virtually every aspect of NEPA and its longstanding practice, contradicts decades of court interpretations of NEPA's mandates, and undercuts the reliance placed on NEPA by the public, decision-makers, and project proponents. It does so by limiting the scope of actions to which NEPA applies, eviscerating the thorough environmental analysis that lies at the heart of the statute, reducing the ability of the public to participate in federal agency decision-making, and seeking to limit review of agency NEPA compliance. The legality of the final rule is being challenged in a number of federal lawsuits as part of a diverse coalition of national and regional environmental justice, outdoor recreation, public health, and conservation organizations that rely on NEPA to protect their varied interests in human health and the environment.[486] Indeed, given its immediate, far-reaching consequences and facial invalidity, the final rule is the subject of a pending motion to enjoin its implementation or stay its effective date pending resolution of the lawsuit.[487]

After September 14, 2020, agencies are required to apply the final rule only to new NEPA processes initiated after that date. Agencies have *discretion* to continue applying existing regulations in place before the final rule to ongoing NEPA processes begun before that date.[488] The final CEQ rule directs agencies to revise their NEPA procedures to eliminate inconsistencies with the final rule by September 14, 2021, and prohibits agencies from imposing more stringent NEPA procedures, representing a massive change from the past 40 years where the regulations functioned as a floor, not a ceiling. *Id.* § 1507.3(b). In the interim, where existing agency NEPA procedures are inconsistent with the revised regulations, the final CEQ rule purports to control.[489]

With respect to this process, BLM should *not* apply the final CEQ rule. Doing so would change the rules of the game midstream, creating significant chaos and confusion for the agency and the public, legal liability, and harm to the public's interest in a stable regulatory environment.

First, it would be manifestly unwise and highly inefficient for agencies to begin implementing such sweeping changes in the absence of agency policies, procedures, guidance,

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[484] *See* 43 C.F.R. § 46.20.
[485] 85 Fed. Reg. 43,304 (July 16, 2020) (to be codified at 40 C.F.R. Part 1500).
[486] *Alaska Community Action on Toxics v. CEQ*, No. 3:20-cv-05199 (N.D. Cal. July 19, 2020); *see also Wild Virginia v. CEQ*, No. 3:20-cv-00045-NKM (W.D. Va. July 29, 2020); *Environmental Justice Health Alliance v. CEQ*, No. 1:20-cv-06143 (S.D.N.Y. Aug. 6, 2020).
[487] *Wild Virginia v. CEQ*, No. 3:20-cv-00045-NKM, Motion for Preliminary Injunction or Stay, Doc. 30 (Aug. 18, 2020).
[488] 40 C.F.R. § 1506.13 (2020).
[489] *Id.* § 1507.3(a).

and training. Agency data – which was ignored throughout CEQ's rulemaking process – demonstrates that existing inefficiencies in the NEPA process are largely attributable to inadequate training, budget, and other institutional challenges and factors external to NEPA procedures.[490]

Layer on top of those inefficiencies the massive challenges with interpreting and applying the Trump Administration's significant and far-reaching rollback, and it is a recipe for chaos, wasted taxpayer dollars, and litigation. That is especially true because the final CEQ rule creates conflict with governing case law, agency regulations and guidance, and longstanding practices that the public, decision-makers, and the courts have relied on for the past four decades.

Finally, given the highly uncertain fate of the final rule – with pending legal challenges and a potential change in administrations – agencies and project proponents would be wise not to jeopardize or delay ongoing decision-making processes by injecting additional and unnecessary uncertainty. In short, continuing to apply the 1978 regulations, as BLM states it will do, is the path to certainty, given the agency's clear discretion to do so with respect to this process, which was clearly initiated before September 14, 2020.

XIII. Conclusion

In sum, BLM cannot continue with the leasing process because the EA violates NEPA, CAA, FLPMA and will continue the cycle of pollution from oil and gas development that plagues Kern county. BLM must provide the requisite analysis before the leases are sold. In this case, because the environmental damage of new leasing to the climate, to water, to the species, and to the public would be so great, an EA is insufficient and an EIS should be completed.

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[490] *See* David Adelman *et al.*, Comments on the Council on Environmental Quality NPRM Update to the Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, Docket Id. CEQ-2019-0003-169621, pp.7-10 (Mar. 9, 2020) (on behalf of 95 law professors).

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List of References

Adams, M.B. 2011. Land Application of Hydrofracturing Fluids Damages a Deciduous Forest Stand in West Virginia. Journal of Environmental Quality

Adelman, David et al., Comments on the Council on Environmental Quality NPRM Update to the Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, Docket Id. CEQ-2019-0003-169621, pp.7-10 (Mar. 9, 2020)

Agency for Toxic Substances and Disease Registry (ATSDR), ATSDR A-Z Index, available at: https://www.atsdr.cdc.gov/az/a.html (last visited on July 12, 2018)

Allen, David et al., Measurements of Methane Emissions at Natural Gas Production Sites in The United States, 110 PNAS 17768 (2013)

Allred, B.W., W.K. Smith, D. Twidwell, J.H. Haggerty, S.W. Running, D.E. Naugle, and S.D. Fuhlendorf. 2015. Ecosystem Services Lost to Oil and Gas in North America. Science

