August 29, 2022

**VIA ELECTRONIC SUBMISSION**

Gabe Garcia, Field Manager
U.S. Bureau of Land Management
Bakersfield Field Office
35126 McMurtrey Avenue
Bakersfield, CA 93308
BLM_CA_Web_BK@blm.gov

**RE: Comments on Applications for Permit to Drill in the Bakersfield Field Office**

Dear Mr. Garcia:

This letter is sent on behalf of Center for Biological Diversity, The Wilderness Society, Patagonia, Natural Resources Defense Council, the Chalon Indian Council of Bakersfield of the Chalon Indian Nation, the Central California Asthma Collaborative, and Friends of the Earth to comment on the U.S. Bureau of Land Management's (BLM's) proposed approval of the following Applications for Permit to Drill (APDs) wells in the Bakersfield Field Office:

| **Field Office** | **Federal Lease Numbers** | **Operator** | **Well Numbers** | **NEPA Number** |
|---|---|---|---|---|
| Bakersfield Field Office | CACA004999, CAS019301C | California Resource Production Corporation | King 1008V, King 1009V, Sarrett Fee 1118FVH, Sarrett Fee 1145LVH, Sarrett Fee 1146TVH, Matthew Fee 1113LVH | DOI-BLM-CA-C060-2022-0112-EA |
| Bakersfield Field Office | CAS0019275A | Innex California Inc. | KMDU 42-30 | DOI-BLM-CA-C060-2022-0071-EA |

As discussed below, BLM's approval of these APDs without providing the draft Environmental Assessment(s) (EAs) for public comment—and often without providing any environmental documents or decision records even after the project is actually approved—violates the public participation requirements of the National Environmental Policy Act (NEPA), the Mineral Leasing Act (MLA), and the Federal Land Policy and Management Act (FLPMA). We request that BLM defer approval of these permits to provide a minimum 30-day public comment period on the draft EAs as well as sufficient additional time for the agency to review and adequately respond to any comments.

We also submit these public comments to urge BLM to comply with its substantive obligations under FLPMA, NEPA, and the Clean Air Act before issuing these APDs. This includes taking a hard look at how these APDs will impact environmental justice communities that comprise the majority of Kern County's population, and how additional wells will negatively impact air pollution, water quality and scarcity, climate change, and the imperiled Temblor legless lizard. BLM must provide this requisite analysis in the draft EAs, or, if necessary, a draft environmental impact statement (EIS), and evaluate alternatives that would lessen the environmental damage from additional oil and gas development, before approving these APDs.

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## I. BLM's process for issuing APDs violates the public participation requirements of NEPA, FLPMA, and the MLA.

BLM's process for issuing APDs is rife with significant failures that rob the public of opportunities to review or comment on APDs prior to their approval, contrary to NEPA, FLPMA, and the MLA. The agency must provide a minimum 30-day comment period for the EA or EIS for each project to ensure proper public participation.

NEPA's purpose is to ensure that an agency, "in reaching its decision, will have available, and will carefully consider, detailed information concerning significant environmental impacts; it also guarantees that the relevant information will be made available to the larger audience that may also play a role in both the decision-making process and the implementation of that decision." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989). Thus, the Ninth Circuit has explained that "[a]n agency, when preparing an EA, must provide the public with sufficient environmental information, considered in the totality of circumstances, to permit members of the public to weigh in with their views and thus inform the agency decision-making process." *Bering Strait Citizens for Responsible Res. Dev. v. U.S. Army Corps of Engineers*, 524 F.3d 938, 953 (9th Cir. 2008) (citing *Sierra Nevada Forest Prot. Campaign v. Weingardt*, 376 F. Supp. 2d 984, 992 (E.D. Cal. 2005) (finding that the Forest Service failed to give the public adequate pre-decisional opportunity for informed comment when "[t]he scoping notice provided no environmental data concerning impacts to wildlife, cultural resources, watersheds, soils, fisheries, and aquatics")). "[A] complete failure to involve or even inform the public about an agency's preparation of an [environmental assessment (EA)] and a [finding of no significant impact (FONSI)] . . . undermines the very purpose of NEPA, which is to "ensure[ ] that federal agencies are informed of environmental consequences before making decisions and that the information is available to the public." *Citizens for Better Forestry v. U.S. Dep't of Agric.*, 341 F.3d 961, 970–71 (9th Cir. 2003) (quoting *Okanogan Highlands Alliance v. Williams,* 236 F.3d 468, 473 (9th Cir. 2000)).

Section 309(e) of FLPMA similarly requires BLM to "give . . . the public adequate notice and an opportunity to comment upon . . . and to participate in . . . the management of[] the public lands." 43 U.S.C. § 1739(e). In addition, the MLA requires that BLM must provide the public with the "terms" of a drilling permit as well as "maps or a narrative description of the affected lands," at least 30 days before issuing the permit. 30 U.S.C. § 226(f). Thus, under NEPA, FLPMA, and the MLA, BLM must provide opportunity for meaningful public participation. *See, e.g.*, *W. Watersheds Project v. Zinke*, 441 F. Supp. 3d 1042, 1072 (D. Idaho 2020) (holding that BLM violated NEPA and FLPMA by limiting public participation in decisions concerning whether to grant oil and gas leases on federal lands).

BLM's practice of issuing drilling permits without any opportunity for public comment on the underlying EA, and without providing any information on the drilling project other than the (i) the company/operator name, (ii) the well name/number, and (iii) the well location violates NEPA, FLPMA, and the MLA by failing to provide adequate public participation. In fact, BLM has not provided the EAs for any of the APDs at issue here. The agency has only posted very basic well information that does not include meaningful details for the public to understand the environmental consequences of drilling and associated activities. BLM does not solicit public

comment after it posts the basic well information, nor does it give the public sufficient information about the proposed drilling on which to comment. The public cannot reasonably be expected to formulate helpful comments and inform the agency decisionmaking process without access to such information.

Even more troublingly, BLM routinely issues APDs without providing the EAs, decision records, or any notice that the APDs have already been approved until well after the approval date, leaving the public completely in the dark on the decisionmaking process. In one typical example, in December 2021, BLM posted basic well information on its National NEPA Register website for six APDs from the operator California Resources Elk Hills.[1] In early May 2022, BLM's Automated Fluid Minerals Support System (AFMSS), an entirely different website, reported after the fact that all six APDs were previously approved in February, March, and April 2022.[2] AFMSS includes only basic well information and does not provide EAs or decision records, so the public has no way of understanding how or why BLM issued the approvals. In late May 2022, BLM finally released the EA and decision record for the APDs on its National NEPA Register site, months after they were apparently approved.[3] This segmented and convoluted process effectively shuts out the public and all but ensures that APD approvals are taking place without the benefit of public review and input.[4]

Beyond failing to provide notice or the EAs and decision records until well after an APD is approved, BLM often issues approvals without *ever* providing the EAs or decisions to the public at all. In many instances, BLM has approved APD packages of 10, 14, and even 50 wells without releasing these documents at any point, and even without releasing the APD form itself

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[1] *See*, "Documents" page, BLM National NEPA Register, *DOI-BLM-CA-C060-2022-0024-EA*, available at: https://eplanning.blm.gov/eplanning-ui/project/2017168/510 (accessed June 7, 2022); *see also*, Exhibit 1 (June 7, 2022 screenshot of "Documents" page of *DOI-BLM-CA-C060-2022-0024-EA*).

[2] Exhibit 2 (BLM, Automated Fluid Minerals Support System (AFMSS), Approved APDs Report – Federal (June 6, 2022)).

[3] *See*, "Documents" page, BLM National NEPA Register, *DOI-BLM-CA-C060-2022-0024-EA*, available at: https://eplanning.blm.gov/eplanning-ui/project/2017168/510 (accessed June 7, 2022); *see also*, Exhibit 1 (June 7, 2022 screenshot of "Documents" page of *DOI-BLM-CA-C060-2022-0024-EA*).

[4] In another example, in March 2022, BLM posted basic well information on its National NEPA Register website for four APDs from the operator California Resources Production Corporation. In early August 2022, BLM's AFMSS website reported after the fact that three of the four APDs were previously approved as of August 8, 2022, otherwise providing only basic well information with no EAs or decision records. As of August 22, 2022, the EAs or decision records still have not been posted on either AFMSS or the National NEPA register website. Exhibit 3 (August 22, 2022 screenshot of "Home" page of *DOI-BLM-CA-C060-2022-0065-EA*) and Exhibit 4 (August 22, 2022 screenshot of "Documents" page of *DOI-BLM-CA-C060-2022-0065-EA*), both missing the EA or decision record for 4 APDs in Kern County and stating the project status is "In Progress – Analysis & Document Preparation"; Exhibit 5 (BLM, Automated Fluid Minerals Support System (AFMSS), Approved APDs Report – Federal (as of Aug. 19, 2022)), showing 3 of the 4 APDs approved on Aug. 5, 2022 and Aug. 8, 2022.

with the basic well information.[5] The agency has also approved APDs as soon as one day or a week after posting notice of the application, leaving no time for the public to learn about the application, let alone review and comment on it.[6]

BLM's APD process demonstrates other key deficiencies. The agency regularly posts APDs that include approximate dates when drilling activity is scheduled to begin *prior to* when the EA or the APD form itself becomes available—or even prior to when the APD is actually approved[7]—thereby allowing work to commence at the drill site well before the public is

[5] *See*, Exhibit 6 (June 7, 2022 screenshot of "Home" page of *DOI-BLM-CA-C060-2021-0011-EA*) and Exhibit 7 (June 7, 2022 screenshot of "Documents" page of *DOI-BLM-CA-C060-2021-0011-EA*), both missing the EA or decision record for 10 APDs in Kern County and stating the project status is "In Progress – Analysis & Document Preparation"; Exhibit 8 (BLM, Automated Fluid Minerals Support System (AFMSS), Approved APDs Report – Federal (period Dec. 2020 through Mar. 2022)), showing 10 APDs approved nearly a year and a half ago in Jan. 7, 2021 and Jan. 8, 2021; Exhibit 9 (June 7, 2022 screenshot of "Home" page of *DOI-BLM-CA-C060-2021-0054-EA*), missing the APD form, EA, or decision record for 14 APDs in Kern County and stating the project status is "In Progress - Analysis & Document Preparation"; Exhibit 8 (BLM, Automated Fluid Minerals Support System (AFMSS), Approved APDs Report – Federal (period Dec. 2020 through Mar. 2022)), showing 14 APDs approved over a year ago in May 3, 2021; Exhibit 10 (June 7, 2022 screenshot of "Home" page of *DOI-BLM-CA-C060-2021-0074-DNA*) and Exhibit 11 (June 7, 2022 screenshot of "Documents" page of *DOI-BLM-CA-C060-2021-0074-DNA*), both missing the EA or decision record for 50 APDs in Kern County and stating the project status is "In Progress – Analysis & Document Preparation"; Exhibit 8 (BLM, Automated Fluid Minerals Support System (AFMSS), Approved APDs Report – Federal (period Dec. 2020 through Mar. 2022)), showing 50 APDs approved as of November 5, 2021.

[6] *See, e.g.*, Exhibit 12h (June 7, 2022 screenshot of "Documents" page of *DOI-BLM-CA-C060-2022-0046-EA*), showing the APD forms released on Mar. 29, 2022 and the EA and decision record released on Mar. 31, 2022; Exhibit 13 (July 13, 2022 screenshot of "Home" page of *DOI-BLM-CA-C060-2022-0103-EA*) and Exhibit 14 (July 13, 2022 screenshot of "Documents" page of *DOI-BLM-CA-C060-2022-0103-EA*), both missing the EA or decision record for 1 APD in Kern County and stating the project status is "In Progress – Analysis & Document Preparation"; Exhibit 15 (BLM, Automated Fluid Minerals Support System (AFMSS), Approved APDs Report – Federal (as of July 13, 2022)), showing 1 APD approved as of July 5, 2022, despite the APD form being released a week prior on June 27, 2022.

[7] *See, e.g.*, Exhibit 12 (June 7, 2022 screenshot of "Documents" page of *DOI-BLM-CA-C060-2022-0046-EA*), showing 3 APDs were approved on Mar. 30, 2022, and Form 3160-3 for one of these APDs, with "approximate date work will start" listed as Mar. 11, 2022, available at: https://eplanning.blm.gov/public_projects/2018383/200516020/20056678/250062860/Form_3160_3_20220323164045_Redacted.pdf; Exhibit 16 (June 8, 2022 screenshot "Documents" page of *DOI-BLM-CA-C060-2022-0067-EA*), showing 1 APD was approved on June 7, 2022, and Form 3160-3 for this APD, with "approximate date work will start" listed as May 2, 2022, available at https://eplanning.blm.gov/public_projects/2018900/200516948/20057061/250063243/Form_3160_3_20220331113646_Redacted.pdf.

notified of the project or is able to provide input.[8] BLM's failures foreclose any real public participation and violate NEPA, FLMPA, and the MLA.

We request that BLM defer approval of the permits at issue until it has allowed for a minimum 30-day public comment period on the draft EAs, or for an appropriate-length public comment period on a draft EIS, and thoroughly reviewed and responded to those comments. In light of the significant Spanish-speaking population in Kern County, we also request that BLM translate all documents into Spanish and provide Spanish interpreters at any public meetings on the permits, in order to properly inform the agency's decisionmaking process.

## II. BLM must comply with Permanent Instruction Memorandum No. 2022-001.

In addressing NEPA compliance for the APDs, BLM must comply with the newly-issued guidance contained in Permanent Instruction Memorandum No. 2022-001 (Oct. 14, 2021), available at www.blm.gov/policy/pim-2022-001-0 ("PIM 2022-001"). PIM 2022-001 sets forth agency procedures for NEPA compliance for APDs where the underlying mineral lease is under litigation-related review.

For those APDs where the underlying lease is subject to litigation over the adequacy of its accompanying NEPA compliance, and has either been remanded by a court to BLM for further review, or BLM is reassessing the pre-existing NEPA documentation, PIM 2022-001 sets forth certain procedures the agency must follow. Failure to cure NEPA defects prior to authorizing permits to drill can result in not only unnecessary and irreversible environmental harm, but also in wasted investments by lessees pursuing development of potentially void or voidable leases. PIM 2022-001 explains that, "[i]n its reassessment of the pre-existing environmental analysis for the leasing decision, BLM in coordination with their regional solicitor may find that portions of the environmental analysis are outdated or otherwise in need of revision, in which case BLM should not rely on those portions of environmental analysis when approving an APD or MDP. Instead, BLM should ensure that any decision to approve the APD is supported by adequate supplemental or additional analysis."

Here, the NEPA environmental review for the Bakersfield Field Office's 2014 Resource Management Plan and most recent December 2020 lease sale have both been remanded to the

[8] *See, e.g.,* Form 3160-3 for 4 APDs to Chevron in the Lost Hills oil field in Kern County (posted Oct. 22, 2021, with "approximate date work will start" listed as Dec. 2, 2021, despite no EA or decision record available as of Mar. 21, 2022), available at: https://eplanning.blm.gov/eplanning-ui/project/2016327/510; Form 3160-D for 18 APDs to Sentinel Peak Resources California in the Midway Sunset oil field in Kern County (posted Oct. 22, 2021, with "approximate date work will start" listed as Sep. 2, 2021, *before* the date it was posted and despite no EA or decision record available as of Mar. 21, 2022), available at: https://eplanning.blm.gov/eplanning-ui/project/2016329/510; Form 3160-3 for 10 APDs to California Resource Production Corp. in the Mount Poso oil field in Kern County (posted Dec. 3, 2020, with "approximate date work will start" listed as Jan. 1, 2021, despite no EA or decision record available as of Mar. 21, 2022), available at: https://eplanning.blm.gov/eplanning-ui/project/2003957/510.

agency and BLM is reassessing its documentation and conducting supplemental NEPA analysis.[9] Thus, at a minimum, BLM must review whether the underlying leases in this case are subject to unlawful NEPA deficiencies analogous to those identified by the courts in numerous other cases. "These challenges have primarily claimed that there are deficiencies in BLM's analysis of reasonably foreseeable greenhouse gas emissions but have also challenged BLM's NEPA analysis regarding impacts to groundwater from hydraulic fracturing or to ozone concentrations. *See generally WildEarth Guardians v. Haaland*, Civ. No. 16-cv-01724 (D.D.C.); *San Juan Citizens Alliance, v. Jewell*, Civ. No. 16-cv-00376 (D.N.M.); *Center for Biological Diversity v. U.S. Forest Serv.*, Civ. No. 17-cv-00372 (S.D. Ohio). As of the date of this PIM, fifteen cases are pending in the Federal court system and final judgments in those cases have the potential to affect the issuance of leases from multiple competitive oil and gas lease sales. Five cases involving competitive oil and gas lease sales have been remanded (either by the court or voluntarily) for additional NEPA analysis." PIM 2022-001. To avoid both misallocation of resources and irreversible environmental harm, BLM should take measures, including deferring approval of any APDs and preparation of appropriate supplemental NEPA documents, to "ensure that any decision to approve the APD is supported by adequate supplemental or additional analysis." PIM 2022-001.

The recent Permanent Instruction Memorandum further cautions that BLM must ensure APD approvals are supported by adequate cumulative effects analysis:

> When BLM is revisiting any cumulative effects analysis for the underlying leasing decision (and/or re-evaluating effects of the leasing decision that are later in time or farther removed in distance from the APD) to inform the NEPA analysis for an APD or MDP, and BLM finds that the cumulative impacts analysis for the lease sale has weaknesses that require supplementation, modification, or replacement, the BLM staff reviewing an APD on a lease that was issued based on that lease decision should ensure that the analysis for the individual APD—including, as appropriate and/or required by law, analysis of greenhouse gas emissions, air quality, and impacts to lands with wilderness characteristics, special designations, cultural resources and special status species (including related habitat) etc.—is reflected in the supplemental or additional environmental analysis for that APD or MDP.

PIM 2022-001, par. B. Where, as here, that guidance has never been completed, the PIM reinforces the clear mandate of NEPA statutory text and case law that an adequate cumulative effects analysis for past, currently authorized, and reasonably foreseeable federal and non-federal emissions and other environmental consequences must be completed prior to APD approval. This cumulative effects analysis must take into account, at a minimum, BLM's October 29, 2021 Specialist Report on Annual

[9] Stipulation of Dismissal Pursuant to Settlement, *Center for Biological Diversity v. U.S. Bureau of Land Management*, No. 2:20-cv-00371-DSF (C.D. Cal. Aug. 1, 2022); Stipulation of Dismissal Pursuant to Settlement Agreement, *Center for Biological Diversity v. U.S. Bureau of Land Management*, No. 1:21-cv-00475-DAD-SAB (E.D. Cal. July 29, 2022).

Greenhouse Gas Emissions and Climate Trends, https://www.co.blm.gov/AirResources Report/ghg/ (hereinafter Specialist Report).

## III. BLM must consider environmental justice impacts to communities in Kern County and feasible mitigation measures before issuing APDs.

Kern County residents are already disproportionately burdened by air and water pollution, and additional oil and gas development will only exacerbate already severe environmental and public health harms. BLM must take a hard look at the impacts these additional wells will have on both fence line communities and the County overall before approving the proposed APDs.

### A. NEPA requires agencies to take a hard look at environmental justice impacts.

The U.S. Environmental Protection Agency (EPA) explains that environmental justice requires "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies."[10] Executive Order 12898 directs each federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations . . . ."[11]

Therefore, under NEPA, agencies conducting environmental review for a proposed project "must not only disclose . . . that certain communities and localities are at greater risk, but must also fully assess these risks." *California v. Bernhardt*, 472 F. Supp. 3d 573, 620 (N.D. Cal. 2020). The lead agency must take a hard look at the localized public health impacts on vulnerable communities, "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." *Id.*; *see also Marsh v. Oregon Nat. Res. Council,* 490 U.S. 360, 374 (1989) (stating that NEPA requires an agency to take a "hard look" at all environmental consequences of a proposed project). The hard look standard requires the agency to "adequately consider[] every significant aspect [of the project's environmental impacts], and inform[] the public of its reasoning and conclusions." *Or. Wild v. Bureau of Land Mgmt.*, No. 6:14-CV-0110-AA, 2015 WL 1190131, at *12 (D. Or. Mar. 14, 2015) .

In order to satisfy this hard look standard, BLM must assess the public health impacts of issuing APDs, including grappling with the substantial evidence that these new wells will severely affect California's most vulnerable and overburdened communities.

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[10] U.S. Environmental Protection Agency (EPA). (2021). *Learn About Environmental Justice*, available at: https://www.epa.gov/environmentaljustice/learn-about-environmental-justice (accessed July 20, 2021).

[11] Exec. Order No. 12898, 59 C.F.R. 32 (1994).

### B. Kern County is an environmental justice community facing disproportionate environmental and public health burdens.

An environmental justice community is a "geographic location with significant representation of persons of color, low-income persons, indigenous persons, or members of Tribal nations, where such persons experience, or are at risk of experiencing, higher or more adverse human health or environmental outcomes."[12]

Kern County is one of the most significant environmental justice communities in California. According to a summary of American Community Survey data collected between 2014 and 2018, 65 percent of Kern County residents are people of color.[13] Fifty-three percent of residents are Hispanic, and 18 percent of households are linguistically isolated, meaning that no one who is 14 and over in the household speaks English.[14] A report from EPA's EJSCREEN tool indicates that 47 percent of residents in Kern County are considered low-income.[15] BLM also noted in prior planning documents that 17 percent of the population receives income from the Supplemental Nutritional Assistance Program.[16]

These population characteristics make Kern County residents especially vulnerable to environmental hazards and make it more difficult for many community members to participate in the public process under NEPA.

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[12] White House Environmental Justice Advisory Council. (2021). *Final Recommendations: Justice40, Climate and Economic Justice Screening Tool & Executive Order 12898 Revisions*, available at: https://www.epa.gov/sites/default/files/2021-05/documents/whiteh2.pdf (accessed July 20, 2021).
[13] EPA. (2018). *EJSCREEN ACS Summary Report: Kern County*, available at: https://ejscreen.epa.gov/mapper/ (accessed July 20, 2021).
[14] *Id.*
[15] EPA. (2020). *EJSCREEN Report: Kern County, California EPA Region 9*, available at: https://ejscreen.epa.gov/mapper/ (accessed July 20, 2021).
[16] U.S. Bureau of Land Management (BLM), Bakersfield Field Office. (2020). *Competitive Oil and Gas Lease Sale Final Environmental Assessment* (Dec. 2020) at 12.


Moreover, already existing environmental conditions in Kern County mean that communities are guaranteed to endure "more adverse human health [and] environmental outcomes" from new environmental hazards.[17] Air quality in the region is among the worst in the state and the nation. Much of the county is in nonattainment for air quality standards and the ozone and particulate matter concentrations are higher than in 95 percent of the U.S.[18] In a 2021 State of the Air Report, the American Lung Association found Bakersfield, a city in Kern County, to be the most polluted city in the *nation* by year-round particle pollution, the second-most polluted by ozone, and the third-most polluted by daily particle pollution.[19] Two other cities in the San Joaquin Valley—Fresno and Visalia—are also among the top five polluted cities in the country for ozone and particle pollution.[20]

Kern County also experiences severe drinking water contamination problems. Much of the region contains groundwater that is more threatened than 80 percent of the state. Tens of

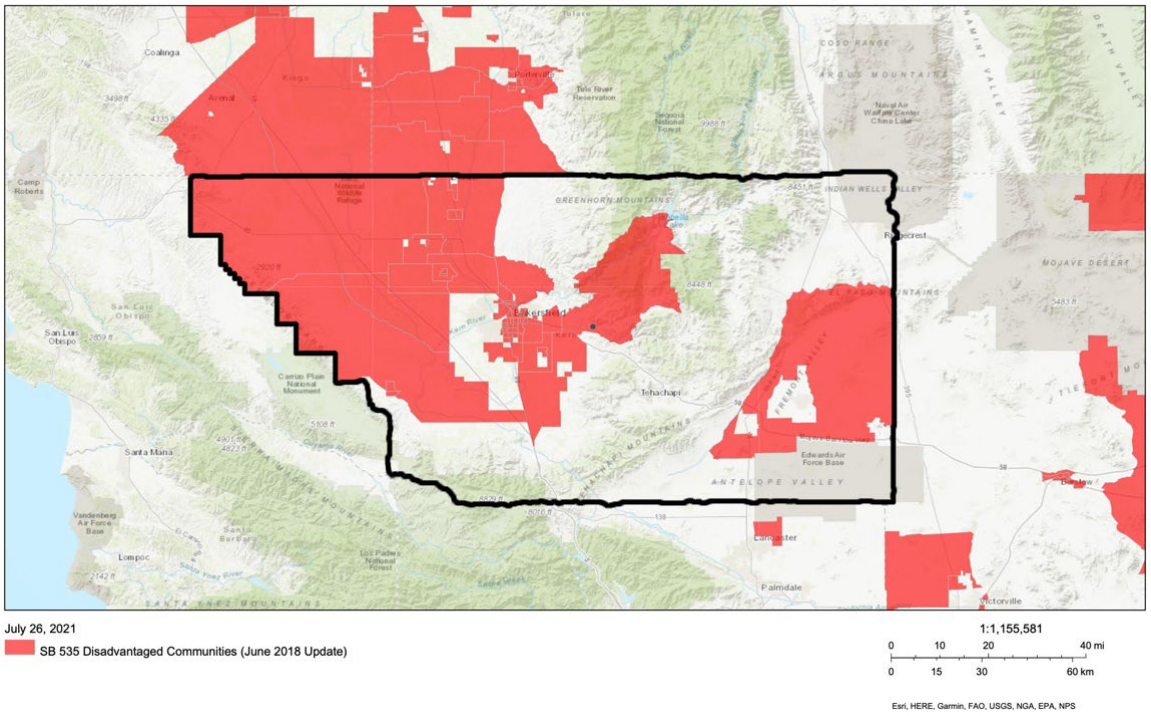
[17] State of California Department of Justice (Cal. DOJ). (2020). *Comments on the December 2020 Oil and Gas Lease Sale Environmental Assessment of BLM's Bakersfield Field Office*.
[18] EPA. (2020). *EJSCREEN Report: Kern County, California EPA Region 9*.
[19] American Lung Association (ALA). (2021). *State of the Air: Most Polluted Cities*, available at: https://www.lung.org/research/sota/city-rankings/most-polluted-cities (accessed July 20, 2021).
[20] *Id.*

millions of gallons of oil have spilled in Kern County oil fields since 2003.[21] The County has the second highest number of community water systems in California that rely on contaminated groundwater.[22] Residents are forced to rely on contaminated drinking water because the community water systems in Kern County are small and lack the resources to properly treat the groundwater or use another uncontaminated water source.[23]

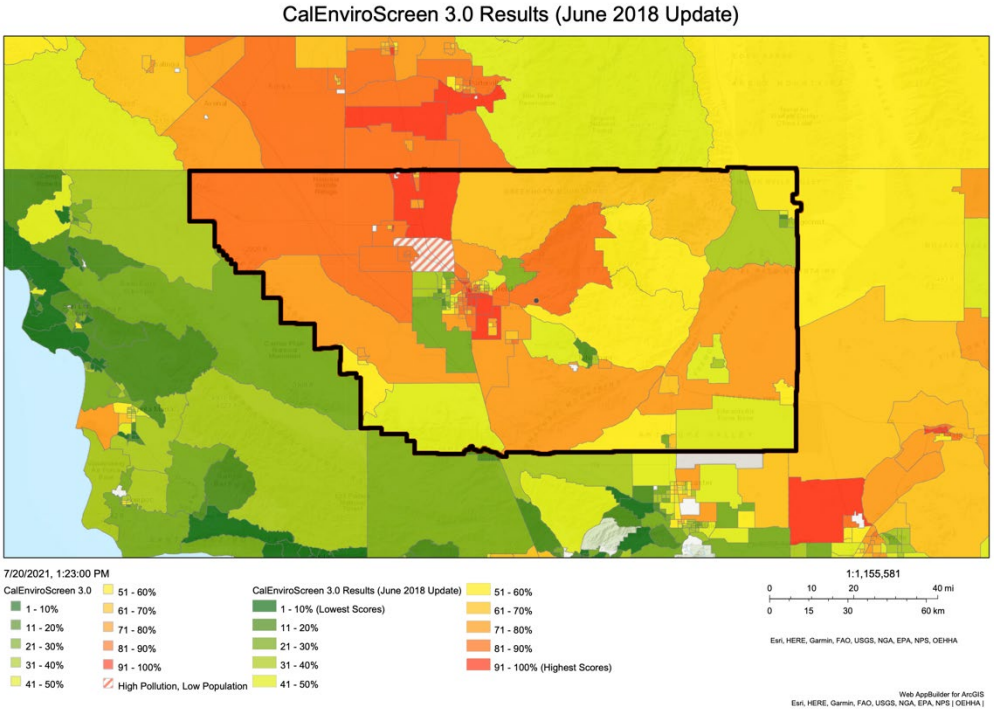
[21] T. Goldberg. (2019). *New Chevron Crude Spills Emerge in Kern County Oil Field*, available at: https://www.kqed.org/news/11780057/new-chevron-crude-spills-emerge-in-kern-county-oil-field (accessed July 20, 2021).
[22] Center for Biological Diversity (CBD). (2020). *Comments on DOI-BLM-CA-C060-2020-08-26 (December 2020, Oil and Gas Lease Sale Environmental Assessment)* at 69.
[23] Cal. DOJ. (2020). *Comments on the December 2020 Oil and Gas Lease Sale Environmental Assessment of BLM's Bakersfield Field Office* at 13; State Water Resources Control Board (SWRCB). (2013). *Report to the Legislature: Communities That Rely on a Contaminated Groundwater Source for Drinking Water*, available at: https://www.waterboards.ca.gov/gama/ab2222/docs/ab2222.pdf (accessed July 20, 2021). *See also* Office of Environmental Health Hazard Assessment (OEHHA). (2017). *Methodology for a Statewide Drinking Water Contaminant Indicator*, available at: https://oehha.ca.gov/media/downloads/calenviroscreen/report/ces3dwmethodology.pdf (accessed July 20, 2021).

As a result of high pollution burdens in vulnerable communities, many parts of Kern County are considered "disadvantaged communities" by the California Office of Environmental Health Hazard Assessment and the California Environmental Protection Agency (CalEPA).[24]

Kern County Disadvantaged Communities

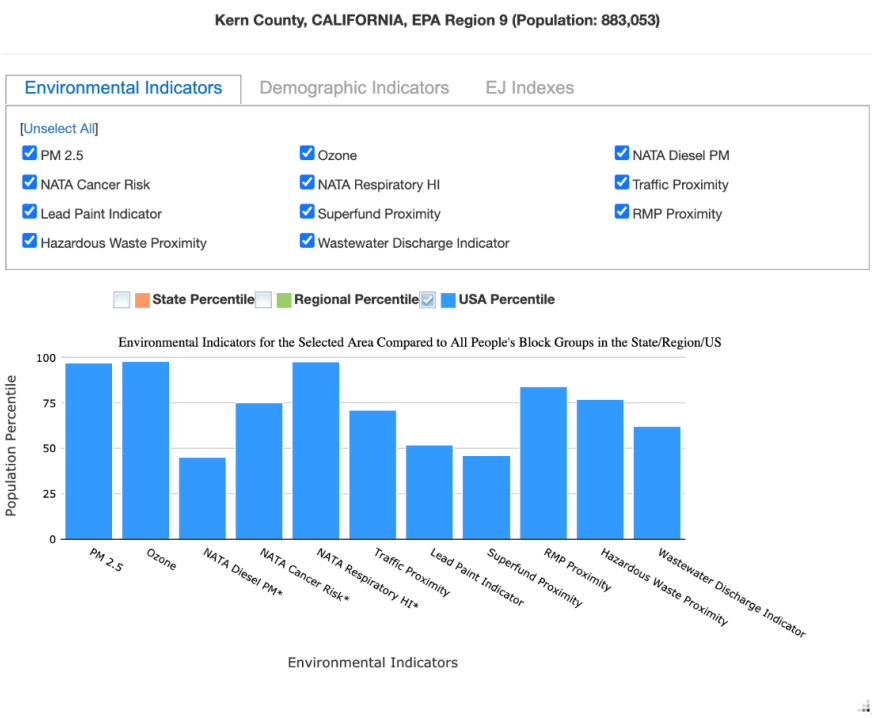



[24] OEHHA. (2018). *Senate Bill (SB) 535 Disadvantaged Communities*, available at: https://oehha.ca.gov/calenviroscreen/sb535 (accessed July 20, 2021); OEHHA. (2018). *SB 535 Disadvantaged Communities* (map), available at: https://oehha.maps.arcgis.com/apps/View/index.html?appid=c3e4e4e1d115468390cf61d9db83efc4 (accessed July 20, 2021); *see also* OEHHA. (2017). *CalEnviroScreen 3.0 Tool*, available at: https://oehha.ca.gov/calenviroscreen (accessed July 20, 2021).




Pollution from industrial agriculture, heavy diesel truck traffic, and intensive oil and gas development in the region have contributed to high rates of public health problems. Data from CalEPA's CalEnviroScreen tool indicates that communities in California's Central Valley are statistically the "most affected by pollution" in the state, meaning they experience the most asthma emergency room visits, heart attacks, and low birth-weight infants.[25] The EPA's National-Scale Air Toxics Assessment indicates that the respiratory hazard index in Kern County is higher than 95 percent of the nation and the cancer risk is higher than 75 percent of the nation.[26]

[25] OEHHA. (2017). *CalEnviroScreen 3.0 Tool*.
[26] EPA. (2020). *EJSCREEN Report: Kern County, California EPA Region 9*.

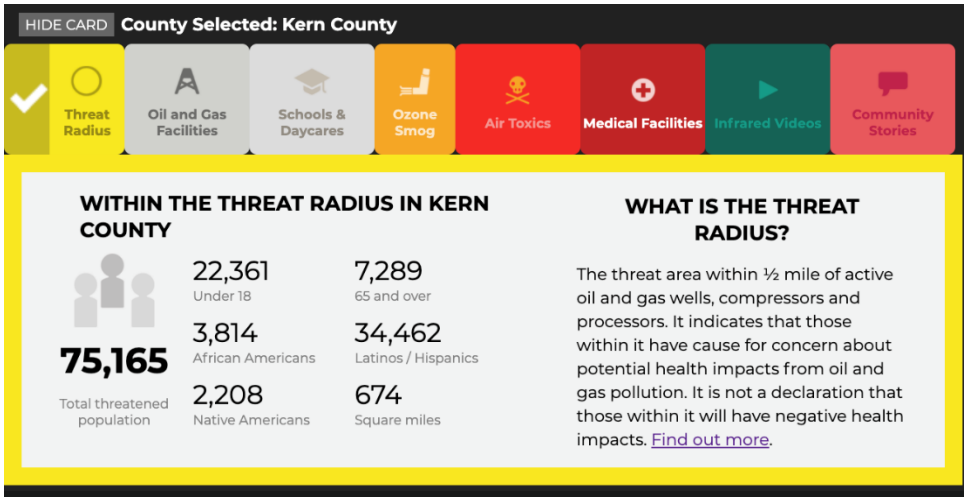



Kern County's community characteristics and existing environmental burdens warrant thorough consideration of potential "disproportionately high and adverse human health or environmental effects" associated with permitting new wells in the County.[27] Yet despite acknowledging in its 2012 EIS and 2019 Supplemental Environmental Impact Statement (SEIS) for the Bakersfield Field Office planning area that "Kern County qualifies as an environmental justice population area," BLM has seemingly ignored the potential environmental justice impacts in any prior environmental review for the oil and gas extraction it authorizes on public land.[28]

[27] Exec. Order No. 12898, 59 C.F.R. 32 (1994).
[28] BLM. (2012). *Bakersfield Field Office, Proposed Resource Management Plan & Final Environmental Impact Statement* at 388.

### C. Oil and gas drilling exacerbates public health harms to environmental justice communities in Kern County.

Kern County is home to more than 70 percent of California's oil and gas wells, and 35 percent of the population lives within one mile of an oil or gas well.[29] Over 75,000 people, or nearly 8 percent of residents, live within roughly a half-mile of oil and gas wells,[30] and one-third of the County's wells are within the same distance of schools and hospitals.[31] Overall, approximately 25 percent of oil and gas wells in Kern County are located in low-income communities.[32] As discussed further below, the sheer density of oil and gas activity in the region has serious public health and safety impacts, however, even a *single* well drilled near communities has been found to adversely affect health.[33]




Oil and gas drilling exacerbates environmental conditions, so approving more wells will intensify the already severe public health crisis in Kern County communities in myriad

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[29] T. Srebotnjak & M. Rotkin-Ellman, Natural Resources Defense Council (NRDC). (2014). *Drilling in California: Who's at Risk?*, available at: https://www.nrdc.org/resources/drilling-california-whos-risk (accessed July 20, 2021); *see also* Earthjustice. (2021). *In the Shadow of Big Oil: Neighborhood Drilling in California*, available at: https://earthjustice.org/features/buffer-zones-oil-drilling-california-neighborhoods (accessed July 20, 2021).

[30] The Oil & Gas Threat Map. (2021). *Oil & Gas Threat Map 2.0*, available at: https://oilandgasthreatmap.com/threat-map/ (accessed July 20, 2021).

