HEADQUARTERS
120 Shelton McMurphey Blvd.
Suite 340
Eugene, OR 97401
(541) 485-2471
info@westernlaw.org

OFFICES
Oregon
Washington
New Mexico
Montana
Colorado

Defending the West

westernlaw.org

WESTERN ENVIRONMENTAL LAW CENTER

June 11, 2025

U.S. Bureau of Land Management
Farmington Field Office
Attn: Cody McCullah
620 E. Greene Street
Carlsbad, NM 88220-6292

U.S. Bureau of Land Management
Pecos District Office
Attn: Catherine Brewster
2909 West Second Street
Roswell, NM 88201-2019

Via Eplanning (*Exhibits sent via FedEx*)

Re: Scoping for the New Mexico Q1 2026 Oil and Gas Lease Parcel Sales (DOI-BLM-NM-F010-2025-0033-EA & DOI-BLM-NM-P020-2025-1005-EA)

The Western Environmental Law Center ("WELC"), along with Center for Biological Diversity, Citizens Caring for the Future, Earth Ethics, Inc., Living Rivers & Colorado Riverkeeper, New Mexico & El Paso Interfaith Power and Light, San Juan Citizens Alliance, Sierra Club, Sierra Club Rio Grande Chapter, Torreon Community Alliance, Daniel Tso, Waterkeeper Alliance, Western Watersheds Project, WildEarth Guardians ("Commenters"), submit the following scoping comments on the Bureau of Land Management ("BLM") New Mexico Q1 2026 Oil and Gas Lease Parcel Sales ("Lease Sales"). These sales include two nominated parcels of Federal minerals administered by the Farmington Field Office, and 28 nominated parcels of Federal minerals administered by the Carlsbad Field Office.[1] As detailed below, Commenters encourage

[1] A list of parcel numbers and serial numbers referenced in this comment letter is attached as **Appendix A** to this comment. A list of all exhibits to this comment is attached as **Appendix B**. Exhibits referenced herein and itemized in Appendix B and Appendix D were provided on a USB drive sent under separate cover via FedEx, postmarked on June 9, 2025. They were delivered at the New Mexico State office June 10, 2025, see delivery proof, **Appendix C**. Supplemental comments for the sale are provided in **Appendix D**. Commenters do not provide a summary of the attached documents herein, because each document's relevance is identified in the proposition for which it is cited. Moreover, nothing in NEPA, case law, or any other law or regulation imposes additional exhaustion requirements on the public, as BLM suggests in requiring commenters to summarize the relevance of exhibits. It is arbitrary and capricious and a violation of NEPA and the APA for BLM to shift its duties to the public. 5 U.S.C. § 706 (2)(A) and (D). It is BLM's responsibility, not that of commenters, to consider "all the relevant factors," including information submitted during public comment, in its decision-making and use that information to articulate a rational connection between the facts found and the choices made. *Motor Vehicle Mfr. Ass'n v. State Farm Mut. Auto. Ins. Co*., 463 U.S. 29, 43, 52 (1983). *See also Te-Moak Tribe v. Interior,* 608 F.3d 592, 605-606 (9th Cir. 2010) ("Compliance with [the National Environmental Policy Act] is a primary duty of every federal agency; fulfillment of this vital responsibility should not depend on the vigilance and limited resources of [the public];.*Friends of the Clearwater v. Dombeck*, 222 F.3d 552, 559 (9th Cir. 2000) (modification added) (*quoting Warm Springs Dam Task Force v. Gribble,* 621 F.2d 1017, 1023 (9th Cir. 1980).(Stating that the *agency* has a 'continuing duty to gather and evaluate new information relevant to the environmental impact of its actions,' even after release of an [EA].").

the BLM to complete a thorough, transparent environmental review for the parcels *before* moving forward with these Lease Sales.

The names, mailing addresses, and telephone numbers for each organization and individual filing this comment letter are listed below:

Center for Biological Diversity
1536 Wynkoop Street Suite #421
Denver, CO 80202
520.623.5252

Citizens Caring for the Future
PO Box 27162
Albuquerque, NM 87125
575.302.7587

Earth Ethics, Inc.
PO Box 1783
Pensacola Florida 32591

Interfaith Power & Light, New Mexico & El Paso Region
PO Box 27162
Albuquerque, NM 87125
505-266-6966

Living Rivers & Colorado Riverkeeper
PO Box 466
Moab, UT 84532
435-260-2590 (cell)

San Juan Citizens Alliance
1309 E 3rd Avenue, Suite 5
Durango, CO 81302
(970) 259-3583

Sierra Club
1650 38th St. Ste. 103W
Boulder, CO 80301
(303) 449-5595 ext. 101

Sierra Club Rio Grande Chapter
2215 Lead Ave. SE
Albuquerque, NM 87106
(505) 301-0863

Torreon Community Alliance
6358 Main Street # 1054
Cuba, NM 87013
(505) 321-9974

Daniel Tso
92 Rd 3050
Aztec, NM 87410
(505) 576-0289

Waterkeeper Alliance
180 Maiden Lane, Suite 603
New York, NY 10038
212.747.0622

Western Environmental Law Center
409 East Palace Avenue, #2
Santa Fe, New Mexico 87501
505.570.5565

Western Watersheds Project
P.O. Box 1770
Hailey, ID 83333
208.788.2290

WildEarth Guardians
301 N. Guadalupe, Ste. 201
Santa Fe, NM 87501
505.988.9126

I, Morgan O'Grady, have been authorized to file this comment letter on behalf of the above groups.

STATEMENT OF REASONS IN SUPPORT OF COMMENTERS' COMMENT LETTER ON THE FIRST QUARTER LEASE SALES.