American Lung Association, San Joaquin Valley Regional Summary (2016), available at: https://www.lung.org/local-content/california/documents/state-of-the-air/2016/sota-2016_ca_san-joaquin-fact.pdf

American Lung Association, State of the Air 2020 (2020), available at: http://www.stateoftheair.org/assets/SOTA-2020.pdf

American Lung Association, Valley's air quality in the 2016 State of the Air Report (Apr, 30, 2016), available at: https://bazallergy.com/2016-state-air-report/

Armendariz, Al, Emissions for Natural Gas Production in the Barnett Shale Area and Opportunities for Cost-Effective Improvements (2009)

Associated Press, Court Strikes Down Kern County's Industry-Friendly System for Approving Oil Drilling, Los Angeles Times, Feb. 26, 2020

Bay Area Air Quality Management District, Particulate Matter Overview, Particulate Matter and Human Health (2012)

Brittingham, M.C., K.O. Maloney, A.M. Farag, D.D. Harper, and Z.H. Bowen. 2014. Ecological Risks of Shale Oil and Gas Development to Wildlife, Aquatic Resources and their Habitats. Environmental Science and Technology

Brown, Heather, Memorandum to Bruce Moore, U.S.EPA/OAQPS/SPPD re Composition of Natural Gas for use in the Oil and Natural Gas Sector Rulemaking, July 28, 2011

Brown, David et al., Understanding Exposure From Natural Gas Drilling Puts Current Air Standards to the Test. 29 Reviews on Environmental Health 277 (2014)

Bruckner, Thomas et al., 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 (2014)

Cal. Office of Environmental Health Hazard Assessment, About CalEnviroScreen (last visited Sept. 22, 2020), available at: https://oehha.ca.gov/calenviroscreen/about-calenviroscreen

California Air Resources Board, Federal Standard Area Designations (2018), available at: https://www.arb.ca.gov/desig/feddesig.htm

California Council on Science and Technology, Advanced Well Stimulation Technologies in California (2016), available at: http://ccst.us/publications/2014/160708-blm-report.pdf

California Council on Science and Technology, Orphan Wells in California: An Initial Assessment of the State's Potential Liabilities to Plug and Decommission Orphan Oil and Gas Wells (2018)

California Council on Science and Technology, Volume II, Potential Environmental Impacts of Hydraulic Fracturing and Acid Stimulations (2015)

California Department of Conservation, Division of Oil, Gas & Geothermal Resources, Benzene in water produced in Kern County oil fields containing fresh water (1993)

California Department of Conservation, Division of Oil, Gas, and Geothermal Resources, Idle Well Program Report on Idle & Long-Term Wells in California, Reporting Period: Jan. 1, 2018 to Dec. 31, 2018 (July 2019), available at: https://www.conservation.ca.gov/calgem/idle_well/Pages/idle-well-program-report.aspx

California Department of Conservation, Division of Oil, Gas, and Geothermal Resources. CalGEM. 2020. Oil Field Surface Expressions, available at: https://www.conservation.ca.gov/calgem/Pages/Chevron-Cymric-oil-spill.aspx

California Department of Conservation. 2015. SB4 Environmental Impact Report. Chapter 7: Description of the Project, Analysis of Oil and Gas Well Stimulation Treatments in California

California Department of Conservation, Oil Filed Surface Expressions, available at: https://www.conservation.ca.gov/calgem/Pages/Chevron-Cymric-oil-spill.aspx

California Department of Fish and Wildlife. 2019. Cymric Oil Field Incident, available at: https://calspillwatch.wordpress.com/tag/cymric-oil-field-incident/

California Department of Health, COVID-19 Updates, California COVID-19 by the numbers (accessed on Sept. 15, 2020), available at:

https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Immunization/ncov2019.aspx#COVID-19%20by%20the%20Numbers

California Department of Public Health, California Breathing, County Asthma Data Tool, available at: https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHIB/CPE/Pages/CaliforniaBreathingCountyAsthmaProfiles.aspx

California Department of Public Health, COVID-19. Cal. Dept. of Pub. Health (June 3, 2020), State Officials Announce Latest COVID-19 Facts (News Release No. NR20-111), available at: https://www.cdph.ca.gov/Programs/OPA/Pages/NR20-111.aspx

Californians Against Fracking, Fracking and Dangerous Drilling in California, Briefing Book, Center for Biological Diversity (Accessed July 13, 2018), available at: https://www.biologicaldiversity.org/campaigns/california_fracking/pdfs/fracking-and-drilling-in-california.pdf

California Resources Corporation, Production Methods (accessed on Sept. 12, 2019), available at: https://crc.com/our-business/technology/production-methods

Carnegie Endowment for International Peace, Profiling Emissions in the Supply Chain, http://oci.carnegieendowment.org/#supply-chain (Accessed Sept. 6, 2018)

Casey, Joan A., Unconventional Natural Gas Development and Birth Outcomes in Pennsylvania, USA, 27 Epidemiology 163 (2016)

Center for Biological Diversity, California December 2020 Lease Sale (2020)

Center for Biological Diversity, Temblor Legless Lizard EOI Parcels (2020)