[31] K. Ferrar. (2020). *California Setback Analyses Summary*, FracTracker Alliance, available at: https://www.fractracker.org/2020/04/california-setback-analysis-summary/ (accessed July 20, 2021).

[32] *Id.*

[33] *See, e.g.*, E. L. Hill. (2018). *Shale Gas Development and Infant Health: Evidence from Pennsylvania*, available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6629042/ (accessed July 20, 2021).

ways. Studies link oil and gas operations to higher rates of cancer, adverse birth outcomes, respiratory illnesses, cardiovascular problems, and other negative health consequences.[34]

### 1. Respiratory Illnesses

According to the American Lung Association, "[i]f you live in Kern County, the air you breathe may put your health at risk."[35]

Oil and gas operations increase rates of respiratory illnesses by worsening air quality conditions. In Kern County, oil and gas drilling is expected to make up a large share of all air pollution emitted within the County by 2035, including 40 percent of all fine particulate matter ($PM_{2.5}$) emissions County-wide, 70 percent of all nitrogen oxide emissions County-wide, and 97 percent of all sulfur dioxide emissions County-wide.[36] A study conducted in Kern County found significant concentrations of volatile organic compounds (VOCs) and other toxic pollutants near oil and gas operations.[37] Another recent study published in California assessed data from the U.S. EPA Air Quality System from 2006 to 2019 and documented higher concentrations of air pollutants including $PM_{2.5}$, nitrogen dioxide ($NO_2$), VOCs, and ozone ($O_3$) as far away as 4 kilometers (13,123 feet) from well sites.[38]

These pollutants are common at oil and gas sites and pose serious health and safety dangers to nearby communities. For example, $PM_{2.5}$ is one of six "criteria" air pollutants regulated by EPA and causes some of the most alarming adverse health effects, including cardiovascular and respiratory hospitalizations, irregular heartbeat, decreased lung function, and

[34] Environmental Defense Fund (EDF). (2017). *Filling the Void: The Value of New Technology to Reduce Air Pollution and Improve Information at Oil and Gas Sites in California* at 13, available at: https://www.edf.org/sites/default/files/california-monitoring_filling-the-void.pdf (accessed July 20, 2021).
[35] ALA. (2021). *State of the Air Report Card: Kern County*, available at: https://www.lung.org/research/sota/city-rankings/states/california/kern (accessed July 20, 2021).
[36] Kern County Planning & Community Development Department. (2015). *Environmental Impact Report for Revisions to the Kern County Zoning Ordinance*, available at: https://kernplanning.com/environmental-doc/environmental-impact-report-revisions-kern-county-zoning-ordinance-2015-c-focused-oil-gas-local-permitting/ (accessed July 20, 2021).
[37] J. Arbelaez & B. Baizel. (2015). *Californians at Risk: An Analysis of Health Threats from Oil and Gas Pollution in Two Communities*, available at: https://www.cleanwaterfund.org/sites/default/files/docs/publications/CaliforniansAtRiskFINAL.pdf (accessed July 20, 2021).
[38] D.J. Gonzalez et al. (2021). *Upstream Oil and Gas Production and Ambient Air Pollution in California*, available at: https://doi.org/10.1016/j.scitotenv.2021.150298 (accessed Mar. 17, 2022).

premature death.[39] Ozone can inflame and damage the airways, increase susceptibility to lung infection, and aggravate lung diseases like emphysema and chronic bronchitis.[40] In fact, a scientific advisory panel of public health experts recently convened by the state of California to guide development of its new public health and safety regulations for oil and gas operations concluded "with a high level of certainty that concentrations of health-damaging air pollutants, including criteria air pollutants and toxic air contaminants, are more concentrated near [oil and gas development] activities compared to further away."[41] The panel further noted that oil and gas development is "responsible for the majority of emissions of multiple toxic air contaminants including acetaldehyde, benzene, formaldehyde, hexane and hydrogen sulfide" in the already overburdened San Joaquin Valley.[42]

These emissions from active oil and gas wells are also known to cause and worsen asthma.[43] One California study found that physician-diagnosed asthma rates were elevated in communities close to drilling operations.[44] Another study indicates that populations residing in close proximity to oil and gas activity have almost four times the risk of asthma exacerbation than those that do not.[45] In Kern County, nearly 70,000 residents (almost eight percent of the

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[39] U.S. EPA, *NAAQS Table*, available at: https://www.epa.gov/criteria-air-pollutants/naaqs-table (accessed Mar. 17, 2022); Cal. Air Resources Board, *Overview: Diesel Exhaust & Health*, available at: https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health (accessed Mar. 17, 2022); U.S. EPA, *Health and Environmental Effects of Particulate Matter (PM)*, available at: https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm (accessed Mar. 17, 2022).

[40] U.S. EPA, *Health Effects of Ozone Pollution*, available at: https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution (accessed Mar. 17, 2022).

[41] Letter from Cal. Oil & Gas Public Health Rulemaking Scientific Advisory Panel. (2021). *Response to CalGEM Questions* at 11, available at: https://www.conservation.ca.gov/calgem/Documents/public-health/Public%20Health%20Panel%20Responses_FINAL%20ADA.pdf (accessed Mar. 17, 2022).

[42] *Id.* at 10.

[43] B. Shamasunder et al. (2018). *Community-Based Health and Exposure Study Around Urban Oil Developments in South Los Angeles*, available at: https://doi.org/10.3390/ijerph15010138 (accessed July 20, 2021); L. Peng et al. (2018). *The Health Implications of Unconventional Natural Gas Development in Pennsylvania*, available at: https://doi.org/10.1002/hec.3649 (accessed July 20, 2021); M.D. Willis et al. (2018). *Unconventional Natural Gas Development and Pediatric Asthma Hospitalizations in Pennsylvania*, available at: https://doi.org/10.1016/j.envres.2018.06.022 (accessed July 20, 2021); S.G. Rasmussen et al. (2016). *Association Between Unconventional Natural Gas Development in the Marcellus Shale and Asthma Exacerbations*, available at: https://doi.org/10.1001/jamainternmed.2016.2436 (accessed July 20, 2021).

[44] B. Shamasunder et al. (2018). *Community-Based Health and Exposure Study around Urban Oil Developments in South Los Angeles*.

[45] S.G. Rasmussen et al. (2016). *Association Between Unconventional Natural Gas Development in the Marcellus Shale and Asthma Exacerbations*.

population) have asthma, and rates of childhood asthma are three times higher than the state average.[46]

Recent studies have also identified deserted, unplugged wells as "super-emitting" sources of methane and hydrogen sulfide.[47] There are over 35,000 idle wells in California, and roughly 350,000 Californians live within 600 feet of an unplugged well.[48] In Kern County alone, there are over 18,800 idle wells—more than half of the total number of idle wells in the state.[49] Methane contributes to ground-level ozone pollution, also known as smog, which can cause a number of health effects including asthma, various respiratory and cardiovascular diseases, and premature death.[50] At low levels, hydrogen sulfide gas can cause difficulty breathing, headaches, poor memory, tiredness, loss of balance, and eye, nose, or throat irritation.[51] Higher exposure levels may lead to respiratory distress, loss of consciousness, or even death.[52]

### 2. Cancer

The air pollution emitted by oil and gas development is also linked to higher rates of cancer. The EPA's National Air Toxics Assessment found that populations living near oil and gas sites may surpass U.S. EPA's Level of Concern for developing cancer, with those living

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[46] ALA. (2021). *State of the Air Report Card: Kern County*; Earthjustice. (2021). *In the Shadow of Big Oil: Neighborhood Drilling in California*.

[47] J. Sullivan. (2014). *Abandoned Wells Can Be 'Super-Emitters' of Greenhouse Gas*, available at: https://www.princeton.edu/news/2014/12/09/abandoned-wells-can-be-super-emitters-greenhouse-gas (accessed July 20, 2021); M. Pianko. (2020). *California Lagged in Capping Century-old Oil Wells Leaking Under Homes of LA Residents Plagued by Illness and Odors*, available at: https://www.desmogblog.com/2020/02/13/los-angeles-vista-hermosa-cap-orphan-oil-wells-leaking-doggr (accessed July 20, 2021); M. Kang et al. (2016). *Identification and Characterization of High Methane-Emitting Abandoned Oil and Gas Wells*, available at: https://www.pnas.org/content/pnas/113/48/13636.full.pdf (accessed July 20, 2021).

[48] M. Olalde & R. Menezes. (2020). *California's Multibillion-dollar Problem: The Toxic Legacy of Old Oil Wells*, available at: https://publicintegrity.org/environment/wells-run-dry/californias-multibillion-dollar-problem-the-toxic-legacy-of-old-oil-wells/ (accessed July 20, 2021).

[49] FracTracker Alliance. (2019). *Kern County: Oil and Gas Activities by the Numbers*, available at: https://www.fractracker.org/a5ej20sjfwe/wp-content/uploads/2019/07/Kern-County-Active-Oil-and-Gas-Wells-Table_5_28_19_CTquestions_KFedits.pdf (accessed July 20, 2021).

[50] Air & Waste Management Assn. (2012). *Air Pollution Issues Associated* at fn. 3-4, available at: https://www.edf.org/sites/default/files/AWMA-EM-airPollutionFromOilAndGas.pdf (accessed Mar. 17, 2022); U.S. EPA, *Health Effects of Ozone in the General Population*, available at: https://www.epa.gov/ozone-pollution-and-your-patients-health/health-effects-ozone-general-population (accessed Mar. 17, 2022).

[51] Agency for Toxic Substances & Disease. (2016). *Public Health Statement for Hydrogen Sulfide*, available at: https://www.atsdr.cdc.gov/ToxProfiles/tp114-c1-b.pdf (accessed Mar. 17, 2022).

[52] *Id.*; New Jersey Dept. of Health. (2016). *Right to Know: Hazardous Substance Fact Sheet* at 1-2, available at: https://www.nj.gov/health/eoh/rtkweb/documents/fs/1017.pdf (accessed Mar. 17, 2022).

closer than a half mile facing an especially critical threat.[53] One 2018 study found an association between cancer rates and living near oil and gas wells.[54] It concluded that oil and gas development can expose a large population to known hematologic carcinogens.[55]

Studies also show that oil and gas operations contaminate groundwater through the common practice of disposing wastewater in unlined pits, which are prone to leaking.[56] The contaminants, which include arsenic, uranium and other naturally occurring toxic elements and make their way into water used for human consumption and agricultural crop irrigation, have been shown to include potentially carcinogenic chemicals.[57] Indeed, a recent study from the Central Valley Regional Water Quality Control Board on the impacts of irrigating crops with produced water in Kern County could not answer fundamental safety questions about whether produced water posed no identifiable health risks based on the available data.[58]

### 3. Adverse Birth Outcomes

Several important studies analyzing the effects of oil and gas drilling—specifically in California—have found a significant association between nearby oil and gas production and adverse birth outcomes.

A recent study conducted by researchers at the University of California, Berkeley, determined that prenatal exposure to active oil and gas production from both conventional and unconventional wells in California was associated with low birth weight and small gestational

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[53] EDF. (2017). *Filling the Void: The Value of New Technology to Reduce Air Pollution and Improve Information at Oil and Gas Sites in California* at 13; EPA. (2020). *National Air Toxics Assessment FAQs*, available at: https://www.epa.gov/national-air-toxics-assessment/nata-frequent-questions (accessed July 20, 2021).

[54] L.M. McKenzie et al. (2017). *Childhood Hematologic Cancer and Residential Proximity to Oil and Gas Development*, available at: https://doi.org/10.1371/journal.pone.0170423 (accessed July 20, 2021).

[55] *Id.*

[56] EPA. (2016). *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States* (EPA-600-R-16-236ES), available at: https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=332990 (accessed July 20, 2021).

[57] S.B.C. Shonkoff et al. (2016). *Hazard Assessment of Chemical Additives Used in Oil Fields that Reuse Produced Water for Agricultural Irrigation, Livestock Watering, and Groundwater Recharge in the San Joaquin Valley of California: Preliminary Results* at 9, available at: https://www.psehealthyenergy.org/wp-content/uploads/2017/04/Preliminary_Results_13267_Disclosures_FINAL-1.pdf (accessed July 20, 2021).

[58] L. Gross. (2022). *A California Water Board Assures the Public that Oil Wastewater Is Safe for Irrigation, But Experts Say the Evidence Is Scant, Inside Climate News*, available at: https://insideclimatenews.org/news/06022022/a-california-water-board-assures-the-public-that-oil-wastewater-is-safe-for-irrigation-but-experts-say-the-evidence-is-scant/ (accessed Feb. 25, 2022).

age.[59] The study relied in part on analysis of births in the San Joaquin Valley Air Basin, which encompasses part of Kern County, and it found a strong association between exposure to wells and adverse birth outcomes in rural areas of the state.[60] It found that mothers exposed to oil and gas production during pregnancy were 1.4 times more likely than unexposed mothers to have low-weight births and 1.22 times more likely to have a small gestational age birth.[61] The study also determined that pregnancy exposure was associated with decreases in term birth weight of 36 grams on average.[62]

Another recent study found that living near oil and gas operations may increase the risk of preterm births.[63] Stanford researchers examined 225,000 births from mothers in the San Joaquin Valley who lived within about six miles of oil and gas wells.[64] They found that women who lived near wells during pregnancy were 8 to 14 percent more likely to experience a spontaneous preterm birth, which is the leading cause of infant death in the United States.[65]

One study found that even a single well drilled within 2.5 kilometers (8,200 feet) of a maternal residence was associated with adverse birth outcomes.[66]

These findings reveal a major threat in California, especially as more than a million babies were born in California between 2006 and 2015 to mothers who live within one kilometer (roughly 3,000 feet) of an oil or gas well.[67]

#### 4. Recurring Symptoms

As discussed above, drilling for oil and gas emits ozone, chemicals, and fine particulate matter, and even abandoned wells emit methane and other toxic air pollutants. Scientific studies have linked these emissions to acute recurring symptoms in nearby residents, including headaches, fatigue, burning eyes and throats, nausea, and nosebleeds.[68]

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[59] K.V. Tran et al. (2020). *Residential Proximity to Oil and Gas Development and Birth Outcomes in California: A Retrospective Cohort Study of 2006–2015 Births*, available at: https://ehp.niehs.nih.gov/doi/full/10.1289/EHP5842 (accessed July 20, 2021).
[60] *Id.*
[61] *Id.*
[62] *Id.*
[63] D.J. Gonzalez et al. (2020). *Oil and Gas Production and Spontaneous Preterm Birth in the San Joaquin Valley, CA: A Case-Control Study*, available at: https://journals.lww.com/environepidem/Fulltext/2020/08000/Oil_and_gas_production_and_spontaneous_preterm.1.aspx?context=LatestArticles (accessed July 20, 2021).
[64] *Id.*
[65] D.T. Tucker. (2020). *Living Near Oil and Gas Wells May Increase Preterm Birth Risk, According to Stanford Research*, available at: https://news.stanford.edu/2020/06/09/living-near-oil-gas-wells-may-increase-preterm-birth-risk/ (accessed July 20, 2021).
[66] E.L. Hill. (2018). *Shale Gas Development and Infant Health: Evidence from Pennsylvania*.
[67] Earthjustice. (2021). *In the Shadow of Big Oil: Neighborhood Drilling in California*.
[68] Liberty Hill Foundation. (2015). *Drilling Down: The Community Consequences of Expanded*

Studies also show that unlined pits used to store wastewater from oil and gas development release noxious odors and may cause nausea and headaches.[69]

In California, community members living near oil and gas wells report that these symptoms are a constant part of their lives and that they are "conditioned to think [it] is normal."[70] One resident who has been experiencing severe nosebleeds since age nine described getting nosebleeds at night and having to "sleep upright in a chair to stop from choking on [her] own blood."[71] According to another resident, "[t]he oil wells are hidden, but everybody seems to feel [their impacts]."[72]

### 5. Mental Health

Being surrounded by oil and gas wells also takes a heavy toll on residents' mental and emotional health. Scientific studies have documented the loud and disruptive nature of noise produced by upstream oil and gas development activities, as well as its unhealthy effects.[73] One study found that residents living near oil and gas operations experience disturbances to their sleep from these noise levels, since oil and gas activity occurs at all times of day and night.[74]

Studies also link oil and gas development to increased mental health problems. One study found depression symptoms and sleep disorders are higher near oil and gas operations.[75] Another

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*Oil Development in L.A.*, available at: https://www.libertyhill.org/news/reports/urban-oil-drilling-report (accessed July 20, 2021); Los Angeles County Department of Public Health. (2018). *Public Health and Safety Risks of Oil and Gas Facilities in Los Angeles County*, available at: http://publichealth.lacounty.gov/eh/docs/ph_oilgasfacilitiesphsafetyrisks.pdf (accessed July 20, 2021); N. Steinzor et al. (2013). *Investigating Links Between Shale Gas Development and Health Impacts Through a Community Survey Project in Pennsylvania*, available at: https://pubmed.ncbi.nlm.nih.gov/23552648/ (accessed July 20, 2021).

[69] D. Hasemyer. (2014). *Hazards of Open Pits for Storing Wastewater from Fracking is Focus of New Study*, available at: https://insideclimatenews.org/news/20112014/hazards-open-pits-storing-wastewater-fracking-focus-new-study/ (accessed July 20, 2021).

[70] Earthjustice. (2021). *In the Shadow of Big Oil: Neighborhood Drilling in California*.

[71] *Id.*

[72] *Id.*

[73] M. Basner et al. (2014). *Auditory and Non-Auditory Effects of Noise on Health*, available at: http://dx.doi.org/10.1016/S0140-6736(13)61613-X (accessed July 20, 2021).

[74] J. Hays et al. (2017). *Public Health Implications of Environmental Noise Associated with Unconventional Oil and Gas Development*, available at: https://www.sciencedirect.com/science/article/abs/pii/S0048969716325724 (accessed July 20, 2021).

[75] J.A. Casey et al. (2018). *Associations of Unconventional Natural Gas Development with Depression Symptoms and Disordered Sleep in Pennsylvania*, available at: https://doi.org/10.1038/s41598-018-29747-2 (accessed July 20, 2021).

study found that stress and anxiety are among the most commonly reported symptoms in communities near wells.[76]

California residents experience life disruptions such as forced long-term evacuations due to leaky oil wells and even explosions from idle wells in their neighborhoods.[77] Many residents express deep concern about their health and the health of their loved ones.[78] One Kern County resident, Saul Martinez, described the hardship of living near oil and gas operations on windy days especially. One of his daughters cannot leave the house on many days due to her asthma.[79] In a video produced by Earthworks, Mr. Martinez pleaded with the state and federal government to think of the health of his family and his community, which they have neglected to do thus far.[80]

Many of these health problems already plague environmental justice communities in Kern County—approving more oil and gas wells will exacerbate the public health crisis in the area.

These negative impacts of oil and gas development fall primarily on people of color. In Kern County, a significant majority (76 percent) of the people living near wells and suffering negative health impacts are people of color.[81] In contrast, the people in Kern County that live further from oil and gas wells are majority white (49 percent) and are less impacted by environmental pollution.[82] This is a stark example of environmental injustice in Kern County. BLM must fulfill NEPA's requirement to consider environmental justice impacts by addressing this disparity in its site-specific environmental review, since it has failed to do so in previous stages of its oil and gas management process or its planning documents.

### D. BLM must adequately address the environmental justice impacts of approving new APDs in Kern County.

Agencies may tier environmental analysis between different project stages under NEPA only "when it would eliminate repetitive discussions of the same issues, focus on the actual issues ripe for decision, and exclude from consideration issues already decided or not yet ripe at each level of environmental review." 40 C.F.R. § 1501.11(a). Thus, if an issue has not been

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[76] B. Weinberger et al. (2017). *Health Symptoms in Residents Living Near Shale Gas Activity: A Retrospective Record Review from the Environmental Health Project*, available at: https://doi.org/10.1016/j.pmedr.2017.09.002 (accessed July 20, 2021).
[77] Earthjustice. (2021). *In the Shadow of Big Oil: Neighborhood Drilling in California*; M. Olalde & R. Menezes. (2020). *California's Multibillion-dollar Problem: The Toxic Legacy Of Old Oil Wells*.
[78] Earthworks. (2016). *Saul Martinez, Kern County, CA* (video), available at: https://www.youtube.com/watch?v=VsTp724GDmM&t=3s&ab_channel=Earthworks (accessed July 20, 2021).
[79] *Id.*
[80] *Id.*
[81] T. Srebotnjak & M. Rotkin-Ellman, NRDC. (2014). *Drilling in California: Who's at Risk?*.
[82] *Id.*

discussed in a prior planning document, it must be addressed at the project-specific stage. *See, e.g.*, *Diné Citizens Against Ruining Our Env't v. Bernhardt*, 923 F.3d 831, 851 (10th Cir. 2019), reh'g denied (June 24, 2019) ("[I]f the 'relevant analysis in the [prior EIS] is not sufficiently comprehensive or adequate . . . the [site-specific EA] must explain this and provide any necessary analysis.'"); *see also Cal. Native Plant Soc'y v. U.S. E.P.A.,* No. C06-03604 MJJ, 2007 WL 2021796, at *17 (N.D. Cal. July 10, 2007) (holding that "EAs could not be saved by tiering to an EIS that likewise failed to analyze the specific impacts").

Here, BLM must conduct an environmental justice analysis that grapples with the community impacts discussed above because it has not done so at any prior stage of the NEPA process. BLM must complete this analysis to fulfill NEPA's mandate and to ensure awareness of the potential conflicts with state policy on fossil fuels and public health protections in vulnerable communities.

First, BLM must take a hard look at whether the already overburdened communities in the planning area face increased public health and safety risks from additional oil and gas development. The 2014 Resource Management Plan (2014 RMP) and FEIS for the Bakersfield Field Office planning area omitted any analysis of these impacts on local environmental justice communities, as did the 2019 SEIS. Both documents claimed that a comprehensive environmental justice analysis would be conducted at the later site-specific stage. Likewise, in the December 2020 Bakersfield lease sale EA, BLM claimed that environmental justice impacts "would be considered and mitigated as needed on a project basis at the development application stage."[83] Now at the APD stage, and the last step in the process for approving new oil and gas wells, BLM cannot continue to defer environmental justice analysis. *See* 40 C.F.R. § 1501.11; *Diné Citizens Against Ruining Our Env't*, 923 F.3d at 851. In order to comply with NEPA, BLM must conduct a thorough analysis of all the environmental justice impacts that Kern County communities will face if new oil and gas wells are approved. *Bernhardt*, 472 F. Supp. 3d at 620.

Second, BLM must employ a level of analysis that accurately captures meaningful information on environmental justice impacts. In the past, BLM has occasionally analyzed environmental justice impacts at the census tract level.[84] But census tract-level analysis obscures meaningful examination of oil and gas impacts in Kern County, because in many areas it is sparsely populated and rural.[85] Census tracts in Kern County are often drawn to separate urban areas from industrial and agricultural areas where oil and gas wells tend to be located. This creates abnormally shaped census tracts, "where communities in much smaller census tracts (by area) are enveloped by large rural census tracts containing oil fields."[86] For instance, the Shafter

[83] BLM Bakersfield Field Office. (2020). *Competitive Oil and Gas Lease Sale Final EA* at 39.
[84] *See, e.g. id.* at 31.
[85] *See* K. Ferrar. (2020). *People and Production: Reducing Risk in California Extraction*, FracTracker Alliance, available at: https://www.fractracker.org/2020/12/people-and-production/#toggle-id-2 (accessed July 20, 2021).
[86] K. Ferrar. (2020). *Recommendations for an EIR to Prioritize Kern County Frontline Community – Addendum*, FracTracker Alliance, available at: https://www.fractracker.org/2020/09/kern-eir-ej/ (accessed July 20, 2021).

area is located near more than 100 operational wells in the North Shafter oil field.[87] However, most of this area's population is located in an urbanized area located within one census tract, while the wells are located in a separate but adjacent census tract in the surrounding agricultural area.[88] In other words, many Shafter residents live in close physical proximity to oil and gas wells even though their residences and the wells are in different census tracts. This demonstrates the ineffectiveness of census tract-level analysis for communities in Kern County.[89]

Thus, to accurately analyze environmental justice impacts in specific Kern County communities, BLM should use a more granular level of analysis than census tract-level analysis. For example, it could analyze data on the number and demographics of residents living within at least 2,500 feet of a well.[90] Researchers have compiled this data for several frontline communities in Kern County in a report that provides recommendations for prioritizing these environmental justice communities in County planning decisions.[91] This data and level of analysis is essential to accurately disclosing and assessing the increased risk of new oil and gas wells to affected communities, as required by NEPA.

At the same time BLM must analyze the fence line impacts from new oil and gas wells, it also must analyze the cumulative burden of oil and gas development in Kern County more broadly, including the cumulative air quality, water quality, and public health risks, recognizing that new oil and gas development will impact already overburdened environmental justice communities beyond the immediate fence line. Under NEPA, BLM is required to take a hard look at *all* environmental justice impacts, regardless of physical distance between the location of the wells it approves and the communities impacted. *See Vecinos Para El Bienestar De La Comunidad Costera v. Federal Energy Regulatory Commission*, No. 20-1045, 2021 WL 3354747, at *5 (D.C. Cir. Aug. 3, 2021) (holding that the lead agency's "decision to analyze the projects' impacts on environmental justice communities only in census blocks within two miles of the project sites was arbitrary, given its determination that environmental effects from the projects would extend well beyond two miles from the project sites"). Thus, BLM must assess the cumulative burdens of new oil and gas wells on environmental justice communities across Kern County, where most production is already concentrated, not just in communities immediately adjacent to new wells in the same census tracts.

Third, in approving new APDs, BLM must assess whether its actions conflict with statewide policies to phase out oil and gas production and protect vulnerable communities in California. Under NEPA, an agency must include a discussion of "[p]ossible conflicts between the proposed action and the objectives of" state plans and policies in an EIS.[92] The EIS must also

[87] K. Ferrar. (2020). *People and Production: Reducing Risk in California Extraction*.
[88] *Id.*
[89] CBD et al. (2020). *Supplemental Comments on the Draft Supplemental Recirculated Environmental Impact Report for Revisions to Title 19-Kern County Zoning Ordinance* at 2-3.
[90] K. Ferrar. (2020). *Recommendations for an EIR to Prioritize Kern County Frontline Community – Addendum*.
[91] *Id.*
[92] 40 C.F.R. § 1502.16(a)(5).

"discuss any inconsistency of a proposed action with any approved State, Tribal, or local plan or law."[93]

California has enacted several statutes to protect its disadvantaged communities from air and water pollution. Approving new oil and gas wells on federal lands would have a significant adverse impact on the state's ability to meet these goals. California State Assembly Bill 617 (2017) created a Community Air Protection Program that is focused on reducing exposure in communities most impacted by air pollution.[94] The program focuses primarily on reducing emissions and increasing air quality monitoring in environmental justice communities like Kern County, starting with the ten most burdened communities.[95]

In addition, the state of California recently proposed statewide public health and safety regulations prohibiting new wells and facilities within a 3,200-foot physical setback area from all homes, schools, hospitals, and other sensitive locations, and requiring pollution controls for existing wells and facilities.[96] The state's scientific advisory panel of public health experts concluded "with a high level of certainty" that there is a causal relationship between close geographic proximity to oil and gas operations and adverse health outcomes based on a review of the epidemiological evidence.[97] As a result, the panel further recommended the complete cessation of new drilling and phase out of existing oil and gas activity in the state as "the most health protective strategy."[98]

BLM has not yet sufficiently analyzed the conflicts with such California state plans and policies posed by new oil and gas development in Kern County. Under NEPA, it must now assess how approving additional APDs will infringe on the state's ability to meet its community protection and emissions reduction goals.

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[93] *Id*. § 1506.2(d).
[94] Governor Gavin Newsom. (2020). *Executive Order N-79-20*, available at: https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf (accessed February 2, 2022).
[95] California Air Resources Board (CARB). (2018). *Community Air Protection Blueprint*, available at: https://ww2.arb.ca.gov/sites/default/files/2018-10/final_community_air_protection_blueprint_october_2018.pdf (accessed July 20, 2021); CARB. (2018). *Community Air Protection Program, 2018 Community Recommendations Staff Report* at 7, available at: https://ww2.arb.ca.gov/sites/default/files/2020-05/2018_community_recommendations_staff_report_revised_september_11_acc.pdf (accessed July 20, 2021).
[96] Dept. of Conservation, Geologic Energy Management Div. (2021). *Draft Rule for Protection of Communities and Workers from Health and Safety Impacts from Oil and Gas Production Operations, Pre-Rulemaking Release*, available at: https://www.conservation.ca.gov/calgem/Documents/public-health/PHRM%20Draft%20Rule.pdf (accessed Mar. 17, 2022).
[97] Letter from Cal. Oil & Gas Public Health Rulemaking Scientific Advisory Panel. (2021). *Response to CalGEM Questions* at 4.
[98] *Id.* at 12-13.

### E. Hard look review requires BLM to consider the cumulative environmental justice impacts of each new well.

Under NEPA, BLM must adequately assess all significant environmental justice impacts of each new oil well it approves. 40 C.F.R. 1502.1; *Bernhardt*, 472 F. Supp. 3d at 620. This requires assessing the cumulative impacts of new wells in Kern County communities.

Although the Trump Administration's 2020 revisions to the Council on Environmental Quality (CEQ) guidelines eliminated the express mandate to consider cumulative impacts, the CEQ has restored the requirement for a cumulative impacts analysis as an essential component of NEPA review, effective May 20, 2022.[99] In addition, the current regulations still require agencies to take a hard look at all potential effects of a project that "are reasonably foreseeable and have a reasonably close causal relationship to the proposed action or alternatives." 40 C.F.R. 1508.1(g); *Marsh*, 490 U.S. at 374.

Taking the requisite "hard look" at all significant environmental justice impacts inherently requires an analysis of cumulative impacts. Communities are designated as environmental justice communities precisely because of the cumulative nature of the environmental impacts they endure. New environmental impacts on already overburdened communities intensify the adverse environmental justice impacts of seemingly discrete projects, such as approving even a single new APD. As CalEPA explained in the 2021 CalEnviroScreen 4.0 report:

> Many factors, often referred to as stressors, contribute to a community's pollution burden and vulnerability. . . . In reality, people are simultaneously exposed to multiple contaminants from multiple sources and also have multiple stressors based on their health status as well as living conditions. Thus, the resulting cumulative health risk is influenced by nonchemical factors such as socioeconomic and health status of the people living in a community.[100]

Reflecting this reality, CalEPA has adopted the following definition of cumulative impacts:

> Cumulative impacts means exposures, public health or environmental effects from the combined emissions and discharges, in a geographic area, including environmental pollution from all sources, whether single or multi-media, routinely, accidentally, or otherwise released. Impacts will take into account sensitive populations and socioeconomic factors, where applicable and to the extent data are available.[101]

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[99] 87 Fed. Reg. 23,453 (Apr. 20, 2022).
[100] OEHHA. (2021). *CalEnviroScreen 4.0 Report* at 9.
[101] CalEPA. (2010). *Cumulative Impacts: Building a Scientific Foundation*, available at: https://oehha.ca.gov/media/downloads/calenviroscreen/report/cireport123110.pdf (accessed July 20, 2021).

Cumulative impacts are a particular concern for communities in Kern County because they are already overburdened by environmental pollution and other stressors and therefore are particularly susceptible to adverse health consequences. Indeed, Kern County is already "the epicenter of extraction in California, with over 70 [percent] of the state's oil and gas wells."[102] Therefore, to conduct an adequate environmental justice analysis and satisfy NEPA, BLM must consider how each new well will exacerbate the cumulative existing burdens on these environmental justice communities that were discussed above.

### F. BLM must consider feasible mitigation measures for environmental justice impacts.

Under NEPA, BLM must discuss project alternatives that include appropriate mitigation strategies to offset the environmental justice impacts of approving new APDs in Kern County. 40 C.F.R. 1502.14(e); *Methow Valley Citizens Council*, 490 U.S. at 351.

First, BLM must consider measures to ensure that environmental justice communities can be "meaningfully involve[d]" in the NEPA process. Current barriers to achieving this procedural prong of environmental justice in Kern County communities can be mitigated in a variety of ways, including by:

- Providing advance notice and adequate time for communities to access and review and comment on all relevant information, including the EAs for the APDs, before issuing APDs;

- Translating all documents into Spanish and making them readily available in the affected communities, since many of these communities are significantly comprised of monolingual Spanish-speaking households;

- Engaging with community-based organizations that work directly with residents in advance of decisionmaking deadlines so that residents are properly informed of their options for submitting comments;

- Coordinating with community leaders to schedule all public meetings and comment periods, for example, during weeknights or weekends when community members are more likely available to attend, and at locations accessible to impacted populations, and offering Spanish interpreters at these meetings;

- Responding thoroughly to public comments; and

- Providing communities with funding and resources that will allow community members to meaningfully engage in the public process.

[102] Earthjustice. (2021). *In the Shadow of Big Oil: Neighborhood Drilling in California*.

Second, BLM must consider methods of substantially improving monitoring and safety controls at oil and gas sites to mitigate the adverse public health impacts of pollution from oil and gas production.

There are several feasible mitigation measures for air pollution from oil and gas production. For example, if BLM identifies any communities in close proximity to proposed oil and gas sites, BLM must immediately implement physical setbacks of at least 3,200 feet, in line with the state of California's recently proposed statewide setback distance to protect the health of the children, families, and vulnerable people most immediately impacted by oil and gas development.[103] Numerous studies link proximity to oil and gas wells to a host of health problems, including increased risk of pre-term births and high-risk pregnancies, asthma and other respiratory illnesses, depression and other adverse mental health outcomes, and some types of cancer. A safe distance between drilling operations and residences, schools, and other sensitive places is necessary to avoid these serious public health and safety risks. The body of peer-reviewed literature that supports instituting a minimum 3,200-foot setback is constantly growing. Importantly, two recent California-specific studies independently analyzed hundreds of thousands of birth records for mothers living in close proximity to oil and gas operations, and found a significant association between nearby oil and gas production and adverse birth outcomes.[104] The establishment of a minimum 3,200-foot setback is particularly necessary to protect people of color and lower income residents.[105]

The state of California's recently proposed oil and gas public health and safety regulations further provide examples of feasible pollution controls BLM should similarly adopt. For example, the proposed regulations require continuous on-site monitoring by operators.[106] Recent studies have concluded that "[a]dditional air monitoring near oil and gas operations is needed" in vulnerable California communities.[107] Real-time, continuous fence line and community air monitoring of air pollutants would help mitigate environmental justice impacts by

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[103] Department of Conservation, Geologic Energy Management Division. (2021). Draft Rule for Protection of Communities and Workers from Health and Safety Impacts from Oil and Gas Production Operations, Pre-Rulemaking Release for Public Review and Consultation, available at: https://www.conservation.ca.gov/calgem/Documents/public-health/PHRM%20Draft%20Rule.pdf (accessed Feb. 4, 2022).

[104] D.J. Gonzalez et al. (2020). *Oil and Gas Production and Spontaneous Preterm Birth in the San Joaquin Valley, CA: A Case-Control Study*; K.V. Tran et al. (2020). *Residential Proximity to Oil and Gas Development and Birth Outcomes in California: A Retrospective Cohort Study of 2006–2015 Births*.

[105] *See* Voices in Solidarity Against Oil in Neighborhoods (VISIÓN). (2020). *Scoping Comments on the California Geologic Energy Management Division's Public Heath Rulemaking*.

[106] *See, e.g.,* Dept. of Conservation, Geologic Energy Management Div. (2021). *Pre-Rulemaking Release* at Cal. Code Regs., tit. 14, § 1766(b)(2) and (c), 1766.3(a)(5).

[107] Clean Water Action/Clean Water Fund. (2014). *In the Pits: Oil and Gas Wastewater Disposal into Open Unlined Pits and the Threat to California's Water and Air* at 9, available at: https://www.cleanwateraction.org/sites/default/files/docs/publications/In%20the%20Pits.pdf (accessed July 20, 2021).

providing sorely needed data on the existing pollution burdens in vulnerable communities.[108] This data would allow state regulators to better understand the impacts of oil and gas development on California communities and, in turn, to better protect environmental justice communities from excessive environmental degradation and extreme health risks.[109] In addition, "empirical evidence from existing monitoring programs shows that monitored facilities are more likely to reduce pollution."[110] Indeed, U.S. EPA is now determining how to "empower communities, regulators, and the public to assist in identifying and stopping large emission events" and considering "technologies that may be used as part of such a community monitoring program" for its newly proposed rule to sharply reduce methane emissions from new and existing oil and gas operations across the country.[111] BLM should thus consider providing public access to monitoring data via an online portal or website, and include objective standards and metrics that community members and the public can use to interpret the data and measure compliance. Any failures to submit data must result in serious consequences that incentivize better reporting and data collection, including notices of violation with automatic penalties or the immediate pause of operations at the well site until the operator catches up and resumes submissions.