The above-named Commenters submit these scoping comments in response to the BLM's proposed Q1 '25 Lease Sales and their respective proposed parcels. For reasons explained below, BLM must defer all parcels proposed for lease pending completion of programmatic review of the federal fossil fuel programs. Specifically, it must complete an analysis, under the National Environmental Policy Act of 1976 ("NEPA"), the Federal Land Policy and Management Act ("FLPMA"), the Endangered Species Act ("ESA"), and other laws and regulations, of those programs' cumulative greenhouse gas pollution, their associated climate impacts, and their compatibility with BLM's public-lands statutory mandates and the U.S. goal of limiting global warming to 1.5° Celsius. Importantly, that analysis is both legally required and has never been done. Each sold lease parcel would lock in more future greenhouse gas pollution at a time when it is imperative for the U.S. to reduce emissions. That pollution will worsen climate and extinction crises and their associated harm to people and the environment. Multiple studies show that there is simply no room left in the global carbon budget for new commitments of fossil fuel development. The world's already-producing oil and gas fields, if fully developed, will by themselves push global warming past the 1.5° Celsius limit (not accounting for emissions from coal production). Thus, we again urge BLM, and by extension the Department of Interior, to exercise their full authority under federal law to end new federal fossil fuel leasing and enact a managed decline of production consistent with the U.S. goal of limiting global warming to 1.5° Celsius.

I. NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

Recent and upcoming legislation, rulemaking, and regulatory changes do not absolve BLM of its duties under NEPA, FLPMA, the ESA, the APA, and all other applicable laws and regulations. BLM must take a hard look at potentially significant impacts of oil and gas leasing and development, and must otherwise meet its NEPA obligations for these lease sales and the federal oil and gas program as a whole, including considering alternatives and mitigation necessary to conform the agency's action to FLPMA's substantive obligations. We emphasize NEPA's action-forcing purpose as an indispensable tool to comply with FLPMA. As NEPA provides, "the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth [in NEPA]." 42 U.S.C § 4332(1). Further, NEPA serves as the vehicle for BLM to make reasoned and informed multiple use decisions, directing the agency to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C § 4332(2)(H).

Given the myriad concerns we have substantiated in these comments, in particular regarding climate change, it is self-evident that further oil and gas leasing, and these specific lease sales, "involves unresolved conflicts" demanding a full-throated consideration of alternatives and required mitigation to avoid, minimize, and mitigate, in that sequence of priority, impacts. This includes, critically, but is not limited to, consideration of a "no action" alternative. *Bob Marshall Alliance v. Hodel*, 852 F.2d 1223, 1229 n.4 (9th Cir. 1988); *see also Montana Wilderness Assn. v. Fry*, 310 F.Supp.2d 1127, 1145-46 (D. Mont. 2004) (BLM failed to consider no-action alternative). The fact that the administration's political position may prioritize

domestic fossil fuel production over other multiple uses does not, whatever the basis of that position be, obviate the agency's NEPA and interwoven FLPMA duties.

A. CEQ Guidance on Implementation of NEPA Contravenes NEPA

We encourage BLM to rely on the Department of Interior's NEPA regulations, BLM's Manual on NEPA, BLM's NEPA Handbook, and the 1978 CEQ regulations, on which these agency procedures are based. These procedures best comport with NEPA's plain language, purpose to foster informed decision making, and policy to promote environmental protection.

On January 20, 2025, President Trump issued Executive Order 14154, Unleashing American Energy, directing CEQ to rescind its NEPA regulations, and directing federal agencies to promulgate their own regulations implementing NEPA. Subsequently, CEQ issued an interim final rule rescinding the regulations, effective April 11, 2025. CEQ, Removal of National Environmental Policy Act Implementing Regulations 90 Fed. Reg. 10610 (Feb. 25, 2025). CEQ recommended that, in the interim—until agencies promulgate their own regulations—agencies apply their "current NEPA implementing procedures with any adjustments needed to be consistent with the NEPA statute as revised by the [Fiscal Responsibility Act Amendments]." CEQ, Memorandum for Heads of Federal Departments and Agencies (Feb. 19, 2025) ("CEQ 2025 Guidance"), at 1.[2]

Moreover, CEQ directed that even though it had rescinded its regulations implementing NEPA, agencies "should consider voluntarily relying on those regulations in completing ongoing NEPA reviews or defending against challenges to reviews completed while those regulations were in effect." *Id*. at 4. This guidance does not specify which regulations should apply for ongoing NEPA reviews that agencies had begun but not completed before the CEQ regulations were rescinded, or for new NEPA reviews commencing after the recission.

However, the Guidance recommends that agencies use the first Trump Administration's final CEQ regulations amended in 2020, 85 Fed. Reg. 43304 (July 16, 2020) ("2020 Rule"), "as an initial framework for the development of revisions to their NEPA implementing procedures," CEQ 2025 Guidance at 1, 4, suggesting that the 2020 Rule should apply to all NEPA reviews going forward. In addition, the Guidance suggests that the Fiscal Responsibility Act ("FRA") amendments do not require cumulative impacts analysis, and that NEPA does not require analysis of environmental justice impacts. *See* CEQ 2025 Guidance at 5. As explained below, these directives contradict the statute and decades of NEPA practice and precedent, including CEQ and agency interpretations of NEPA deserving of "great respect." *Loper Bright Enters. v. Raimondo*, 603 U.S. 369, 386 (2024) ("great respect" to Executive Branch's statutory interpretation is "especially warranted" if it "was issued roughly contemporaneously with enactment of the statute and remained consistent over time").