Center for Biological Diversity et al., Comments on the Draft Supplemental Recirculated Environmental Impact Report for Revisions to Title 19-Kern County Zoning Ordinance (2020-A) Focused on Oil and Gas Local Permitting (SCH # 2013081079) (September 16, 2020)

Center for Public Integrity, Open Pits Offer Cheap Disposal for Fracking Sludge But Health Worries Mount, October 2, 2014

Census Bureau, available at: https://datausa.io/profile/geo/kern-county-ca#economy

Charlton, K. G., Trace metal concentrations in San Joaquin kit foxes from the southern San Joaquin Valley of California, California Fish & Game (2001) (abstract)

Cheek, A.O. 2006. Subtle Sabotage: Endocrine Disruption in Wild Populations. Revista de Biologia Tropical

Chen, Huan & Kimberly E. Carter, Modeling potential occupational inhalation exposures and associated risks of toxic organics from chemical storage tanks used in hydraulic fracturing using AERMOD, 224 Environmental Pollution 300 (2017)

Childers, Linda, Driven By High Asthma Rates, Central Valley Tries to Improve Indoor Air Quality, California Health Report (Mar 23, 2017)

Chittick, Emily A. & Tanja Srebotnjak, An analysis of chemicals and other constituents found in produced water from hydraulically fractured wells in California and the challenges for wastewater management, 204 Journal of Environmental Management 502 (2017)

Clean Air Task Force, Fossil Fumes: A Public Health Analysis of Toxic Air Pollution From the Oil and Gas Industry, June 2016, available at: http://www.catf.us/resources/publications/files/FossilFumes.pdf

Clean Water Action, Enhanced Oil Recovery: A Threat to Drinking Water, available at: https://www.cleanwateraction.org/sites/default/files/docs/publications/EOR%20Risk%20and%20Oversight%20Factsheet_0.pdf

Clean Water Action, The Environmental Risks and Oversight of Enhanced Oil Recovery in the United States: An overview of Class II well trends and regulations in EPA's Underground Injection Control Program (2017), available at: https://www.cleanwateraction.org/sites/default/files/docs/publications/Environmental%20Risks%20and%20Oversight%20of%20Enhanced%20Oil%20Recovery%2011.08.17a.pdf

Clough, Emily & Derek Bell, Just Fracking: A Distributive Environmental Justice Analysis of Unconventional Gas Development in Pennsylvania, USA, 11 Environmental Research Letters 025001 (2016)

Colborn, Theo et al., Natural Gas Operations from a Public Health Perspective, 17 Human and Ecological Risk Assessment (2011)

Colborn, Theo et al., An Exploratory Study of Air Quality near Natural Gas Operations, Human and Ecological Risk Assessment (2012)

Colorado Dept. of Public Health and Environment, Conservation Commission, Colorado Weekly and Monthly Oil and Gas Statistics (July 6, 2012)

Congressional Research Service, California Agricultural Production and Irrigated water Use, at 20, available at: https://fas.org/sgp/crs/misc/R44093.pdf

Conticini, Edoardo et al., Can Atmospheric Pollution Be Considered a Co-factor in Extremely High Level of SARS-CoV-2 Lethality in Northern Italy?, 261 Environmental Pollution 114465 (June 2020), https://doi.org/10.1016/j.envpol.2020.114465

Council on Environmental Quality, Environmental Justice Guidance under the National Environmental Policy Act, 1997

Council on Environmental Quality, Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews (Aug. 2016), available at: https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/nepa_final_ghg_guidance.pdf

Craft, Elena, Environmental Defense Fund, Do Shale Gas Activities Play a Role in Rising Ozone Levels? (2012)

Crain, D.A. and L.J. Guilette, Jr. 1998. Reptiles as Models of Contaminant-Induced Endocrine Disruption. Animal Reproduction Science

Currie, Janet et al., Hydraulic fracturing and infant health: New evidence from Pennsylvania, 3 Science Advances e1603021 (2017)

Del Real, Jose A., They Grow the Nation's Food, but They Can't Drink the Water, New York Times (May 21, 2019), available at: https://www.nytimes.com/2019/05/21/us/california-central-valley-tainted-water.html

Department of Conservation, Division of Oil, Gas, and Geothermal Resources, Order to Pay a Civil Penalty No. 1163, available at: https://www.conservation.ca.gov/calgem/Documents/Orders/1163.pdf

DOGGR, Freeport McMoRan Oil and Gas Surface Expression

Earthworks, Sources of Oil and Gas Pollution (2011)

Ecoshift Consulting, et al., The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels, Prepared for Center for Biological Diversity & Friends of the Earth (2015)

Elliot, Elise G. et al., A Systematic Evaluation of Chemicals in Hydraulic-Fracturing Fluids and Wastewater for Reproductive and Developmental Toxicity, 27 Journal of Exposure Science and Environmental Epidemiology 90 (2016)

Elliott, Elise G. et al., Unconventional oil and gas development and risk of childhood leukemia: Assessing the evidence, 576 Science of the Total Environment 138 (2017)

Esswein, Eric et al., Evaluation of Some Potential Chemical Exposure Risks during Flowback Operations in Unconventional Oil and Gas Extraction: Preliminary Results, 11 Journal of Occupational and Environmental Hygiene D174 (2013)