Additional air quality mitigation measures would require pollution control and monitoring technologies to be used at oil and gas wells and production facilities, particularly those in close proximity to communities. California's proposed regulations include measures for leak detection and response planning for methane and hydrogen sulfide, which are ubiquitous at well sites.[112] BLM should consider requiring similar leak detection systems and expand their scope to detect other toxic and hazardous air contaminants including $PM_{2.5}$, carbon monoxide, nitrous oxide, ozone, and VOCs such as aromatic (cyclic and polycyclic) hydrocarbons like benzene. Several natural gas storage facilities have either tested or installed similar monitors to detect leaks in real-time, which gives them the ability to respond to emission events as quickly as possible, and mitigate air pollution from leaks that may occur at their sites.[113] Leak detection plans should be updated by operators regularly or whenever substantial changes occur at the well site.

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[108] EDF. (2017). *Filling the Void: The Value of New Technology to Reduce Air Pollution and Improve Information at Oil and Gas Sites in California* at 27.
[109] *See* Clean Water Action/Clean Water Fund. (2014). *In the Pits: Oil and Gas Wastewater Disposal into Open Unlined Pits and the Threat to California's Water and Air*.
[110] EDF. (2017). *Filling the Void: The Value of New Technology to Reduce Air Pollution and Improve Information at Oil and Gas Sites in California* at 32.
[111] EPA. (2021). *EPA Proposes New Source Performance Standards Updates, Emissions Guidelines to Reduce Methane and Other Harmful Pollution from the Oil and Natural Gas Industry*, available at: https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/epa-proposes-new-source-performance (accessed Mar. 17, 2022).
[112] Dept. of Conservation, Geologic Energy Management Div. (2021). *Pre-Rulemaking Release* at Cal. Code Regs., tit. 14, § 1766.
[113] EDF. (2017). *Filling the Void: The Value of New Technology to Reduce Air Pollution and Improve Information at Oil and Gas Sites in California* at 42.

A 2017 study found that technologies that can detect methane, benzene, and/or ozone precursor compounds at oil and gas facilities are "commercially available for use now, and can be deployed once initiatives demand it."[114] More recent reports further confirm the availability of engineered emission controls and effective operational practices such as leak detection and repair programs.[115] Leak monitors would also help BLM fulfill its duty to prevent waste of leased resources, which is a prevalent issue in Kern County oil and gas production.[116] Implementing these readily accessible monitoring and repair mitigation measures for all new and existing oil wells would likely spur technological development and lead to more effective mitigation in the future. In fact, U.S. EPA is now proposing similar leak detection and response measures as part of its new methane regulations for oil and gas operations, which BLM should refer to as a floor rather than a ceiling to adopt the strongest standards protective of human health.[117] In light of the overburdened communities in the area, BLM should ensure nearby residents are informed and have the opportunity to provide input on any leak detection and response plans.

Similarly, in order to limit air pollution and prevent methane waste, BLM should also prohibit both venting and flaring. A 2020 study showed that flaring and venting during oil production were "the highest contributors to sector emissions [of methane], accounting for 32% and 24%, respectively."[118] BLM could thus consider requiring a vapor venting prevention system like the measure required in California's proposed oil and gas regulations.[119] Operators would report vapor venting whenever it occurs, and BLM would then suspend operations until the source of the vapor is identified and any leak is repaired, and permanently shut down wells and production facilities that repeatedly violate the prohibition. A related prohibition on flaring—which is an even bigger source of methane emissions than venting and can cause increases in respiratory-related hospitalizations for people even 60 miles away—would further reduce public health and safety risks in frontline communities and go a long way toward addressing the

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[114] *Id.* at 43.
[115] *See, e.g.*, Michanowicz, D., et al. *Methane and Health-Damaging Air Pollutants from the Oil and Gas Sector: Bridging 10 Years of Scientific Understanding* (Oct. 6, 2021), available at: https://www.psehealthyenergy.org/wp-content/uploads/2021/10/Full-Report_Bridging-10-Years-of-Scientific-Understanding.pdf (accessed Feb. 4, 2022).
[116] *See* EPA. (2019). *U.S. EPA, U.S. Department of Justice Settle with Kern Oil & Refining Co. for Violations at Bakersfield Refinery*, available at: https://www.epa.gov/newsreleases/us-epa-us-department-justice-settle-kern-oil-refining-co-violations-bakersfield (accessed Aug. 9, 2021); J. Cox. (2012). *The Sound and the Fury: Gas Flare Wears on Shafter-area Residents*, available at: https://www.bakersfield.com/news/the-sound-and-the-fury-gas-flare-wears-on-shafter-area-residents/article_089faa15-5091-5719-8e52-5f837d1fa0c8.html (accessed Aug. 9, 2021).
[117] EPA. (2021). *EPA Proposal to Reduce Climate- and Health-Harming Pollution from the Oil and Natural Gas Industry; Planning Process for States*, available at: https://www.epa.gov/system/files/documents/2021-11/epas-proposed-oil-and-gas-rules.-information-for-states.11.2.21.pdf (accessed Feb. 4, 2022).
[118] Michanowicz, D., et al. *Methane and Health-Damaging Air Pollutants from the Oil and Gas Sector: Bridging 10 Years of Scientific Understanding* at 3-9.
[119] Dept. of Conservation, Geologic Energy Management Div. (2021). *Pre-Rulemaking Release* at Cal. Code Regs., tit. 14, § 1766.1.

statewide impacts of flaring on air quality.[120] At minimum, BLM should establish limits on the volume of natural gas that can be flared by an operator, require the measurement and reporting of all volumes of natural gas flared on site, mandate that operators use green completion techniques for all completion operations, and require operators to submit waste minimization plans along with all APDs, similar to the requirement included in the 2016 BLM waste prevention rule.

California's proposed oil and gas regulations include a range of other engineering mitigation controls designed to address air pollution that BLM must consider here. For example, new requirements for tank leak detection and removal of tanks that have not been timely inspected[121] recognize the reality that upstream liquid storage tanks have emerged as the single largest fugitive emissions source of both methane and VOCs.[122] Additional recommendations from a recent report include (i) "inhibiting the usage of formaldehyde," which increases toxic emissions associated with liquid storage tanks; (ii) targeting methanol, 2-propanol, and ethanol for further restrictions to reduce occupational inhalation exposures; (iii) "[i]dentify[ing] and implement[ing] vapor control measures aimed at reducing fugitive leaks from liquid storage tanks, especially from tank thief hatches" to reduce health-damaging air pollutants; and (iv) adding "retrofit and replacement requirements for thief hatches and dehydrators on condensate tanks and for produced water tanks, both new and existing."[123]

California's proposed regulations further include measures specifying that operators must conduct gas sampling and analysis for each field or distinct geologic area where they produce gas, particularly if hydrogen sulfide is suspected.[124] Recognizing that oil and gas production invariably produces dust that threatens public health, the regulations also include dust control measures like limiting vehicle speeds and covering drilling muds and stored sands.[125] BLM should consider stronger dust control measures that better mitigate $PM_{2.5}$ and $PM_{10}$ emissions by, for example, requiring measures that address emissions during each phase of production activity and for different source activities.[126]

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[120] W. Blundell & A. Kokoza. (2022). *Natural Gas Flaring, Respiratory Health, and Distributional Effects*, available at: https://doi.org/10.1016/j.jpubeco.2022.104601 (accessed Mar. 17, 2022).
[121] Dept. of Conservation, Geologic Energy Management Div. (2021). *Pre-Rulemaking Release* at Cal. Code Regs., tit. 14, §§ 1773.2, 1773.4.
[122] Michanowicz, D., et al. *Methane and Health-Damaging Air Pollutants from the Oil and Gas Sector: Bridging 10 Years of Scientific Understanding* at 6-7, 14.
[123] *Id.* at 4-19, 4-22, 5-15.
[124] Dept. of Conservation, Geologic Energy Management Div. (2021). *Pre-Rulemaking Release* at Cal. Code Regs., tit. 14, § 1766.6.
[125] *Id.* at Cal. Code Regs., tit. 14, § 1766.5.
[126] *See, e.g.*, South Coast Air Quality Management Dist. *Fugitive Dust*, available at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust (accessed Mar. 17, 2022).

BLM should also consider phasing out the use of diesel engines at oil production sites entirely. These sites are riddled with equipment and infrastructure running on diesel.[127] Yet diesel engines emit a serious mixture of pollutants, including very small carbon particles, or "soot" coated with numerous organic compounds, known as diesel particulate matter (DPM).[128] DPM is responsible for a host of negative health effects that put communities at risk, including cardiovascular and respiratory hospitalizations, cancer, and premature death.[129]

In addition to air pollution, BLM must also require mitigation measures designed to prevent water pollution due to oil and gas drilling, which is a serious concern for frontline communities. Similar to air quality monitoring, BLM should implement more consistent water quality monitoring practices and technologies.[130] California's proposed oil and gas regulations include baseline and post-drilling water testing to help communities measure the impacts of drilling, and require operators to provide notice to community members pre-drilling.[131] BLM should consider similar requirements and further expand the list of analytes for water testing to include key per- and polyfluoroalkyl substances (PFAS), also known as "forever" chemicals that are associated with drilling fluids and known to cause cancer and developmental toxicity.[132] Where sampling results are indicative of contamination, the agency must require suspension of operations pending demonstration of repairs to the wells at issue. As in California's regulations, BLM should require operators to obtain its approval before using any fluids with the "potential to degrade water quality."[133]

There are also appropriate mitigation strategies for ongoing leaks and hazards from unlined waste pits and active and idle wells that lead to water contamination. A top priority should be to ensure that communities with contaminated water have access to safe drinking water by providing bottled water, treating the contaminated groundwater, or finding a new, stable

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[127] E.J. Esswein et al. (2018). Measurement of Area and Personal Breathing Zone Concentrations of Diesel Particulate Matter (DPM) during Oil and Gas Extraction Operations, including Hydraulic Fracturing. *J. Occup. Environ. Hyg.* 15(1):63-70, at 2-3, available at: https://doi.org/10.1080/15459624.2017.1388512 (accessed Feb. 4, 2022).
[128] CARB. *Overview: Diesel Exhaust & Health*, available at: https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health (accessed Feb. 4, 2022).
[129] CARB, *Overview: Diesel Exhaust & Health.*
[130] SWRCB. (2013). *Report to the Legislature: Communities That Rely on a Contaminated Groundwater Source for Drinking Water* at 94-95.
[131] Dept. of Conservation, Geologic Energy Management Div. (2021). *Pre-Rulemaking Release* at Cal. Code Regs., tit. 14, § 1766.2.
[132] H. Tabuchi. (2021). *E.P.A. Approved Toxic Chemicals for Fracking a Decade Ago, New Files Show*, available at: https://www.nytimes.com/2021/07/12/climate/epa-pfas-fracking-foreverchemicals.html; CalEPA, Office of Environmental Health Hazard Assessment. (2021). *Safe Drinking Water and Toxic Enforcement Act of 1986 Chemicals Known to the State to Cause Cancer or Reproductive Toxicity* at 18, available at: https://oehha.ca.gov/media/downloads/proposition-65/p65chemicalslistsinglelisttable2021p.pdf (accessed Mar. 17, 2022).
[133] Dept. of Conservation, Geologic Energy Management Div. (2021). *Pre-Rulemaking Release* at Cal. Code Regs., tit. 14, § 1722.6.

drinking water source (e.g. by drilling a new well or switching to surface water sources).[134] BLM could also implement infrastructure requirements to cap wells or use specific well casings to prevent leaks, and should ban the use of unlined pits or ponds entirely and require operators to implement closed loop drilling systems as soon as feasible. In the event of a spill, operators should be required to report immediately to BLM even for spills as small as one-half barrel, similar to the requirements in California's proposed regulations.[135]

Additionally, BLM should limit the use of hazardous and poorly understood chemicals in oil and gas drilling to mitigate pollution and ensuing public health impacts. One measure to achieve this would be to require oil and gas operators to thoroughly monitor and report the types and quantities of chemicals used in drilling, production, and maintenance operations.[136] In light of the common practice of using produced water containing these chemicals for irrigation, BLM must evaluate whether produced water from the wells at issue will be used to irrigate crops, and if so, to investigate whether it will cause public health and safety risks to communities.[137] BLM must also require produced water sampling and chemical analyses in line with California's proposed regulations.[138]

BLM should consider putting a range of other restrictions or conditions on APDs to minimize environmental justice impacts. Some reasonable options include limiting the number of APDs issued each year, or restricting the timing and methods of drilling. As suggested in recent EPA comments on the 2019 SEIS, BLM could also consider seasonal timing limitations on drilling, prohibit the use of highly variable sources of toxic chemicals, and require emissions capture at well sites.[139] BLM could further require emissions-reducing technologies such as reduced emissions completions (RECs), no or low bleed pneumatic controllers, cleaner engines (e.g. electric motors instead of internal combustion engines, EPA Tier 4 engines for nonroad diesel equipment, and trucks that meet 2010 standards), and processes and technologies to reduce emissions from dehydrators and tanks.

California's proposed regulations also include sound controls, in recognition of the fact that oil and gas activities expose nearby residents to constant noise for a long duration of time, with "round-the-clock" drilling that can occur for several months and where noise shielding is

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[134] SWRCB. (2013). *Report to the Legislature: Communities That Rely on a Contaminated Groundwater Source for Drinking Water* at 90-92.
[135] Dept. of Conservation, Geologic Energy Management Div. (2021). *Pre-Rulemaking Release* at Cal. Code Regs., tit. 14, § 1766.8.
[136] EPA. (2019). *Detailed Comments on the Bakersfield Field Office Hydraulic Fracturing DSEIS* at 2-3.
[137] L. Gross. (2022). *A California Water Board Assures the Public that Oil Wastewater Is Safe for Irrigation, But Experts Say the Evidence Is Scant, Inside Climate News*.
[138] Dept. of Conservation, Geologic Energy Management Div. (2021). *Pre-Rulemaking Release* at Cal. Code Regs., tit. 14, § 1766.7.
[139] EPA. (2019). *Comments on the Bakersfield Field Office Hydraulic Fracturing DSEIS* at 2-3.

infeasible.[140] The regulations prohibit the use of diesel engine vehicles and vehicle alarms during evening hours and require continuous monitoring of sound levels at the property boundaries of nearby sensitive locations.[141] The regulations similarly provide light controls that BLM should consider, including requirements for minimum intensity lighting at well sites during evening hours and hooded lighting that is not shined onto neighboring properties.[142]

Finally, BLM must consider conducting long-term, independent studies on the impacts of oil and gas drilling on environmental justice communities. Although oil and gas production has been occurring in California since the 19th century, until recent years there has been little scientific research on its public health impacts. According to a 2015 report, even "[r]egulatory agencies in California have not extensively studied the effects of oil and gas development on public health, mirroring the silence that has accompanied contamination events from related activities over the years."[143] The available studies demonstrate damning results, however. For example, the scientific advisory panel of public health experts convened by the state of California to inform its proposed oil and gas regulations recently evaluated a large body of peer-reviewed epidemiological studies and concluded "with a high level of certainty" that there is a causal relationship between close geographic proximity to oil and gas operations and all manner of adverse health outcomes.[144] In light of its conclusion, the panel recommended the complete cessation of new drilling and phase out of existing oil and gas activity in the state.

Emerging research demonstrates that every new well in Kern County will pose severe risks to environmental justice communities, but the long-term extent of these risks is unknown due to the lack of attention to these communities.[145] Therefore, before approving more APDs, BLM should conduct comprehensive studies on the long-term health impacts in order to determine and implement the most sustainable and effective strategies to mitigate environmental justice impacts.

## IV. The APDs must demonstrate Clean Air Act conformity with the state implementation plan.

The San Joaquin Valley Air Basin is home to our nation's greatest air quality challenges. It maintains the worst designation for ozone pollution in the country and has yet to attain the

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[140] Kern County Planning & Natural Resources Dept. (2020). *Draft SREIR for Revisions to Kern County Zoning Ordinance*, Vol. 1, section 4.12 at 4.12-26 to 4.12-27, available at: https://psbweb.co.kern.ca.us/UtilityPages/Planning/EIRS/OG_SREIR/aVol1/Oil_Gas_SREIR_Oct%202020_Vol%201_04.12%20Noise.pdf (accessed Mar. 17, 2022).
[141] Dept. of Conservation, Geologic Energy Management Div. (2021). *Pre-Rulemaking Release* at Cal. Code Regs., tit. 14, § 1766.3.
[142] *Id.* at Cal. Code Regs., tit. 14, § 1766.4.
[143] Clean Water Action/Clean Water Fund. (2014). *In the Pits: Oil and Gas Wastewater Disposal into Open Unlined Pits and the Threat to California's Water and Air* at 9.
[144] Letter from Cal. Oil & Gas Public Health Rulemaking Scientific Advisory Panel. (2021). *Response to CalGEM Questions* at 4, 12.
[145] Clean Water Action/Clean Water Fund. (2014). *In the Pits: Oil and Gas Wastewater Disposal into Open Unlined Pits and the Threat to California's Water and Air* at 9.

1997 $PM_{2.5}$ National Ambient Air Quality Standard.[146] Despite growing concerns over the lasting impacts that air pollution will have on community members in the San Joaquin Valley, the region continues to produce 75 percent of California's crude oil and maintain over 83 percent of the state's active wells, which cause significant air pollution.[147] Despite this, BLM has never meaningfully considered the General Conformity Rule, which is the Clean Air Act (CAA) provision that was enacted to prevent the federal government from worsening air quality in already polluted geographies, at any point in approving petroleum extraction in this region.

Activities can qualify as exempt from the CAA's General Conformity Rule by producing *de minimis* emissions, being presumed to conform, or having no reasonably foreseeable emissions. For example, legislative proceedings, electric power marketing, and responses to emergency events or natural disasters can validly claim exemptions under the CAA.[148] An APD for an oil well cannot. Drilling and extraction operations cause significant emissions, as has been documented with detail and specificity by the Kern County Zoning Ordinance and EIR and by other BLM offices outside of California. For every APD BLM issues, BLM has a responsibility to provide accurate air emissions estimates in its environmental assessments, supplement those estimates with details about the calculations and assumptions used to achieve those numbers, and to perform a conformity determination for the aggregated effects of all APDs issued. BLM's failure to provide this information and perform a conformity determination for APDs is arbitrary and capricious and violates the Clean Air Act.

### A. Clean Air Act conformity requirements.

The purpose of the Clean Air Act[149] is "to protect and enhance" air quality in the United States.[150] To achieve this goal, states are required to submit a State Implementation Plan (SIP) to EPA that regulates the states' fulfillment of the CAA and the enforcement of the National Ambient Air Quality Standards (NAAQS).[151] Functionally, NAAQS work by establishing upper limits for six common criteria pollutants in order to protect public health and welfare.[152] Namely, the six criteria pollutants are: ozone ($O_3$), particulate matter ($PM_{2.5}$ and PM10), sulfur dioxide (SO2), nitrogen dioxide ($NO_2$), lead (Pb), and carbon monoxide (CO).[153] When an area is unable to comply with one or more NAAQS, the EPA designates it as "nonattainment" and requires it to

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[146] San Joaquin Valley Air Pollution Control District. (2021). *Ambient Air Quality Standards & Valley Attainment Status*, available at: https://www.valleyair.org/aqinfo/attainment.htm (accessed Aug. 2, 2021).
[147] Western States Petroleum Association (WSPA). (2019). *San Joaquin Valley: The Oil and Gas Industry's Production Workhorse*, available at: https://www.wspa.org/wp-content/uploads/LAEDC_regional_factsheet_SanJoaquin_v2.pdf (accessed Aug. 27, 2021).
[148] 40 C.F.R. § 93.153(c).
[149] 42 U.S.C. § 7401 et seq.
[150] *Id.* § 7401(b)(1).
[151] *Id.* § 7410(a)(2).
[152] EPA. (2021). *NAAQS Table*, available at: https://www.epa.gov/criteria-air-pollutants/naaqs-table (accessed Aug. 2, 2021).
[153] EPA. (2015). *Criteria Pollutants, Environments and Contaminants*.

abide by stricter regulations that are intended to drive the area toward attainment.[154] One of such requirements for areas designated as nonattainment is that they must comply with the General Conformity Rule pursuant to United States Code section 7506(c).

The EPA promulgated its final General Conformity Rule under the Clean Air Act in 1993.[155] Under this rule, the federal government is required to conform "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."[156] Specifically, the federal government may not cause new NAAQS violations, intensify the rate or severity of NAAQS violations, or interrupt the timely attainment of any NAAQS or interim milestones.[157] In other words, the federal government's actions must be consistent with a state's implementation plan and its goals for achieving attainment.

An action will trigger a formal conformity determination if it requires federal funding or approval, occurs in a nonattainment or maintenance area, exceeds federal *de minimis* levels, and is not otherwise exempt.[158] These threshold requirements constitute the applicability analysis—at the end of which the federal agency must determine whether it must support its action with a formal conformity determination.[159]

Estimating a project's emissions for comparison with the region's *de minimis* levels is an important component of the applicability analysis. To determine whether a project's emissions are *de minimis*, the federal agency must show that total direct and indirect emissions, combined, are below the region's stipulated thresholds.[160] Direct emissions are those that are caused by the action and indirect emissions are those that may be separated by time or space but are of the type that "the agency can practically control" and for which "the agency has continuing program responsibility."[161] All emissions must be "reasonably foreseeable," which means that they may be calculated based on reasonable assumptions regarding techniques and equipment to be used.[162] The portion of a project's emissions that must be permitted or are otherwise presumed to conform may be excluded from the *de minimis* calculations.[163]

As enacted, the General Conformity Rule is intended to ensure that the federal government does not hinder a state's ability to provide its most polluted communities with healthier air. APDs in the San Joaquin Valley are not exempt from this requirement, satisfy all

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[154] 42 U.S.C. §§ 7407 (on area designation), 7502-7509(a) (on requirements for nonattainment areas).
[155] 58 Fed. Reg. 63,247 (Nov. 30, 1993).
[156] 42 U.S.C. § 7506(c)(1)(A).
[157] *Id.*
[158] EPA. (2010). *General Conformity Training Module* at 12.
[159] 40 C.F.R. § 93.152.
[160] EPA. (2010). *General Conformity Training Module* at 21.
[161] 40 C.F.R. § 93.152.
[162] EPA. (2010). *General Conformity Training Module* at 21.
[163] *Id.*; 40 C.F.R. § 93.153(d)(1).

threshold components in the applicability analysis, and as such, must be supported by a formal conformity determination.[164]

### B. The San Joaquin Valley is one of the most polluted places in the nation.

Not all localities are required to support federal actions with a formal conformity determination; only actions that take place in areas designated as nonattainment and maintenance can trigger this rule. The San Joaquin Valley Air Basin clearly satisfies this threshold requirement because all eight of its constituent counties (including the western half of Kern County) are currently designated as nonattainment for 8-hour ozone and $PM_{2.5}$ NAAQS, and as nonattainment for 1-hour ozone under state standards.[165]

In fact, pollution levels are so severe that each of the counties' ozone nonattainment status is designated as extreme[166]: the worst possible classification for ozone.[167] Currently, there are only a total of 12 counties in the entire nation that are classified at this level.[168] This means that the Valley Air Basin accounts for two thirds of our nation's most severely polluted counties in terms of ozone. Despite the severity of the Valley's nonattainment, the California Geologic Energy Management Division (CalGEM) recently announced that new well permits for "conventional oil and gas extraction wells" increased by 91 percent in 2020 as compared to 2019.[169]

When ozone forms in the upper atmosphere, it creates a protective layer that shields ground-level organisms from the harmful effects of the sun—but when formed at ground-level,

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[164] *See* BLM. (2013). *Actions Pertinent to the BLM that are Exempt from a Conformity Determination*, available at: https://www.blm.gov/sites/blm.gov/files/uploads/IM2013-025_att1.pdf (accessed Aug. 27, 2021).

[165] The 1-hour ozone NAAQS was revoked in 2005, but the San Joaquin Valley had previously been classified as extreme nonattainment. Under California standards, the Valley is classified as severe nonattainment. San Joaquin Valley Air Pollution Control District. (2021). *Ambient Air Quality Standards & Valley Attainment Status*, available at: https://www.valleyair.org/aqinfo/attainment.htm (accessed Aug. 2, 2021).

[166] Areas designated as nonattainment for ozone may be classified as marginal, moderate, serious, severe, or extreme. 42 U.S.C. § 7511(a)(1).

[167] San Joaquin Valley Air Pollution Control District. (2015). *Guidance for Assessing and Mitigating Air Quality Impacts (GAMAQI)* at 29, available at: https://www.valleyair.org/transportation/GAMAQI-2015/FINAL-DRAFT-GAMAQI.PDF (accessed Aug. 27, 2021).

[168] EPA. (2021). *Greenbook: Current Nonattainment Counties for All Criteria Pollutants*, available at: https://www3.epa.gov/airquality/greenbook/ancl.html#Top (accessed June 30, 2021).

[169] California Department of Conservation. (2021). *CalGEM Releases 2020 Annual Permit Summary: Well Plugging Permits Outpace New Drilling Permits for Second Consecutive Year*, available at: https://www.conservation.ca.gov/index/Pages/News/CalGEM-Releases-2020-Annual-Permit-Summary.aspx (accessed July 15, 2021).

ozone is a harmful air pollutant that causes smog and damage to the respiratory system.[170] Ground-level ozone, now the most prevalent outdoor air pollutant in the country, is created when VOCs/ROGs[171] react with NOx.[172]

Ozone pollution in the Valley Air Basin is not a new problem.[173] This pollutant is measured at 25 monitoring stations across the Valley, and while some stations have documented decreases in ozone emissions, an alarming number show significant increases.[174] For example, at the Bakersfield-Muni and Edison monitoring stations, the number of days over the 2008 8-hour ozone standard more than doubled between 2013 and 2015. This same number tripled at the Oildale and Shafter stations. At the Modesto station, this number increased by five times over the same period. At the Visalia station, by seven times.[175] Altogether, 14 monitoring stations reported increases in the number of days in violation of the ozone NAAQS between 2013 and 2015.

More recently, 87 percent of Western Kern County's monitoring stations reported an increase in the number of days exceeding the California standard for 1-hour ozone between 2016 and 2018 (revoked from NAAQS but still monitored under California Ambient Air Quality Standards).[176] Over the same period, 38 percent of these stations also increased in the number of days exceeding NAAQS 8-hour ozone levels. Most alarmingly, the Oildale station's days of exceedances rose by 47 days between 2016 and 2018.

According to the American Lung Association, of the top five cities most polluted by ozone, Valley Air Basin municipalities account for three of the spots, with Bakersfield at number two, Visalia at number three, and Fresno-Madera-Hanford at number four.[177] All three of these cities received the lowest possible score for air quality from the American Lung Association's 2021 report, which attributes the Valley Air Basin's level of unhealthy days, in part, to an increase in oil and gas extraction in the area. The increase in pollution has worsened so much

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[170] EPA. (2021). *Ground-level Ozone Basics*, available at: https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics (accessed July 26, 2021).
[171] The term reactive organic gases (ROGs) refers to a California-specific defined class of species, and are similar (and interchangeable for all practical purposes) to volatile organic compounds (VOCs). *See* California Council on Science & Technology (CCST). (2015). *An Independent Scientific Assessment of Well Stimulation in California, Vol. 2, Chpt. 3, Air Quality Impacts from Well Stimulation* at 186.
[172] ALA. (2021). *Volatile Organic Compounds*, available at: https://www.lung.org/clean-air/at-home/indoor-air-pollutants/volatile-organic-compounds (accessed July 26, 2021).
[173] San Joaquin Valley Air Pollution Control District. (2016). *2016 Ozone Plan for 2008 8-Hour Ozone Standard* at 2-9, available at: http://valleyair.org/Air_Quality_Plans/Ozone-Plan-2016/Adopted-Plan.pdf (accessed Oct. 21, 2021).
[174] *Id.* at 2-6.
[175] *Id.* at 2-8 (Figure 2-10: Quantity of Days Over the 2008 8-Hour Ozone Standard).
[176] Kern County. (2020). *Draft Supplemental Recirculated Environmental Impact Report* at 4.3-8.
[177] ALA. (2021). *State of the Air Report* at 12-13.

that NOx emissions are now visible from space—a development that can be largely attributed to an increase in oil and gas operations.[178]

Emissions from VOCs and reactive organic gases (ROGs) are of significant concern. One study estimates VOC emissions from oil and gas extraction in the Valley as akin to total transportation emissions in the region.[179] Bakersfield in particular attributes 22 percent of all anthropogenic emissions during the spring and summer months to petroleum operations, and 8 percent of all total potential ozone precursors.[180] This suggests that petroleum operations are responsible for significant amounts of emissions from criteria pollutants in the San Joaquin Valley.

Emissions from oil and gas extraction impact regions beyond their immediate vicinity. Research performed at national parks between 2014 and 2019 shows that while ozone remained low at Carlsbad Caverns until 2017, the park suddenly registered ten days exceeding ozone NAAQS in 2018 and another six violations in 2019.[181] Joshua Tree National Park has a long history of exceeding NAAQS for ozone. Such increases are considered correlated with increases in oil and gas production.[182]

Air pollution is also widely known to have serious health effects on communities. Broadly speaking, air pollution associated with oil and gas drilling and production is associated with respiratory and neurological issues, cardiovascular damage, endocrine disruption, birth defects in babies, cancer, and premature mortality.[183] A recent study found that people living in areas with the highest pollution in California, including the Valley, experienced 51 percent higher risk of COVID-19 mortality compared to those living in areas with less pollution.[184] For the 2.17 million Californians that live within a half mile of an oil or gas well, these health effects

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[178] B. Dix et al. (2020). *Nitrogen Oxide Emissions from U.S. Oil and Gas Production: Recent Trends and Source Attribution*, Geophysical Research Letters, available at: https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2019GL085866 (accessed Oct. 28, 2021).

[179] Gentner et al. (2014). Emissions of Organic Carbon and Methane from Petroleum and Dairy Operations in California's San Joaquin Valley. *Atmos. Chem. Phys.*, 14, 4955–4978, at 4971, available at: https://doi.org/10.5194/acp-14-4955-2014 (accessed Feb. 9, 2022).

[180] *Id.*

[181] K. Benedict et al. (2020). *Volatile Organic Compounds and Ozone at Four National Parks in the Southwestern United States*, Atmospheric Environment, available at: https://ui.adsabs.harvard.edu/abs/2020AtmEn.23917783B/abstract (accessed Oct. 28, 2021).

[182] *Id.*

[183] T. Srebotnjak & M. Rotkin-Ellman, NRDC. (2014). *Drilling in California: Who's at Risk?* at 6; K.V. Tran et al. (2020). *Residential Proximity to Oil and Gas Development and Birth Outcomes in California: A Retrospective Cohort Study of 2006–2015 Births*.

[184] P.B. English et al. (2022). Association between long-term exposure to particulate air pollution with SARS-CoV-2 infections and COVID-19 deaths in California, U.S.A., *Environmental Advances*, Vol. 9, available at: https://doi.org/10.1016/j.envadv.2022.100270 (accessed Aug. 21, 2022).

have acute and lasting impacts on daily life—causing some to experience dramatic challenges in completing normal daily activities like walking, talking, and sleeping.[185]

Air quality in the San Joaquin Valley is only expected to worsen over the years as the impacts of climate change aggravate dangerous weather patterns. The Valley is expected to see more hot days, which will cause an increase in ground-level ozone formation and a decrease in the soil's ability to retain moisture, causing more dust.[186] Additionally, as air quality worsens with climate change, the community will be subjected to worsening drought conditions, increasing concerns about water quality and availability and rising rates of Valley fever.[187] These problems are all interrelated and cannot be assessed in a vacuum. As air quality deteriorates for community members in the Valley, so too will their ability to face continued risk of illness and contaminated water.

As a result of the San Joaquin Valley's ongoing struggles with air pollution and NAAQS violations, this area is often called the most polluted air basin in the country. Until the Valley sheds this label—until it achieves attainment designations for all criteria pollutants—it will be required to comply with the CAA's General Conformity Rule. While the San Joaquin Valley Air Basin continues its efforts toward providing cleaner air for its communities, BLM must comply with the lowest *de minimis* thresholds for ozone precursors as established under the CAA: 10 tons per year (TPY) for both NOx and ROGs.[188]

### C. Oil and gas operations produce significant emissions.

At every stage of oil and gas extraction—including construction, drilling, operations, maintenance, plugging, and abandonment—pollutants are released that exacerbate NAAQS violations in the Valley Air Basin, cause adverse health effects to communities, and worsen the consequences of climate change.

The process of oil extraction involves industrial procedures that emit significant amounts of criteria pollutants, both intentionally and unintentionally. Specifically, oil and gas operations can produce emissions from oil extraction (pumping and extraction), oil handling in tanks and

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[185] J.L. Mernit. (2021). *The Health Hazards of California's Neighborhood Drilling*, High Country News, available at: https://www.hcn.org/articles/climate-desk-oil-the-health-hazards-of-californias-neighborhood-drilling (accessed July 26, 2021).
[186] Union of Concerned Scientists. (2020). *Climate Change in the San Joaquin Valley: A Household and Community Guide to Taking Action*.
[187] Diffenbaugh et al. (2015). *Anthropogenic Warming Has Increased Drought Risk in California*, Proceedings of the National Academy of Sciences at 3931–36, available at: https://doi.org/10.1073/pnas.1422385112 (accessed Oct. 21, 2021); I. Mallakpour et al. (2018). *A New Normal for Streamflow in California in a Warming Climate: Wetter Wet Seasons and Drier Dry Seasons*, available at: https://doi.org/10.1016/j.jhydrol.2018.10.023 (accessed Oct. 21, 2021); D. Hutchins et al. (2019). *Climate Change Microbiology: Problems and Perspectives* at 391–96, available at: https://doi.org/10.1038/s41579-019-0178-5 (accessed Oct. 21, 2021).
[188] San Joaquin Valley Air Pollution Control District. (2016). *2016 Ozone Plan for 2008 8-Hour Ozone Standard*.

pipelines, well drilling and workovers, well stimulation via hydraulic fracturing and acidization, and the separation of oil and water.[189] Pollutants are released from pump seals, tank hatches, site glasses, pipe fittings, gauges, valves, pipe repairs that produce a blowdown, and a number of other common channels.[190]

Ozone precursors, NOx and VOC, are of particular concern in the Valley where the region is already in extreme nonattainment for ozone. In oil operations, NOx emissions are specifically attributable to activities that depend on diesel or natural gas engines, such as drilling, workovers, hydraulic fracturing, and general use trucks.[191] Emissions of VOCs are also highly impacted by oil extraction, and in fact the oil and natural gas industry is the largest source of industrial VOCs in the country.[192] Hazardous air pollutant (HAP) emissions are also highly significant at drilling sites and can be detected at well production, during completions and recompletions, during flaring, and from equipment leaks.[193] By one estimate, total fuel chain emissions from California-refined oil between 2013 and 2017 produced around 75.9 metric tons of $PM_{2.5}$ and were responsible for more than 8,000 deaths.[194]

Sometimes, oil and gas regions will experience spikes in emissions where dramatic increases can occur in just a few minutes. These spikes can amount to emissions in the wheelhouse of "a thousand or more wells in routine operation" occurring simultaneously.[195] Such was the case in 2015 when a leak at an Aliso Canyon well effectively doubled methane emissions of the entire Los Angeles basin.[196] In fact, multiple spills in Kern County have released over a million gallons of oil and wastewater at the surface.[197] Just one of these spills has

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[189] EDF. (2017). *Filling the Void: The Value of New Technology to Reduce Air Pollution and Improve Information at Oil and Gas Sites in California* at 13.
[190] *Id.*
[191] CCST. (2015). *Air Quality Impacts from Well Stimulation* at 186.
[192] EPA. (2021). *Controlling Air Pollution from the Oil and Natural Gas Industry*, available at: https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/basic-information-about-oil-and-natural-gas (accessed Aug. 5, 2021).
[193] Earthjustice. (2014). *Petition to the EPA: EPA Must List Oil and Gas Wells and Associated Equipment as an Area Source Category and Set National Air Toxics Standards to Protect Public Health* at 26-29.
[194] G. Karras. (2020). *Decommissioning California Refineries: Climate and Health Paths in an Oil State* (compiling deaths attributable to chronic exposure to $PM_{2.5}$, and excluding deaths related to other pollutants and indirect emissions such as wildfires).
[195] D. Allen. (2016). *Emissions from Oil and Gas Operations in the United States and their Air Quality Implications*, Journal of the Air & Waste Management Association, available at: https://www.tandfonline.com/doi/full/10.1080/10962247.2016.1171263 (accessed Oct. 28, 2021).
[196] S. Conley et al. (2016). *Methane Emissions from the 2015 Aliso Canyon Blowout in Los Angeles, CA*, Science, available at: https://www.science.org/doi/10.1126/science.aaf2348 (accessed Oct. 28, 2021).
[197] T. Goldberg & D. Brekke. (2019). *State Launches Probe Into Oil Field Spills – Including One That's Been Flowing Since 2003*, KQED, available at:

been activating on and off for about 17 years, cumulatively releasing 84 million gallons of oil and waste fluid.[198]

Other times, delinquent operators have allowed accidents to go undetected. This has occurred in the past when crude oil spills and degraded netting around sump ponds have gone entirely unnoticed, adding additional air pollution.[199] Even the state agency responsible for enforcing compliance with regulations at extraction sites, CalGEM, admits that it is unable to "prosecute enforcement actions in a timely manner" or to "adequately protect the health and safety of the citizens of the state."[200]

In the area with the worst ozone designation available under the CAA, actions that have the potential to contribute to the ambient pollution of ozone precursors must be scrutinized carefully. Oil extraction in California emits significant pollution at every step of the process, and our state lacks even the resources to ensure compliance with the most basic health and safety measures as they exist now—allowing significant deterioration of machinery and leaks to go unnoticed. The General Conformity Rule's exception for *de minimis* emissions, which recognizes that some actions do not significantly contribute to emissions and should therefore be exempted, cannot apply to activities that promise to contribute significantly to air pollution concerns in the San Joaquin Valley such as well drilling—which BLM has failed to show fall below *de minimis* levels.