1. BLM Must Consider Cumulative Impacts, Including Cumulative Impacts on Climate Change

[2] **Exhibit 1,** Katherine R. Scarlett, *Memorandum for Heads of Federal Departments and Agencies*, Council on Environmental Quality (Feb. 19, 2025). *Avaulable at* https://ceq.doe.gov/docs/ceq-regulations-and-guidance/CEQ-Memo-Implementation-of-NEPA-02.19.2025.pdf.

BLM cannot abandon cumulative impacts analysis, based on CEQ's 2025 Guidance or its suggestion to follow the 2020 CEQ regulations, which eliminated the requirement for cumulative impacts analysis. Cumulative impacts necessarily fall within NEPA's mandate for agencies to consider the reasonably foreseeable effects of its action, "to the fullest extent possible," 42 U.S.C. § 4332, tracing back to NEPA's original understanding, as interpreted by CEQ, the courts, and BLM and the Department of Interior.

Within a few months of NEPA's enactment in 1970, CEQ issued its first set of guidelines on implementing NEPA, at President Nixon's direction, Executive Order 11,514, § 3(h). CEQ, Statements on Proposed Federal Actions Affecting the Environment; Interim Guidelines (April 30, 1970) ("1970 Guidelines"), 35 Fed. Reg. 7390 (May 12, 1970).[3] The guidelines advised that agencies "should prepare an [EIS] if it is reasonable to anticipate a cumulatively significant impact on the environment from Federal action," in recognition that a project's effects "can be individually limited but cumulatively considerable." 35 Fed. Reg. at 7391. Specifically, CEQ noted that section 4332(C) of NEPA directing agencies to prepare a "detailed statement" for "major Federal actions significantly affecting the quality of the human environment" "is to be construed . . . with a view to the overall, cumulative impact of the action proposed" and "of further actions contemplated." *Id*. Examples included: "when one or more agencies over a period of years puts into a project individually minor but collectively major resources, when one decision involving a limited amount of money is a precedent for action in much larger cases or represents a decision in principle about a future major course of action, or when several Government agencies individually make decisions about partial aspects of a major action." *Id*. at 7391; *see also Ely v. Velde*, 451 F.2d 1130, 1137, n.22 (4th Cir. 1971) (citing 1971 guidelines to hold that agency action's cumulative impacts triggered preparation of an EIS).

CEQ also advised that the EIS should "assess the action for cumulative and long-term effects," in view of two other statutory provisions. 35 Fed. Reg. at 7392. The guidelines found that the statutory requirement for an EIS to address "[t]he relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity," 42 U.S.C. § 4332(C)(iv), "in essence" required a cumulative effects analysis. *Id*. *See also* National Environmental Policy Act of 1969, S. Rept. 91-296 (July 9, 1969) ("Senate Report on NEPA"),[4] at 2, 21 (draft precursor to 42 U.S.C. § 4332(C)(iv) would have required a finding that the proposed "local, short-term uses of man's environment are consistent with maintaining and enhancing long-term productivity"). Further, this assessment should be done "from the perspective that each generation is trustee of the environment for succeeding generations," 35 Fed. Reg. at 7392, in clear reference to NEPA's policy statement that the Federal Government "use all practicable means" to "fulfill the responsibilities of each generation [as] trustee of the environment for succeeding generations," 42 U.S.C. § 4331(b)(1). This was in apparent recognition that "long-term productivity" and future sustainability can only be assessed and preserved if the overall impact from all actions in the affected area are cumulatively considered.

[3] Available at https://archives.federalregister.gov/issue_slice/1970/5/12/7389-7393.pdf#page=2.
[4] Available at https://ceq.doe.gov/docs/laws-regulations/Senate-Report-on-NEPA.pdf.

CEQ repeated the recommendations that cumulative impacts can trigger an EIS, and should be addressed in an EIS, in subsequent updates to the Guidelines in 1971 and 1973.[5]

In 1978, CEQ codified these guidelines—that a proposed action's significant cumulative impacts should trigger an EIS, and that an EIS should analyze cumulative impacts, among others—in binding regulations. *See* 40 C.F.R. § 1508.27(b)(7) (1978) (requiring consideration of "[w]hether the action is related to other actions with individually insignificant but cumulatively significant impacts" to determine whether to prepare an EIS, and noting "[s]ignificance exists if it is reasonable to anticipate a cumulatively significant impact on the environment."); *id*. § 1508.7 (1978) (including "cumulative impact" in the definition of "effect," and describing it as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions").[6] These requirements remained in effect, except for the short period between July 2020 and April 2022, until CEQ rescinded its regulations earlier this year. *Compare id. with* § 1508.1(g) (2020) (removing cumulative impacts from definition of "effects") *with* § 1508.1(g) (2022) *&* § 1508.1(i) (2024) (restoring cumulative impacts); *see also id*. § 1501.3 (2020) (removing consideration of cumulative effects from determining the significance of an action).

And, in later guidance to agencies, CEQ reiterated the importance of a cumulative impacts analysis in advancing NEPA's purpose of informed decision making for individual projects:

> Many times there is a mismatch between the scale at which environmental effects occur and the level at which decisions are made. Such mismatches present an obstacle to cumulative effects analysis. For example, while broad scale decisions are made at the program or policy level (e.g., National Energy Strategy, National Transportation Plan, Base Realignment and Closure Initiative), the environmental effects are generally assessed at the project level (e.g., coal-fired power plant, interstate highway connector, disposal of installation land). Cumulative effects analysis should be the tool for federal agencies to evaluate the implications of even project-level environmental assessments (EAs) on regional resources.