Esswein, Eric J. et al., Occupational Exposures to Respirable Crystalline Silica During Hydraulic Fracturing, 10 Journal of Occupational and Environmental Hygiene 347 (2013)

Evelyn, C.J. and S.S. Sweet. 2018. California Legless Lizard (*Anniella pulchra*) sensu lato: Draft Species Account and Evaluation Form for Pacific Southwest Region Management Plan. Prepared for USDA Forest Service, Pacific Southwest Region

Ferrar, Kyle, Impact of a 2,500' Oil and Gas Well Setback in California, FracTracker Alliance (July 2, 2019)

Fiehler, C.M. and B.L. Cypher. 2011. Ecosystem Analysis of Oilfields in Western Kern County, California. Prepared for U.S. Bureau of Land Management

Fiore, Arlene et al., Linking Ozone Pollution and Climate Change: The Case for Controlling Methane, 29 Geophys. Res Letters 19 (2002)

FracTracker Alliance, *California Setback Analyses Summary*, available at: https://www.fractracker.org/2020/04/california-setback-analysis-summary/ (Apr. 2, 2020)

Freedman, Andrew, California endures record-setting 'kiln-like' as fires rage, causing injuires, September 6, 2020, available at: https://www.washingtonpost.com/weather/2020/09/06/california-wildfires-heat-wave/

Friedman, Lisa, New Research Links Air Pollution to Higher Coronavirus Death Rates, New York Times, April 17, 2020, available at: https://www.nytimes.com/2020/04/07/climate/air-pollution-coronavirus-covid.html

Galloway, Devin et al., Land Subsidence in the United States, U.S. Geological Survey (1999)

Gentner, Drew et al., Emissions of Organic Carbon and Methane from Petroleum and Dairy Operations in California's San Joaquin Valley, 14 Atmospheric Chemistry and Physics 4955 (2014)

Gibbons, J.W., D.E. Scott, T.J. Ryan, K.A. Buhlmann, T.D. Tuberville, B.S. Metts, J.L. Greene, T. Mills, Y. Leiden, S. Poppy, and C.T. Winne. 2000. The Global Decline of Reptiles, Déjà vu Amphibians. Bioscience, R 657

Global Carbon Project, Global Carbon Budget 2018 (published on 5 December 2018), available at: https://www.globalcarbonproject.org/carbonbudget/18/files/GCP_CarbonBudget_2018.pdf

Goldberg, Ted, Chevron Faces New Demands From Regulators as Kern County Oil Releases Continue, KQED, Sept. 10, 2019, available at: https://www.kqed.org/news/11773382/chevron-faces-new-demands-from-regulators-as-kern-county-oil-releases-continue

Goldberg, Ted, New Chevron Crude Spills Emerge in Kern County Oil Field, KQED, October 15, 2019, available at: https://www.kqed.org/news/11780057/new-chevron-crude-spills-emerge-in-kern-county-oil-field

Goldberg, Ted, State Orders Chevron to Stop Massive Crude Oil Release from Kern County Well, KQED, July 13, 2019, available at: https://www.kqed.org/news/11761141/state-orders-chevron-to-stop-massive-crude-oil-release-in-kern-county-oil-field

Gonzalez, D.J.X., et al., Oil and gas production and spontaneous preterm birth in the San Joaquin Valley, CA, 4 Environmental Epidemiology 4 (2020), available at: https://journals.lww.com/environepidem/Fulltext/2020/08000/Oil and gas production and spontaneous preterm.1.aspx?context=LatestArticles

Gonzales, Patrick et al., Chapter 25: Southwest, in U.S. Global Change Research Program, 2018: Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II (Reidmiller, D.R. et al., eds. 2018), available at: https://nca2018.globalchange.gov/chapter/25/

Hammerson, G.A. 2019. *Anniella alexanderae*. The IUCN Red List of Threatened Species 2019: https://dx.doi.org/10.2305/IUCN.UK.2019-2.RLTS.T89929911A89929920.en

Harrison, Robert J. et al., Sudden Deaths Among Oil and Gas Extraction Workers Resulting from Oxygen Deficiency and Inhalation of Hydrocarbon Gases and Vapors — United States, January 2010–March 2015. 65 MMWR Morb Mortal Wkly Rep 6 (2016)

Harriss, Robert et al., Using Multi-Scale Measurements to Improve Methane Emission Estimates from Oil and Gas Operations in the Barnett Shale Region, Texas, 49 Environ. Sci. Technol. 7524 (2015)

Hays, Jake & Seth B.C. Shonkoff, Towards an Understanding of the Environmental and Public Health Impacts of Unconventional Natural Gas Development: A Categorical Assessment of the Peer-Reviewed Scientific Literature, 11 PLoS ONE e0154164 (2016)

Hein, Jayni Foley, Harmonizing Preservation and Production (June 2015), available at: https://policyintegrity.org/files/publications/DOI_LeasingReport.pdf

Helmig, Detlev et al., Reversal of Global Atmospheric Ethane and Propane Trends Largely Due to US Oil and Natural Gas Production, 9 Nature Geoscience 490 (2016)

Hopkins, Francesca M. et al., Spatial Patterns and Source Attribution of Urban Methane in the Los Angeles Basin, 121 J. Geophysical Research: Atmospheres 249 (2016)