### D. BLM has never undertaken a meaningful conformity review for oil and gas development in the San Joaquin Valley.

BLM's decisionmaking process for facilitating mineral extraction has three phases: (1) the resource management plan (RMP) phase, where BLM creates a guide for the entire region that dictates which resources are extractable; (2) the leasing stage, where BLM bids out parcels of land; and (3) the site-specific application for permit to drill (APD) stage, where individual lessees' APDs are approved or denied.[201] At every point in this process, BLM evades performing a conformity determination.

In the current RMP for its Bakersfield Field Office, BLM determined that estimated emissions from the proposed plan fall below *de minimis* levels. Specifically, the agency found in the Bakersfield 2012 RMP that the total projected emissions from oil and gas development in the Valley would result in an additional 2.058 TPY of NOx and 6.779 TPY of ROGs emissions—

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https://www.kqed.org/news/11769850/statelaunches-probe-into-oilfield-spills-including-one-that-started-in-2003 (accessed Aug. 5, 2021).

[198] *Id.*

[199] J. Wilson. (2021). *Are California Oil Companies Complying With the Law? Even Regulators Often Don't Know*, ProPublica, available at: https://www.propublica.org/article/are-california-oil-companies-complying-with-the-law-even-regulators-often-dont-know (accessed July 13, 2021).

[200] *Id.*

[201] *Pennaco Energy, Inc. v. U.S. Dep't of Interior*, 377 F.3d 1147, 1151 (10th Cir. 2004).

both of which are below the region's de minimis threshold of 10 TPY each.[202] These estimates are unsubstantiated and unrealistically low.

At the second (leasing) stage, BLM evades conformity analysis again. In its recent December 2020 lease sale in the Bakersfield area, BLM claimed that lease sales are exempt from conformity review because the "location of the emission sources are not known," and because conformity determinations do not need to be performed "for any portions of a federal action that are subject to major or minor New Source Review [] permitting."[203] BLM further claimed that performing a conformity analysis at this stage would be redundant because the actions would still need to be permitted through a local agency, so "[a] secondary analysis by BLM is not required."[204] Instead, BLM stated that it will perform a conformity analysis for non-permitted emission sources as a result of the lease.

What is not mentioned, however, is that by the time BLM performs its conformity analysis at the third and final stage (the APD stage), the project has been segmented into smaller actions. What was once an entire regional plan for petroleum operations, consisting of hundreds of APDs, has now become a project with just a single or handful of APDs. This means that at the very final point at which petroleum extraction could undergo a conformity determination, it evades the process again and the entire oil development process skirts review.

### E. BLM must aggregate its air emissions estimates to perform a cumulative assessment for conformity review.

BLM's failure to perform a conformity analysis of the aggregated effects that hundreds of APDs have on air quality at the leasing stage does not mean that the agency may forgo an aggregated analysis altogether. NEPA law doctrines prevent federal projects from being "segmented" or "piecemealed" to circumvent proper review.[205] The same prohibition against segmentation under NEPA applies to conformity review under the CAA.[206]

Companies frequently split large numbers of APDs up, and group them to fit their needs—for instance, Chevron has recently been allowed to split 41 APDs at the same location

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[202] BLM. (2012). *Bakersfield Field Office, Proposed Resource Management Plan & Final Environmental Impact Statement* at 402, 756.
[203] BLM. (2020). *Bakersfield Field Office December 2020 Competitive Oil and Gas Lease Sale, Final EA* at 6.
[204] *Id.*; *see also WildEarth Guardians v. U.S. Bureau of Land Mgmt.*, 322 F.Supp.3d 1134, 1140 (D. Colo. 2018) ("BLM determined that because a conformity analysis requires more precise information to allow an accurate comparison of project-level emissions with specific thresholds in the General Conformity Rules, it cannot reasonably estimate air quality impacts for conformity purposes because of all the unknowns previously discussed.").
[205] *Delaware Riverkeeper Network v. F.E.R.C.*, 753 F.3d 1304, 1308 (D.C. Cir. 2014) (holding FERC had improperly segmented a pipeline project and failed to assess cumulative impacts).
[206] EPA. (2010). *General Conformity Training Module* at 12 (stating that an "action cannot be segmented to create several smaller projects with the emissions from each compared to the de minimis levels").

into five separate EAs, avoiding conformity determination for them all.[207] Unhindered piecemealing of project review cannot be permitted to continue in California's most oil-producing and most polluted region. BLM must analyze the aggregated emissions for APDs it issues in its conformity analyses.

### F. Without detailed emissions estimates, BLM's conformity review violates the Clean Air Act and is arbitrary and capricious.

A court must overturn an agency's action when it finds that the agency's analysis was "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law."[208] An agency's analysis will be considered arbitrary and capricious if it 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."[209] Pursuant to this standard, an agency's failure to "consider[] the relevant factors and articulate[] a rational connection between the facts found and the choice made" constitutes arbitrary and capricious behavior.[210] Moreover, an agency's inconsistent application of CAA programs in different states must be deemed arbitrary and capricious unless the agency "clearly set[s] forth the ground for its departure from prior norms so that [a court could] understand the basis of the [its] action."[211] This is the standard of review that is used to evaluate an agency's conformity analysis under the CAA.[212]

BLM's analysis is thus arbitrary and capricious when it fails to perform a conformity determination as required under the CAA. BLM's conduct rises to the level of arbitrary and capricious behavior when it: (1) refuses to support its air emissions calculations in its EAs[213]; (2)

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[207] Chevron has had 41 APDs either approved or slated for approval at the same location in the Midway Sunset oil field in the last year: DOI-BLM-CA-C060-2020-0095-EA; DOI-BLM-CA-C060-2020-0141-EA; DOI-BLM-CA-C060-2020-0123-EA; DOI-BLM-CA-C060-2021-0010-EA; DOI-BLM-CA-C060-2021-0054-EA.

[208] 5 U.S.C. § 706(2)(A).

[209] *Bark v. U.S. Forest Serv.*, 958 F.3d 865, 869 (9th Cir. 2020) (quoting *Motor Vehicle Mfrs. Ass'n v. State Farm Mutual Auto. Ins. Co.*, 463 U.S. 29, 43 (1983)).

[210] *Nat'l Ass'n of Home Builders v. Norton*, 340 F.3d 835, 841 (9th Cir. 2003) (quoting *Baltimore Gas & Elec. Co. v. Nat. Res. Def. Council*, 462 U.S. 87, 105 (1983)).

[211] *Western States Petroleum Ass'n v. E.P.A.*, 87 F.3d 280 (9th Cir. 1996).

[212] *Id.*; *Sierra Club v. U.S. E.P.A.*, 671 F.3d 955, 961 (9th Cir. 2012); *City of Olmsted Falls v. FAA*, 292 F.3d 261, 268 (D.C. Cir. 2002) (holding "'arbitrary and capricious' standard of review applied to the FAA's conformity analysis under the Clean Air Act" but that petitioner had failed to carry its burden of proof).

[213] Commenters have previously requested information supporting BLM's emissions calculations, but BLM has failed to respond. *See* Earthjustice. (2021). *FOIA Earthjustice Request for Production – RE: Bureau of Land Management, Bakersfield Field Office, Oil and Gas Clean Air Act Conformity Review for Applications for Permits to Drill* (requesting this information, but receiving no response to date).

fails to model per-well emission estimates[214]; and (3) negligently reuses emissions estimates without performing project-specific analysis.[215] To properly comply with the provisions of the CAA, BLM must support its air emissions tables with detailed calculations that reasonably describe its emissions estimates, model its calculations after the best data available or else explain why it has chosen other modeling sources, and perform a site-specific air analysis for every APD.

### 1. BLM has failed to support its emissions calculations in past EAs for APDs.

In EPA's explanation of its final conformity rule, the agency proffered this clarification about what is required to calculate "reasonably foreseeable" emissions: "the Federal agency [must] review all of its own information and all information presented to the Federal agency. Selection and documentation of the relevant emissions scenarios for conformity review is the responsibility of the Federal agency and should be based on reasonable expectations of future activity resulting from the Federal action."[216]

Despite the guidance from EPA that it must "review all" of the information it gathers and receives, and that it must document the "relevant emissions scenarios," BLM's Bakersfield Field Office's past emissions analysis tables remain entirely unsupported in its applicability analysis. To properly support its air emissions tables, BLM must describe the calculations it uses to determine its final estimates, the assumptions relied upon when making those calculations, and all of the emissions allocations based on machinery, activity, and source.

Specifically, BLM must support its air emissions estimates with:

- Calculations used to estimate emissions for the various phases of the project;

[214] *See Sierra Club*, 671 F.3d at 961 (holding that EPA's failure to use "accurate" and "current" emissions data in a state's SIP, or even explain why it chose to forgo using such data, was arbitrary and capricious).
[215] *See Am. Lung Ass'n v. Env't Prot. Agency*, 985 F.3d 914, 967 (D.C. Cir. 2021), *petition for cert. filed* ("An agency's wooden refusal to factor in reality and such on-point considerations would ordinarily render its decisionmaking arbitrary and capricious.").
[216] 58 Fed. Reg. 63,214, 63,226 (Nov. 30, 1993); *see also* BLM. (2012). *Guidance for Conducting Air Quality General Conformity Determinations*, available at: https://www.blm.gov/policy/im-2013-025 (accessed Aug. 5, 2021).

- The underlying data used to complete the emissions estimate calculations and the source of that data, including any actual field test results[217];

- Reasoned explanations that support BLM's use of the aforementioned data sources over other sources with more accurate or updated information;

- All underlying assumptions that the agency relies upon to calculate its emissions, and the basis for those assumptions, such as: (1) the duration of the construction period, (2) a description of permitted sources, (3) emission sources, (4) equipment specifications and manufacturers, (5) equipment efficiency and controls, (6) emission factors, (7) activity levels, (8) load factors, and (9) well depth and direction; and

- Descriptions of all source emissions at all stages of the extraction process (even if it is not included in the final calculation), and explanations of what emissions or stages are excluded from the final calculation with an explanation of BLM's justification for doing so.[218]

Detailed analysis on a level comparable to what is described above can be found in EAs developed by other BLM field offices. For example, the Farmington, New Mexico Field Office released an EA from October 2020 for 16 APDs in an area designated as in attainment that includes an appendix with categorical details about site-specific machinery usage.[219] There, all criteria pollutant emissions are broken down for each well pad and associated with specific equipment—for example: "(3) Caterpillar CG137-12 Compressor Engines" produce 15.84 TPY of NOx and "(4) GTA8.3 VRU Engines" produce 3.4 TPY of NOx at Nageezi Unit G35-2409

[217] BLM has failed to provide this information in its prior EAs, preferring instead to reuse the same generalized description of the types of data and assumptions that *may* have been used. The agency frequently states: "emissions are associated with combustion sources such as diesel drill and completion/workover rig engines, drill pad construction equipment (i.e., dozers, backhoe, grader, etc.), equipment trucks, water trucks, drill rig crew trucks/vehicles, and portable lift equipment . . . ." *See, e.g.*, BLM. (2020). *Aera, 9 APDs in Lost Hills, EA* (DOI-BLM-CA-C060-2020-0070-EA) at 22; BLM. (2020). *Berry, 6 APDs in Poso Creek, EA* (DOI-BLM-CA-C060-2020-0009-EA) at 17; BLM. (2020). *HW, 17 Maricopa APDs, EA* (DOI-BLM-CA-C060-2020-0138-EA) at 20.

[218] This is particularly important because prior EAs have described emissions estimates for activities such as "construction and drilling" and excluded emissions from "maintenance and reclamation activities" because they would be "short-term and localized and clearly below de minimis emission levels." *See, e.g.*, BLM. (2020). *Aera, 9 APDs in Lost Hills, EA* at 23. Putting aside the issue that "short-term and localized" is not a valid exemption for portions of emissions during the applicability analysis, *emissions from operations are not even mentioned.* BLM must provide sufficient information so that one could reasonably understand whether the regular use of a well has been calculated as part of its air estimates, and if it has not, an explanation of this decision.

[219] BLM. (2020). *Nageezi Units 2309 and 2409 Cluster Wells Projects* (DOI-BLM-NM-FO10-2020-0029) at 131-35.

(one of the project's four well pads). The report also provides the underlying assumptions and data used to calculate burner emissions, vapor recovery, fugitive emissions, enclosed combustion device emissions, and pneumatic VOC/HAP emissions.

BLM's APD assessments in the San Joaquin Valley, in contrast, generally lack any level of specificity resembling the detailed calculations the agency routinely provides elsewhere. These deficiencies are stark in a region like the Valley, where air quality continues to be a noxious and persistent problem for community members, and where the BLM field office continues to fail to provide accurate emissions estimates for new APDs (*see infra*).

### 2. BLM's average estimates of per-well emissions in the San Joaquin Valley are unsupported and unrealistically low.

In addition to failing to support its air emissions estimates with calculations or explanations, BLM's final evaluations are also unrealistically low in general. Such was the case in every APD EA released by the Bakersfield Field Office in 2020, and continues to be the case for BLM's most recent disclosed EAs for APDs in the Valley in 2021.

Here, commenters calculated average per-well estimates so that BLM's typical emissions estimates may be compared to other per-well estimates. Of the EAs that provide an estimate for NOx at the development stage (Year 1) in 2020, the average is 0.357 TPY. The average ROG estimate at this stage is 0.069 TPY. Of the EAs that provide estimates at the production stage (Years 2-18), the average NOx estimate is 0.011 TPY. The average ROG estimate at this stage is 0.006. Using these averages, this is what a standard ozone emissions estimate for an APD in SJV looked like in 2020:

*Table 1: Comparison of Average Per-Well Emissions from California BLM Bakersfield Field Office APDs in 2020 to Federal De Minimis Levels for San Joaquin Valley Air Basin*

| **Regulated Pollutant** | **Federal Designation** | ***De minimis* level (tons/year)** | **Emission Estimate for One Well (tons/year) in Dev. Stage (Year 1)** | **Emission Estimate for One Well (tons/year) in Prod. Stage (Year 2-18)** |
|---|---|---|---|---|
| **Ozone (ROGs)** | Extreme nonattainment | 10 | 0.069 | 0.006 |
| **Ozone (NOx)** | | 10 | 0.357 | 0.011 |

These estimates are *incredibly* low. In fact, using the per-well estimates from this data, in 2020, it would have taken an average of *29 wells* to trigger a conformity determination in the Valley. These estimates are orders of magnitude lower than comparable emissions estimates from Kern County.

### a. Using the Kern County Zoning Ordinance EIR calculations, it takes three to four wells to trigger a conformity determination.

In the Draft Supplemental Recirculated EIR (October 2020) for the Kern County Zoning Ordinance ("Kern County" or "Kern Zoning EIR"), the total estimates for NOx emissions is 13,677 TPY and 8,588 TPY for ROGs for 3,966 new wells estimated to be permitted by Kern County in 2015.[220] This estimate is based on the annual emissions from construction and operation for the entire project (projected change by the end of the project period) divided into 21 years.[221] Here, permitted emissions that require offsets are included in the totals, causing the per-well emission estimates to be even higher than Kern County's ultimate per-well estimate.[222] At this higher per-well estimate, it would only take three wells to trigger a conformity determination. Ultimately, Kern County reduces these totals to produce more conservative per-well estimates that translate to needing four wells to trigger a conformity determination.[223]

The table below compares the Kern County estimates with the combined averages calculated in Table 1. Placing these numbers side by side underscores a serious discrepancy. Kern County's estimated ROGs are over six times higher than the average for Bakersfield area APDs in 2020, with NOx over seven times higher.

*Table 2: Comparison of Average Per-Well Emissions from California BLM Bakersfield Field Office APDs in 2020 to Kern County Zoning EIR Estimates*

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[220] Kern County. (2020). *Draft Supplemental Recirculated EIR* at 4.3-123. The Kern County Zoning Ordinance's EIR emissions estimates are provided for purposes of comparison only. The Kern County Zoning EIR suffers from a number of legal and scientific deficiencies, including underestimating the health risks of air-polluting wells. *See Committee for a Better Arvin v. County of Kern*, Verified Petition for Writ of Mandate and Complaint for Injunctive Relief, Case No. BCV-21-100536 (Mar. 10, 2021) (challenging the Kern County Zoning EIR).

[221] Kern County. (2020). *Draft Supplemental Recirculated EIR.* ("The annual emissions from operation of permitted equipment have been calculated by dividing the projected change in the permitted equipment emissions at Project build-out in 2035 by the number of Project years from 2015 to 2035 (i.e., 21 years).").

[222] Using this number, the estimated per-well emissions for wells in Kern County are 3.449 TPY of NOx and 2.165 TPY of ROGs (using the report's estimate of 3,966 new wells in 2015). *See id.* at 4.3-128.

[223] This reduction excludes all permitted emissions that require offsets and processing emissions that were initiated prior to 2015. This lowers total NOx emissions to 11,064 TPY and total ROG emissions to 1,919 TPY in 2015, or 2.79 TPY of NOx per well and 0.48 TPY of ROGs per well. Kern County thus estimates that permitted emissions account for 18.6 percent of NOx and 51.54 percent of ROG emissions produced by the petroleum extraction process. These numbers were reached by considering the 2015 total NOx and ROGs emissions as the baseline (*see id.* at Table 4.3-27). The 2015 total emissions that excludes permitted emissions (*see id.* at Table 4.3-28) was then subtracted from the baseline to get the numerical representations of the amounts of NOx and ROGs produced by permitted sources. This number is 18.6 percent of the total for NOx and 51.54 percent of the total for ROGs.

| Regulated Pollutant | Federal Designation | *De minimis* level (tons/year) | Combined Average CA APD Estimate for One Well (tons/year)[224] | Kern County Zoning EIR Estimate for One Well (tons/year) |
|---|---|---|---|---|
| **Ozone (ROGs)** | Extreme nonattainment | 10 | 0.075 | 0.48 |
| **Ozone (NOx)** | | 10 | 0.368 | 2.79 |

This comparison presents a stark difference. While APDs that were approved in 2020 have average per-well emissions estimates that indicate it should take 29 wells to trigger a conformity determination, Kern County estimates that it should only take four or more wells to compel a conformity determination.

**b. Using per-well estimates from other states, it takes one to two wells to trigger a conformity determination.**

Where BLM has documented emissions for APDs in other states, and where *de minimis* thresholds are higher or nonexistent, per-well emissions of ozone precursors are considerably greater.

For example, a project EA for four well pads and 16 APDs in San Juan County, New Mexico estimated emissions as 4.36 TPY of NOx and 18.306 TPY of VOC per well.[225] Because this county is in attainment for the NAAQS, BLM did not perform a conformity analysis. Had these wells been built in the San Joaquin Valley, however, one well would have triggered a conformity determination.

To use an example from another state, a project EA for three APDs and one well pad in Adams County, Colorado documented maximum annual emissions at the development stage as 11.047 TPY of NOx and 1.087 TPY of VOC per well (including permitted emissions).[226] At these levels, a single well would trigger a conformity determination in the Valley—but because the *de minimis* levels for ozone precursors in Adams County are 50 TPY (five times higher than the Valley's levels), this EA is exempted from a conformity determination.

[224] Calculated by combining the average emissions during the development and production stages (*see* Table 1, *supra*). Understandably, this number represents an overestimate, because it essentially assumes Year 1 and Year 2 occur simultaneously in a single year. However, even using an overestimate to represent the emissions BLM calculated for APDs in 2020, they *still* stand six to seven times lower than the Kern County EIR estimates.
[225] BLM. (2020). *Nageezi Unit 2309 and 2409 Cluster Oil Wells Projects, EA* (DOI-BLM-NM-FO10-2020-0029).
[226] BLM. (2020). *Crestone Peak Reserve Federal APDs, EA* (DOI-BLM-CO-F020-2021-0003-EA).

The emissions estimates provided in these EAs are of an entirely different caliber than what BLM typically estimates as the per-well emissions for Valley APDs. The Adams County, Colorado calculations for NOx are 30 times greater than the 2020 Valley average. The San Juan County, New Mexico calculations for VOCs are over 244 times greater than the Valley average. Even if the agency is able to provide calculations and descriptions to support its incredibly low emissions estimates in the Valley, it is doubtful that any level of mathematic maneuvering will be able to justify emissions that are so low.

The discrepancies between the emissions estimates from other analyses, and the minimal emissions estimates typically used by the Bakersfield Field Office, underscore the need for BLM to justify the divergences with a detailed analysis of the emissions data underlying its conclusions for the APDs it is proposing to issue.

### 3. BLM has failed to calculate the expected emissions from each individual project, displaying a willingness to negligently copy and paste between actions that should have distinct air emissions tables.

More than merely omitting documentation that would support the air emissions calculations in BLM's EAs for APDs in the San Joaquin Valley, BLM has displayed a willingness to wholly disregard site-specific air analyses altogether. In 2020, this was best evidenced by the successive approval of two FONSIs for projects that had identical air emissions tables in their EAs.

The first FONSI was signed in May 2020 for 12 Chevron APDs in the Midway Sunset oil field in Kern County, and the second was signed in October 2020 for 3 Chevron APDs also in Midway Sunset.[227] In both EAs, the air analysis tables for the development stage ("Comparison of Project Emissions (Year 1) to Federal *de minimis* Levels for San Joaquin") contain exactly the same emissions estimates.[228] This is the case for the air analysis tables for the production stage as well.[229] While finding identical emissions estimates may be reasonable for projects that intend to perform the same actions, it is not reasonable here, where one project is for twelve APDs and the other is for three.

It bears emphasizing that these examples only further justify the importance of providing more detailed documentation in EAs. Scientific models for estimating emissions from oil extraction are widely available and provide detailed calculations for various activities at different levels of efficiency, meaning that there is no valid excuse for BLM's refusal to perform detailed calculations for each proposed project.[230]

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[227] BLM. (2020). *Chevron, 12 APDs in Midway Sunset, EA* (DOI-BLM-CA-C060-2020-0095-EA); BLM. (2020). *Chevron, 3 APDs in Midway Sunset, EA* (DOI-BLM-CA-C060-2020-0141-EA).

[228] In tons per year: ROG–0.336; NOx–1.219; PM10–0.116; $PM_{2.5}$–0.050.

[229] In tons per year: ROG–0.062; NOx–0.032; PM10–0.014; $PM_{2.5}$–0.003.

[230] CalEPA & CARB. (2018). *Oil Production Greenhouse Gas Emissions Estimator: User Guide and Technical Documentation*.

### G. BLM must perform a conformity determination.

To properly avoid triggering a conformity determination, BLM must show that its emissions fall below *de minimis* levels, which are 10 TPY of NOx and ROGs in the San Joaquin Valley. To claim that APDs will fall below this *de minimis* threshold, BLM must support its findings with the calculations, assumptions, data sources, and explanations described above. Further, BLM's final emissions estimates must be reasonable and based on the best data available. Unrealistically low estimates that BLM is unable to support, or that are based on outdated or otherwise inferior data, cannot properly exempt these emissions from a conformity determination. Finally, BLM must actually perform site-specific analysis that shows individualized project-based estimates. Failure to perform any one of these will constitute arbitrary and capricious behavior by BLM in its failure to comply with the Clean Air Act's General Conformity Rule.

Should BLM find that the emissions from the proposed APDs surpass *de minimis* levels, it will then be required to show that the action conforms with a SIP. Specifically, it must show that the project will not cause new NAAQS violations, intensify the rate or severity of NAAQS violations, or interrupt the timely attainment of any NAAQS or interim milestones.[231]

Moreover, assuming the APDs produce more than *de minimis* emissions, BLM must also revise its RMP before issuing additional APDs, because the additional APDs exceed the "levels of production or use" contemplated in the RMP (which assumed only *de minimis* emissions from APDs).[232] 43 C.F.R. §§ 1601.0-5(n)(2), (3), 1610.5-3(c), 1610.5-5 (requiring initiation of amendment process to address any "change in the scope of resource uses" within the resource area); *see also, e.g.*, *Diné Citizens Against Ruining Our Env't*, 923 F.3d at 856 (holding that BLM abused its discretion in tiering EAs for APDs to RMP EIS, when EIS predicted that drilling a single vertical well would use 283,500 gallons of water but drilling a single horizontal well will actually use 1,020,000 gallons of water).

San Joaquin Valley community members deserve more than indifference toward their health and wellbeing in the face of continued expansion of oil extraction in their communities. They deserve clean air, livable communities, and healthy environments—and the San Joaquin Valley Air Pollution Control District's efforts to attain those goals should not be hindered by BLM's inability to comply with the provisions of the CAA.

## V. BLM must address the impacts to water from oil and gas development.

BLM has never fully analyzed the impacts to water quality and scarcity from approving new oil and gas drilling permits prior to the APD stage. In order to comply with NEPA, it must now take a hard look at these impacts before approving the proposed APDs.

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[231] 42 U.S.C. § 7506(c)(1)(B).

[232] BLM. (2012). *Bakersfield Field Office, Proposed Resource Management Plan & Final Environmental Impact Statement* at 402, 756.

### A. Kern County already faces severe water pollution and water scarcity.

As discussed above, Kern County already experiences severe drinking water contamination problems. The County has the second highest number of community water systems in California that rely on contaminated groundwater,[233] and residents are already forced to rely on contaminated drinking water because the community water systems in Kern County are small and lack the resources to properly treat the groundwater or use another uncontaminated water source.[234]

California, and Kern County in particular, also faces extreme water scarcity. The entire state of California suffers from some level of drought, but Kern County is part of the 33.4 percent of the state that is classified as being in an "exceptional drought."[235] Kern County receives an average of less than six inches of rainfall per year, which means that surface water supplies do not meet the needs of the region.[236] Therefore, the County is forced to rely on a complicated system of importing water and pumping/storing groundwater. Kern County has already spent hundreds of millions of dollars to invest in a groundwater banking system that is responsible for providing most of the County's potable water to its residents.[237]

The San Joaquin Valley also has the biggest imbalance between groundwater pumping and replenishment in the state.[238] As climate change and the accompanying droughts continue to worsen, so will surface water scarcity and pressure on groundwater resources.[239] This trend is already visible, as groundwater overdraft in the San Joaquin Valley has accelerated in recent years[240]:

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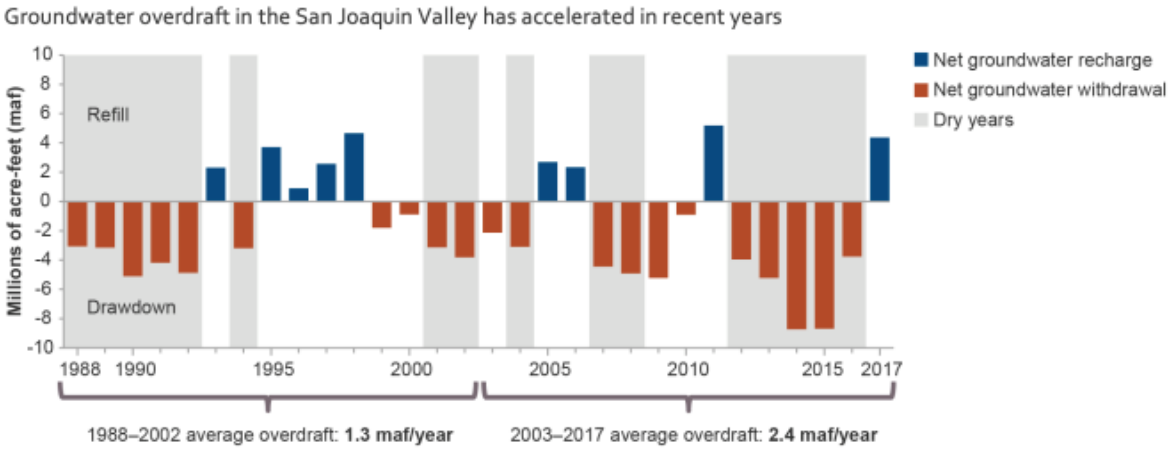
[233] CBD. (2020). *Comments on DOI-BLM-CA-C060-2020-08-26 (December 2020 Oil and Gas Lease Sale EA)* at 69.
[234] Cal. DOJ. (2020). *Comments on the December 2020 Oil and Gas Lease Sale EA of BLM's Bakersfield Field Office* at 13; SWRCB. (2013*). Report to the Legislature: Communities that Rely on a Contaminated Groundwater Source for Drinking Water*. *See also* OEHHA. (2017). *Methodology for a Statewide Drinking Water Contaminant Indicator*.
[235] National Integrated Drought Information System. (2021). *Current U.S. Drought Monitor Conditions for California*, available at: https://www.drought.gov/states/california (accessed July 26, 2021).
[236] Kern County Water Agency. (2021). *Agency Functions*, available at: https://www.kcwa.com/agencyfunction/ (accessed July 27, 2021).
[237] *Id.*
[238] Hanak et al. (2018). *Replenishing Groundwater in the San Joaquin Valley* at 3, available at: https://www.ppic.org/wp-content/uploads/r-0417ehr.pdf (accessed July 19, 2021).
[239] Hanak et al. (2019). *Water and the Future of the San Joaquin Valley* at 11, available at: https://www.ppic.org/wp-content/uploads/water-and-the-future-of-the-san-joaquin-valley-february-2019.pdf (accessed July 19, 2021).
[240] *Id.*




### B. BLM must take a "hard look" at the direct, indirect, and cumulative impacts of issuing APDs on water scarcity and water quality.

Additional oil and gas production is likely to cause further contamination of both surface water and groundwater as well as increased water scarcity. These contamination and scarcity issues have been extensively discussed in prior comments to BLM's Bakersfield Field Office at the RMP and lease sale stages, and are incorporated by reference here.[241] NEPA requires that agencies take a "hard look" at the environmental effects of their planned actions, even if a proposal has received initial approval. *Marsh*, 490 U.S. at 373-74. BLM must consider the particular impacts that oil and gas production will have on the quality and quantity of surface water and groundwater in Kern County. In the case of water, a hard look requires that BLM examine "the current state of water, potential risks associated with its [APD decision], mitigation measures, and prospective monitoring of water quality." *San Juan Citizens Alliance v. U.S. Bureau of Land Mgmt.*, 326 F.Supp.3d 1227, 1255 (D.N.M. 2018). BLM has failed to adequately address each of these features and 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. *See Diné Citizens Against Ruining Our Environment*, 923 F.3d at 831. As the Tenth Circuit determined, a NEPA document is not adequate unless it quantifies the cumulative impacts of reasonably foreseeable water use. *Id.* 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 issuing additional APDs. It also demonstrates that water use and contamination is a reasonably foreseeable outcome of the permitting.

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[241] *See generally* The Wilderness Society et al. (2019). *Bakersfield 2014 RMP Hydraulic Fracturing Analysis Comments on Draft SEIS and attachments*; *see also* EPA. (2019). *Detailed Comments on the Bakersfield Field Office Hydraulic Fracturing Draft SEIS* at 4-10; CBD et al. (2020). *Comments on DOI-BLM-CA-C060-2020-08-26 (December 2020, Oil and Gas Lease Sale EA)* at 54-65; Cal. DOJ. (2020). *Comments on the December 2020 Oil and Gas Lease Sale EA of BLM's Bakersfield Field Office* at 16-18.

BLM has only ever provided cursory analysis about impacts to water scarcity and the possibility of surface water and groundwater contamination in Kern County in its prior NEPA review at the RMP and lease sale stage, and BLM has never fully responded to prior public comments. BLM must now address the risk that the County's water faces from new APDs. This includes taking a hard look at the impacts of oil and gas drilling on water scarcity and water quality, as well as the particular dangers of the use of waste pits and shallow fracturing.

### 1. BLM must take a hard look at impacts to water scarcity.

BLM has historically only addressed groundwater impacts to Kern County as a whole and has failed to consider how groundwater supplies in local communities would be impacted by oil and gas drilling. For example, BLM has acknowledged in its recent lease sale EA that "estimates of loss of ground water [sic] storage and land subsistence [are] also dependent on local hydrogeology . . .," but then only accounted for total County water use by stating that "[i]f we assume that all proposed wells consume a similar volume of water in their drilling and all 10 wells [authorized under the EA] are constructed in the same year, then the volume required would be 6.1 acre foot and would represent 0.0003 percent of Kern County Annual Water use."[242] As another example, in its 2019 SEIS for the Bakersfield area, BLM compared the 200,000 gallons needed for each fracked well to the total water consumption of Kern County overall, but made no attempt to analyze the cumulative impacts of the water withdrawal with other water uses in the area on the *local communities affected*.[243] But as the California Council on Science and Technology (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. 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. *This could cause concern for smaller communities and 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.[244]

The CCST report also notes that cyclic steam injection for enhanced oil recovery uses between 2-15 times as much freshwater as well stimulation operations.[245] Like fracking and other well stimulation treatments, enhanced oil recovery methods such as steam injection, water

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[242] BLM. (2020). *Final EA for Bakersfield Field Office December 2020 Competitive Oil and Gas Lease Sale* at 57.
[243] BLM. (2019). *Bakersfield Field Office Hydraulic Fracturing Final SEIS* at 85.
[244] CCST. (2015). *An Independent Assessment of Well Stimulation in California*, *Vol. 2, Potential Environmental Impacts of Hydraulic Fracturing and Acid Stimulations* at 65 (emphasis added).
[245] *Id.* at 61.

flooding, and steam flooding involve the injection of large volumes of water underground to increase the flow of oil or gas to the surface.[246] These methods are increasingly used both to expand the productivity of existing wells in California and to maximize production from new wells.[247]

Indeed, the oil industry in Kern County enjoys "profligate" water use, with ever increasing amounts of water needed to extract the County's heavy crude oil.[248] Thus, to rationally determine whether water use will cause significant impacts, BLM must evaluate the impacts on the scale of the local affected community, rather than compared to Kern County's water use overall. In each of these evaluations of the local affected communities, BLM should include:

- The community's total water withdrawals across water use categories including, but not limited to, aquaculture, domestic, industrial, irrigation, livestock, mining, public water supply, and thermoelectric power;
- An examination of water use, cumulative water use, and water use trends in the Kern County Subbasin;
- Water use associated with oil and gas development in Kern County;
- Potential sources of water for project development;
- A study of regional water supply dynamics under different management, policy, and growth scenarios for portions of Kern County that have been identified as having a high potential for oil and gas development;
- Estimates of weekly or monthly water use that could occur if multiple stimulation jobs drawing from the same or connected groundwater resources were to occur at the same time.

BLM has included this type of analysis in EAs for APDs in other areas. For instance, the 2021 EA for three well pads in New Mexico included information detailing the current sources and

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[246] Clean Water Action. (2021). *Enhanced Oil Recovery: A Threat to Drinking Water* at 2, available at: https://www.cleanwateraction.org/sites/ default/files/docs/publications/ EOR%20Risk%20and%20Oversight%20Factsheet_0.pdf (accessed July 13, 2022); Clean Water Action. (2017). *The Environmental Risks and Oversight of Enhanced Oil Recovery in the United States* at 5, 25, available at: https://www.cleanwateraction.org/sites/default/files/docs/ publications/Environmental %20Risks%20and%20Oversight%20of%20Enhanced %20Oil%20Recovery%2011.08.17a.pdf (accessed July 13, 2022).

[247] J. Fleming. (2021). *Killer Crude: How California Produces Some of the Dirtiest, Most Dangerous Oil in the World,* Center for Biological Diversity at 3, available at: https://www.biologicaldiversity.org/programs/climate_law_institute/pdfs/June-2021-Killer-Crude-Rpt.pdf (accessed July 13, 2022); Clean Water Action. (2017). *The Environmental Risks and Oversight of Enhanced Oil Recovery in the United States* at 5 (Enhanced oil recovery "is the most common oil recovery practice in the United States," with "more than half" of all these wells located in California and Texas.); Clean Water Action. (2021). *Enhanced Oil Recovery: A Threat to Drinking Water*.

[248] L. Gross. (2022). *A California Water Board Assures the Public that Oil Wastewater Is Safe for Irrigation, But Experts Say the Evidence Is Scant, Inside Climate News*.

uses of water in the surrounding area, identified the potential sources of water for the project, and analyzed the project's impact on water supplies.[249] At a minimum, BLM must include comparable information and analysis for the APDs proposed here.