CEQ, Considering Cumulative Effects Under the National Environmental Policy Act (Jan. 1997), Chapter 1 at 4.[7]

---

[5] *See* CEQ, Statements on Proposed Federal Actions Affecting the Environment: Guidelines, 36 Fed. Reg. 7724, 7724-25 (April 23, 1971), at §§ 5(b), 6(a)(5) ("1971 Guidelines"), available at https://ceq.doe.gov/docs/laws-regulations/FR-1971-04-23-36-FR-7724-CEQ-NEPA-Guidelines-original.pdf; CEQ, Preparation of Environmental Impact Statements: Guidelines, 38 Fed. Reg. 20550, 20551 (Aug. 1, 1973) ("1973 Guidelines"), at § 1500.6(a) (also clarifying that cumulative impact of the action includes "related Federal actions and projects in the area, and further actions contemplated"); *id*. at § 1500.8(a)(1) ("The interrelationships and cumulative environmental impacts of the proposed action and other related Federal projects shall be presented in" the EIS), available at https://ceq.doe.gov/docs/laws-regulations/FR-1973-08-01-38-FR-20550-CEQ-NEPA-Guidelines-revised.pdf.

[6] The 1978 regulations are printed at 43 Fed. Reg. 55,978, available at https://ceq.doe.gov/docs/laws-regulations/FR-1978-11-29-43-FR-55978-CEQ-NEPA-Regulations-NOFR.pdf.

[7] Available at https://ceq.doe.gov/publications/cumulative_effects.html.

The 2020 Rule's jettisoning of cumulative impacts analysis deviated from CEQ's otherwise consistent interpretation of NEPA since NEPA's enactment, that agencies should consider cumulative impacts.

Likewise, eliminating cumulative impacts analysis would conflict with U.S. Supreme Court and other federal court decisions dating back to NEPA's early implementation, and pre-dating the 1978 regulations. Courts have found in NEPA's statutory text the requirement to consider cumulative impacts and "focus concern on the 'big picture' relative to environmental problems." *Swain v. Brinegar*, 517 F.2d 766, 775 (7th Cir. 1975). In *Swain*, the Seventh Circuit observed NEPA "expressly requires recognition of 'the worldwide and long-range character of environmental problems," 42 U.S.C. § 4332(2)(E) [1975] [now codified at 4332(2)(I)], and one of its specific elements to be studied in the EIS is 'the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity.'" 42 U.S.C. § 4332(2)(C)." *Swain*, 517 F.2d at 775. Thus, NEPA recognizes that "each 'limited' federal project is part of a large mosaic of thousands of similar projects and that cumulative effects can and must be considered on an ongoing basis." *Id*.; *see also Kleppe v. Sierra Club*, 427 U.S. 390, 409-410 (1976) ("comprehensive impact statement may be necessary" for agency to meet its duties under NEPA; "[w]hen several proposals . . . will have cumulative or synergistic environmental impact upon a region are pending concurrently before an agency, their environmental consequences must be considered together").

Courts have also recognized that cumulative impacts analysis is necessary to put a proposed action's effects into meaningful context and fulfill NEPA's informed decisionmaking purpose. In *Hanly v. Kleindienst*, 471 F.2d 823 (2d Cir. 1972), the court stated that agencies are required to consider "the absolute quantitative adverse environmental effects of the action itself, including the cumulative harm that results from its contribution to existing adverse conditions or uses in the affected area." *Id*. at 830-31. "[E]ven a slight increase in adverse conditions that form an existing environmental milieu may sometimes threaten harm that is significant. One more factory polluting air and water in an area zoned for industrial use may represent the straw that breaks the back of the environmental camel." *Id*. at 831; *see also Minnesota Public Interest Research Group v. Butz*, 498 F.2d 1314, 1322 (8th Cir. 1974) ("There has been increasing recognition that man and all other life on this earth may be significantly affected by actions which on the surface appear insignificant," and citing CEQ guidelines on cumulative impacts); *Natural Resources Defense Council v. Callaway*, 524 F.2d 79, 88 (2nd Cir. 1975) (Congress intended "to instill in the environmental decisionmaking process a more comprehensive approach so that long term and cumulative effects of small and unrelated decisions could be recognized, evaluated and either avoided, mitigated, or accepted as the price to be paid for the major federal action under consideration"); *Swain v. Brinegar II*, 542 F.2d 364, 370 (7th Cir 1976) (finding illegal segmentation of highway project, because "the combined statements of course do not consider the overall environmental effects of the 42-mile freeway"); *id*. at 368 ("although the individual environmental impact might be slight, the cumulative consequences could be devastating"); *Klamath-Siskiyou Wildlands Ctr. v. BLM*, 387 F.3d 989, 994 (9th Cir. 2004) ("Cumulative impacts of multiple projects can be significant in different ways. The most obvious way is that the greater total magnitude of the environmental effects … may demonstrate by itself that the environmental impact will be significant. Sometimes the total impact from a set of actions may be greater than the sum of the parts.").

Accordingly, for decades courts have held that NEPA reviews "must give a realistic evaluation of the total impacts and cannot isolate a proposed project, viewing it in a vacuum." *Grand Canyon Trust v. FAA*, 290 F.3d 339, 342 (D.C. Cir. 2002); *see also Healthy Gulf v. FERC*, 107 F.4th 1033, 1043 (D.C. Cir. 2024) ("NEPA's mandate to consider the cumulative effects of a project makes sense: A project's incremental emissions do not exist in a vacuum, and requiring consideration of the overall state of the surrounding environment helps ensure that agencies do not overlook the full impact of those emissions.").