Ingraffea, Anthony, "Fluid Migration Mechanisms due to Faulty Well Design And/or Construction: An Overview and Recent Experiences in the Pennsylvania Marcellus Play," 2013, physicians, Scientists and Engineers for Healthy Energy

Institute for Policy Integrity, Look Before You Lease; Reducing Fossil Fuel Dominance on Public Lands by Accounting for Option Value (2020)

International Union for the Conservation of Nature. 2020. The IUCN Red List of Threatened Species 2020, available at: https://www.iucnredlist.org/search

IPCC, Climate Change 2014 Synthesis Report, Summary for Policymakers, available at: http://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf

IPCC SR 15, Global Warming of 1.5°: Summary for Policy Makers (Oct. 2018), available at: http://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf

Jemielita, Thomas et al., Unconventional Gas and Oil Drilling Is Associated with Increased Hospital Utilization Rates. 10 PLoS ONE e0131093 (2015)

Jennings, M.R. and M.P. Hayes. 1994. Amphibian and Reptile Species of Special Concern in California. Prepared for California Department of Fish and Game

Jeong, Seongeun et al., Estimating Methane Emissions in California's Urban and Rural Regions Using Multitower Observations, 121 J. Geophysical Research: Atmospheres 13031 (2016)

Jeong, Seongeun et al., Spatially Explicit Methane Emissions from Petroleum Production and the Natural Gas System in California, 48 Environmental Science & Technology 5982 (2014)

Jia, C., & Batterman, S., A critical review of naphthalene sources and exposures relevant to indoor and outdoor air, 7 International Journal of Environmental Research and Public Health, *7* (2010)

Kasler, Dale, 360,000 Californians have unsafe drinking water. Are you one of them?, Sacramento Bee (June 1, 2018), available at: https://www.sacbee.com/news/state/california/water-and-drought/article211474679.html

Kern County California, 2018 Kern County Agricultural Crop Report, available at: http://www.kernag.com/caap/crop-reports/crop10_19/crop2018.pdf

Kern County Planning and Community Development Department, Final Environmental Impact Report for the Revisions to the Kern County Zoning Ordinance – 2015 (C) Focused on Oil and Gas Permitting, SCH #2013081079 (Nov. 9, 2015)

Kern County Water Agency, Agency Function, available at: https://www.kcwa.com/agencyfunction/

Klein, Kerry, Millions of Gallons of Oily Water Have Surfaced in A Kern County Oil Field, and More Keeps Coming, NPR for Central California, available at: https://www.kvpr.org/post/millions-gallons-oily-water-have-surfaced-kern-county-oil-field-and-more-keeps-coming

Koch, Wendy, *Wyoming's Smog Exceeds Los Angeles' Due to Gas Drilling*, USA Today (May 9, 2011)

Kort, Eric A. et al., Fugitive Emissions From the Bakken Shale Illustrate Role of Shale Production in Global Ethane Shift, 43 Geophysical Research Letters 4617 (2016)

LeQuéré, Corinne et al., Global carbon budget 2018, 10 Earth System Science Data 2141 (2018)

Long, Jane C.S. et al., Chapter 1: Introduction, California Council on Science and Technology, An Independent Assessment of Well Stimulation in California Volume II: Potential Environmental Impact of Hydraulic Fracturing and Acid Stimulations (July 2015)

Los Padres Forest Watch, Documented Impacts of Oil Development on Endangered California Condors (2016)

Lyman, Seth & Howard Shorthill, Final Report: 2012 Uintah Basin Winter Ozone & Air Quality Study, Utah Department of Environmental Quality (2013)

MacNally R. and G.W. Brown. 2001. Reptiles and Habitat Fragmentation in the Box-ironbark Forests of Central Victoria, Australia: Predictions, Compositional Change and Faunal Nestedness. Oecologia

Maffy, Brian, Utah grapples with toxic water from oil and gas industry, The Salt Lake Tribune, August 28, 2014, available at: http://archive.sltrib.com/story.php?ref=/sltrib/news/58298470-78/danish-flats-ponds-company.html.csp

Martin, Randal et al., Final Report: Uinta Basin Winter Ozone and Air Quality Study Dec 2010 - March 2011 (2011)

McCawley, Michael, Air Contaminants Associated with Potential Respiratory Effects from Unconventional Resource Development Activities, 36 Seminars in Respiratory and Critical Care Medicine 379 (2015)

McKenzie, Lisa et al., Ambient Nonmethane Hydrocarbon Levels Along Colorado's Northern Front Range: Acute and Chronic Health Risks, 52 Environmental Science & Technology 4514 (2018)

McKenzie, Lisa M., Birth Outcomes and Maternal Residential Proximity to Natural Gas Development in Rural Colorado, 122 Environmental Health Perspectives 412 (2014)

McKenzie, Lisa M. et al., Human Health Risk Assessment of Air Emissions From Development of Unconventional Natural Gas Resources, 424 Science of the Total Environment 79 (2012)

McKenzie, Lisa M. et al., Population Size, Growth, and Environmental Justice Near Oil and Gas Wells in Colorado, 50 Environmental Science & Technology 11471 (2016)

Meretsky, Vicky J. et al., Demography of the California Condor: Implication for Reestablishment, 14 Conservation Biology 4 (2000), available at: http://www.biologicaldiversity.org/species/birds/California_condor/pdfs/conbio-condorarticle.pdf