### 2. BLM must take a hard look at impacts to water quality.

Commenters have previously explained the myriad ways that oil and gas development can impact surface and groundwater quality, including through spills, leaks, direct injection of fluids into underground sources of drinking water, movement of fluids from an injection zone through the confining strata, and communication between offset wells during hydraulic fracturing.[250] BLM must take a hard look at these risks to groundwater from the APDs. This inquiry should:

> (1) include maps identifying the quality of underlying groundwater and identifying whether and where usable drinking water exists in relation to the proposed APDs;
> (2) include maps identifying the locations of surrounding exempt and non-exempt aquifers;
> (3) include maps of proposed oil and gas wells, existing producing wells, and nonproducing wells in the area that describe each well's status (e.g., idle, shut-in, plugged, and abandoned);
> (4) include maps that compare the target depths for drilling with the depths of useable groundwater, identifying the location of nearby surface water and drinking water wells, and identifying whether they will be impacted by drilling;
> (5) address whether there are any recharge areas in the area for any of the aquifers that are below the surficial aquifers. If there are recharge areas in the planning area, BLM should describe ways in which possible surface contamination and impacts to infiltration will be minimized; and
> (6) identify all water bodies or segments in the area that appear on the latest EPA-approved 303(d) list and, for each, disclose the nature of the impairment, whether or not a Total Maximum Daily Load has been established, and any load allocations in effect that may apply to the APD.

This information is readily available to BLM,[251] and its failure to consider this basic information before authorizing APDs constitutes a failure to take a hard look under NEPA.[252]

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[249] BLM. (2021). *Carlsbad Field Office, EA* (DOI-BLM-NM-P020-2021-0569-EA).
[250] *See, e.g.*, The Wilderness Society et al. (2019). *Bakersfield RMP Hydraulic Fracturing Analysis Comments on Draft SEIS, Exhibit A* at 21-22.
[251] BLM. (2020). *Appendix H for Final EA for BLM Montana March 2020 Lease Sale* (including a map of lease parcels comparing depths of targeted formations to depths of existing water wells).
[252] *See, e.g.*, *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).

### 3. BLM must analyze the use of waste pits.

BLM must analyze whether the well operator is likely to use waste pits as a part of its wastewater management. The use of "pits" as a part of wastewater management is a historic and dangerous practice in the oil and gas industry, particularly throughout the San Joaquin Valley and Kern County in particular.[253] Pits, sometimes referred to as "sumps,"[254] are used for temporary storage or permanent disposal of hydraulic fracturing wastewater.[255] States are responsible for governing the use of pits within their jurisdiction and can regulate where they can be used, how they must be constructed, and whether they must be lined.[256] In California, nine Regional Water Quality Control Boards have primary authority to regulate waste pits throughout the state.[257]

California rules allow three types of sumps: drilling sumps, evaporation sumps, and operations sumps.[258] A February 2016 report found that there were 790 active pits in California and that a vast majority of them are unlined.[259] There are hundreds more that are technically "inactive" but continue to harm the environment. Further, 60 percent of waste pits in California either do not have a permit or are otherwise out of compliance with state water quality standards, but nevertheless have been allowed to remain in operation.[260] As of April 2015, over 200 unlined pits in the Central Valley alone were operating without the necessary permits.[261]

Waste pits, and especially unlined pits, pose a number of threats to both surface water and groundwater in California. The vast majority of active pits are in "close proximity" to surface waterways and some even sit "directly above or adjacent to" high quality groundwater.[262] This is particularly concerning in Kern County where agricultural fields sit side by side with oil

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[253] EPA. (2016). *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States* (EPA-600-R-16-236ES) at 8-39, available at: https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=332990 (accessed Oct. 21, 2021).
[254] Earthworks. (2021). *California Oil and Gas Waste Report: The Failure to Safely Manage Oil and Gas Waste* at 11, available at: https://www.earthworks.org/cms/assets/uploads/2021/01/CA-Waste-Report-2021-Final-2-1.pdf (accessed July 22, 2021).
[255] EPA. (2016). *Hydraulic Fracturing for Oil and Gas* at 8-39.
[256] *Id.*
[257] CCST. (2015). *An Independent Assessment of Well Stimulation in California*, *Vol. 2, Potential Environmental Impacts of Hydraulic Fracturing and Acid Stimulations* at 110.
[258] Earthworks. (2021). *California Oil and Gas Waste Report* at 11.
[259] *Id.*
[260] *Id.*
[261] CCST. (2015). *An Independent Assessment of Well Stimulation in California*, *Vol. 2, Potential Environmental Impacts of Hydraulic Fracturing and Acid Stimulations* at 110.
[262] Clean Water Action/Clean Water Fund. (2014). *In the Pits: Oil and Gas Wastewater Disposal into Open Unlined Pits and the Threat to California's Water and Air* at 9.

fields and where most of the state's pits are concentrated.[263] Unlined pits allow toxic chemicals from the wastewater to seep into surrounding potable water and water used for irrigation.[264] Even when pits are lined, tears in the liner or improper installation can result in the waste leaking into the surrounding groundwater.[265] Indeed, a new study confirms that unlined pits endanger groundwater in the San Joaquin Valley, documenting how the disposal of over 16 billion barrels of oil and gas wastewater into unlined pits over a 50-year period has introduced salts, carcinogens, and other toxins into regional aquifers.[266]

[263] J. Cart. (2015). *Hundreds of Illicit Oil Wastewater Pits Found in Kern County*, Los Angeles Times, available at: https://www.latimes.com/local/lanow/la-me-ln-pits-oil-wastewater-20150226-story.html (accessed Aug. 29, 2021).
[264] *Id.*
[265] EPA. (2016). *Hydraulic Fracturing for Oil and Gas* at 8-43.
[266] D.C. DiGiulio et al. (2021). *Vulnerability of Groundwater Resources Underlying Unlined Produced Water Ponds in the Tulare Basin of the San Joaquin Valley, California*, available at: https://doi.org/10.1021/acs.est.1c02056 (accessed Oct. 20, 2021).

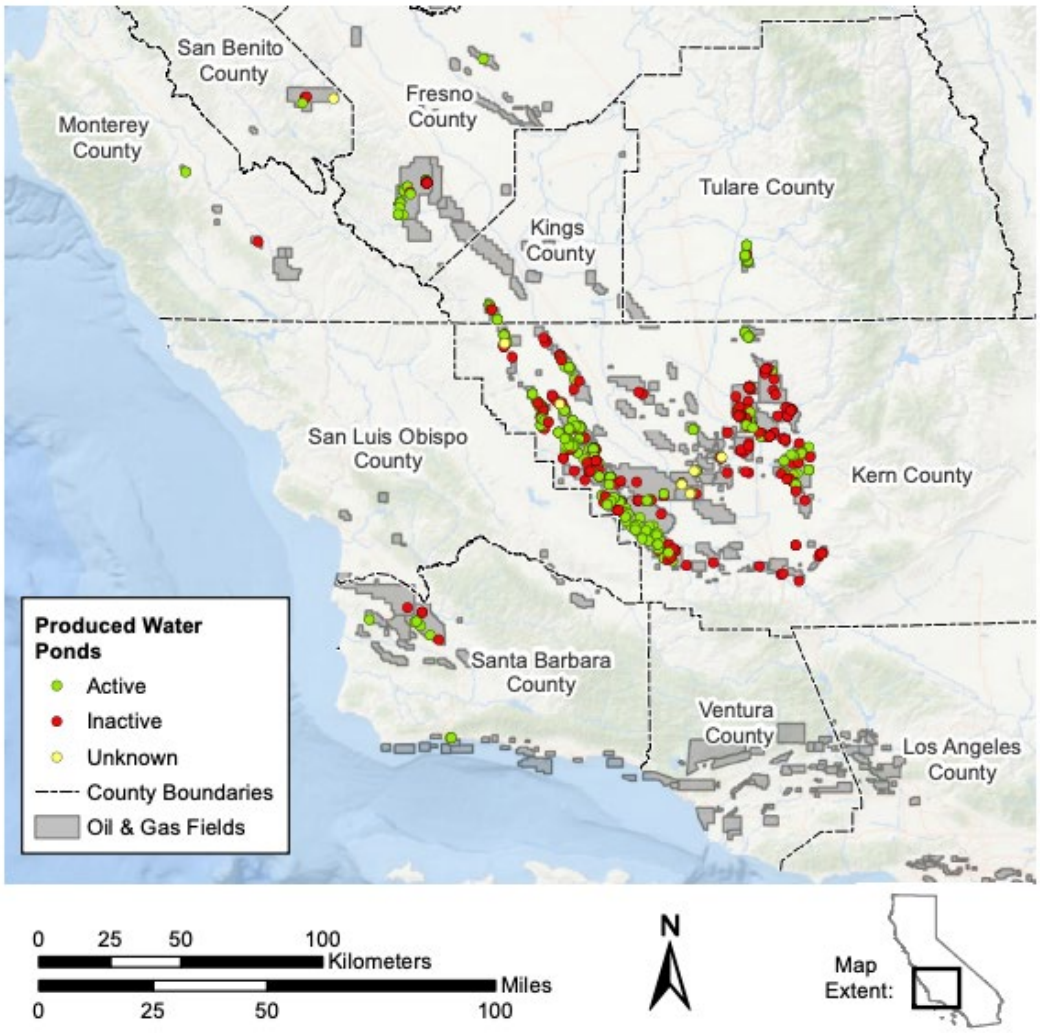


*Figure 2.6-3. Unlined pits used for produced water disposal in the Central Valley and the Central Coast, 2015. Data from CVRWQCB 2015; Borkovich 2015a; 2015b (Appendix 2.G).*

Figure 2.6-3.[267]

California is the only state with significant oil production that allows wastewater to be dumped into unlined pits.[268] Technically, wastewater must meet certain salinity, chloride, and boron thresholds in order to be dumped into waste pits. However, even wastewater that exceeds the salinity thresholds may be discharged in "unlined sumps, stream channels, or surface water if the discharger successfully demonstrates to the Regional Water Board in a public hearing that the proposed discharge will not substantially affect water quality nor cause a violation of water

[267] CCST. (2015). *An Independent Assessment of Well Stimulation in California*, *Vol. 2, Potential Environmental Impacts of Hydraulic Fracturing and Acid Stimulations* at 112.
[268] CBD. (2019). *California Water Board Finds Oil-Industry Contaminants in Water Wells*, available at: https://www.biologicaldiversity.org/news/press_releases/2019/oil-industry-pollution-04-11-2019.php (accessed July 26, 2021).

quality objectives."[269] There is "ample evidence" of groundwater contamination from waste pits in California.[270] For example, in the Central Valley, the Regional Water Quality Control Board ordered the closure of several waste pits in Lost Hills and the North and South Belridge oil fields because of their negative impacts on groundwater.[271] BLM must analyze whether the well operator will utilize waste pits and should consider prohibiting the use of waste pits.

#### 4. BLM must analyze the impacts of underground injection of wastewater.

BLM must analyze whether the well operator is likely to inject wastewater into usable sources of drinking water. Under the Safe Drinking Water Act (SDWA), an "underground source of drinking water" is defined as an aquifer with water that contains less than 10,000 parts per million (ppm) of total dissolved solids (TDS). 40 C.F.R. § 146.3; 40 C.F.R. § 144.3. Following the SDWA's definition, in its Onshore Oil and Gas Order No. 2, BLM similarly defines "usable water" as water containing less than 10,000 ppm TDS.[272] While water with salinity approaching 10,000 ppm TDS is considered "brackish," such aquifers are increasingly being used for drinking water. In fact, EPA adopted the 10,000 ppm standard based on the 1974 legislative history of SDWA, which explained that Congress intended SDWA to "protect not only currently-used sources of drinking water, but also potential drinking water sources for the future."[273] This standard underscores the need to identify and protect every potentially usable groundwater aquifer, regardless of whether that aquifer currently supplies existing water wells.

Oil and gas operators in the San Joaquin Valley frequently dispose of waste fluids by using underground injection wells. But oftentimes, those injection wells allow injection of waste fluids directly into aquifers that may contain usable water, or into aquifers hydrologically

[269] CCST. (2015). *An Independent Assessment of Well Stimulation in California*, *Vol. 2, Potential Environmental Impacts of Hydraulic Fracturing and Acid Stimulations* at 110.
[270] *Id.* at 112.
[271] *Id.*
[272] 53 Fed. Reg. 46,798, 46,801, 46,805 (Nov. 18, 1988).
[273] H.R. Rep. No. 93-1185 (1974), 1974 U.S.C.C.A.N. 6454, 6484; *see also* U.S. Geological Survey. (2018). *National Brackish Groundwater Assessment*, available at: https://water.usgs.gov/ogw/gwrp/brackishgw/ (suggesting brackish groundwater may offer a partial solution to current and future water demands) (accessed Feb. 9, 2022).

connected to usable water.[274] BLM must therefore (1) take a hard look at where the operator intends to dispose of oil and gas waste fluids; (2) evaluate whether injection will endanger usable sources of water, either through direct injection into usable water zones or through eventual migration of waste fluids into usable water zones; and (3) consider prohibiting injection of waste fluids without assurance that injection will not impact usable water.

### 5. BLM must identify whether shallow fracturing may occur.

BLM should identify and analyze whether shallow fracturing will occur. Oil and gas activity is particularly dangerous in California because extreme production techniques, like hydraulic fracturing (or "fracking"), often occur at shallow depths close to groundwater supplies.[275] In fact, approximately three-quarters of the state's hydraulic fracturing takes place in shallow wells that are less than 600 meters (2,000 ft.) deep.[276] Further, shallow fracturing—a water-intensive extraction technique—is most common in Kern County, where water is already incredibly scarce.

Shallow fracturing not only depletes the County's already limited water resources, it also leads to contamination of the remaining water. Where drinking water aquifers exist above shallow fracturing operations, hydraulic fractures may intersect with and contaminate aquifers used for drinking, agriculture, and other uses that impact public health.[277] Groundwater monitoring alone may not detect groundwater contamination from shallow hydraulic fracturing, and there has been little to no systematic monitoring of aquifers in the vicinity of oil and gas production sites.[278] Therefore, a lack of reports of cases of groundwater contamination does not mean that none have occurred. BLM must disclose whether shallow fracturing will occur on the proposed wells and should consider prohibiting the practice.

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[274] *See, e.g.*, L. Sommer. (2017). *How Much Drinking Water Has California Lost to Oil Industry Waste? No One Knows*, KQED, available at: https://www.kqed.org/science/1914130/how-much-drinking-water-has-california-lost-to-oil-industry-waste-no-one-knows (accessed Feb. 4, 2022); A. Bland. (2015). *Dirty Water: Wastewater Injection in the San Joaquin Valley Threatens Farmland*, Comstock's Magazine, available at: https://www.comstocksmag.com/web-only/dirty-water (accessed Feb. 4, 2022); J. Wilson. (2019). *Proposal Would Allow Oil Companies Keep Injecting Wastewater into Kern County Aquifers*, available at: https://www.desertsun.com/story/news/environment/2019/08/20/california-oil-injection-wells-aquifers-water-supplies-environment/1807384001/ (accessed Feb. 4, 2022); D. Bacher. (2019). *California Regulators Continue to Allow Oil Field Wastewater Injection into Protected Groundwater*, available at: https://yubanet.com/california/dan-bacher-california-regulators-continue-to-allow-oil-field-wastewater-injection-into-protected-groundwater/ (accessed Feb. 4, 2022).

[275] Last Chance Alliance. (2019). *California Oil & Gas Policy Brief* at 18, available at: https://lastchancealliance.org/wp-content/uploads/2019/07/California-Oil-and-Gas-Policy-Brief-Last-Chance-Alliance.pdf (accessed July 20, 2021).

[276] CCST. (2015). *An Independent Assessment of Well Stimulation in California*, *Vol. 2, Potential Environmental Impacts of Hydraulic Fracturing and Acid Stimulations* at 404.

[277] *Id.*

[278] *Id.* at 34-35.

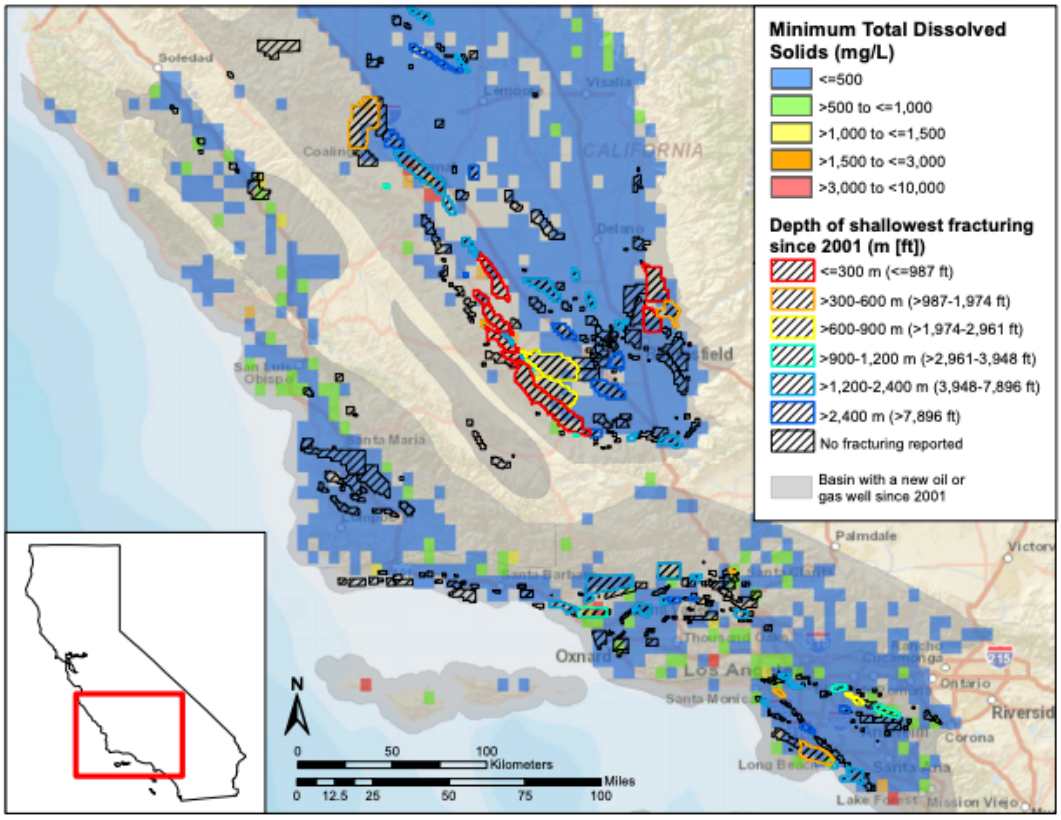


*Figure 1.3-8. Shallow fracturing locations and groundwater quality in the San Joaquin and Los Angeles Basins. Some high quality water exists in fields that have shallow fractured wells (figure from Volume II, Chapter 2).*

Figure 1.3-8.[279]

### C. BLM must consider alternatives and mitigation measures that would protect water quality and quantity.

BLM must identify and consider alternatives to protect water quality and quantity. Commenters have previously identified commonsense measures BLM should require in order to protect Kern County's water resources. BLM has ample authority to require these additional mitigation measures at the APD stage even if they were not explicitly included in the applicable lease. An oil and gas lessee's rights are explicitly limited by "such reasonable measures as may be required by the authorized officer to minimize adverse impacts to other resource values, land uses, or users not addressed in the lease stipulations at the time operations are proposed,"[280] and BLM has the explicit regulatory authority to include "appropriate modifications or conditions" on new drilling permits.[281]

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[279] *Id.* at 36.
[280] 43 C.F.R. § 3101.1-2.
[281] *Id.* § 3162.3-1(h).

For instance, BLM must consider the impacts of additional drilling in the face of extreme water scarcity in the Valley,[282] by accounting for potential loss of groundwater wells due to the combination of drought and even more water being removed. The agency must also account for the impacts on water infrastructure like existing canal systems from ground subsistence as even more groundwater is removed.

Additionally, EPA has previously suggested that BLM consider numerous mitigation measures that could be adopted at the RMP stage[283] that BLM has thus far failed to analyze or adopt. These mitigation measures must now be analyzed at the APD stage as project alternatives under NEPA,[284] and should be adopted as best management practices (BMPs) as a condition of BLM's approval of the APDs. EPA's suggestions include:

- Consider adopting a Condition of Approval (COA) that a future operator complete an inventory of existing wells (including both old and abandoned wells) surrounding the proposed drilling site (Area of Review) within a radius equivalent to the planned and modeled hydraulic fracture length before well stimulation begins. EPA recommends that all wells within the Area of Review be examined for their mechanical integrity, and their construction records be evaluated to determine whether they have been sealed and cemented properly and to ensure that they do not provide a viable pathway for potential contamination associated with hydraulic fracturing, well stimulation, or other injection activity.
- Incorporate abandonment procedures, as a COA, for sealing wells no longer in use, to reduce the potential for inactive wells to serve as the conduits for fluid movement between production zone(s) and aquifer(s). This is particularly important where existing wells do not have surface casing set into the base of [underground sources of drinking water (USDWs)] and lack sufficient production casing cement. If these recommendations are covered by existing State of California requirements, note such RMP stipulations . . . .
- [Require the sampling of] the results of produced water following well stimulation and 30 days after commencing production. Identify sample result thresholds that would require corrective action.
- Consider whether more stringent measures to protect groundwater should be required in areas with less than a specified amount of separation between a shale reservoir and overlying non-exempt groundwater

[282] CCST. (2015). *An Independent Assessment of Well Stimulation in California*, *Vol. 2, Potential Environmental Impacts of Hydraulic Fracturing and Acid Stimulations* at 65 (emphasis added).
[283] EPA. (2019). *Detailed Comments on the Bakersfield Field Office Hydraulic Fracturing Draft SEIS* at 4-10.
[284] *WildEarth Guardians*, 457 F. Supp. 3d at 889 (holding BLM violated NEPA when it failed to consider oil and gas mitigation measures that "would have protected usable groundwater, including an alternative whereby parcels would not be leased in area overlying usable groundwater, and an alternative that includes other measures to ensure that all usable groundwater zones are protected").

resource, and explain the basis for the amount of separation selected as the trigger.

- Consider . . . COAs requiring closed loop drilling, monitoring of water quality and water levels, closure and monitoring of reserve pits, and lining and monitoring of evaporation ponds.
- Consider . . . [s]etback stipulations, such as No Surface Occupancy (NSO) for oil and gas activities, where appropriate, to minimize the potential for impacts to current and potential drinking water resources, including both domestic and public water supply wells.
- Consider . . . 500-foot setback for private wells. Setbacks provide an opportunity for released contaminants to attenuate before reaching a water supply well, and may afford an opportunity for a release to be remediated before it can impact a well, or for an alternate water supply to be secured.
- Consider . . . [a] mitigation plan for remediating future unanticipated impacts to groundwater or drinking wells from future oil and gas activities, such as requiring the operator to remedy those impacts through treatment, replacement, or other appropriate means.
- [I]dentify, as appropriate, potential . . . stipulations that would ensure groundwater resources are not stressed by well stimulations during dry times of the year or from multiple well stimulation jobs in the same geographic area.
- Identify any Critically Overdrafted Basins, and which include federal mineral estate. . . . Consider including a . . . stipulation that would prohibit groundwater withdrawal from any Critically Overdrafted Basin.
- Clarify whether interim . . . stipulations would be necessary to ensure protection comparable to that which would be afforded through the implementation of state regulations such as the California State Water Resources Control Board's regional monitoring program and the Sustainable Groundwater Management Act.
- Clarify . . . the BLM’s authority and means to investigate any reports of potential USDW or drinking water well contamination occurring after well completion and, if necessary, require remediation.
- In the absence of groundwater modeling to determine the distance from the project at which impacts may occur, consider adopting . . . requirements for monitoring to occur in private wells within one mile of an oil and/or gas project area. Such monitoring would help ensure that mitigation measures are adequate and water resources are being fully protected.
- Consider requiring fracture monitoring, where appropriate, to protect surface water and groundwater resources. Fracture monitoring uses microseismic and tiltmeter surveys to achieve real-time mapping of a hydraulic fracturing treatment in progress.
- [Require] [s]etbacks, including:
    - Minimum 100-foot NSO setback from slopes greater than 30%;
    - Minimum 500-foot NSO setback for flowing waters (rivers and streams) or 100-year floodplain, whichever is greater;

    - Minimum 500-foot NSO setback for lakes, ponds and reservoirs, wetland and riparian areas and springs;
    - Minimum 750-foot NSO setback for 303(d) impaired waters;
    - Minimum 1,000-foot NSO setback for special or significant waters; and
    - Minimum 100-foot NSO setback for intermittent and ephemeral streams.
- Consider including a COA to avoid all surface water resources (including ephemeral streams) during not only geophysical exploration, but also drilling, completion and production.
- Consider whether any high value wetland or riparian area, as well as Areas of Critical Environmental Concern, would warrant protection through a NSO stipulation . . .
- Include a list of potential avoidance measures, mitigation requirements and BMPs that may be applicable at the project level to prevent adverse impacts to aquatic resources, including limited stream crossing or access points, silt fences, detention ponds and other stormwater control measures.
- Include a mitigation measure to offset the loss of acreage and function of waters impacted.
- [C]onduct a hydrologic assessment to ensure all NSO stipulations are sufficient. Consider the geomorphological setting as well as the hydrology of the waters at risk.
- Clarify . . . any existing requirements for setbacks from impaired waters, and identify any COAs that would be required . . . to ensure that impaired waters would not be further degraded from proposed development or operational activities within and/or downstream of the planning area.
- [Consider adopting a] stipulation that encourages operators to recycle produced water for use in well drilling and stimulation, and discuss to what extent this could help alleviate the need for water withdrawals and minimize associated impacts.[285]

Other commenters have also previously urged BLM to require additional BMPs to protect water quality. For instance, The Wilderness Society and others have previously encouraged BLM to adopt the following BMPs to protect well integrity and prevent groundwater contamination. BLM should analyze and adopt these BMPs for the proposed APDs:

- In areas where the depth to the deepest protected groundwater is not known, operators must estimate this depth. This depth should then be verified by running petrophysical logs, such as resistivity logs, after drilling to the estimated depth. If the depth to the deepest protected water is deeper than estimated, an additional string of casing is required. Surface casing must be of sufficient diameter to allow the use of one or more strings of intermediate casing. All instances of protected water not

[285] EPA. (2019). *Detailed Comments on the Bakersfield Field Office Hydraulic Fracturing Draft SEIS* at 4-10.

anticipated on the permit application must be reported including the formation depth and thickness and water flow rate, if known or estimated.

- A formation integrity test (FIT) must be performed immediately after drilling out of all surface and intermediate casing. The test should demonstrate that the casing shoe will maintain integrity at the anticipated pressure to which it will be subjected while drilling the next section of the well, no flow path exists to formations above the casing shoe, and that the casing shoe is competent to handle an influx of formation fluid or gas without breaking down. If any FIT fails, the operator must contact the regulator and remedial action must be taken to ensure that no migration pathways exist. The casing and cementing plan may need to be revised to include additional casing strings in order to properly manage pressure.
- All surface, intermediate, and production casing strings must stand under pressure until a compressive strength of 500 psi is reached before drilling out, initiating testing, or disturbing the cement in any way. In no case should the wait-on-cement (WOC) time be less than 8-hours.
- All surface, intermediate, and production casing strings must be pressure tested. Drilling may not be resumed until a satisfactory pressure test is obtained. Casing must be pressure tested to a minimum of 0.5 psi/foot of casing string length or 1500 psi, whichever is greater, but not to exceed 80% of the minimum internal yield. If the pressure declines more than 10% in a 30-minute test or if there are other indications of a leak, corrective action must be taken.
- Surface casing setting depth must be shallower than any hydrocarbon-bearing zones and must be set at least 100’ but not more than 200’ into a competent confining zone below the base of the deepest protected groundwater and be fully cemented to surface by the pump and plug method.
- Intermediate casing must be used where necessary to isolate protected water, anomalous pressure zones, lost circulation zones, or other drilling hazards. Casing setting depth must be based on local engineering and geologic factors and be set at least 100' below the deepest protected water, anomalous pressure zones, lost circulation zones, and other drilling hazards. Intermediate casing must be set to protect groundwater if surface casing was set above the base of protected water, and/or if additional protected water was found below the surface casing shoe. When intermediate casing is installed to protect groundwater, the operator shall set a full string of new intermediate casing to a minimum depth of at least 100 feet below the base of the deepest strata containing protected water and cement to the surface. The location and depths of any hydrocarbon strata or protected water strata that is open to the wellbore above the casing shoe must be confirmed by coring, electric logs or testing and shall be reported as part of the post-treatment report.
- If both surface casing and intermediate casing are used as water protection casing, or if intermediate casing is not used, a full string of production casing is required. A production liner may be hung from the base of the

intermediate casing and used as production casing as long as the surface casing is used as the water protecting casing and intermediate casing is set for a reason other than isolation of protected water.

- When intermediate casing is installed to protect groundwater, it must be fully cemented to surface. When intermediate casing is set for a reason other than to protect strata that contain protected water, it must be fully cemented to surface unless doing so would result in lost circulation. If not cemented to the surface, intermediate casing shall be cemented with sufficient cement to fill the annular space from the casing shoe to at least 600 feet above fluid-bearing formations, lost circulation zones, oil and gas zones, and anomalous pressure intervals, or other drilling hazards. Where the distance between the casing shoe and shallowest zone to be isolated makes this technically infeasible, multi-stage cementing must be used to isolate any hydrocarbon- or fluid-bearing formations or abnormally pressured zones and prevent the movement of fluids.
- When intermediate casing is not used, production casing must be fully cemented to surface unless doing so would result in lost circulation. If not cemented to the surface, production casing shall be cemented with sufficient cement to fill the annular space from the casing shoe to at least 600 feet above fluid-bearing formations, lost circulation zones, oil and gas zones, anomalous pressure intervals, or other drilling hazards. Where the distance between the casing shoe and shallowest zone to be isolated makes this technically infeasible, multi-stage cementing must be used to isolate any hydrocarbon- or fluid-bearing formations or abnormally pressured zones and prevent the movement of fluids. Sufficient cement shall also be used to fill the annular space to at least 100 feet above the base of the freshwater zone, either by lifting cement around the casing shoe or cementing through perforations or a cementing device placed at or below the base of the freshwater zone.
- If fluid returns, lift pressure, displacement and/or other operations indicate inadequate cement coverage, the operator must (i) run a radial cement evaluation tool, a temperature survey, or other test approved by [BLM] to identify the top of cement, (ii) submit a plan for remedial cementing to [BLM] for approval and (iii) implement such plan by performing additional cementing operations to remedy such inadequate coverage prior to continuing drilling operations.
- Prior to cementing the hole must be prepared to ensure an adequate cement bond by circulating at least two hole volumes of drilling fluid and ensuring that the well is static and all gas flows are killed. Top and bottom wiper plugs and spacer fluids must be used to separate drilling fluid from cement and prevent cement contamination. Casing must be rotated and reciprocated during cementing when possible and when doing so would not present a safety risk.
- Cement should be pumped at a rate and in a flow regime that inhibits channeling of the cement in the annulus. During placement of the cement, operator shall monitor pump rates to verify they are within design

parameters to ensure proper displacement efficiency. Throughout the cementing process operator shall monitor cement mixing in accordance with cement design and cement densities during the mixing and pumping.

- All cement must have a have a 72-hour compressive strength of at least 1200 psi and free water separation of no more than two milliliters per 250 milliliters of cement, tested in accordance with the current API RP 10B. Cement must conform to API Specification 10A and gas-blocking additives must be used. Cement mix water chemistry must be proper for the cement slurry designs. At a minimum, the water chemistry of the mix water must be tested for pH prior to use, and the cement must be mixed to manufacturer's recommendations. An operator's representative must be on site verifying that the cement mixing, testing, and quality control procedures used for the entire duration of the cement mixing and placement are consistent with the approved engineered design and meet the cement manufacturer recommendations, API standards, and the requirements of this section.
- Compressive strength tests of cement mixtures without published performance data must be performed in accordance with the current API RP 10B and the results of these tests must be provided to the regulator prior to the cementing operation. The test temperature must be within 10 degrees Fahrenheit of the formation equilibrium temperature at the top of cement. A better quality of cement may be required where local conditions make it necessary to prevent pollution or provide safer operating conditions.
- For surface, intermediate, and production casing, at a minimum, centralizers are required at the top, shoe, above and below a stage collar or diverting tool (if used) and through all protected water zones. In non-deviated holes, a centralizer shall be placed every fourth joint from the cement shoe to the ground surface or to within one joint of casing from the bottom of the cellar, or casing shall be centralized by implementing an alternative centralization plan approved by [BLM]. In deviated holes, [BLM] may require the operator to provide additional centralization. All centralizers must meet API Spec 10D (Recommended Practice for Casing Centralizers – for bow string centralizers) or API Spec 10 TR4 (rigid and solid centralizers) and 10D-2 (Petroleum and Natural Gas Industries, Equipment for Well Cementing, Part 2, Centralizer Placement and Stop Collar Testing).
- For any section of the well drilled through fresh water-bearing formations, drilling fluids must be limited to air, fresh water, or fresh water-based mud and exclude the use of synthetic or oilbased mud or other chemicals.
- To reduce the risk of external casing corrosion all potential flow zones—as defined in API RP 65-2, Isolating Potential Flow Zones During Well Construction—must be properly isolated. Failure to isolate flow zones can also result in annular overpressurization, which can lead to a loss of mechanical integrity, putting groundwater at risk, and/or allow crossflow of subsurface fluids, potentially into protected water if it has not been

properly isolated. All well construction materials must be compatible with fluids with which they may come into contact and be resistant to corrosion, erosion, swelling, or degradation that may result from such contact.

- Internal and external well mechanical integrity must be assessed at least yearly.
- Prohibit disposal of wastewater in percolation ponds.
- Measures to minimize spills and leaks of drilling, workover, completion, and waste fluids including requiring the use of closed-loop fluid handling systems in lieu of surface pits/impoundments and comprehensive spill contingency planning and reporting requirements.
- Require secondary containment for transport, mixing, and pumping equipment in order to minimize potential soil and water resource impacts from chemical spills, including measures to ensure the integrity of these barriers over time.
- Limit the amount of a given hazardous material [that] may be stored or present at a given site, as well as potential aggregate or temporal limits for storage.
- Require monitoring and detection for naturally occurring radioactive material (NORM), employ best management practices for handling NORM if detected, proper worker health and safety protection with respect to NORM, and the use of proper disposal methods for wastes containing NORM.[286]

If hydraulic fracturing is proposed on the APD, commenters have also previously suggested that BLM require the following BMPs:

- [Require] [f]ull disclosure of all chemicals used in hydraulic fracturing activities.
- Consistent with recommendations made by the CCST, the use of hazardous and poorly understood chemicals should be limited. The use of chemicals with unknown environmental profiles should be prohibited. The overall number of different chemicals should be reduced, and the use of more hazardous chemicals and chemicals with poor environmental profiles should be reduced, avoided, or disallowed. The chemicals used in hydraulic fracturing should be limited to those on an approved list that would consist only of those chemicals with known and acceptable environmental hazard profiles. Operators should apply Green Chemistry principles to the formulation of hydraulic fracturing fluids, particularly for biocides, surfactants, and quaternary ammonium compounds, which have widely differing potential for environmental harm.
- Well design, construction, and maintenance standards should be updated to ensure that wells can withstand the stresses of hydraulic fracturing activities.

[286] The Wilderness Society et al. (2019). *Bakersfield RMP Hydraulic Fracturing Analysis Comments on Draft SEIS, Exhibit A*.

- Require operators to characterize and monitor groundwater and surface water to detect any contamination that may be related to hydraulic fracturing activities.
- Require operators to evaluate the chemistry of produced water from hydraulically fractured wells, the potential consequences of that chemistry for the environment, and how this chemistry changes over time.
- Consistent with CCST recommendations, prohibit the use of produced water from hydraulically fractured wells for purposes such as irrigation that could negatively impact the environment, human health, wildlife and vegetation. This ban should continue until or unless testing the produced water specifically for hydraulic fracturing chemicals and breakdown products shows non-hazardous concentrations or required water treatment reduces concentrations to nonhazardous levels.
- Consistent with CCST recommendations, operators proposing to use hydraulic fracturing operations near protected groundwater resources should be required to provide adequate assurance that the expected fractures will not extend into these aquifers and cause contamination. If the operator cannot demonstrate the safety of the operation with reasonable assurance, agencies with jurisdiction should either deny the permit, or develop protocols for increased monitoring, operational control, reporting, and preparedness.
- Require operators to determine how far fractures and injected fluids will extend from the wellbore and, within that zone, require operators to:
    - Identify all existing wells; evaluate the adequacy of the well design and construction methods to achieve the goal of isolating protected water; assess the internal and external mechanical integrity of each well identified; prepare a plan for performing corrective action if any of the wells identified are improperly designed, constructed, completed, plugged, or abandoned; perform an assessment to determine the risk that the stimulation treatment will communicate with each well identified; for each well identified as at-risk for communication, prepare a plan for well control, including but not limited to: (1) a method to monitor for communication, (2) a determination of the maximum pressure which the at-risk well can withstand, (3) actions to maintain well control; if the at-risk well is not owned or operated by the owner/operator of the well to be stimulated, a plan for coordinating with the offset well operator to prevent loss of well control;
    - Demonstrate the presence of an adequate confining zone, consisting of a geologic formation, group of formations, or part of a formation that can prevent the migration of injected or displaced fluids into protected water. If an adequate confining zone is not present, fracturing must be prohibited, and;
    - Identify all geologic features, including but not limited to known or suspected faults, that may act as migration pathways for injected fluids or displaced formation fluids to reach protected water and assess the risk that the fracture treatment will communicate with

such geologic features. If identified geologic features may act as migration pathways and are at-risk for communication, the fracturing design must be revised to ensure that the treatment will not communicate with such features or the well must be re-sited.