Agency practice predating the CEQ's 1978 regulations is consistent with CEQ's and the courts' decades-long reading of NEPA that significant cumulative impacts should trigger preparation of an EIS. *See* Office of the Secretary, Environmental Statements: Issuance of Departmental Directives Regarding Preparation, 36 Fed. Reg. 19343, 19344-45 (Oct. 2, 1971) (DOI Department Manual Part 516 echoing CEQ Guidelines at Chapter 2, .5.B(1))); BLM, Environmental Statements: Issuance of Revised Bureau Directives, 37 Fed. Reg. 15015 (June 27, 1972) (same at 15017, § 1792.1.14.1). Those policies also similarly required that EISs analyze cumulative impacts, to fulfill NEPA's requirement that the EIS consider "[t]he relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity," 42 U.S.C. § 4332(C)(iv). Interior's Department Manual directed that the EIS "shall discuss the local short-term use of the environment involved in the proposed action in relation to its cumulative and long-term impacts and give special attention to its relationship to trends of similar actions which would significantly affect ecological interrelationships or pose long-term risks to health or safety." 36 Fed. Reg. at 19345, § .6.C.(6). And BLM's 1971 NEPA Manual directed:

- "The environmental impact of a Bureau action, combined with the impacts of other actions to be taken in a broader regional context, including actions of other government agencies, may have a significant cumulative effect which should be analyzed." 37 Fed. Reg. at 15017, § 1792.1.14.2.
- BLM responsible officials should "[d]iscuss the local short-term use of the environment involved in the proposed action in relation to its long-term impacts on the productive capacity of the area both for the same use and for a variety of uses," and "[a]nalyze the cumulative long-term impact of this action combined with the effects of all actions with similar environmental impacts." *Id*. at 15108, § 1792.2.22.C.6.

BLM should continue to follow current Interior and BLM policies and procedures requiring cumulative impacts analysis and the failure to do so would be arbitrary and capricious. *See* Office of the Secretary, Implementation of the National Environmental Policy Act (NEPA) of 1969, 73 Fed. Reg. 61292, 61310 (Oct. 15, 2008) (recognizing that Interior's 43 CFR 46.415(a)(3)'s requirement for an EIS to "disclose 'the environmental impact of the proposed action" necessarily includes "cumulative impacts"); 43 CFR § 46.215(f) (categorical exclusion exception applies if the responsible official determines the proposed action has "a direct relationship to other actions with individually insignificant but cumulatively significant environmental effects"). *See also id*. §§ 46.30, 46.115 (recognizing cumulative impacts analysis must consider reasonably foreseeable future actions and past actions, respectively); BLM, 516

Department Manual 11, at 6 § 11.8 (Jan. 16, 2025) [8] (BLM Manual providing that an EIS is required "[i]n circumstances where a proposed action is directly related to another action(s), and cumulatively the effects of the actions taken together would be significant, even if the effects of the actions taken separately would not be significant"); BLM, NEPA Handbook 1790-1 (2008)[9] at Ch. 6.8.3 ("the purpose of cumulative effects analysis is to ensure that Federal decision-makers consider the full range of consequences of actions (the proposed action and alternatives, including the No Action alternative)").

BLM's duty to consider cumulative impacts includes consideration of climate change impacts. "The impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct." *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin*., 538 F.3d 1172, 1217 (9th Cir. 2008); *see also Scientists' Institute for Public Information, Inc. v. Atomic Energy Com*., 481 F.2d 1079, 1090 (D.C. Cir. 1973) (NEPA "plainly contemplates consideration of 'both the long-and short-range implications to man, his physical and social surroundings, and to nature, in order to avoid to the fullest extent practicable undesirable consequences for the environment'") (citing 1971 Guidelines, 36 Fed. Reg. at 7724); *id*. at 1090 n.46 (noting NEPA's "concern for long-range planning" in its declaration of policy to "fulfill the responsibilities of each generation as trustee of the environment for succeeding [generations]" (citing 42 U.S.C. § 4331(b)(1)).

Indeed, Congress's primary concern in enacting NEPA was to compel the Federal Government to confront the exact challenges and existential threats posed by climate change. In the Senate Report accompanying the July 1969 version of the NEPA bill, the bill's sponsors highlighted the need to manage and account for nature's "limited capacities" and "the cost of adaptation to deteriorating conditions" to avoid "environmental catastrophe" and irreparable damage, for humanity's sake:

> Natural beauty, increased recreational opportunity, urban esthetics and other amenities . . . are worthy and important public objectives in their own right. But the compelling reasons for a national policy are more deeply based. The survival of man, in a world in which decency and dignity are possible, is the basic reason for bringing man's impact on his environment under informed and responsible control. The economic costs of maintaining a life-sustaining environment are unavoidable. We have not understood the necessity for respecting the limited capacities of nature in accommodating itself to man's exactions, nor have we properly calculated the cost of adaptation to deteriorating conditions. In our management of the environment we have exceeded its adaptive and recuperative powers, and in one form or another we must now pay directly the costs of maintaining air, water, soil, and living space in quantities and qualities sufficient to our needs. Economic good sense requires the declaration of a policy and the establishment of a comprehensive environmental quality program now. Today we have the option of channeling some of our wealth into the protection of our future. If we fail to do this in an adequate and timely manner, we may find ourselves confronted, even in this generation, with

[8] Available at https://www.doi.gov/document-library/departmental-manual/516-dm-11-managing-nepa-process-bureau-land-management-2.
[9] Available at https://www.blm.gov/sites/blm.gov/files/uploads/Media_Library_BLM_Policy_Handbook_h1790-1.pdf.

> an environmental catastrophe that could render our wealth meaningless and which no amount of money could ever cure.