Merrill, Matthew D. et al., Federal lands greenhouse gas emissions and sequestration in the United States—Estimates for 2005–14: U.S. Geological Survey Scientific Investigations Report 2018–5131 (2018)

Miller, Scot et al., Anthropogenic emissions of methane in the United States, 110 PNAS 50 (2013)

Miller, C.M. 1944. Ecological Relations and Adaptions of the Limbless Lizards of the Genus Anniella. Ecological Monographs

Natural Resources Defense Council, Drilling in California: Who's at Risk?, October 2014, available at: https://www.nrdc.org/sites/default/files/california-fracking-risks-report.pdf

NatureServe Explorer. 2020. *Anniella alexanderae*: Temblor Legless Lizard. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.960627/Anniella_alexanderae

Norris, D.O. and K.H. Lopez. 2011. Hormones and Reproduction of Vertebrates: Reptiles. Chapter 14: Endocrine Disruption of Reproduction in Reptiles

Ogen, Yaron, Assessing Nitrogen Dioxide (NO2) Levels As a Contributing Factor to Coronavirus (COVID-19) Fatality, 720 Science of the Total Environment 138605 Adv. Online Pub. (July 15, 2020), https://doi.org/10.1016/j.scitotenv.2020.138605

Oil Change International, The Sky's Limit California: Why the Paris Climate Goals Demand That California Lead in a Managed Decline of Oil Extraction (2018), available at: http://priceofoil.org/ca-skys-limit

Oil Change International, The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production (September 2016), available at: http://priceofoil.org/2016/09/22/the-skys-limit-report/

Ostro, Bart et al., Long-term Exposure to Constituents of Fine Particulate Air Pollution and Mortality: Results from the California Teachers Study, 118 Environmental Health Perspectives 3 (2010)

Papenfuss, T.J. and J.F. Parhum. 2013. Four New Species of California Legless Lizard (*Anniella*). Breviora Museum of Comparative Zoology

Parham, J.F., M.S. Koo, W.B. Simison, A. Perkins, T.J. Papenfuss, and E.N. Tennant. 2019. Conservation Assessment of the California Legless Lizard (*Anniella*). Prepared for California Department of Fish and Wildlife

Peischl, Jeff et al., Quantifying sources of methane using light alkanes in the Los Angeles basin, California, 118 J. Geophysical Research Atmospheres 1 (2013)

Peltier, Laurel, Pennsylvania Fracking Water Contamination Much Higher Than Reported, EcoWatch, February 4, 2016, available at: https://www.ecowatch.com/pennsylvania-fracking-water-contamination-much-higher-than-reported-1882166816.html (Accessed July 12, 2018)

Physicians for Social Responsibility and Concerned Health Professionals of NY, Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking, Fourth Edition, November 17, 2016

Pichtel, J. 2016. Oil and Gas Production Wastewater: Soil Contamination and Pollution Prevention. Applied and Environmental Soil Science

Piggot, Georgia et al., Realizing a just and equitable transition away from fossil fuels, Discussion brief, Stockholm Environment Institute (January 2019), available at: https://www.sei.org/publications/just-and-equitable-transition-fossil-fuels/

Rabinowitz, Peter M. et al., Proximity to Natural Gas Wells and Reported Health Status: Results of a Household Survey in Washington County, Pennsylvania, 123 Environmental Health Perspectives 21 (2015)

Rasmussen, Sara G. et al., Association Between Unconventional Natural Gas Development in the Marcellus Shale and Asthma Exacerbations, 176 JAMA Internal Medicine 1334 (2016)

Robiou du Pont, Yann et al., Equitable mitigation to achieve the Paris Agreement goals, 7 Nature Climate Change 38 (2017)

Sahu, Ranajit, On the Underestimation of NOx Emissions from Oil Well Drilling Activities in Kern County, CA (2015)

San Joaquin Valley Air Pollution Control District, 2016 Plan for the 2008 8-Hour Ozone Standard, (June 16, 2016), available at: http://www.valleyair.org/Air_Quality_Plans/Ozone-Plan-2016.htm

Shonkoff, Seth B.C. et al., Environmental Public Health Dimensions of Shale and Tight Gas Development, 122 Environmental Health Perspectives 787 (2014)

Shonkoff, Seth & Donald Gautier, A Case Study of the Petroleum Geological Potential and Potential Public Health Risks Associated with Hydraulic Fracturing and Oil and Gas Development in The Los Angeles Basin, In California Council on Science and Technology, *An Independent Assessment of Well Stimulation in California*, Volume 3, Chapter 4 (2015)

Sierra Club et al. comments on New Source Performance Standards: Oil and Natural Gas Sector; Review and Proposed Rule for Subpart OOOO (Nov. 30, 2011)

Souther, S., M.W. Tingley, V.D. Popescu, D.T.S. Hayman, M.E. Ryan, T.A. Graves, B. Hartl, and K. Terrell. 2014. Biotic Impacts of Energy Development from Shale: Research Priorities and Knowledge Gaps. Frontiers in Ecology and the Environment