- Ensure that all groundwater with potential beneficial uses is protected from contamination by hydraulic fracturing activities and waste disposal, taking into account modern water treatment methods and groundwater availability and demand.
- Require operators to develop strategies to minimize use of fresh water or water with other beneficial uses and to develop reuse and recycling plans.
- Prohibit the direct injection of contaminants into protected or usable water unless operators can demonstrate that (1) the water does not now and will not in the future serve as a source of usable water, taking into account modern treatment methods and groundwater availability and demand, or (2) the water can be restored to its original or better quality.
- Wells that will be stimulated must be sited such that a suitable confining zone is present. The owner or operator must demonstrate to the satisfaction of the BLM that the confining zone:
    - Is of sufficient areal extent to prevent the movement of injected or displaced fluids into protected water;
    - Is sufficiently impermeable to prevent the vertical migration of injected or displaced fluids;
    - Is free of transmissive faults or fractures that could allow the movement of injected or displaced fluids above the stimulated zone, and;
    - Contains at least one formation of sufficient thickness and with geomechanical characteristics capable of preventing or arresting vertical propagation of fractures.
- A physical barrier on the ground surface for all production facilities should be required for all hydraulic fracturing operations, regardless of whether hazardous materials will be used. Such secondary containment must be required for all hydraulic fracturing equipment and material including flowback fluid tanks; waste handling tanks; additive containers; and chemical and waste transport, mixing, and pumping equipment. Such secondary containment must:
    - Be designed and constructed in accordance with good engineering practices;
    - Be constructed, coated or lined with materials that are chemically compatible with the environment and the substances to be contained;
    - Provide adequate freeboard;
    - Be protected from heavy vehicle or equipment traffic; and
    - Have a volume of at least 110 percent of the largest storage tank within the containment area.

- Require best practices for well design, construction, and maintenance to ensure wells can withstand the stresses of hydraulic fracturing activities.[287]

BLM must analyze these proposed measures to protect groundwater before issuing the APDs.

## VI. BLM must take a hard look at climate impacts and consider a reasonable alternative of managed decline of GHG emissions from the APDs.

There is no remaining room in the carbon budget for incremental additions of greenhouse gas (GHG) emissions. BLM must therefore take a hard look at the climate change impacts of authorizing additional APDs. BLM must also consider a reasonable alternative of managed decline of GHG emissions from the APDs, before issuing their approval.

### A. BLM has a duty under FLPMA and NEPA to avoid catastrophic climate change in oil and gas permitting decisions.

BLM has a legal duty to avoid catastrophic climate change in oil and gas permitting decisions. Under FLPMA, BLM, in its decisions about whether and how to approve new APDs, must:

- Protect public land values including air and atmospheric, water resource, ecological, environmental, and scenic values, and to preserve and protect "certain public lands in their natural condition," and "food and habitat for fish and wildlife"[288];
- Account for "the long-term needs of future generations"[289];
- Prevent "permanent impairment of the productivity of the land and quality of the environment"[290]; and
- "[T]ake any action necessary to prevent unnecessary or undue degradation of the lands."[291]

These mandates, given the climate emergency and its past, current, and projected future harms, render approval of new fossil fuel infrastructure or development on public lands unjustifiable in fact, law, or policy, as articulated in President Biden's January 27, 2021 Executive Order 14008 on "Tackling the Climate Crisis at Home and Abroad" ("EO 14008"). EO 14008 recognizes that taking action to address the climate crisis is "more necessary and urgent than ever":

> The scientific community has made clear that the scale and speed of necessary action is greater than previously believed. There is little time left to avoid setting the world on a dangerous, potentially catastrophic, climate trajectory. Responding

[287] *Id.*
[288] 43 U.S.C. § 1701(a)(8).
[289] 43 U.S.C. § 1702(c).
[290] 43 U.S.C. § 1702(c).
[291] 43 U.S.C. § 1732(b).

> to the climate crisis will require both significant short-term global reductions in greenhouse gas emissions and net-zero global emissions by mid-century or before.[292]

EO 14008 also establishes national policy that places the climate crisis "at the center of U.S. foreign policy and national security."[293] It sets forth policy to "organize and deploy the *full capacity* of its agencies to combat the climate crisis to implement a Government-wide approach that reduces climate pollution in every sector of the economy."[294] EO 14008 prioritizes bolstering climate change resilience: "The United States will also move quickly to build resilience, both at home and abroad, against the impacts of climate change that are already manifest and will continue to intensify according to current trajectories."[295] This includes taking action to "conserve[] our lands, waters, and biodiversity"[296] and specifically to "achieve the goal of conserving at least 30 percent of our lands and waters by 2030" (the "30x30" goal or initiative).[297]

These policies, in combination with FLPMA's mandates and well-established facts relating to the climate emergency and its past, ongoing, and potential future harms, militate strongly to avoid catastrophic climate change in oil and gas permitting decisions. Additionally, NEPA requires BLM to consider ways to avoid, minimize, and mitigate impacts in accordance with the mitigation hierarchy.[298] Specifically, agencies must "include appropriate mitigation measures not already included in the proposed action or alternatives."[299] BLM must, in order, seek to avoid impacts, minimize impacts, and, only if those approaches are insufficient to fully mitigate the impacts, appropriately and sufficiently offset any remaining impacts. Thus, based on site-specific NEPA reviews that rationally connect to FLPMA's mandates, BLM must impose constraints on new well approvals to avoid catastrophic climate change and protect and advance the public interest.[300] This includes the robust use by BLM of conditions of approval to, in sequenced priority, avoid, mitigate, or compensate for climate, public lands, or community impacts.[301]

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[292] Executive Order (EO) 14008 (Jan. 27, 2021), § 101.
[293] *Id.*
[294] *Id.* § 201 (emphasis added).
[295] *Id.* § 101.
[296] *Id.* § 201.
[297] *Id.* § 206. *See also id*. § 215 (establishing Civilian Climate Corps Initiative, which "shall aim to conserve and restore public lands and waters," "protect biodiversity," and "address the changing climate," among other things).
[298] 40 C.F.R. §§ 1508.8, 1502.14, 1502.16, 1508.20.
[299] *Id.* §§ 1502.14(e), 1502.16(h).
[300] *See* B.M. Pendery. (2010). *BLM's Retained Rights: How Requiring Environmental Protection Fulfills Oil and Gas Lease Obligations*.
[301] *See* 43 U.S.C. §§ 1701(a)(8), 1702(c), 1732(b); 43 C.F.R. § 3101.1-2; *Yates Petroleum Inc*., 176 I.B.L.A. 144, 154 (2008) (upholding conditions of approval more stringent than provisions contained in the overarching resource management plan).

Under FLPMA, BLM is required to manage public lands on the basis of multiple use and sustained yield.[302] This in turn requires consideration of "the present and future needs of the American people," providing for "the long-term needs of future generations," and ensuring the "harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment [considering] the relative values of the resources."[303] As the Supreme Court has explained:

> "Multiple use management" is a deceptively simple term that describes the enormously complicated task of striking a balance among the many competing uses to which land can be put, "including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and [uses serving] natural scenic, scientific and historical values."

*Norton v. S. Utah Wilderness Alliance*, 542 U.S. 55, 58 (2004) (quoting 43 U.S.C. § 1702(c)).

In recognition of the environmental components of the multiple use mandate, courts have repeatedly held that development of public lands is not required but must instead be weighed against other possible uses, including conservation to protect environmental values. *See, e.g.*, *New Mexico ex rel. Richardson v. BLM*, 565 F.3d 683, 710 (10th Cir. 2009) ("BLM's obligation to manage for multiple use does not mean that development *must* be allowed. . . . Development is a *possible* use, which BLM must weigh against other possible uses—including conservation to protect environmental values, which are best assessed through the NEPA process." (emphasis in original)); *Wilderness Workshop v. BLM*, 342 F. Supp. 3d 1145, 1166 (D. Colo. 2018) ("[T]he principle of multiple use does not require BLM to prioritize development over other uses" (internal quotations and citations omitted).). Just as BLM can deny a project outright to protect the environmental uses of public lands, it can also condition a project's approval on the commitment to mitigation measures that lessen environmental impacts. *See, e.g.*, *Pub. Lands Council v. Babbitt*, 167 F.3d 1287, 1300–01 (10th Cir. 1999) ("FLPMA unambiguously authorizes the Secretary to specify terms and conditions in livestock grazing permits in accordance with land use plans."); *Grynberg Petro*, 152 IBLA 300, 307–08 (2000) (describing how appellants challenging conditions of approval bear the burden of establishing that they are "unreasonable or not supported by the data").

The multiple use framework's emphasis both on environmental resources and the need to balance between present and future generations is highly relevant to consideration of climate change-related impacts. Climate change will inevitably affect future generations more than present ones and threatens to deplete a variety of resources—both renewable and nonrenewable. In addition, climate change is affecting and will continue to affect every other resource value included in the multiple use framework, whether environmental, recreational, or economic in nature, due to the many changes it is causing to the ecosystems of public lands and increased threats from natural disasters. In this context, satisfying FLPMA's multiple use and sustained yield mandate requires full consideration and mitigation of climate impacts as a condition of approval on any development decisions.

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[302] 43 U.S.C. § 1732(a).
[303] *Id.* § 1702(c).

Second, mitigation of GHG emissions to the greatest extent possible is also required to satisfy BLM's obligation to prevent unnecessary or undue degradation (UUD) under FLPMA.[304] In other contexts, BLM has defined its obligation to avoid UUD as requiring mitigation for adverse impacts.[305] The Interior Board of Land Appeals (IBLA) and courts have likewise recognized that BLM has authority to incorporate mitigation measures into project authorizations to prevent UUD. *See, e.g.*, *Theodore Roosevelt Conservation P'ship v. Salazar*, 661 F.3d 66, 76, 78 (D.C. Cir. 2011) (citing with approval *Biodiversity Conservation Alliance*, 174 IBLA 1, 5–6 (Mar. 3, 2008), which held that an environmental impact may rise to the level of UUD if it results in "something more than the usual effects anticipated from development, subject to *appropriate mitigation*" (emphasis added)); *Biodiversity Conservation Alliance v. BLM*, No. 09-CV-08-J, 2010 U.S. Dist. LEXIS 62431, at *1, *27 (D. Wyo. June 10, 2010) (holding infill drilling project would not result in UUD where BLM required enforceable mitigation of project impacts).

Given the catastrophic impacts of climate change on public lands, multiple uses, and future generations, avoiding UUD requires BLM to ensure no new GHG emissions from any development decisions that are incompatible with climate science and limiting warming to 1.5 degrees Celsius. Given the global nature of climate change, it is *never* necessary to have an incremental increase in GHG emissions, because any emissions can and must be fully avoided or, at the least, mitigated.

If BLM is to rely on an EA instead of an EIS (which it should not do here) to evaluate an action with likely significant environmental effects, it must impose mitigation of those impacts in a mitigated FONSI. *See, e.g.*, *Environmental Prot. Info. Ctr. v. United States Forest Serv.*, 451 F.3d 1005, 1011–12 (9th Cir. 2006); *Nat'l Audubon Soc'y v. Hoffman*, 132 F.3d 7, 11, 17 (2nd Cir. 1997). NEPA requires BLM to consider ways to avoid, minimize, and mitigate impacts in accord with the mitigation hierarchy. 40 C.F.R. § 1508.1(s). Specifically, agencies must "include appropriate mitigation measures not already included in the proposed action or alternatives." *Id.* § 1502.14(e). BLM must, in order, seek to avoid impacts, minimize impacts, and, only if those approaches are insufficient to fully mitigate the impacts, appropriately and sufficiently offset any remaining impacts. *Id.* § 1508.1(s).

BLM has failed to adequately identify or evaluate mitigation measures or discuss requiring mitigation in order to address GHG emissions. The Specialist Report lists several mitigation measures,[306] but BLM fails to include (let alone evaluate) or require any adequate

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[304] 43 U.S.C. § 1732(b) (requiring BLM "[i]n managing the public lands . . . [to] take any action necessary to prevent unnecessary or undue degradation of the lands"); *see also Rocky Mountain Oil & Gas Ass'n v. Watt*, 696 F.2d 734, 739 (10th Cir. 1982) ("In general, the BLM is to prevent unnecessary or undue degradation of the public lands.").

[305] *E.g.*, 43 C.F.R. §§ 3809.5, 3809.420(a)(4) (stating that, in the hard rock mining context, UUD means conditions, activities, or practices that are not "reasonably incident" to the mining operation or that fail to comply with other laws or standards of performance, which include "mitigation measures specified by BLM to protect public lands").

[306] Specialist Report at 100–05.

measures for mitigating GHG emissions and resulting climate impacts associated with these permitting decisions. This failure violates BLM's obligations under NEPA and FLPMA.

BLM must impose constraints on new APD approvals to avoid catastrophic climate change and protect and advance the public interest.[307] FLPMA's broad policy directives support this approach. For instance, FLPMA calls on BLM to 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."[308] It also directs BLM to receive "fair market value" for the use of public lands.[309] "Fair market value" is not defined in FLPMA, but BLM's economic valuation handbook and previous working groups convened by the Department of the Interior indicate that "economic, environmental, and social considerations [should be considered] in determining the value of federal lands—including option value."[310] Because climate change, and thus all emissions of GHGs, create costs to be borne by society at large and by the BLM in adapting its lands to the changing climate, the "fair market value" of oil and gas extraction activities should take carbon costs into consideration.

### B. BLM must consider recent climate science and quantify and assess the impacts of the greenhouse gas emissions that will result from the proposed drilling.

BLM must properly analyze and quantify the direct, indirect, and cumulative greenhouse gas pollution that would result from the construction and operation of the proposed wells. This includes analyzing the impacts of those emissions on climate change and on the human environment resulting from climate change.

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 proposed drilling and other past, present, and reasonably foreseeable federal and non-federal 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.[311] Court decisions clearly

[307] *See* B.M. Pendery. (2010). *BLM's Retained Rights: How Requiring Environmental Protection Fulfills Oil and Gas Lease Obligations.*
[308] 43 U.S.C. § 1701(a)(8) (emphasis added).
[309] *Id.* § 1701(a)(9).
[310] *See* New York University School of Law, Institute for Policy Integrity. (2020). *Look Before You Lease; Reducing Fossil Fuel Dominance on Public Lands by Accounting for Option Value* at 4 (citing J.F. Hein. (2018). *Federal Lands and Fossil Fuels: Maximizing Social Welfare in Federal Energy Leasing*, Harvard Environmental Law Review at 39–40).
[311] 40 C.F.R. §§ 1500.1 (requiring "high quality information" and "accurate scientific analysis"); 1502.16 (outlining what is required in an impacts analysis); 1508.7 (defining cumulative impacts); 1508.8 (defining direct and indirect impacts).

establish that NEPA mandates consideration and analysis of the indirect and cumulative climate impacts of BLM's fossil fuel production decisions, including at the leasing and drilling stages.[312]

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 GHGs, in particular carbon dioxide and methane. There is a near-linear relationship between cumulative anthropogenic CO2 emissions and the global warming they cause, where each 1000 GtCO2 of emissions causes a 0.45 degree Celsius increase in global surface temperature.[313] Carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are recognized as the key greenhouse gases contributing to climate change. In 2009, EPA found that these "six greenhouse gases taken in combination endanger both the public health and the public welfare of current and future generations."[314] The D.C. Circuit has upheld this decision as supported by the vast body of scientific evidence on the subject.[315]

In addition to complying with NEPA, BLM must ensure the climate change analysis for this proposed drilling complies with the Administrative Procedure Act, 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."[316] 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."[317]

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[312] *Citizens for a Healthy Community v. BLM*, No. 1:17-cv-2519 (D. Colo. Mar. 27, 2019) ("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 [of] 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.*, 326 F. Supp. 3d at 1242–43 (collecting cases and requiring assessment of GHG 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 at the RMP stage); *Sierra Club v. Fed. Energy Regulatory Comm'n*, 867 F.3d 1357, 1374 (D.C. Cir. 2017) (requiring quantification of indirect GHG emissions); *Nat'l Highway Traffic. Admin.*, 538 F.3d at 1215 (requiring assessment of the cumulative impacts of climate change).

[313] Intergovernmental Panel on Climate Change (IPCC). (2021). *2021: Summary for Policymakers*, Climate Change 2021: The Physical Science Basis, Contribution of Working Group I to the Sixth Assessment Report of the IPCC at 36.

[314] 74 Fed. Reg. 66,496 (Dec. 15, 2009).

[315] *See Coal. for Responsible Regulation, Inc. v. EPA*, 684 F.3d 102, 120-22 (D.C. Cir. 2012).

[316] 5 U.S.C. § 706(2)(A).

[317] *Motor Vehicle Mfrs. Ass'n*, 463 U.S. at 43.

### 1. 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 socioeconomic 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.[318] 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 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-20$^{th}$ 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.[319]

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[318] IPCC. (2014). *Climate Change 2014 Synthesis Report, Summary for Policymakers*, available at: http://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf (accessed Oct. 21, 2021).
[319] *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 degree Celsius warming and 2.0 degree Celsius warming are significant and that rapid transition away from fossil fuels is needed if we are to limit the impacts of climate change.[320] Specifically, the IPCC found:

- Human activities are estimated to have caused approximately 1.0 degree Celsius of global warming above pre-industrial levels, with a likely range of 0.8 degrees Celsius to 1.2 degrees Celsius. Global warming is likely to reach 1.5 degrees Celsius 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 degrees Celsius.
- Climate models project robust differences in regional climate characteristics between present-day and global warming of 1.5 degrees Celsius, and between 1.5 degrees Celsius and 2 degrees Celsius. 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 degrees Celsius of global warming compared to 2 degrees Celsius. Limiting global warming to 1.5 degrees Celsius compared to 2 degrees Celsius 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 degrees Celsius and increase further with 2 degrees Celsius.
- Pathways limiting global warming to 1.5 degrees Celsius 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.[321]

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[320] *See* IPCC. (2018). *Special Report Global Warming of 1.5 Degrees: Summary for Policy Makers*, available at: https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf (accessed Oct. 27, 2021).

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

In August 2021, IPCC issued the Sixth Assessment Report (AR6), updating earlier assessment reports with renewed urgency and specificity about the causes, effects, rates, extents, and severity of anthropogenic warming, and the correspondingly urgent need to rapidly curtail fossil fuel combustion to maintain favorable chances of avoiding 1.5 degrees Celsius warming.[322] Specifically, the IPCC found:

- It is unequivocal that human influence has warmed the atmosphere, ocean, and land. Human influence has warmed the climate at a rate that is unprecedented in at least the last 2,000 years. Widespread and rapid changes in the atmosphere, ocean, cryosphere, and biosphere have occurred.
- The scale of recent changes across the climate system as a whole and the present state of many aspects of the climate system are unprecedented over many centuries to many thousands of years.
- In 2019, concentrations of $CO_2$ in the atmosphere were higher than at any time in at least the last two million years.
- Every ton of $CO_2$ adds to global warming. With every additional increment of global warming, changes in extremes continue to become larger. Every additional 0.5 degrees Celsius of global warming causes clearly discernible increases in the intensity and frequency of hot extremes, heavy precipitation, and agricultural and ecological droughts.
- Human-induced climate change is already affecting many weather and climate extremes in every region across the globe. Evidence of observed changes in extremes such as heatwaves, heavy precipitation, droughts, and tropical cyclones, and, in particular, their attribution to human influence, has strengthened since the Fifth Assessment Report (AR5).
- Many changes in the climate system become larger in direct relation to increasing global warming. They include increases in the frequency and intensity of hot extremes, marine heatwaves, and heavy precipitation, agricultural and ecological droughts in some regions, and proportion of intense tropical cyclones, as well as reductions in Arctic sea ice, snow cover, and permafrost.
- Continued global warming is projected to further intensify the global water cycle, including its variability, global monsoon precipitation, and the severity of wet and dry events.
- With further global warming, every region is projected to increasingly experience concurrent and multiple changes in climatic impact-drivers. Changes in several climatic impact-drivers would be more widespread at 2 degrees Celsius compared to 1.5 degrees Celsius global warming and even more widespread and/or pronounced for higher warming levels.
- The remaining global carbon budget, from the beginning of 2020, is 400 and 300 $GtCO_2$ for maintaining 67 percent and 83 percent likelihoods, respectively, of limiting global warming to 1.5 degrees Celsius.

[322] IPCC. (2018). *Special Report Global Warming of 1.5 Degrees: Summary for Policy Makers*.

With 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 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 wellbeing.
- 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 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.[323]

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 who live and work in coastal areas and would put billion of 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 state's already limited water supply.

[323] *See* P. Gonzales et al. (2018). *Chapter 25: Southwest, in U.S. Global Change Research Program*, Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Vol. II, available at: https://nca2018.globalchange.gov/chapter/25/ (accessed Oct. 21, 2021).

- Forestry and higher risk of forest fires: As demonstrated by the recent record-setting fire season,[324] 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.
- 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.[325]

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").[326] The Final Climate Guidance applies to all proposed federal agency actions, "including land and resource management actions."[327] In its Final Climate Guidance, the CEQ recognizes 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

[324] A. Freedman. (2020). *California Endures Record-Setting 'Kiln-like' Heat as Fires Rage, Causing Injuries*, available at: https://www.washingtonpost.com/weather/2020/09/06/california-wildfires-heat-wave/ (accessed Aug. 29, 2021).
[325] Cal. DOJ. (2013). *Climate Change Impacts in California*, available at: https://oag.ca.gov/environment/impact (accessed Aug. 29, 2021).
[326] CEQ. (2016). *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*, available at: https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/nepa_final_ghg_guidance.pdf (accessed Oct. 21, 2021).
[327] 81 Fed. Reg. 51,866 (Aug. 5, 2016).

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.[328]

### 2. NEPA mandates the consideration of direct, indirect, and cumulative climate impacts of greenhouse gas emissions from oil and gas production.

Analysis of the direct, indirect, and cumulative climate impacts of BLM oil and gas drilling 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 notoriously dirty tar sands crude,[329] and California-sourced crude is becoming more carbon-intensive over time.[330]

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 ten.[331] 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.[332]

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[328] CEQ. (2016). *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*.

[329] S. Wolf & K. Siegel. (2017). *Oil Stain: How Dirty Crude Undercuts California's Climate Progress,* Center for Biological Diversity, available at: https://www.biologicaldiversity.org/programs/climate_law_institute/energy_and_global_warming/pdfs/Oil_Stain.pdf (accessed Oct. 21, 2021).

[330] J. Fleming. (2021). *Killer Crude: How California Produces Some of the Dirtiest, Most Dangerous Oil in the World*.

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

[332] S. Wolf & K. Siegel. (2017). *Oil Stain: How Dirty Crude Undercuts California's Climate Progress*.

Meaningful consideration of greenhouse gas emissions is clearly within the scope of required NEPA review. *Nat'l Highway Traffic Safety Admin*., 538 F.3d at 1217. 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."[333]

The courts have ruled that federal agencies must consider indirect GHG emissions resulting from agency policy, regulatory, and leasing decisions. For example, agencies cannot ignore the indirect air quality and climate change impacts of decisions that would open up access to coal reserves.[334]

Furthermore, BLM is required to assess recent science and include high quality information in its NEPA analyses. Thus, the BLM must consider several recent studies that have determined that existing fossil fuel reserves would push the world beyond warming of 1.5 degrees Celsius and 2 degrees Celsius above pre-industrial levels.[335]

In all its decisionmaking processes, BLM must meaningfully consider alternatives that reduce GHG emissions consistent with 1.5 degrees Celsius climate targets, including the phase-out of fossil fuel production. Where, as here, the climate consequences of BLM planning, leasing, and drilling 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 lifecycle impacts of production, processing, transport, and combustion; market and energy impacts of cumulative BLM leasing and production decisions; and the effects of methane venting, flaring, and leakage. Further, these indirect and cumulative

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[333] *Nat'l Highway Traffic Safety Admin*., 538 F.3d at 1216 (quoting 40 C.F.R. § 1508.7).
[334] *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 Ctr. 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).
[335] *See* K. Trout & L. Stockman, Oil Change International. (2019). *Drilling Toward Disaster: Why U.S. Oil & Gas Expansion is Incompatible with Climate Limits* at 1, 6, 11, available at: http://priceofoil.org/content/uploads/2019/01/Drilling-Towards-Disaster-Web-v3.pdf (accessed Oct. 21, 2021); SEI, IISD, ODI, E3G & UNEP. (2021). *The Production Gap Report: 2020 Special Report*, available at: http://productiongap.org/2020report (accessed Oct. 21, 2021); P. Achakulwisut & P. Erickson. (2021). *Trends in Fossil Fuel Extraction: Implications for a Shared Effort to Align Global Fossil Fuel Production with Climate Limits*, Stockholm Environment Institute, available at: www.sei.org/publications/trends-in-fossil-fuel-extraction/ (accessed Oct. 21, 2021).

impacts must be given meaningful context, including national and regional carbon budgets, rather than simply dismissed as insignificant compared to global totals.

NEPA requires "reasonable forecasting," which includes the consideration of "reasonably foreseeable future actions . . . even if they are not specific proposals." *N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1079 (9th Cir. 2011) (citation omitted). 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." *Id.* 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. *Sierra Club v. Federal Energy Regulatory Comm'n*, 863 F.3d 1357, 1373-74 (D.C. Cir. 2017).

The CEQ's Final Climate Guidance is dispositive on the issue of federal agency review of GHG emissions as foreseeable direct and indirect effects of the proposed action.[336] The CEQ guidance provides clear direction for BLM to conduct a lifecycle GHG 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 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.[337]

CEQ's guidance even provides an example of where a lifecycle analysis is appropriate in a leasing and drilling context:

> 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

[336] 81 Fed. Reg. 51,866 (Aug. 5, 2016).
[337] CEQ. (2016). *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* at 16.

> end-use of the fossil fuel being extracted would be the reasonably foreseeable combustion of that coal.[338]

Although the 2016 CEQ guidance was "withdrawn for further consideration,"[339] the underlying requirement to consider climate change impacts under NEPA, including indirect and cumulative combustion impacts foreseeably resulting from fossil fuels leasing and drilling decisions, has not changed.[340] Further, President Biden on January 20, 2021 rescinded that Trump Executive Order, and directed CEQ to "review, revise, and update" its 2016 climate guidance.[341] On February 19, 2021, CEQ effectively reinstated the 2016 GHG guidance:

> CEQ will address in a separate notice its review of and any appropriate revisions and updates to the 2016 GHG Guidance. In the interim, agencies should consider all available tools and resources in assessing GHG emissions and climate change effects of their proposed actions, including, as appropriate and relevant, the 2016 GHG Guidance.[342]

It is reasonably foreseeable, as opposed to speculative, that these APDs will induce oil and natural gas production, transmission, and ultimate end-user climate pollution and impacts. The effects of this induced production must be considered in an EA and, in fact, given the context of a nearly exhausted global carbon budget, necessitate a more robust review under an EIS. *See*, *e.g.*, *N. Plains Res. Council, Inc.*, 668 F.3d at 1081-82 (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 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*, 345 F.3d at 549 (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. U.S. 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).

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

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[338] *Id.*
[339] 82 Fed. Reg. 16,576 (Apr. 5, 2017).
[340] *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; *Diné Citizens Against Ruining Our Env't*, 82 F. Supp. 3d at 1201; *High Country Conservation Advocates*, 52 F. Supp. 3d at 1174.
[341] 86 Fed. Reg. 7037, 7040, 7042 (Jan. 25, 2021).
[342] 86 Fed. Reg. 10,252 (Feb. 19, 2021).

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. U.S. 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").[343]

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 GHG 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. As the most recent scientific information demonstrates, *any* additional, currently unaccounted for increase in GHG emissions from fossil fuel consumption is unwarranted and increases the likelihood of failing to limit warming to 1.5 degrees Celsius. Because the cumulative climate impacts of federal fossil fuel programs have never faced a hard look analysis under NEPA, no individual drilling proposal can lawfully be dismissed as insignificant or de minimis. *Any* emissions source, no matter how small, is potentially significant, such that BLM should fully explore mitigation and avoidance options for all sources.

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.[344] The results "indicate that anthropogenic fossil [methane] emissions are underestimated by about 38 to 58 teragrams $CH_4$ per year, or about 25 to 40 percent of recent

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[343] *See also* CEQ. (2016). *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* at 14. 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 decisionmaking.

[344] B. Hmiel et. al. (2020). *Preindustrial $^{14}CH_4$ Indicates Greater Anthropogenic Fossil $CH_4$ Emissions*, Nature, at 409.

estimates."[345] This "highlights the human impact on the atmosphere and climate, [and] provides a firm target for inventories of the global [methane] budget."[346] BLM must consider what implications its drilling decisions will have against this backdrop of new information.

BLM must quantify the potential production volumes and corresponding lifecycle GHG emissions that will result from the proposed APDs. BLM must also account for emissions potentials specific to California, because of the energy-intensive nature of crude oil extraction as explained in the earlier sections. Potential lifecycle GHG emissions for resultant oil and gas volumes were generated using a peer-reviewed carbon calculator and lifecycle GHG emissions model developed by EcoShift consulting.[347] This model is not novel in its development or methodology. Numerous GHG calculation tools exist to develop lifecycle analyses, particularly for fossil fuel extraction, operations, transport, and end-user emissions.[348] Indeed, the U.S. Department of Energy has historically utilized these types of lifecycle emissions analyses in NEPA reviews of oil and gas infrastructure projects.[349] Other federal agencies have begun to employ upstream, downstream, and lifecycle GHG emissions analyses for NEPA review of

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[345] *Id.*
[346] *Id.*
[347] *See* Ecoshift Consulting. (2015). *The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels, Center for Biological Diversity and Friends of the Earth*, available at: http://www.ecoshiftconsulting.com/wp-content/uploads/Potential-Greenhouse-Gas-Emissions-U-S-Federal-Fossil-Fuels.pdf (accessed Oct. 27, 2021).
[348] *See* CEQ. (2014). *Revised Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts*, available at: https://www.energy.gov/nepa/articles/revised-draft-guidance-consideration-greenhouse-gas-emissions-and-climate-change-nepa (accessed Oct 28, 2021).
[349] U.S. Department of Energy, National Energy Technology Laboratory (US DOE NETL). (2014). *Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States*, DOE/NETL-2014/1649, available at: http://energy.gov/sites/prod/files/2014/05/f16/Life%20Cycle%20GHG%20Perspective%20Report.pdf (accessed Oct. 21, 2021). *See also,* U.S. Department of Energy, National Renewable Energy Laboratory (US DOE NREL). (2013). *Life Cycle Greenhouse Gas Emissions from Electricity Generation Fact Sheet,* Pub No. NREL/FS-6A20-57817, available at: http://www.nrel.gov/docs/fy13osti/57187.pdf (accessed Oct. 21, 2021); US DOE NETL. (2012). *Role of Alternative Energy Sources: Natural Gas Technology Assessment,* Pub No. DOE/NETL-2012/1539, available at: https://netl.doe.gov/projects/files/FY12_RoleofAlternativeEnergySourcesNaturalGasTechnologyAssessment_060112.pdf (accessed Oct. 27, 2021); US DOE NETL. (2011). *Life Cycle Greenhouse Gas Inventory of Natural Gas Extraction, Delivery and Electricity Production,* Pub No. DOE/NETL-2011/1522, available at: https://fossil.energy.gov/ng_regulation/sites/default/files/programs/gasregulation/authorizations/2012/applications/sierra_exhibits_12_100_LNG/Ex._89_-_Skone_Life_Cycle_GHG_Inventory_.pdf (accessed Oct. 27, 2021); US DOE NETL. (2010). *Life Cycle Analysis: Natural Gas Combined Cycle (NGCC) Power Plant,* Pub No DOE/NETL-403-110509, available at: https://www.netl.doe.gov/projects/files/FY13_LifeCycleAnalysisNaturalGasCombinedCycle(NGCC)PowerPlantFinal_060113.pdf (accessed Oct. 27, 2021).

energy-related projects.[350] 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.").[351]

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[350] BLM. (2015). *Final Supplemental Environmental Impact Statement for the Leasing and Underground Mining of the Greens Hollow Federal Coal Lease Tract, UTU-84102* at 286-87 (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. 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. (2013). *Record of Decision and Final Environmental Impact Statement, Oil and Gas Leasing Analysis, Fishlake National Forest* at 169 (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. (2012). *Final Environmental Impact Statement: Alaska Stand Alone Gas Pipeline*, Vol. 2 Sec. 5.20-70–71. 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. (2014). *Final Supplemental Environmental Impact Statement for the Keystone XL Project*, § 4.14.3, Appendix U (The Department of State, as lead agency on the Keystone XL Pipeline Review, conducted a relatively comprehensive lifecycle GHG analysis for the proposed pipeline, alternatives, and baseline scenarios that could occur if the pipeline was not constructed.). EPA Region X. (2013). *Letter from Dennis McLerran, Regional Administrator, to Randel Perry, U.S. Army Corps of Engineers Seattle District, re Gateway Pacific Projects* (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.).

[351] *High Country Conservation Advocates*, 52 F. Supp. 3d at 1174 (court held that the agencies' failure to quantify the effect of 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 Diné Citizens Against Ruining Our Env't*, 82 F. Supp. 3d at 1213-18 (court held that the agency failed to adequately consider the reasonably foreseeable combustion-related downstream effects of the proposed action, and that combustion emissions associated with a mine that fed a single power plant were reasonably foreseeable because the agency knew where the coal would be consumed).

### 3. BLM must quantify the cumulative lifecycle greenhouse gas emissions of oil and gas production and assign significance to the impacts of those emissions on climate change.

BLM must properly analyze and quantify the direct, indirect, and cumulative GHG pollution that would result from the construction and operation of the proposed wells. This includes analyzing the impacts of those emissions on climate change and on the human environment resulting from climate change. BLM must engage in a robust examination of cumulative impacts of oil and gas production at the local, regional, and national, program-wide levels.

NEPA requires that BLM engage in a thorough 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 greenhouse gases and global carbon budgets. 40 C.F.R. § 1502.21(c); *Vecinos*, 6 F.4th at 1328-29.

An agency must "consider every significant aspect of the environmental impact of a proposed action." *Baltimore Gas & Elec. Co.*, 462 U.S. at 107. This includes the disclosure of direct, indirect, and cumulative impacts of its actions, including climate change impacts and emissions.[352] 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 decisionmaking 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.*, 274 F. Supp. 3d at 1097 (citing 42 U.S.C. § 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.[353] Section 4332(C) of NEPA is an "action-forcing" provision intended as a directive to all agencies to assure consideration of the environmental impact of their actions in decision-making. *Kleppe v. Sierra Club*, 427 U.S. 390, 409 (1976). Furthermore, "[a]n 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, but raising substantial questions whether a project may have a significant effect is sufficient." *Montana Envtl. Info. Ctr.*, 274 F.

[352] 40 C.F.R. § 1508.25(c).
[353] 42 U.S.C. § 4332(C).

Supp. 3d at 1099 (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 Finding of No Significant Impact (FONSI), and thus not to prepare an EIS, "the arbitrary and capricious standard under the [Administrative Procedure Act] 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 FONSI, 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 Biological Div*., 538 F.3d at 1223.

Estimating the tonnage of the project's GHG emissions is not enough to satisfy the NEPA requirement to assess a project's significance. *See Ctr. for Biological Diversity*, 538 F.3d at 1216 ("While the [environmental document] quantifies the expected amount of CO2 emitted . . . , it does not evaluate the 'incremental impact' that these emissions will have on climate change or on the environment more generally."); *Klamath-Siskiyou Wildlands Ctr.*, 387 F.3d at 995 ("A calculation of the total number of acres to be harvested in the watershed is a necessary component [of a NEPA analysis] but it is not a sufficient description of the actual environmental effects that can be expected from logging those acres."). To satisfy this requirement, BLM should provide the context of how emissions compare to GHG emissions targets and carbon budgets. BLM must also look to the Specialist Report and the wealth of high-quality information on climate change, which offer ample resources to make an assessment of significance.

The Specialist Report lays the groundwork for the analysis required to determine significance. By "comparing emissions levels between proposed actions, current emissions and conditions, and published predictions based on forecasted emission scenarios" BLM can "form a qualitative judgment about the potential for climate impacts from a proposed action."[354] This "analysis is also useful . . . to identify options for maximizing the effectiveness of mitigation and emissions reduction strategies."[355] While there is difficulty in "downscaling" impacts to a particular action, BLM can use existing information and analysis to judge "the potential for climate impacts from a proposed action."[356]

The proxy that BLM references in the Specialist Report and should use in aiding its significance determination here is the social cost of greenhouse gases (SC-GHG).[357]

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[354] Specialist Report at 64.
[355] *Id.*
[356] *Id.*
[357] Specialist Report at 11. *See also* Interagency Working Group on the Social Cost of Greenhouse Gases. (2021). *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide – Interim Estimates Under Executive Order 13,990* at 4; *Vecinos*, 6 F.4th at 1328-29; *California v. Bernhardt*, 472 F. Supp. 3d at 612-14 (emphasizing the importance of using social cost models based on the best available scientific data and finding BLM's use of an interim domestic measure to be arbitrary and capricious); *High Country Conservation Advocates*, 52 F. Supp. 3d at 1190-93.