Senate Report on NEPA at 17; *see also id*. at 16–17 ("The longer we delay in meeting our environmental responsibilities, the longer the growing list of 'interest charges' in environmental deterioration will run.").

Accordingly, BLM must quantify the direct, indirect, and cumulative emissions of developing the proposed leases, analyze their cumulative impact on climate change, and study alternatives and mitigation measures to avoid and/or minimize those impacts, as explained in the comments of Western Environmental Law Center Regarding BLM's Recent Leasing Proposals Throughout the West (attached as Exhibit A, *see* pp. 21–63), which we incorporate here by reference.

2. BLM Must Consider Environmental Justice Impacts

CEQ's 2025 Guidance incorrectly suggests that NEPA contains no independent basis for agencies to review the environmental justice impacts of their proposed actions. It states:

> E.O. 14148 revoked E.O. 14096 E.O. 14173 revoked E.O. 12898. Therefore, NEPA documents should not include an environmental justice analysis, to the extent that this approach is consistent with other applicable law.

CEQ 2025 Guidance at 5. To the contrary, environmental justice impacts fall squarely within NEPA's purview.

In enacting NEPA, Congress recognized the interconnection between environmental quality and human welfare, or "the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man." 42 U.S.C. § 4331(a) (emphasis added). Accordingly, NEPA sets forth "a continuing policy of the Federal Government . . . to use all practicable means and measures . . . in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans." *Id.* (emphasis added). Consistent with this focus on human welfare, Congress required that agencies address the impacts of "major Federal actions significantly affecting the quality of the human environment." 42 U.S.C. § 4332(C) (emphasis added); *id*. § 4336(b)(1) (requiring an EIS for a "proposed agency action . . . that has a reasonably foreseeable significant effect on the quality of the human environment").

Moreover, Congress specifically identified values of the "human environment" it intended NEPA to achieve, including broad enjoyment of health and safety, historic and cultural preservation, and diverse beneficial uses by all Americans and future generations:

> In order to carry out the policy set forth in this Act, it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may, among other things …

(1) fulfill the responsibilities of each generation as the trustee of the environment for succeeding generations;

(2) assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;

(3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;

(4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice; [and]

(5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities.

42 U.S.C. § 4331(b) (emphases added). Congress also recognized that "each person should enjoy a healthful environment and that each person has a responsibility to contribute to the preservation and enhancement of the environment." 42 U.S.C. § 4331(c) (emphasis added); *see also* CEQ, Environmental Justice: Guidance under the National Environmental Policy Act (Dec. 10, 1997) ("CEQ EJ Guidance"), at 7 (stating that the above goals "make clear that attainment of environmental justice is wholly consistent with the purposes and policies of NEPA").[10]

Assessing environmental justice impacts in NEPA reviews is one of the "all practicable means" an agency can use to "assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings." 42 U.S.C. § 4331(b)(2). On the other hand, authorizing actions that would perpetuate a historical pattern and practice of overburdening low-income, Black, Brown, Indigenous, and other socioeconomically disadvantaged communities with industrial facilities, pollution, health harms, safety risks, and blight, without any regard for these adverse effects, would run contrary to these Congressional policies.

Failing to conduct environmental justice analysis would also run contrary to CEQ's consistent understanding that NEPA requires consideration of economic and social effects that are interrelated with physical environmental impacts. CEQ has long recognized, "effects" under NEPA include not just "ecological" effects, but also "aesthetic, historic, cultural, economic, social, or health" effects. 40 CFR § 1508.8 (1978); 1508.1(g)(1) (2020); *id*. § 1508.1(i)(4) (2024); *see also* 1970 Guidelines, 35 Fed. Reg. at 7391 ("alternative actions that will minimize adverse impact should be explored and both the long- and short-range implications to man, his physical and social surroundings, and to nature"); 1971 Guidelines, 36 Fed. Reg. at 7725, § 2 (same), § 5(c) ("Significant adverse effects on the quality of the human environment include both those that directly affect human beings and those that indirectly affect human beings through adverse effects on the environment"); 1973 Guidelines, 38 Fed. Reg. at 20550, § 1500.2(b) ("agencies should use the environmental impact statement process to explore alternative actions that will avoid or minimize adverse impacts and to evaluate both the long- and

[10] Available at https://www.epa.gov/sites/default/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf.

short-range implications of proposed action to man, his physical and social surroundings, and to nature").

Although "economic or social effects by themselves [do not] require preparation of an [EIS]," CEQ has consistently prescribed that when "economic or social and natural or physical environmental effects are interrelated," the EIS shall discuss those effects "on the human environment." *Id*. § 1508.14 (1978); § 1502.16(b) (2020); *id*. § 1502.16(b) (2024) (same). Environmental impacts on areas historically burdened by pollution and industrial facilities, compounded by social disadvantages such as the effects of racial discrimination, poverty, or an English-limited population, are interrelated physical and socioeconomic effects that BLM must address in its NEPA review, or else demonstrate why they are not interrelated. *See also* CEQ EJ Guidance at 9 (advising agencies to consider "whether there may be disproportionately high and adverse human health or environmental effects" on environmental justice populations; "the potential for multiple or cumulative exposure to human health or environmental hazards in the affected population and historical patterns of exposure to environmental hazards"; and "the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed action").

Recent and upcoming legislation, rulemaking, and regulatory changes do not absolve BLM of its duties under NEPA, FLPMA, the ESA, the APA, and all other applicable laws and regulations. The agency cannot rely on emissions reductions goals or other measures in statutes like the Inflation Reduction Act to avoid analyzing, disclosing, and attempting to mitigate or avoid the impacts of oil and gas leasing.