Stacy, Shaina L. et al., Perinatal Outcomes and Unconventional Natural Gas Operations in Southwest Pennsylvania, 10 PLoS ONE e0126425 (2015)

STAND-LA & Center for Biological Diversity, Danger Next Door: The Top 12 Air Toxics Used for Neighborhood Oil Drilling in Los Angeles, Fleming, John C. & Candice Kim, A STAND-LA report prepared by the Center for Biological Diversity (December 2017)

State of California Department of Justice, Climate Change impacts in California, available at: https://oag.ca.gov/environment/impact

Stebbins, Robert C. and Samuel M. McGinnis, Field Guide to Amphibians and Reptiles of California, University of California Press (2012)

Stringfellow, William et al., Comparison of chemical use between hydraulic fracturing, acidizing, and routine oil and gas development, 12 PLoS One 4 (2017)

Stringfellow, William et al., Identifying chemicals of concern in hydraulic fracturing fluids used for oil production, 220 Environmental Pollution 413 (2017)

Stringfellow, William T. et al., Impacts of Well Stimulation on Water Resources, In California Council on Science and Technology, *An Independent Assessment of Well Stimulation in California*, Volume 2, Chapter 2 (2015)

Templeton, A.R., K. Shaw, E. Routman, and S.K. Davis. 1990. The Genetic Consequences of Habitat Fragmentation. Annals of the Missouri Botanical Garden

Thomson, R.C., A.N. Wright, and H.B. Shaffer. 2016. California Amphibian and Reptile Species of Special Concern

Tian, Huaiyu et al., Risk of COVID-19 is Associated with Long-term Exposure to Air Pollution, medRxiv (April 24, 2020), https://doi.org/10.1101/2020.04.21.20073700

Tran, K.V., Casey, J.A., Cushing, L.J., Morello-Frosch, R., Residential Proximity to Oil and Gas Development and Birth Outcomes in California: A Retrospective Cohort Study of 2006–2015 Births, 128 Environmental Health Perspectives 6 (2020), https://doi.org/10.1289/EHP5842

Travaglio, Marco et al., Links Between Air Pollution and COVID-19 in England, medRxiv (April 28, 2020), https://doi.org/10.1101/2020.04.16.20067405

Trout, Kelly & Lorne Stockman, Oil Change International, Drilling Toward Disaster: Why U.S Oil & Gas Expansion is Incompatible with Climate Limits, (Jan. 2019), available at: http://priceofoil.org/content/uploads/2019/01/Drilling-Towards-Disaster-Web-v3.pdf

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), available at: http://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf

U.S. Bureau of Land Management, Instruction Memorandum No. 2013-025, *Guidance for Conducting Air Quality General Conformity Determinations* (Dec. 4, 2012), available at: https://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2013/IM_2013-025.html

U.S. Bureau of Land Management, Land Use Plan Information, DOI-BLM-CA-C060-2020-0120-EA, BLM National NEPA Reg., https://eplanning.blm.gov/eplanning-ui/project/2000634/600 (last updated Aug. 26, 2020)

U.S. Bureau of Land Management, Regulatory Impact Analysis for: Revisions to 43 CFR 3100 (Onshore Oil and Gas Leasing) and 43 CFR 3600 (Onshore Oil and Gas Operations) Additions of 43 CFR 3178 (Royalty-Free Use of Lease Production) and 43 CFR 3179 (Waste Prevention and Resource Conservation), (Nov. 10, 2016)

U.S. Department of the Interior, and U.S. Environmental Protection Agency, Memorandum of Understanding Among the U.S. Department of Agriculture regarding Air Quality Analyses and Mitigation for Federal Oil and Gas Decisions through the National Environmental Policy Act Process, Preamble (2011), available at: https://www.epa.gov/sites/production/files/2014-08/documents/air-quality-analyses-mou-2011.pdf

U.S. Environmental Protection Agency, Additional Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards, 83 FR 25776 (June 4, 2018), available at: https://www.govinfo.gov/content/pkg/FR-2018-06-04/pdf/2018-11838.pdf

U.S. Environmental Protection Agency, Carbon Monoxide, available at: https://www.epa.gov/co-pollution/basic-information-about-carbon-monoxide-co-outdoor-air-pollution#Effects (accessed July 13, 2018)

U.S. Environmental Protection Agency, Criteria Air Pollutants, available at: https://www.epa.gov/criteria-air-pollutants (last visited on July 10, 2018)

U.S. 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 (Dec. 15, 2009), available at: https://www.epa.gov/sites/production/files/2016-08/documents/federal_register-epa-hq-oar-2009-0171-dec.15-09.pdf

U.S. Environmental Protection Agency, Endangered Species Facts, San Joaquin Kit Fox, (Feb. 2010)

U.S. Environmental Protection Agency, Health Effects of Ozone Pollution, available at: https://www.epa.gov/ozone-pollution/health-effects-ozone-pollution (accessed July 10, 2018)

U.S. Environmental Protection Agency, Hydraulic fracturing for oil and gas: impacts from the hydraulic fracturing water cycle on drinking water resources in the United States (Final Report)., Washington DC, USA (2016)

U.S. Environmental Protection Agency, Integrated Science Assessment (ISA) for Ozone (O3) and Related Photochemical Oxidants (2013)