Acknowledging that the SC-GHG values currently used by U.S. government agencies are very likely an underestimate[358] of the true costs and harms of climate change, because the models used to calculate the SC-GHG do not capture the full scope of climate harms, do not adequately account for risk, and use an inappropriately high discount rate, the SC-GHG is a useful and widely applied tool to quantify and communicate more of the costs of leasing and subsequent development.

Using the widely accepted SC-GHG metric for contextualizing the climate impacts of GHG emissions is consistent with climate science. The Biden Administration has recognized that the SC-GHG "facilitates sound decision-making" and called for using the metric in "decision-making."[359] BLM must take the logical next step of adequately applying the SC-GHG to determine whether the climate impacts of permitting decisions are significant. The agency has the means and ability to do so.[360]

Assessing significance is not, of course, solely a fact-based evaluation. Determining whether impacts are significant is a determination that requires reasoned judgment. While the social cost of greenhouse gases is a particularly helpful tool for determining significance, the BLM must also examine additional qualitative factors as detailed herein. A specific monetary threshold should therefore not be the exclusive metric for determining significance. Rather, it illustrates that BLM has the tools at its disposal to make a significance determination concerning GHG emissions. Given the breadth and depth of scientific information available to BLM and the robustness of the social cost of greenhouse gases tool, determining significance for these permitting actions is well within the agency's grasp. Indeed, NEPA requires it. Doing so properly will likely demonstrate that these permitting decisions incur significant environmental effects.

BLM should also conduct a cost-benefit analysis. Comparing an action's costs and benefits would provide context for the SC-GHG dollar amounts and crystalizes the need to choose the no-action alternative for these APD decisions.

Current NEPA regulations allow for analyzing costs and benefits as a means of weighing alternatives. 40 C.F.R. § 1502.22. The nature of GHG emissions and the resulting climate effects

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[358] *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide – Interim Estimates Under Executive Order 13,990* at 4. *See also* Friends of the Earth U.S. (2021). *Comments on 2021 Guidance Towards Updating the U.S. Social Cost of Greenhouse Gases*, available at: https://1bps6437gg8c169i0y1drtgz-wpengine.netdna-ssl.com/wp-content/uploads/2021/06/2021.6.21-FOE-Comments-SCGHG-AEC-FINAL.pdf (accessed Aug. 22, 2022).

[359] Exec. Order No. 13,990 § 5(a)–(b), 86 Fed. Reg. 7037 (Jan. 25, 2021).

[360] Moreover, BLM's duty to study the significance of the project's impacts does not depend on the availability of a perfect methodology for assessing those impacts. *Sierra Club v. FERC*, 867 F.3d 1357, 1374 (D.C. Cir. 2017) (*Sabal Trail*) ("some educated assumptions are inevitable in the NEPA process"). Agencies must use sound judgment to pick among available methodologies and use best efforts when precise tools are unavailable. 40 C.F.R. § 1502.21(c).

present a special instance where some of the important qualitative considerations are helpfully represented (in part) through the quantitative proxy of the social cost metric.

BLM should monetize not only the SC-GHG but also the costs of other environmental and public health impacts, including those discussed above. Those costs should then be compared with the projected monetized benefits of permitting under the various alternatives. Addressing the countervailing benefits of a permitting decision alongside the projected costs would allow BLM and the public to better compare alternatives and evaluate whether approving APDs that impose millions of dollars in social and environmental harm is justified.

The following charts offer an example of an approximate cost-benefit comparison using the SC-GHG on the cost side and estimated royalty revenue on the benefits side (which constitutes the vast majority of direct monetary benefits) from the first quarter of 2022 lease sales projections.[361]

[361] Total SC-GHG estimates over the lifespan of the proposed leases were pulled directly from the Q1 2022 lease sale Environmental Assessments conducted by eight different BLM offices. The location of the source tables are listed next to each state. Calculating expected annual royalty revenues across the lifespans of the proposed leases was a multi-step process. First, we use the reported lifespan production volumes from the EAs and applied the ratio of lifetime production for year 1, year 2, and so on from the Annual Report's production decline curves for average oil and gas wells by state. We harmonize the assumed 30-year span from the Annual Report to fit the varying by-state assumptions for the life of lease and production start years, in order to directly compare royalty revenues to the reported SC-GHG estimates. Next, we applied annual oil and gas price projections derived from the EIA to the by-year production estimates and assume the current 12.5 percent royalty rate. West Texas Intermediate spot price for oil ($2020/bbl) and natural gas spot prices at Henry Hub ($2020/mcf) come from EIA's STEO released on November 9, 2021 for 2022. For 2023 to 2050, we average the EIA AEO 2021 high oil price and reference case annual price projections to reflect a middle ground long-term forecast more in line with the current market outlook. For the states that assume lifespans of the proposed leases continuing past 2050, we use a linear trend to project spot prices out to 2062. All figures are reported in $2020. Unlike the SC-GHG figures, revenue figures are not, therefore, discounted—they are not shown in net present value—meaning the cost-to-benefit disparity is even greater than represented here.

**Costs vs. Revenues over Life of Leases in the Proposed Q1 2022 Actions (reported in $2020)**

| | Estimated Cost of Climate Damages to Society | | Estimated Revenue |
|---|---|---|---|
| | **Average Value, 3% discount rate** | **Average Value, 2.5% discount rate[362]** | **Royalty Revenue** |
| **CO (p. 36, tbl. 15; and p. 32, tbl. 11)** | $882,484,000 | $1,326,367,000 | $214,192,748 |
| **AL (p. 25, tbl. 10; and p. 20, tbl. 6)** | $4,100,000 | $6,173,000 | $1,150,121 |
| **MT-DK (p. 42, tbl. 17; p. 36, tbl. 10)** | $43,578,000 | $66,112,000 | $21,662,117 |
| **NV (p. 28, tbl. 13; p. 23, tbl. 9)** | $5,726,000 | $8,541,000 | $1,446,950 |
| **NM (p. 74, tbl. 3.25; p. 9, tbl. 3.1)** | $32,740,000 | $48,948,000 | $10,398,546 |
| **OK (p. 30, tbl. 3.11; p. 26, tbl. 3.7)** | $8,384,000 | $12,538,000 | $1,954,099 |
| **UT (p. 49, tbl. 18; p. 43, tbl. 11)** | $22,567,000 | $33,863,000 | $5,587,085 |
| **WY (p. 36, tbl. 3.21; p. 30, tbl. 3.12)** | $3,209,636,000 | $4,868,930,000 | $712,495,120 |
| **TOTAL (lifecycle SC-GHG)** | $4,209,215,000 | $6,371,472,000 | $968,886,786 |

[362] These discount rates are used for informational purposes. As the Interagency Working Group on the Social Cost of Greenhouse Gases explained in its recent technical support document, there is considerable evidence that the default estimate should be revised down, and that a 2.5 percent rate "likely underestimate[s] societal damages from [greenhouse gas] emissions." Interagency Working Group on the Social Cost of Greenhouse Gases. (2021). *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide – Interim Estimates Under Executive Order 13,990* at 4. In the context of long-term, intergenerational effects like climate damages, the case for a lower discount rate is strong, in light of ethical considerations and other factors. Multiple expert elicitations show a growing consensus around a discount rate below 2 percent, and factors like uncertainty, negative economic growth correlations, risk aversion, and the scarcity and non-substitutability of environmental goods all point strongly toward even lower discount rates. *See* P. Howard & J.A. Schwartz. (2021). *About Time: Recalibrating the Discount Rate for the Social Cost of Greenhouse Gases* at 10 (reporting such research and concluding that "the best empirical estimate of the discount rate based on long-term interest rates in the current period is under 1%—and is likely to remain under 2% or less for the foreseeable future").

Comparing across all states at the 3 percent or less discount rate shows that the costs clearly outweigh the benefits of leasing. This table leaves out numerous costs other than those of GHG emissions and climate damages. Analysis for these APD decisions would involve quite similar projections and likely lead to a similar result of the costs vastly outweighing any benefits.

Having comparative analysis such as this, which is well within the agency's capabilities, provides an important tool in choosing between alternatives, which must include consideration of choosing the no action alternative. An agency may choose the no action alternative even though it does not fulfill a project's purpose and need. *See, e.g.*, *Agdaagux Tribe of King Cove v. Jewell*, 128 F. Supp. 3d 1176, 1194 (D. Alaska 2015). The "agency's decision may be based on any relevant considerations of law or policy" and "as long as [those considerations] are explained in the decision document" the decision to choose the no action alternative is justified. *See, e.g.*, *id.*

Importantly, the cumulative lifecycle emissions from the proposed drilling, in combination with other federal fossil fuel production in the Bakersfield Field Office area and nationwide, should also be put in the context of the global and U.S. carbon budgets. These emissions, individually and cumulatively, are significant in the scope of global, national, state, and local-level commitments to implementing rapid GHG emissions reductions. At a time when the U.S. must rapidly ratchet down GHG emissions to avoid the worst dangers of climate change, 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. 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.

The United States has committed to the climate change target of holding the long-term global average temperature "to well below 2 degrees Celsius above pre-industrial levels and [to] pursu[e] efforts to limit the temperature increase to 1.5 degrees Celsius above pre-industrial levels" under the Paris Agreement.[363] 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. The Paris Agreement codifies the international consensus that climate change is an "urgent threat" of global concern.[364] The Agreement also requires a "well below 2°C" climate target because 2 degrees Celsius of warming is no longer considered a safe guardrail for avoiding catastrophic climate impacts and runaway climate change.

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[363] United Nations. (2015). Paris Agreement, art. 1(a), available at: https://unfccc.int/sites/default/files/english_paris_agreement.pdf (accessed Feb. 9, 2022) (hereafter UN Paris Agreement).
[364] UN Paris Agreement.

Immediate and aggressive GHG emissions reductions are necessary to keep warming well below a 2 degrees Celsius 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 degrees Celsius above pre-industrial levels, and to 400 $GtCO_2$ from 2011 onward for a 66 percent probability of limiting warming to 1.5 degrees Celsius. These carbon budgets have been reduced to 850 $GtCO_2$ and 240 $GtCO_2$, respectively, from 2015 onward. Most recently, an updated analysis of carbon budgets in the IPCC's Sixth Assessment Report estimates that the remaining global carbon budget from the beginning of 2020 is now only 400 and 300 $GtCO_2$ for maintaining 67 percent and 83 percent likelihoods, respectively, of limiting global warming to 1.5 degrees Celsius.[365]

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 principles and economics. Estimates of the remaining U.S. carbon budget consistent with meeting a 1.5 degrees Celsius target are negative or near zero and very limited.[366] Therefore, whatever remaining carbon budget that the U.S. still has left, if any, is very small and rapidly being consumed.

The landmark 2019 United Nations *Production Gap Report* used publicly available data to estimate the difference between fossil fuel volumes and emissions that countries are currently planning and what the IPCC estimates would be consistent with 1.5 degrees Celsius or 2 degrees Celsius pathways.[367] 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). That is 13 GtCO2, or 53 percent, more than would be consistent with a 2 degrees Celsius pathway (with an interquartile range of 11–15 GtCO2) and 120 percent or 21 GtCO2 (with a range of 18–23 GtCO2) greater than fossil fuel production levels consistent with a 1.5 degrees Celsius pathway. This gap grows wider by 2040, when production levels reach 110 percent (22 GtCO2, with a range of 18–24) and 210 percent (28 GtCO2, with a range of 27–31) higher than those consistent with the 2 degrees Celsius and 1.5 degrees Celsius pathways. The

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[365] IPCC. (2021). *2021: Summary for Policymakers*, Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the IPCC at Table SPM.2.

[366] N. Van den Berg et al. (2020). *Implications of Various Effort-Sharing Approaches for National Carbon Budgets and Emission Pathways,* Climatic Change at 162: 1805-1822, available at: https://link.springer.com/article/10.1007%2Fs10584-019-02368-y (accessed Oct. 27, 2021); K. Dooley et al. (2021). *Ethical Choices Behind Quantifications of Fair Contributions Under the Paris Agreement*, Nature Climate Change at 11: 300-305, available at: https://www.nature.com/articles/s41558-021-01015-8 (accessed Oct. 27, 2021).

[367] SEI, IISD, ODI, Climate Analytics, CICERO & UNEP. (2020). *The Production Gap: The Discrepancy Between Countries' Planned Fossil Fuel Production and Global Production Levels Consistent with Limiting Warming to 1.5°C or 2°C*, available at: http://productiongap.org/ (accessed Oct. 27, 2021).

subsequent 2020 *Production Gap Report* warned that the world must decrease fossil fuel production by roughly 6 percent per year between 2020 and 2030 to limit warming to 1.5 degrees Celsius. Instead, fossil fuel producers are planning and projecting an average annual increase of 2 percent, which by 2030 would result in more than double the production consistent with the 1.5 degrees Celsius limit.[368]

The 2021 *Fossil Fuel Exit Strategy* analysis similarly confirms that ending fossil fuel expansion and the early phase-out of existing extraction is necessary to meet the 1.5 degrees Celsius limit.[369] The analysis concluded that even if all new fossil fuel extraction were halted, in 2030 emissions from existing fossil fuel production would be 66 percent higher than what is needed to limit temperature rise to 1.5 degrees Celsius. The report estimated that global fossil fuel production will need to decline by an average of 9.5 percent for coal, 8.5 percent for oil, and 3.5 percent for gas per year between 2021 and 2030 to remain aligned with 1.5 degrees Celsius. The authors emphasized that "more fossil fuels are already being produced than what is needed, as the world has more than enough renewable energy resources that can be scaled up rapidly enough to meet the energy demands of every person in the world without any shortfall in global energy generation."[370] As a result, many existing fossil fuel projects are already obsolete and risk becoming stranded assets as they simply are not needed to meet demand and cannot compete with renewable energy.

In addition, a 2021 analysis concluded that globally at least 89 percent of coal reserves, 58 percent of oil reserves, and 59 percent of gas reserves must be kept in the ground in order to have even a 50-50 chance of meeting a 1.5 degrees Celsius limit.[371]

According to a U.S.-focused analysis,[372] 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 degrees Celsius limit, and would consume nearly the entire global budget for a 2 degrees Celsius limit.[373] 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.

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[368] SEI, IISD, ODI, E3G & UNEP. (2021). *The Production Gap Report: 2020 Special Report*.
[369] S. Teske & S. Niklas. (2021). *Fossil Fuel Exit Strategy: An Orderly Wind Down of Coal, Oil and Gas to Meet the Paris Agreement*, available at: https://fossilfueltreaty.org/exit-strategy (accessed Feb. 9, 2022).
[370] *Id.* at 5.
[371] D. Welsby et al. (2021). *Unextractable Fossil Fuels in a 1.5 °C World*, 597 Nature 230, available at: https://doi.org/10.1038/s41586-021-03821-8 (accessed Feb. 9, 2022).
[372] Ecoshift Consulting et al. (2015). *The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels*.
[373] *Id.* at 4.

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 degrees.[374]

In sum, the long-lived GHG emissions and fossil fuel infrastructure that would result from this drilling 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, BLM must draw upon the 2017 National Climate Assessment's Climate Science Special Report.[375] Key points from this scientific report highlight the urgent need to reduce GHG 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 degrees Fahrenheit (5 degrees Celsius) 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 degrees Fahrenheit (2 degrees Celsius) 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's system is pushed toward warming, the greater the risk of unanticipated changes and impacts, some of which are potentially large and irreversible.[376]

[374] M. Raupachet al. (2014). *Sharing a Quota on Cumulative Carbon Emissions*, 4 Nature Climate Change 873 at Supplementary Figure 7. For the United States, Raupach et al. (2014) provided a mid-range estimate of the U.S. carbon quota of 158 $GtCO_2$ for a 50 percent chance of staying below 2 degrees Celsius, using a "blended" scenario of sharing principles for allocating the global carbon budget among countries. This study estimated U.S. fossil fuel reserves at 716 $GtCO_2$, of which coal comprises the vast majority, indicating that most fossil fuel reserves in the U.S. must remain unburned to meet a well below 2 degrees Celsius carbon budget.
[375] U.S. Global Change Research Program. (2017). *Climate Science Special Report: Fourth National Climate Assessment*, Vol. I [Wuebbles, D.J. et al. (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 470 pp. (2017).
[376] *Id.* at 11.

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, BLM must prepare an EIS in order to evaluate the severity of the adverse effects of this action.[377]

**4. Any additional greenhouse gas emissions from currently unpermitted fossil fuel development are unacceptable and significant under NEPA.**

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 as 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] pursu[e] efforts to limit the temperature increase to 1.5°C above pre-industrial levels" under the Paris Agreement.[378] The Paris Agreement established the 1.5 degree Celsius climate target given the evidence that 2 degrees of warming would lead to catastrophic climate harms.[379] 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 the United States and global climate action.[380]

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 degrees

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[377] *See* 40 C.F.R. § 1508.27(b) (2006), where significance "requires considerations of both context and intensity," and intensity refers to the severity of impact; *see also* 40 C.F.R. § 1501.3 (2020).

[378] UN Paris Agreement, art. 1(a). 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 announced its intent to withdraw from the agreement, the United States at this time remains a party.

[379] IPCC. (2018). *Global Warming of 1.5°C*, available at: http://www.ipcc.ch/report/sr15/ (accessed Oct. 27, 2021), an IPCC special report on the impacts of global warming of 1.5 degrees Celsius above pre-industrial levels and related global GHG emissions pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.

[380] The 2018 IPCC *Global Warming of 1.5°C* estimated the carbon budget for a 66 percent probability of limiting warming to 1.5 degrees 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* IPCC. (2018). *Global Warming of 1.5°C*. Most recently, an updated analysis of carbon budgets in the IPCC's Sixth Assessment Report estimates that the remaining global carbon budget from the beginning of 2020 is now only 400 and 300 $GtCO_2$ for maintaining 67 percent and 83 percent likelihoods, respectively, of limiting global warming to 1.5 degrees Celsius.

Celsius.[381] The reserves in currently operating oil and gas fields alone, even excluding coal mines, would likely lead to warming beyond 1.5 degrees.[382] 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 or permits for extraction and infrastructure. 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 degrees.[383] 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 catastrophic damages from climate change.[384]

Complementary research shows that construction of new fossil fuel infrastructure projects, including but not limited to pipelines, import and export terminals, storage facilities, refineries, power plants and petrochemical plants, is also inconsistent with meeting the 1.5 degrees Celsius limit.[385] This research finds that the committed carbon emissions from *existing* fossil fuel infrastructure in the energy and industrial sectors exceed the carbon budget for limiting warming to 1.5 degrees Celsius, meaning that no new fossil infrastructure can be built and much existing infrastructure must be *retired early* to avoid catastrophic climate harms.[386]

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[381] Oil Change International. (2016). *The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production* at Table 3, available at: http://priceofoil.org/2016/09/22/the-skys-limit-report/ (accessed Oct. 27, 2021). 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 degrees Celsius-compatible carbon budget estimated in the 2018 IPCC Report on Global Warming of 1.5°C at 420 $GtCO_2$ to 570 $GtCO_2$.

[382] 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 degrees Celsius-compatible carbon budget estimated in the 2018 IPCC Report on Global Warming of 1.5 degrees Celsius at 420 $GtCO_2$ to 570 $GtCO_2$.

[383] Oil Change International. (2016). *The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production* at 5.

[384] 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 degrees Celsius (a target incompatible with the Paris Agreement) by 4 to 7 times, while fossil fuel resources exceed the carbon budget for 2 degrees by 31 to 50 times. *See* T. Bruckner 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 at Table 7.2.

[385] D. Tong et al. (2019). *Committed Emissions from Existing Energy Infrastructure Jeopardize 1.5 °C Climate Target*, 572 Nature 373; C.J. Smith et al. (2019). *Current Fossil Fuel Infrastructure Does Not Yet Commit Us to 1.5 °C Warming*, 10 Nature Communications 101; A. Pfeiffer et al. (2018). *Committed Emissions from Existing and Planned Power Plants and Asset Stranding required to Meet the Paris Agreement*, 13 Environmental Research Letters 054019.

[386] D. Tong et al. (2019) at 373-77.

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 climate targets and avoid the worst dangers of climate change.[387] 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 degrees Paris Agreement target.[388] 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 degrees 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.

A 2021 analysis similarly concluded that the largest increases by far in global oil and gas production between now and 2030 are projected to occur in the U.S.[389] If U.S. fossil fuel expansion is not immediately halted, it will make it impossible to meet the 1.5 degrees Celsius limit 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 associated harms. The U.S. is currently the world's largest oil and gas producer and second-largest coal producer.[390] The U.S. is also the world's largest historic emitter of GHG 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.[391] The U.S. must focus its resources and technology to rapidly phase out extraction while investing in a just

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[387] Oil Change International. (2019). *Drilling Towards Disaster: Why U.S. Oil and Gas Expansion is Incompatible with Climate Limits*, available at: http://priceofoil.org/drilling-towards-disaster (accessed Oct. 27, 2021).
[388] IPCC. (2018). *Global Warming of 1.5°C* at SPM-15, an IPCC special report on the impacts of global warming of 1.5 degrees Celsius above pre-industrial levels and related global GHG emissions pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.
[389] P. Achakulwisut & P. Erickson. (2021). *Trends in Fossil Fuel Extraction*.
[390] SEI, IISD, ODI, E3G, and UNEP. (2021). *The Production Gap Report 2021* at Table 4.1, available at: http://productiongap.org/2021report (accessed Feb. 9, 2022).
[391] C. LeQuéré et al. (2018). *Global Carbon Budget 2018*, 10 Earth System Science Data 2141 at Figure 5, 2167; Global Carbon Project. (2018). *Global Carbon Budget 2018* at 19, available at: https://hal.archives-ouvertes.fr/hal-01951197/document (accessed Oct. 27, 2021) (historical cumulative fossil $CO_2$ emissions by country).

transition for affected workers and communities currently living on the front lines of the fossil fuel industry and its pollution.[392]

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 consistent with the 1.5 degrees Celsius 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.[393] 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 exceed any remaining U.S. carbon budget for a 1.5 degrees Celsius limit[394] and exhaust ~10 percent of the remaining *global* carbon budget for 1.5 degrees Celsius.[395] The potential carbon emissions from unleased federal fossil fuel resources (319 to 450 $GtCO_2eq$) would exhaust the entire global carbon budget for limiting warming to 1.5 degrees Celsius. 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.[396]

Put another way, the production horizons for already leased federal fossil fuel resources underscore how unwarranted, unreasonable, and capricious any additional permitting is. Comparing production horizons to dates at which carbon budgets would be exceeded if current emission levels continue:

- Federal crude oil already leased will continue producing for 34 years beyond the 1.5 degrees Celsius threshold and 19 years beyond the 2 degrees threshold; and

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[392] G. Piggot et al. (2019). *Realizing a Just and Equitable Transition Away from Fossil Fuels*, Discussion brief, Stockholm Environment Institute, available at: https://www.sei.org/publications/just-and-equitable-transition-fossil-fuels/ (accessed Oct. 27, 2021).

[393] Ecoshift Consulting et al. (2015). *The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels*.

[394] *See, e.g.*, N. Van den Berg et al. (2020). *Implications of Various Effort-Sharing Approaches for National Carbon Budgets and Emission Pathways*, Climatic Change 162: 1805-1822, available at: https://link.springer.com/article/10.1007%2Fs10584-019-02368-y (showing a range for the U.S. carbon budget for 2010-2100 of ~10 $GtCO_2$ to -90 $GtCO_2$ for a 1.5°C limit at Figure 4) (accessed Feb. 9, 2022).

[395] As noted above, the IPCC Sixth Assessment Report updated the remaining global carbon budget from the beginning of 2020 at 400 $GtCO_2$ for a 67 percent probability of meeting the 1.5 degrees Celsius limit.

[396] *Id.* at 3 ("[T]he 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.").

- Federal natural gas already leased will continue producing 23 years beyond the 1.5 degrees Celsius threshold and 8 years beyond the 2 degrees threshold.[397]

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.[398] 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.

Such action is commensurate with findings in the International Energy Agency's new report "Net Zero by 2050: A roadmap for the global energy system articulates a pathway for the global energy sector to reach net zero emission by 2050."[399] Even with reliance on unproven future emissions reduction technologies, it cites the incompatibility of new fossil fuel supply projects with the goal of limiting warming to 1.5 degrees Celsius:

> Beyond projects already committed as of 2021, there are no new oil and gas fields approved for development in our pathway, and no new coal mines or mine extensions are required.[400]

"Net Zero by 2050" shows, like many earlier analyses and reports[401], that there is simply no room left in the global carbon budget for new federal fossil fuel leasing. Importantly, the pathway in "Net Zero by 2050" starts now.

The need to end new fossil fuel production and infrastructure approvals has been acknowledged by leaders around the world. Upon the release of the IPCC's Sixth Assessment Report, U.N. Secretary-General António Guterres said "This report must sound a death knell for coal and fossil fuels, before they destroy our planet. . . . There must be no new coal plants built

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[397] D. Mulvaney et al. (2016). *Over-Leased: How Production Horizons of Already Leased Federal Fossil Fuels Outlast Global Carbon Budgets*, available at: https://1bps6437gg8c169i0y1drtgz-wpengine.netdna-ssl.com/wp-content/uploads/wpallimport/files/archive/Over_Leased_Report_EcoShift.pdf (accessed Oct. 27, 2021) (hereinafter Over-Leased).

[398] M.D. Merrill et al. (2018). *Federal Lands Greenhouse Gas Emissions and Sequestration in the United States—Estimates for 2005–14*, U.S. Geological Survey Scientific Investigations Report 2018–5131 at 8.

[399] S. Bouckaert et al. (2021). *International Energy Agency, Net Zero by 2050: A Roadmap for the Global Energy Sector*, available at: https://iea.blob.core.windows.net/assets/beceb956-0dcf-4d73-89fe-1310e3046d68/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf (accessed Oct. 27, 2021) (hereinafter IEA 2021).

[400] *Id.* at 21.

[401] SEI, IISD, ODI, E3G & UNEP. (2021). *The Production Gap Report*: *2020 Special Report*.

after 2021. . . . Countries should also end all new fossil fuel exploration and production. . . ."[402] Fatih Birol, Executive Director of the International Energy Agency (IEA), said upon the release of the IEA's climate report in May 2021: "If governments are serious about the climate crisis, there can be no new investments in oil, gas and coal, from now – from this year."[403]

The Biden Administration recognizes the climate imperative and states that it is committing the government to taking decisive action. It is the policy of the Administration to "deploy the full capacity of its agencies to combat the climate crisis to implement a Government-wide approach that reduces climate pollution in every sector of the economy."[404] This approach includes a "reconsideration of Federal oil and gas permitting . . . practices."[405] Indeed, the federal oil and gas permitting program requires swift and immediate change to avert climate disaster.

### C. BLM should consider an alternative consistent with a managed decline of production rates and greenhouse gas pollution consistent with avoiding 1.5 degrees Celsius warming.

As mentioned above, BLM has a legal duty to avoid catastrophic climate change in oil and gas permitting decisions. The Mineral Leasing Act (MLA) provides BLM with authority to require zero GHG emissions. *See, e.g.*, *W. Energy All. v. Salazar*, 709 F.3d 1040, 1044 (10th Cir. 2013); W. *Energy All. v. Jewell*, No. CV 16-0912 WJ/KBM, 2017 WL 3600741, at *3 (D.N.M. Jan. 13, 2017), *rev'd sub nom. W. Energy All. v. Zinke*, 877 F.3d 1157 (10th Cir. 2017). The MLA allows the Secretary of the Interior to "alter or modify from time to time the rate of prospecting and development and the quantity and rate of production under such plan."[406] Likewise, nearly all BLM leases for onshore oil and gas contain a clause which states: "Lessor reserves the right to specify rates of development and production in the public interest."[407] To address climate impacts, BLM may require full mitigation of GHG emissions and associated climate impacts via lease stipulations and conditions of approval (COAs) designed "to minimize adverse impacts to other resource values."[408]

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[402] United Nations Secretary-General (2021). *Secretary-General's Statement on the IPCC Working Group 1 Report on the Physical Science Basis of the Sixth Assessment*, available at: https://www.un.org/sg/en/content/secretary-generals-statement-the-ipcc-working-group-1-report-the-physical-science-basis-of-the-sixth-assessment (accessed Feb. 9, 2022).

[403] F. Harvey. (2021). *No New Oil, Gas or Coal Development if World is to Reach Net Zero by 2050, Says World Energy Body,* Guardian, available at: https://www.theguardian.com/environment/2021/may/18/no-new-investment-in-fossil-fuels-demands-top-energy-economist.

[404] EO 14008, part 2, § 201.

[405] *Id.* at part 2, § 208.

[406] 30 U.S.C. § 226(m).

[407] *See* U.S. Department of the Interior. (2008). *Offer to Lease and Lease for Oil and Gas, Form 3100-11*.

[408] *See* 30 U.S.C. § 226(g); 43 C.F.R. §§ 3101.1-2, 3101.1–3; *see also* BLM Form 3100-11 at 3 (requiring lessees to "conduct operations in a manner that minimizes adverse impacts to land, air, and water, to cultural, biological, visual, and other resources, and to other lands uses or users").

The U.S. has a moral obligation to lead the world transition from fossil fuel production to 100 percent clean energy. This owes to both its ample financial capability and dominant role in driving global climate change and associated harms. The U.S. is currently the world's largest oil and gas producer and second-largest coal producer.[409] The U.S. is also the world's largest historic emitter of GHG 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.[410] The U.S. must lead the world in mobilizing its resources and technology to rapidly phase out fossil fuel extraction while investing in renewable energy technologies domestically and abroad, in addition to a just transition for affected workers and communities currently living on the front lines of the fossil fuel industry and its pollution.[411]

U.S. climate leadership to reduce fossil fuel supply must be maximized on the federal fossil fuel estate, where laws that afford executive authority over federal fossil fuel leasing and production generally do not apply to non-federal fossil fuels. In short, the U.S. can and should aggressively reduce fossil fuel supply where it has the authority to do so now, both to reduce GHG pollution and to set a global example of leadership in managing state-controlled fossil fuel supplies in a way that is complaint with limiting warming to 1.5 degrees Celsius under the Paris Agreement.

Importantly, an overwhelming scientific consensus has definitively concluded that an immediate managed decline of fossil fuel production is necessary to limit global temperature rise to 1.5 degrees Celsius and avoid catastrophic damage throughout the country and the world.[412] Analysis has shown that already developed oil and gas fields and coal mines contain enough carbon to exceed a 1.5 degrees Celsius limit.[413] In addition, the United Nations 2020 *Production Gap Report* found that fossil fuel producers are planning to extract *more than double* the oil, gas, and coal by 2030 than is consistent with limiting warming to 1.5 degrees Celsius,[414] with U.S. oil and gas production poised to increase more than twice as much as any other country.[415] In fact, the U.S. fossil fuel industry is on track to account for 60 percent of the world's projected growth

[409] SEI, IISD, ODI, E3G, and UNEP. (2021). *The Production Gap Report 2021* at Table 4.1.
[410] C. LeQuéré et al. (2018). *Global Carbon Budget 2018* at Figure 5, 2167; Global Carbon Project. (2018). *Global Carbon Budget 2018* at 19 (historical cumulative fossil $CO_2$ emissions by country).
[411] G. Piggot et al. (2019). *Realizing a Just and Equitable Transition Away from Fossil Fuels*.
[412] IPCC. (2018). *Special Report Global Warming of 1.5 Degrees: Summary for Policy Makers*.
[413] Oil Change International. (2016). *The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production* at Table 3.
[413] Oil Change International. (2019). *Drilling Toward Disaster: Why U.S. Oil and Gas Expansion is Incompatible with Climate Limits* at 5.
[414] SEI, IISD, ODI, E3G & UNEP. (2020). *The Production Gap: The Discrepancy Between Countries' Planned Fossil Fuel Production and Global Production Levels Consistent with Limiting Warming to 1.5°C or 2°C* at 2, 4.
[415] P. Achakulwisut & P. Erickson. (2021). *Trends in Fossil Fuel Extraction* at Figure 3.

in oil and gas production by 2030, which would exhaust nearly half of the world's total allowance for oil and gas production by 2030 consistent with a 1.5 degrees Celsius limit.[416]

Instead of increasing production, governments must make steep reductions of roughly 6 percent per year in fossil fuel production between 2020 and 2030 to limit warming to 1.5 degrees Celsius,[417] including global declines of 8.5 percent per year for oil and 3.5 percent per year for gas.[418] In short, to limit warming to 1.5 degrees, governments must immediately begin a managed decline that not only halts the approval of new fossil fuel production and infrastructure[419] *but also* phases out production in many existing fields and mines before their reserves are fully depleted.[420] As discussed above, the U.S. has a responsibility to lead a more rapid and aggressive managed decline on public lands and waters than what is required on average globally, consistent with a U.S. "fair share" based on the U.S. role as a dominant driver of the fossil-fuel driven climate crisis, high capacity for a just transition, and existing executive authority to undertake managed decline on public lands and waters.[421]

Thus, in accord with the Mineral Leasing Act, the Secretary of the Interior Department, acting through BLM, should set forth a declining rate of production over time that can, alongside transition measures, accommodate lease rights but provide for an orderly phase-out of onshore fossil fuel production consistent with declining rates of emissions necessary to limit temperature rise to 1.5 degrees Celsius. Declining rates of production and GHG emissions should be exercised in existing leases on existing production and codified in Conditions of Approval for new permits to drill, as explained further below. The Mineral Leasing Act allows the Secretary of the Interior to "alter or modify from time to time the rate of prospecting and development and the quantity and rate of production under such plan." Likewise, nearly all BLM leases for onshore oil and gas contain a clause which states that "Lessor reserves the right to specify rates of development and production in the public interest."[422]

Table 4: Annual federal oil and gas production across a 14-year managed decline. Production declines 10% annually in 2022 for eight years and 3% thereafter.

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[416] IPCC. (2018). *Special Report Global Warming of 1.5 Degrees: Summary for Policy Makers* at 6.
[417] SEI, IISD, ODI, E3G & UNEP. (2020). *The Production Gap* at 3, 4.
[418] S. Teske & S. Niklas. (2021). *Fossil Fuel Exit Strategy* at 6.
[419] D. Tong et al. (2019). *Committed Emissions from Existing Energy Infrastructure Jeopardize 1.5 °C Climate Target*, 572 Nature 373.
[420] Oil Change International. (2016). *The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production* at 11.
[421] G. Muttitt & S. Kartha. (2020). *Equity, Climate Justice and Fossil Fuel Extraction: Principles for a Managed Phase Out,* 20 Climate Policy 1024; U.S. Climate Action Network. (2020). *The U.S. Climate Fair Share*, available at: https://usfairshare.org/backgrounder/ (accessed Oct. 27, 2021).
[422] *See* U.S. Department of the Interior, Offer to Lease and Lease for Oil and Gas, Form 3100-11 (Oct. 2008).

| Year | Oil Percentage of Baseline | Oil Production Limit (bbl) | Gas Percentage of Baseline | Gas Production Limit (mcf) |
|---|---|---|---|---|
| 2022 | 90% | 843,950,633 | 90% | 3,621,109,795 |
| 2023 | 80% | 750,178,341 | 80% | 3,218,764,262 |
| 2024 | 70% | 656,406,048 | 70% | 2,816,418,730 |
| 2025 | 60% | 562,633,756 | 60% | 2,414,073,197 |
| 2026 | 50% | 468,861,463 | 50% | 2,011,727,664 |
| 2027 | 40% | 375,089,170 | 40% | 1,609,382,131 |
| 2028 | 30% | 281,316,878 | 30% | 1,207,036,598 |
| 2029 | 20% | 187,544,585 | 20% | 804,691,066 |
| 2030 | 17% | 159,412,897 | 17% | 683,987,406 |
| 2031 | 14% | 131,281,210 | 14% | 563,283,746 |
| 2032 | 11% | 103,149,522 | 11% | 442,580,086 |
| 2033 | 8% | 75,017,834 | 8% | 321,876,426 |
| 2034 | 5% | 46,886,146 | 5% | 201,172,766 |
| 2035 | 2% | 18,754,459 | 2% | 80,469,107 |

BLM should impose Conditions of Approval on the proposed permits to drill that subject any new production to consistency with a 14-year managed decline of federal oil and gas production onshore and offshore, starting from a 2020 production baseline and declining at a rate of 10 percent annually from 2021 to 2029 and 3 percent annually thereafter. Under this decline rate, annual GHG pollution from federal oil and gas production will be reduced by 83 percent by 2030 and 98 percent by 2035 (Table 4, Figure 1), meeting or exceeding reductions consistent with a 1.5 degrees Celsius limit.[423] Across its 14-year span, this rate of managed decline yields total federal oil and gas production of 5,787,261,207 bbl and 25,878,975,124 mcf, which is 7,782,395,691 bbl and 34,810,676,612 mcf less than under baseline 2020 production rates. Conditions of Approval for these new permits should be in addition to BLM exercising declining rates of production in the context of existing permits to drill consistent with the decline rates shown in Table 4 and Figure 1.