B. BLM Must Prepare an EIS to Address the Cumulative Impacts of All Lease Sales Proposed for 2025.

The parcels proposed for sale in New Mexico, including those explicitly commented on here,[11] are driven by the Interior Department's incorrect rationale that the IRA mandates new oil and gas leasing. In addition, BLM has proposed lease sales in other quarters for 2025. Each of the proposed lease sales in 2025 are plainly part of a larger national initiative to implement the IRA and must be analyzed as such under NEPA.

That means preparing an environmental impact statement (EIS) to address the cumulative impacts of the tens of millions of acres that may be leased both onshore and offshore. Cumulative impacts include not only those related to climate and greenhouse gases, but also wildlife habitat, water pollution, impacts to wildlife and recreation and other uses of these lands and waters, health and environmental justice, cultural resources, and other relevant issues. NEPA's cumulative impacts requirement mandates that BLM must evaluate impacts "result[ing] from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions." 40 C.F.R. § 1508.1(g)(3) (2022). BLM's cumulative effects analysis "must give a realistic evaluation of the total impacts and cannot isolate a proposed project, viewing it in a vacuum." *Grand Canyon Trust v. Fed. Aviation Admin.*, 290 F.3d 339, 342 (D.C. Cir. 2002); *see also Great Basin Mine Watch v. Hankins*, 456 F.3d 955, 973-74 (9th Cir. 2006) (holding agency's cumulative impacts analysis insufficient based on failure to discuss other

[11] *See* Appendix A, Parcel List.

mining projects in the region); *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1214-16 (9th Cir. 1998) (overturning Forest Service EA that analyzed impacts of only one of five concurrent logging projects in the same region); *see also Kern v. BLM*, 284 F.3d 1062, 1078 (9th Cir. 2002) (holding that BLM arbitrarily failed to include cumulative impacts analysis of reasonably foreseeable future timber sales in the same district as the current sale); *see also Dine Citizens Against Ruining Our Environment, et al v. Haaland, et al,* No. 21-2116 slip op. at 43 (U.S. 10th Cir. Ct. Ap. Feb. 1, 2023) (holding that BLM arbitrarily failed to adequately contextualize cumulative impacts of GHG emissions when more precise methods were available).

Taking NEPA's requisite hard look at those impacts will require an EIS. NEPA requires an agency to prepare an EIS for any major federal action that may significantly affect the quality of the human environment. 42 U.S.C. § 4332(2)(C). An agency can rely on an EA only if it makes an affirmative finding that environmental impacts will not be significant (a FONSI). If there are "substantial questions" whether leasing may have a significant effect on the environment, an EIS is required. *Anderson v. Evans*, 371 F.3d 475, 488 (9th Cir. 2004); *Ctr. for Biological Diversity v. BLM*, 937 F. Supp. 2d 1140, 1154 (N.D. Cal. 2013). Here, it would be arbitrary and capricious to conclude that leasing on such a scale will not be significant. As a result, all parcels for the Q1 '25 lease sales, listed in Appendix A, in addition to the parcels proposed to-date for lease in other quarters, require the preparation of such an EIS.

Any claim that analyzing the cumulative carbon emissions from these lease sales would be inaccurate and not useful is arbitrary. EAs for previous lease sales have provided a similar analysis of the reasonably foreseeable GHG emissions from each sale, making it entirely feasible to aggregate and assess their cumulative impacts. Even if such an estimate would be conservative, that does not excuse BLM from providing any forecast of cumulative emissions from the lease sales proposed in 2025.

C. BLM Must Prepare a Programmatic EIS to take a Hard Look at the Impacts of the Resumption of Federal Oil and Gas Leasing and to Avoid Any New Greenhouse Gas Pollution.

The proposed lease sales in New Mexico thus are plainly part of a larger national initiative and must be analyzed as such under NEPA. There is no remaining room in the carbon budget for any new commitments of future greenhouse gas (GHG) pollution. Greenhouse gas pollution resulting only from existing federal fossil fuel development and potential development from leases and drilling permits already issued but not yet under production, would contribute to catastrophic climate change and unnecessary and undue degradation to the atmosphere and other public lands values that BLM is legally obligated to protect.[12] The additional burden of new leasing would only exacerbate these extreme climate impacts. BLM has yet to acknowledge this data-driven reality at a programmatic level.

BLM and Interior must therefore take a hard and comprehensive look at the cumulative climate change impacts of authorizing *any* new leasing when combined with committed

[12] *See, e.g.,* **Exhibit 2,** N. Ratledge et al., *Emissions from Fossil Fuels Produced on US Federal Lands and Waters Present Opportunities for Climate Mitigation*, 171 Climatic Change, no. 11, Mar. 14, 2022, at 2–5, https://link.springer.com/content/pdf/10.1007/s10584-021-03302-x.pdf.

emissions already under lease or permit, and immediately defer *any* sale of new leases and APD approvals pending demonstration of compatibility with global climate goals. The Department and BLM must conduct this analysis now, along with other relevant agencies that manage fossil fuel development on federal lands and waters, including BOEM. BLM must also consider a reasonable alternative of managed decline of GHG emissions from the approximately 13.5 million acres of fossil fuel estate already under lease but not producing.[13]

The climate crisis is fundamentally an incremental problem and the contribution of individual oil and gas development actions on the part of the BLM to climate change are difficult to assess, precisely because it is rare that such actions—taken in isolation—will be truly significant at a national or global scale. This is particularly true at the level of an individual lease sale, where the projected development of mineral resources on a given lease or set of leases will reduce the remaining global and national carbon budgets by vanishingly small fractions. Yet it is this creeping normalcy that results in fossil fuel development on BLM administered lands being responsible for 15.3% of total U.S. GHG emissions, 1.8% of global emissions, and nearly 21% of all emissions in the U.S. from fossil fuel production.[14] With respect to carbon dioxide, emissions from fossil fuels produced on federal lands represent a quarter of *all* CO_2 emissions in the U.S.[15]