U.S. Environmental Protection Agency, Nonattainment Areas for Criteria Pollutants (Green Book), available at: https://www.epa.gov/green-book

U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Report to Congress on Hydrogen Sulfide Air Emissions Associated with the Extraction of Oil and Natural Gas (EPA-453/R-93-045) (Oct. 1993)

U.S. Environmental Protection Agency, Oil and Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews Proposed Rule, 76 Fed. Reg 52,738 (Aug 23, 2011)

U.S. Environmental Protection Agency, Oil and Gas Sector: Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution: Background Technical Support Document for Proposed Standards (July 2011)

U.S. Environmental Protection Agency, Particulate Matter, (PM), available at: https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm (Accessed July 13, 2018)

U.S. Environmental Protection Agency, Regional Haze Final Guidance at 2, available at: https://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf

U.S. Environmental Protection Agency, San Joaquin Valley, available at: https://www.epa.gov/sanjoaquinvalley

U.S. Environmental Protection Agency, Sulfur Dioxide, available at: https://www.epa.gov/so2-pollution/sulfur-dioxide-basics#effects (accessed July 13, 2018)

U.S. Environmental Protection Agency, The Clean Air Act Amendments of 1990 List of Hazardous Air Pollutants, Technology Transfer Network Air Toxics Web Site, available at: http://www.epa.gov/ttnatw01/orig189.html (accessed July 29, 2015)

U.S. Fish and Wildlife Service, Recovery Plan for Upland Species of the San Joaquin Valley (1998), available at: https://ecos.fws.gov/docs/recovery_plan/980930a.pdf

U.S. Fish and Wildlife Service, Species Status Assessment for the Blunt-nosed leopard lizard, (2020) available at: https://www.fws.gov/cno/Science/Review%20PDFs/2020/Comments/blunt_nosed_leopard_lizard_ssa_2020-06_comments.pdf

U.S. Fish and Wildlife Service, Spotlight Species Action Plan 2010-2014

Vaidyanathan, Gayathri, How Bad of a Greenhouse Gas is Methane?, SCIENTIFIC AMERICAN (Dec. 22, 2015), available at: https://www.scientificamerican.com/article/how-bad-of-a-greenhouse-gas-is-methane/

Vinciguerra, Timothy et al, Regional Air Quality Impacts of Hydraulic Fracturing and Shale Natural Gas Activities: Evidence From Ambient VOC Observations. 110 Atmospheric Environment 144 (2015)

Water Association of Kern County, Water in Kern County, available at: https://www.wakc.com/water-overview/kern-county/

Webb, Ellen et al., Developmental and reproductive effects of chemicals associated with unconventional oil and natural gas operations, 29 Rev Environ Health 307 (2014)

Webb, Ellen et al., Potential Hazards of Air Pollutant Emissions From Unconventional Oil and Natural Gas Operations on The Respiratory Health of Children And Infants, 31 Reviews on Environmental Health 225 (2016)

Wennberg, Paul O. et al., On the Sources of Methane to the Los Angeles Atmosphere, 46 Environmental Science & Technology 9282

White House, Presidential Executive Order: Promoting Energy Independence and Economic Growth at § 3(c) (Mar. 28, 2017), available at: https://www.whitehouse.gov/presidential-actions/presidential-executive-order-promoting-energy-independence-economic-growth/

Williams, Megan, Air Quality Review, BLM Bakersfield Field Office Hydraulic Fracturing Draft EIS (April 2019)

Willis, Mary D. et al., Unconventional natural gas development and pediatric asthma hospitalizations in Pennsylvania, 166 Environmental Research 402 (2018)

Wilson, Janet, California presses Chevron for data on oil field where 8 spills have happened since April, Palm Springs Desert Sun, September 11, 2019, available at: https://www.desertsun.com/story/news/environment/2019/09/11/california-regulators-chevron-data-cymric-surface-expression-oil-spills/2276867001/

Wilson & Younes, Oil Companies Are Profiting From Illegal Spills. And California Lets Them, Desern Sun & ProPublica (Sept. 18, 2020), available at: https://www.propublica.org/article/oil-companies-are-profiting-from-illegal-spills-and-california-lets-them

Wolf, Shaye & Kassie Siegel, Oil Stain: How Dirty Crude Undercuts California's Climate Progress, Center for Biological Diversity (Nov. 2017), available at: https://www.biologicaldiversity.org/programs/climate_law_institute/energy_and_global_warming/pdfs/Oil_Stain.pdf

Wu, Xiao et al., Exposure to air pollution and COVID-19 mortality in the United States, medRxiv (April 5, 2020), https://doi.org/10.1101/2020.04.05.20054502

Yost, Erin et al., Estimating the Potential Toxicity of Chemicals Associated with Hydraulic Fracturing Operations Using Quantitative Structure-Activity Relationship Modeling, 50 Environmental Science and Technology 14 (2016)

Zhu, Yongjian, Association between short-term exposure to air pollution and COVID-19 infection: Evidence from China, 727 Science of the Total Environment (April 2020) https://doi.org/10.1016/j.scitotenv.2020.138704

Zychowski, G.V. and C.A.J. Godard-Codding. 2016. Reptilian Exposure to Polycyclic Aromatic Hydrocarbons and Associated Effects. Environmental Toxicology and Chemistry