[423] The United Nations *Emissions Gap Report* estimated that limiting warming to 1.5 degrees Celsius requires countries to cut GHG emissions by at least 7.6 percent per year between 2020 and 2030 for a total emissions reduction of 55 percent by 2030 (*see* United Nations Environment Programme. (2019). *Emissions Gap Report 2019*, UNEP, Nairobi at 37, available at: https://www.unenvironment.org/resources/emissions-gap-report-2019 (accessed Oct. 27, 2021)). However, the U.S. "fair share" of GHG emissions reductions for meeting a 1.5 degrees Celsius limit, based on equity principles of responsibility and capacity, has been estimated at 195 percent below 2005 levels by 2030, with at least 70 percent cuts in domestic emissions by 2030 and the remaining 125 percent achieved though financial and technological support for large-scale emissions reductions internationally. *See* U.S. Climate Action Network. (2020). *The U.S. Climate Fair Share*. Therefore, a managed decline in GHG pollution from federal oil and gas production that achieves 83 percent reductions by 2030 is consistent with the U.S. fair share for limiting warming to 1.5 degrees Celsius.

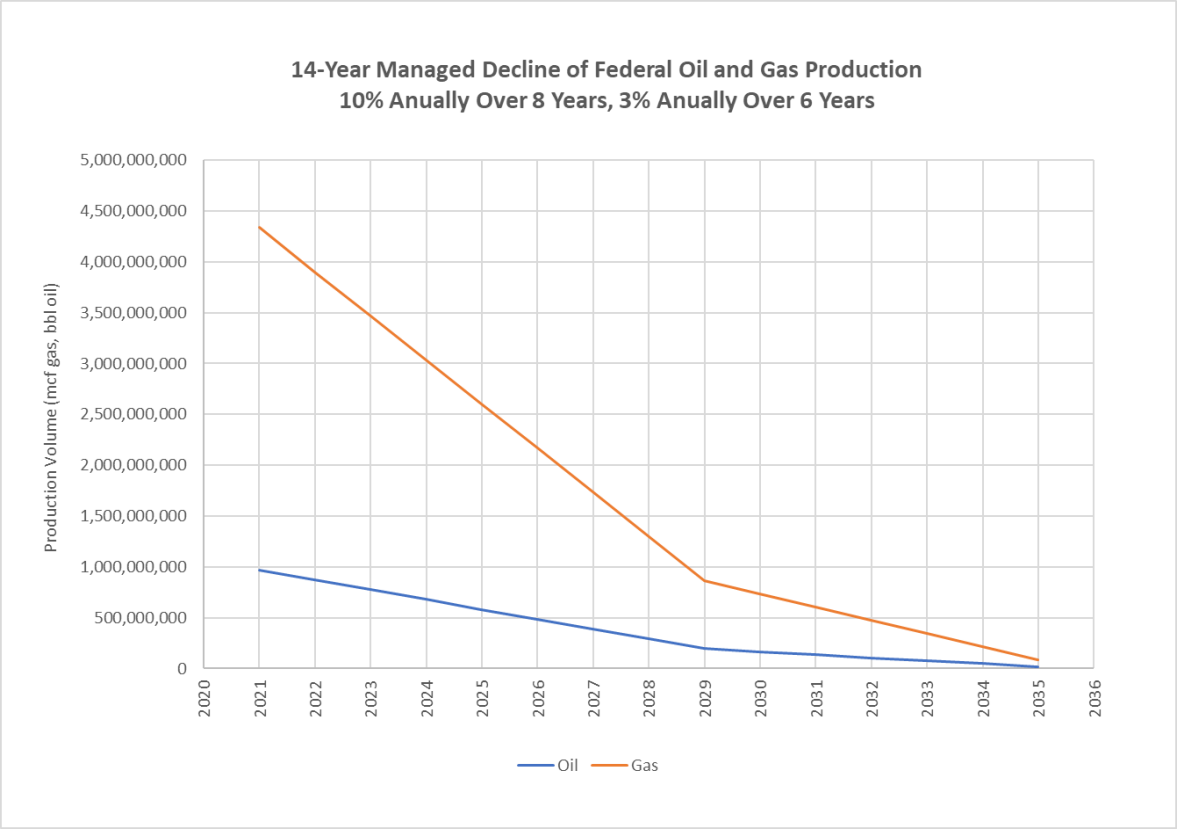


Figure 1: Annual federal oil and gas production across a 14-year managed decline. Using a 2020 production baseline, production declines 10% annually in 2021 for eight years and 3% annually thereafter.

## VII. BLM must address the impacts of oil and gas production on the imperiled Temblor legless lizard.

BLM must analyze the impacts of the oil and gas development on the imperiled Temblor legless lizard, whose range overlaps with previously approved and proposed APD project areas. The Temblor legless lizard *Anniella alexanderae* is a rare species with a restricted range in western Kern County, Kings County, and southern Fresno County. It is listed as a Species of Special Concern in California and has been recommended by scientific experts for federal and state listing under the Endangered Species Act. The species was recently granted candidate status under the California Endangered Species Act. Oil and gas development poses the primary threat to the Temblor legless lizard, and APD projects 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,[424] 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[425] 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).[426]

The Temblor legless lizard *Anniella alexanderae* is a small, slender lizard with no legs, a shovel-shaped snout, smooth shiny scales, and a blunt tail.[427] *Anniella alexanderae* differs physically from snakes by its 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 the tail.[428] Legless lizards are the only sand swimming specialists in California.

*A. alexanderae* can be identified by its unique morphological characteristics. While there are limited differences in scalation among *Anniella* species,[429] *Anniella alexanderae* can be differentiated from others by ventral and dorsum coloration, vertebral counts, and scale counts.[430] *A. alexanderae* has a higher dorsal scale and vertebral count, with light grey ventral coloring from the lower jaw to the end of the tail.[431] 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.[432]

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[424] C.M. Miller. (1944). *Ecological Relations and Adaptions of the Limbless Lizards of the Genus Anniella. Ecological Monographs: 271-289* at 273.
[425] M.R. Jennings & M.P. Hayes. (1994). *Amphibian and Reptile Species of Special Concern in California*, prepared for California Department of Fish and Game, at 111.
[426] T.J. Papenfuss & J.F. Parham. (2013). *Four New Species of California Legless Lizard (Anniella)*, Breviora Museum of Comparative Zoology: 536 at 2; J.F. Parham et al. (2019). *Conservation Assessment of the California Legless Lizard (Anniella)*.
[427] C.M. Miller. (1944). *Ecological Relations and Adaptions of the Limbless Lizards of the Genus Anniella* at 276-280.
[428] C.M. Miller. (1944). *Ecological Relations and Adaptions of the Limbless Lizards of the Genus Anniella* at 276-80.
[429] T.J. Papenfuss & J.F. Parham. (2013). *Four New Species of California Legless Lizard (Anniella)* at 3.
[430] J.F. Parham et al. (2019). *Conservation Assessment of the California Legless Lizard (Anniella)*, prepared for California Department of Fish and Wildlife, at 22.
[431] T.J. Papenfuss & J.F. Parham. (2013). *Four New Species of California Legless Lizard (Anniella)* at 7-8.
[432] *Id.* at 8, 11.

### 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,[433] and "swim" through the dry, loose sand with lateral undulations.[434] They are rarely active on the surface beyond feeding and mating[435] and are sensitive to noise and light pollution,[436] which can affect their hunting.[437] These lizards have been found at varying soil depths, from a couple of inches to almost two feet,[438] but they usually reside in depths from one to four inches.[439] They are not known to move or emigrate far and have a high site fidelity, so populations are localized.[440]

The Temblor legless lizard is a microhabitat specialist due to its specific requirements for burrowing.[441] The lizard prefers warm, loose soil with moderate plant cover.[442] Legless lizards have specific requirements for soil moisture and soil density that are essential to their survival.[443] 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.[444] If the soil has too much clay or adobe, the legless lizard cannot penetrate deep enough for survival and the clay content can plug their nostrils, resulting in death due to suffocation.[445] Loose soil and high sand friction also help in the construction of their burrows.[446]

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[433] M.R. Jennings & M.P. Hayes. (1994). *Amphibian and Reptile Species of Special Concern in California* at 108.
[434] R.C. Stebbins & S.M. McGinnis. (2012). *Field Guide to Amphibians and Reptiles of California*, University of California Press at 333.
[435] R.C. Thomson et al. (2016). *California Amphibian and Reptile Species of Special Concern: 186-191* at 188.
[436] C.M. Miller. (1944). *Ecological Relations and Adaptions of the Limbless Lizards of the Genus Anniella* at 289.
[437] R.C. Thomson et al. (2016). *California Amphibian and Reptile Species of Special Concern: 186-191* at 189, 190.
[438] *Id.* at 188.
[439] C.M. Miller. (1944). *Ecological Relations and Adaptions of the Limbless Lizards of the Genus Anniella* at 289.
[440] *Id.* at 288; M.R. Jennings & M.P. Hayes. (1994). *Amphibian and Reptile Species of Special Concern in California* at 110.
[441] R.C. Thomson et al. (2016). *California Amphibian and Reptile Species of Special Concern: 186-191* at 188.
[442] M.R. Jennings & M.P. Hayes. (1994). *Amphibian and Reptile Species of Special Concern in California* at 111.
[443] *Id.* at 111.
[444] C.M. Miller. (1944). *Ecological Relations and Adaptions of the Limbless Lizards of the Genus Anniella* at 277.
[445] *Id.* at 288.
[446] M.R. Jennings & M.P. Hayes. (1994). *Amphibian and Reptile Species of Special Concern in California* 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.[447]

### 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, invasive species, and anthropogenic climate change. Oil and gas development due to drilling permits would further jeopardize this imperiled species.

The Temblor legless lizard is currently listed as a Species of Special Concern in the state of California.[448] In reference to the Temblor legless lizard *Anniella alexanderae*, the California Natural Resources Agency's October 2021 Special Animals list explains that "[l]egless lizards (Anniella spp.) in California were traditionally considered one species, but are now considered five species (Papenfuss and Parham, 2013)."[449] The Special Animals List further clarifies that *Anniella alexanderae* retains the California Species of Special Concern (SSC) status.[450]

Importantly, in a 2019 conservation assessment prepared for the California Department of Fish and Wildlife, expert scientists recommend federal and state endangered species protection for the Temblor legless lizard.[451] In June 2022, the species was granted candidate status under the California Endangered Species Act.[452]

The Temblor legless lizard is further designated as critically imperiled at the global and state level (G1 and S1 critically imperiled) by NatureServe.[453] 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

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[447] R.C. Thomson et al. (2016). *California Amphibian and Reptile Species of Special Concern: 186-191* at 189.
[448] California Natural Diversity Database (CNDDB). (2021). *Special Animals List*, California Department of Fish and Wildlife, available at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406&inline at 43, 86.
[449] *Id.* at 86.
[450] *Id.* at 86.
[451] J.F. Parham et al. (2019). *Conservation Assessment of the California Legless Lizard (Anniella)* at 24.
[452] Cal. Dept. of Fish & Wildlife. (2022). *California Fish And Game Commission Holds Hybrid Meeting*, News Room, available at: https://wildlife.ca.gov/News/california-fish-and-game-commission-holds-hybrid-meeting (accessed July 13, 2022).
[453] NatureServe Explorer. (2021). *Anniella alexanderae: Temblor Legless Lizard*, available at: https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.960627/Anniella_alexanderae (accessed Jan. 27, 2022).

declines making it especially vulnerable to extirpation from the state."[454]

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 southwestern Fresno County. The species' entire range is a single narrow strip less than 125 miles long, between the Temblor Range and State Highway 33/Interstate Highway 5. It is currently known to exist at only four sites.[455] Scientists consider it rare and to have a small population density.[456]

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 development and urbanization and is no longer suitable.[457] Of the four locations where the lizard has been identified, three are within oil field boundaries, including the Midway-Sunset oil field which is the largest oil field in Kern County with more than 25,000 active and idle wells, the McKittrick oil field, and Pleasant Valley oil field. Only two locations are on protected lands: a 5-acre private parcel in the Palo Prieto Conservation Bank and the 1,200-acre Pleasant Valley Ecological Reserve within the Pleasant Valley oil field.

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

Oil and gas development is the primary threat to the Temblor legless lizard. Three of the four sites where the lizard has been detected are within oil field boundaries and surrounded by extensive oil and gas development. In total, 31 oil fields overlap the Temblor legless lizard's narrow range (Figure 2).[458] More than 98 percent of the lizard's restricted range is already open or potentially available to oil and gas development. The IUCN recently concluded that oil and gas development could propel the Temblor legless lizard to Critically Endangered or Extinct status in the near future.[459] Key threats to the Temblor legless lizard from oil and gas development include habitat loss, fragmentation, and degradation; soil compaction; removal of the duff and litter layer the lizard requires; loss of native plant life; changes in soil moisture; oil

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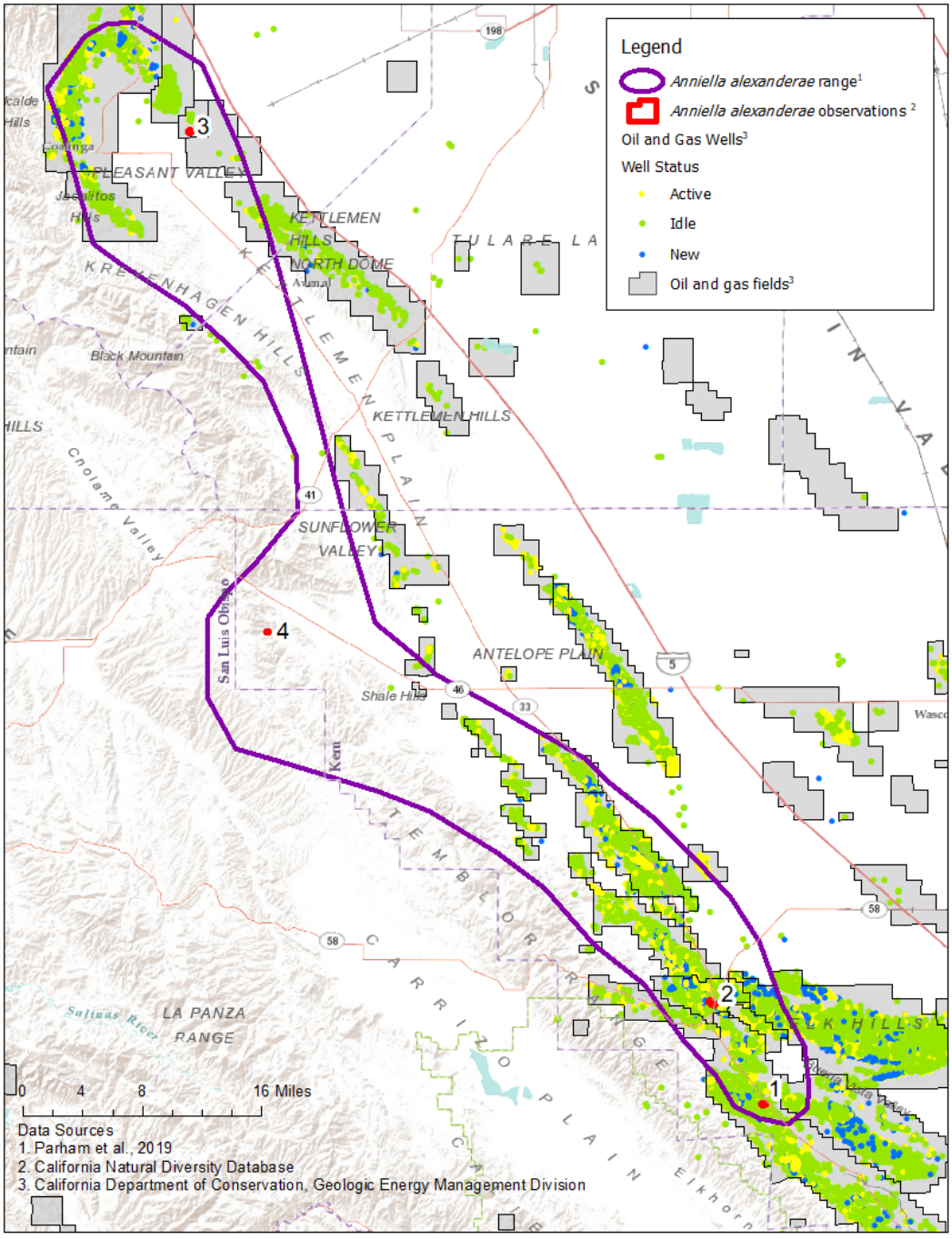
[454] *Id.*
[455] J.F. Parham et al. (2019). *Conservation Assessment of the California Legless Lizard (Anniella)* at 11, 14.
[456] T.J. Papenfuss & J.F. Parham. (2013). *Four New Species of California Legless Lizard (Anniella)* at 14.
[457] R.C. Thomson et al. (2016). *California Amphibian and Reptile Species of Special Concern: 186-191* at 189.
[458] These 31 oil fields are Antelope Hills, North Antelope Hills, Antelope Plains Gas (ABD), Asphalto, Belgian Anticline, Blackwells Corner, Buena Vista, Cal Canal Gas, Carneros Creek, Chico-Martinez, Coalinga, Coalinga East Extension, Cymric, Elk Hills, Guijarral Hills, Jacalitos, Kettleman North Dome, Kreyenhagen (ABD), McDonald Anticline, McKittrick, Midway-Sunset, Monument Junction, North Belridge, Pleasant Valley, Pyramid Hills, Railroad Gap, Shale Flats Gas (ABD), Shale Point Gas (ABD), South Belridge, Temblor East (ABD), and Temblor Ranch.
[459] G.A. Hammerson. (2019). *Anniella alexanderae*. The IUCN Red List of Threatened Species 2019 at 2, 6, available at: https://www.iucnredlist.org/species/89929911/89929920.

and chemical spills; noise, light, and air pollution; human disturbance; and increased climate disruption.

Figure 2: Active oil and gas development in the Temblor legless lizard range



Habitat Destruction and Fragmentation

The Temblor legless lizard has already suffered significant habitat loss and fragmentation from oil and gas development in its restricted range.[460] Satellite imagery indicates that oil and gas development has already destroyed and degraded 50 to 90 percent of the Temblor lizard's range.[461] Habitat destruction and fragmentation from the construction of well pads, roads, pipelines, and other fossil fuel infrastructure impedes wildlife movement and dispersal, reduces home range size and patch size, increases habitat isolation, alters light, moisture, and temperature, and facilitates the spread of invasive species.[462] Fragmentation creates habitat islands that can disrupt migration and dispersal instability[463] and erode genetic variation in small populations and promote inbreeding.[464] Fragmentation also increases the proportion of disturbed edge habitat to undisturbed interior habitat which can increase the likelihood of predation, parasitism, and human disturbance.

In the San Joaquin Valley, high levels of habitat disturbance and fragmentation from oil and gas development prevent endemic species from persisting in those areas. Research has found that native species in heavily impacted saltbush scrub habitat declined with increasing oil field development, and most of the species were no longer detected in areas with 70 percent habitat disturbance or more.[465]

Currently the Temblor legless lizard is known to persist at only four widely separated sites. Species like the Temblor legless lizard with limited ranges, small population size, low mobility, specialized habitat requirements, and high sensitivity to disturbance are at particular risk from habitat loss and fragmentation from oil and gas development.[466] Reptiles that have a

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[460] *Id.* at 2; J.F. Parham et al. (2019). *Conservation Assessment of the California Legless Lizard (Anniella)* at 5.

[461] G.A. Hammerson. (2019). *Anniella alexanderae*. The IUCN Red List of Threatened Species 2019 at 6, available at: https://www.iucnredlist.org/species/89929911/89929920.

[462] M.C. Brittingham et al. (2014). *Ecological Risks of Shale Oil and Gas Development to Wildlife, Aquatic Resources and their Habitats*, Environmental Science & Technology: 11034-11047 at 11034; S. Souther et al. (2014). *Biotic Impacts of Energy Development from Shale: Research Priorities and Knowledge Gaps*, Frontiers in Ecology & the Environment: 330-338, at 330; B.W. Allred et al. (2015). *Ecosystem Services Lost to Oil and Gas in North America*, Science: 401-402, at 402.

[463] R. MacNally & 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.

[464] A.R. Templeton et al. (1990). *The Genetic Consequences of Habitat Fragmentation*, Annals of the Missouri Botanical Garden: 13-27.

[465] C.M. Fiehler & B.L. Cypher. (2011). *Ecosystem Analysis of Oilfields in Western Kern County, California*, prepared for BLM, at 21; C.M. Fiehler et al. (2017). *Effects of Oil and Gas Development on Vertebrate Community Composition in the Southern San Joaquin Valley, California*, Global Ecology & Conservation 9: 131-141.

[466] R. MacNally & G.W. Brown. (2001). *Reptiles and Habitat Fragmentation in the Box-ironbark Forests of Central Victoria, Australia* at 116-17; M.C. Brittingham et al. (2014).

lower mobility and specialized microhabitats are likely to be more vulnerable to local extinction.[467] 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,[468] oil and gas development in their habitat has severe negative consequences.

Threats from Extreme Extraction Techniques

While all oil and gas development poses a threat to the Temblor legless lizard, commonly used oil and gas extraction techniques in the lizard's range in Kern, Kings and Fresno Counties, such as steam flooding, cyclic steam injection, water flooding, and fracking, are particularly destructive, causing additional impacts. These extreme extraction techniques require pumping large volumes of toxic chemicals, steam, water, and sand at high pressures into rock formations, causing them to crack and release oil and gas. Cyclic steaming and steam flooding are heavily used in Midway-Sunset, Cymric, Coalinga, McKittrick, and South Belridge oil fields in the lizard's range.[469] During steam injection for cyclic steaming and steam flooding, the operator repeatedly injects steam at very high temperature and pressure into the well to heat up the surrounding formation. Repeated steam injection creates some of the harshest conditions to which a well can be subjected. The process is known to result in a particularly high rate of well failure, can cause the ground to shift and collapse, and can cause oil and wastewater to rise to the surface ("surface expressions"), which can kill wildlife and plants and destroy habitat.

Fracking is another commonly used extraction technique, particularly in South Belridge oil field in the lizard's range.[470] Fracking uses toxic chemicals and causes wide-ranging ecological harms including habitat loss and fragmentation; surface and groundwater contamination; localized air, noise and light pollution; vehicle traffic; climate change; and other cumulative impacts.[471] 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,[472] all factors of concern for the Temblor legless lizard.

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*Ecological Risks of Shale Oil and Gas Development to Wildlife, Aquatic Resources and their Habitats* at 11034.

[467] R. MacNally & G.W. Brown. (2001). *Reptiles and Habitat Fragmentation in the Box-ironbark Forests of Central Victoria, Australia* at 116-17.

[468] R.C. Thomson et al. (2016). *California Amphibian and Reptile Species of Special Concern: 186-191* at 188-89.

[469] J. Fleming. (2021). *Killer Crude: How California Produces Some of the Dirtiest, Most Dangerous Oil in the World* at 20, Figures 10 and 11.

[470] CalGEM. (2021). *WellSTAR*, available at: https://wellstar-public.conservation.ca.gov/.

[471] Souther et al. (2014). *Biotic Impacts of Energy Development from Shale: Research Priorities and Knowledge Gaps*, Frontiers in Ecology & the Environment: 330-338, at 330; CCST. (2015). *An Independent Assessment of Well Stimulation in California*, *Vol. 2, Potential Environmental Impacts of Hydraulic Fracturing and Acid Stimulations* at 311.

[472] M.C. Brittingham et al. (2014). *Ecological Risks of Shale Oil and Gas Development to Wildlife, Aquatic Resources and their Habitats* at 11034.

Soil Compaction, Loss of Native Plant Life, Changes in Soil Moisture

The Temblor legless lizard requires loose, sandy soil for burrowing, a litter and duff layer, and specific moisture levels for its life cycle, and does not respond well to disturbed soil moisture levels, compacted soil,[473] or mechanical disturbances.[474] Oil and gas development—including construction, road-building, and heavy equipment and vehicle and truck traffic—poses a significant threat by compacting the soil, decreasing the amount of loose substrate for the lizard to move through, removing the litter and duff layer, clearing native plant life, and altering soil moisture levels. Oil and gas development can change soil moisture through clearing and grading of well pads that increases sediment runoff; and construction, maintenance, and/or use of culverts, pipelines, and other structures that alters water flow.[475] In addition, cleared or altered areas generally allow more solar radiation to reach the ground during the day and more to re-radiate to the atmosphere at night, resulting in larger temperature and moisture gradients and higher variability near development edges compared with undisturbed areas.[476] Differences in air temperature, air and soil moisture, and light intensity have been estimated to extend more than 240 meters from disturbed area edges.[477]

Noise Pollution

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.[478] The lizard uses this sense to follow their prey from below and come up ahead of the prey and catch it.[479] Oil and gas development creates 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. 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.[480]

Oil and Produced Water Spills

Oil and produced water spills threaten the Temblor legless lizard including by contaminating habitat with toxic chemicals, altering soil density and moisture content, and injuring and killing lizards during spills or clean-up activities. Oil and produced water spills and leaks are inherent to oil and gas production and occur with troubling frequency in California.

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[473] R.C. Thomson et al. (2016). *California Amphibian and Reptile Species of Special Concern: 186-191* at 188-189.
[474] C.M. Miller. (1944). *Ecological Relations and Adaptions of the Limbless Lizards of the Genus Anniella* at 280.
[475] M.C. Brittingham et al. (2014). *Ecological Risks of Shale Oil and Gas Development to Wildlife, Aquatic Resources and their Habitats* at 11038.
[476] S.F. Wilson. (2016). *Managing zone-of-influence effects of oil and gas activities on terrestrial wildlife and habitats in British Columbia. Journal of Ecosystems and Management* 16: 1-14 at 4.
[477] *Id.*
[478] C.M. Miller. (1944). *Ecological Relations and Adaptions of the Limbless Lizards of the Genus Anniella. Ecological Monographs: 271-289* at 280.
[479] *Id.*
[480] R.C. Thomson et al. (2016). *California Amphibian and Reptile Species of Special Concern: 186-191* at 189, 190.

Kern County has the highest concentration of produced water spills (55 percent) and chemical spills (42 percent) of any county in the state.[481]

Produced water spills contain a toxic mix of chemicals. A 2017 study of the chemicals used in routine oil and gas activities in California – including well drilling, well completion, and well rework – found that there is widespread use of toxic chemicals.[482] Although 70 percent of the disclosed chemical additives could not be fully evaluated because of insufficient reporting on chemical identity by the oil and gas industry, commonly used chemical additives in routine activities include ecotoxic biocides and corrosion inhibitors, as well as the use of high concentrations of hydrochloric acid and hydrofluoric acid for maintenance acidizing. In total, 58 chemical additives were identified as being ecotoxic. Since these lizards are usually found from a couple inches to a couple feet deep in the soil,[483] produced water spills would have a negative effect on the Temblor legless lizard's life cycle and habitat.

Steam injection causes large and frequent "surface expressions" in the Temblor lizard range, in which oil and produced water are pushed up to the surface and cause large-volume spills. These surface spills are particularly common in Cymric, McKittrick, and Midway-Sunset oil fields in the lizard's restricted range. There are currently at least two active surface spills in the legless lizard's range and 18 that have just been controlled in the past two years.[484] For example, the Cymric 1Y Oil Field spill in Kern County was first reported in early May 2019 and took 5 months to clean up an estimated 1,339,926 gallons (31,903 barrels) of spilled oil and water.[485] The state Oil and Gas Supervisor determined that the spill presented a significant threat of harm to human health and the environment.[486] Another surface spill in the Cymric oil field, GS-5, has leaked more than 16.8 million gallons of oil and about 70 million gallons of wastewater intermittently since 2003, more than the Exxon Valdez spill,[487] threatening wildlife and plant species in the area. Of particular concern, the frequency of reported large spills has increased since CalGEM adopted changes to state regulations in April 2019 to allow higher pressure steam injection to occur (Cal. Code Regs, tit. 14, § 1724.10.3 (Apr. 1, 2019)).

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[481] CCST. (2015). *An Independent Assessment of Well Stimulation in California*, *Vol. 2, Potential Environmental Impacts of Hydraulic Fracturing and Acid Stimulations* at 161.
[482] W.T. Stringfellow et al. (2017). *Comparison of chemical-use between hydraulic fracturing, acidizing, and routine oil and gas development*, *PLoS ONE* 12: e0175344.
[483] R.C. Thomson et al. (2016). *California Amphibian and Reptile Species of Special Concern: 186-191* at 188.
[484] CalGEM. (2022). *Oil Field Surface Expressions*, available at: https://www.conservation.ca.gov/calgem/Pages/Chevron-Cymric-oil-spill.aspx.
[485] California Department of Fish and Wildlife (CDFW). (2019). Cal Spill Watch, *Cymric Oil Field Incident* at 1, available at: https://calspillwatch.wordpress.com/tag/cymric-oil-field-incident/.
[486] California Department of Conservation. (2019). Division of Oil, Gas, and Geothermal Resources, *Order to Pay a Civil Penalty, No. 1163* at 6.
[487] CDFW. (2019). Cal Spill Watch, *Cymric Oil Field Incident*; J. Wilson & L. Younes. (2020). *Dozens of Little-Known California Oil Spills Have Earned Companies Millions of Dollars*, Desert Sun, available at: https://www.desertsun.com/in-depth/news/2020/09/18/california-oil-companies-profit-illegal-spills-state-lets-them/3456808001/.

It is well-documented that oil and chemical spills can have catastrophic ecological impacts due to their toxic effects, the potentially large volume of spills, and the difficulty of containment and clean-up (i.e., produced water spills cannot be contained by traditional oil spill response methods). In Kern County, wildlife that live in burrows near spills are "entombed" by the spilled crude oil and records show "dozens of dead and decaying birds and small mammals around spill sites."[488]

The Temblor legless lizard is a small, reclusive reptile that would not be readily visible during oil spill clean-up. They would be entombed by fast-rising crude oil from underground, making it impossible to document. Without focused surveys, it would 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.[489]

Spills could also harm habitat suitability for the Temblor legless lizard by altering soil density and moisture content. Furthermore, reptiles are sensitive to contaminants and accumulate and magnify them to levels equal or greater than those reported for mammals and birds.[490] 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.[491] Some of these pollutants are known to be toxic or carcinogenic in the environment, while others are endocrine disruptors.[492] 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.[493] 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.[494] Studies have shown that endocrine disruptors can affect reptile testosterone levels, gonad size, population levels, energy levels related to reproduction and growth, hatching and

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[488] J. Wilson & L. Younes. (2020). *Dozens of Little-Known California Oil Spills Have Earned Companies Millions of Dollars*.
[489] M.R. Jennings & M.P. Hayes. (1994). *Amphibian and Reptile Species of Special Concern in California* at 110.
[490] D.A. Crain & L.J. Guilette, Jr. (1998). *Reptiles as Models of Contaminant-Induced Endocrine Disruption*, Animal Reproduction Science, at 77-78.
[491] J. Pichtel. (2016). *Oil and Gas Production Wastewater: Soil Contamination and Pollution Prevention*, Applied & Environmental Soil Science, at 1.
[492] *Id.* at 2.
[493] D.O. Norris & K.H. Lopez. (2011). *Hormones and Reproduction of Vertebrates: Reptiles*, Ch. 14: Endocrine Disruption of Reproduction in Reptiles, at 373.
[494] A.O. Cheek. (2006). *Subtle Sabotage: Endocrine Disruption in Wild Populations*, Revista de Biologia Tropical, at 1.

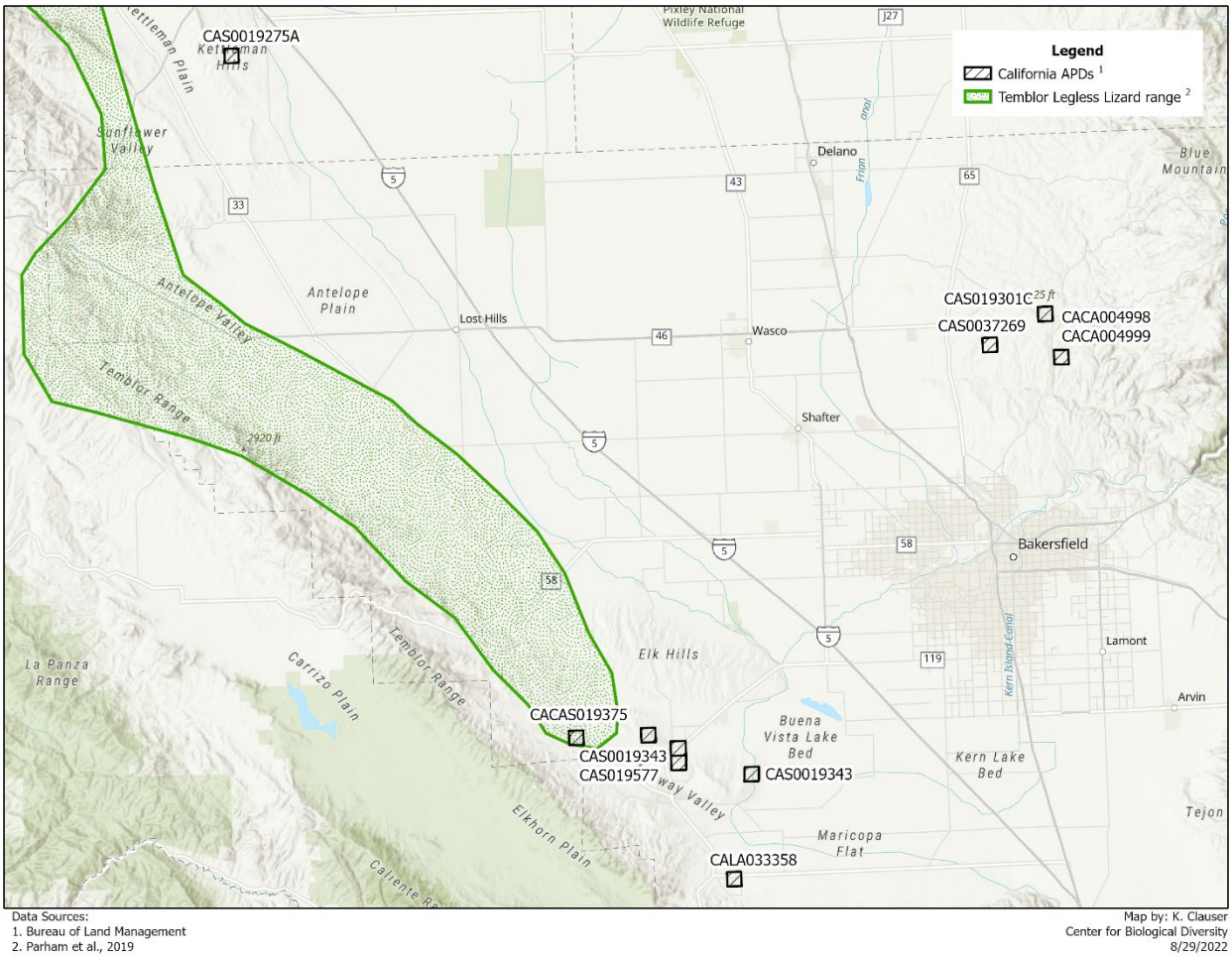
developmental abnormalities, and mortality.[495] Only a modest amount of information is available on the exposure of these compounds on lizards and, while specific impacts to the Temblor legless lizards are not yet known due to its fossorial and cryptic nature and lack of focused monitoring, there is enough information to show that the survival of the Temblor legless lizard is threatened.[496]

### E. APDs are within the Temblor legless lizard's known range, and the species would be harmed by spills, increased traffic, and human disturbance on other APD projects.

Many of the APD projects approved by BLM over the last several months fall directly in or near the Temblor legless lizard's known range, as shown in the map below. BLM's practice of continuing to authorize oil and gas development jeopardizes the remaining populations and habitat of this imperiled lizard in this region. Furthermore, other proposed projects 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. BLM must analyze the impacts of the projects' oil and gas development on the imperiled Temblor legless lizard.

[495] J.W. Gibbons et al. (2000). *The Global Decline of Reptiles, Déjà vu Amphibians*, Bioscience, at R 657; G.V. Zychowski & C.A.J. Godard-Codding. (2016). *Reptilian Exposure to Polycyclic Aromatic Hydrocarbons and Associated Effects*, Environmental Toxicology & Chemistry, at 26; D.A. Crain & L.J. Guillette, Jr. (1998). *Reptiles as Models of Contaminant-Induced Endocrine Disruption* at 77-86.

[496] G.V. Zychowski & C.A.J. Godard-Codding. (2016). *Reptilian Exposure to Polycyclic Aromatic Hydrocarbons and Associated Effects* at 28-29.




## VIII. Conclusion

For the forgoing reasons, BLM must defer approval of the APDs until it has provided for a minimum 30-day public comment period on the draft EA(s) as well as sufficient additional time for the agency to review and adequately respond to any comments. Moreover, it must not approve the APDs until it has taken a hard look at environmental justice, air, water, climate, and species impacts and developed reasonable alternatives that would alleviate the environmental harms the additional oil and gas drilling will cause.

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