It is precisely because of this incrementally small but collectively mammoth impact on the climate crisis that BLM must prepare a programmatic EIS for the federal oil and gas program—prior to committing a single additional acre to fossil-fuel development.[16] Such a programmatic examination would dovetail with an EIS that collectively analyzes the proposed 2025 lease sales, discussed above. At the outset, however, Commenters stress that BLM should prepare a programmatic EIS for the entire federal oil and gas leasing program before holding another lease sale. The purpose of a programmatic EIS or other programmatic NEPA review is to:

> [A]ddress the general environmental issues relating to broad decisions, such as those establishing policies, plans, *programs*, or suite of projects, and can effectively frame the scope of subsequent site-and project-specific federal actions . . . [o]ne advantage of preparing a programmatic NEPA review *for repetitive agency*

[13] *See* 2021 BLM Specialist Report at Table 4-11, Five-Year Federal Oil and Gas Statistics, recording nearly 25 million acres under lease for oil and gas with over 12.6 million acres producing.
[14] 2021 BLM Specialist Report at Section 9.1 (Representative Concentration Pathways), ("Climate change is fundamentally a cumulative phenomenon, global in scope, and all GHGs contribute incrementally to climate change regardless of scale or origin."); Section 7.1. (BLM Share of 2020 Annual Global and U.S. GHG Emissions), Table 7-1.
[15] **Exhibit 3**, Merrill, M.D., Sleeter, B.M., Freeman, P.A., Liu, J., Warwick, P.D., and Reed, B.C., Federal lands greenhouse gas emissions and sequestration in the United States—Estimates for 2005–14: U.S. Geological Survey Scientific Investigations Report 2018–5131, 31 (2018).
[16] **Exhibit 4**, Members of petitioner groups made this point initially in their comments submitted in response to Executive Order 14008, with the title: WELC et al Recommendations for Scope and Criteria for Review of the Federal Fossil Fuel Programs**.** (April 16, 2021).

activities is that the programmatic NEPA review can provide a starting point for analyzing direct, indirect, and cumulative impacts.[17]

A programmatic approach is compelled for the following reasons: 1) the fundamentally incremental nature of the climate crisis; 2) the small and shrinking window that remains to avoid the most catastrophic effects of climate change, a reality that was not reflected in the Department's Report on the Federal Oil and Gas Leasing Program;[18] 3) the importance of completing an analysis BLM started with its issuance of the BLM Specialist Report and the Interior Report, by conducting a PEIS; and 4) the need for consistency with the pending federal coal review.

1. The Incremental Nature of Climate Change and New Policy Commitments Requires a Programmatic EIS.

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").[19] The Final Climate Guidance applies to all proposed federal agency actions, "including land and resource management actions." 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 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.

[17] Memorandum for Heads of Federal Departments and Agencies, *Effective Use of Programmatic NEPA Reviews*, Counsel on Environmental Quality, December 18, 2014 (emphasis added).
[18] *Report on the Federal Oil and Gas Leasing Program, Prepared in Response to Executive Order 14008* (November, 2021) (Hereinafter "Interior Report") (the Report focused entirely on necessary fiscal reforms but ignored climate, in direct contravention of the language of §208 of Executive Order 14008.)
[19] CEQ, Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews (Aug. 2016); *see also* 2023 CEQ Interim Guidance, which was issued in Jan. 2023 and is intended to update the 2016 Guidance.

Furthermore, pursuant to the January 20, 2025 "Unleashing American Energy" Executive Order, as well as the attempted freeze of federal funding for climate mitigation, rollback of fuel economy standards, halting of all leasing of federal lands and waters for new wind farms, targeting of electric vehicle rollout and tax credits and more, current policy commitments indicate that Federal agencies intend to take imminent action that will significantly impact our ability to fight climate change. This action furthers the need for an updated Programmatic EIS. BLM has struggled in the past to comply with this guidance and frame the requisite "hard look" required by NEPA with regard to the climate impacts of individual oil and gas lease sales. The agency has run afoul of NEPA in the past precisely because it has been unable or unwilling to articulate the ways in which individual lease sales and subsequent site-specific decisions contribute to climate change.[20] Importantly, courts have held BLM accountable by recognizing that "the impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct." *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin*., 538 F.3d 1172, 1217 (9th Cir. 2008).

These past failings argue for a comprehensive, programmatic approach to provide context for subsequent leasing and drilling stage actions. NEPA, by its plain language, demands a comprehensive analysis of the impacts of the federal oil and gas leasing program—including, but not limited to the climate impacts.[21] Indeed, the 1978 regulations promulgated by the Council on Environmental Quality appear prescient in this respect; the cumulative impact and effects analyses might have been drafted as tools to help describe climate change. "Cumulative Impact" is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." 40 C.F.R. § 1508.7. "Indirect Effects" encompass such indicia as "effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems." 40 C.F.R. § 1508.8.[22]

If these sections, combined with the fundamentally cumulative nature of climate change, do not themselves compel a programmatic EIS, they certainly provide necessary guidance for

---

[20] *See, e.g.*, *WildEarth Guardians v. Bernhardt*, 501 F. Supp. 3d 1192, 1209 (D.N.M. 2020) (acknowledging minimal impact of local actions but questioning BLM assertion that *de minimis* site specific decision would have *no* impact on climate change); *Wildearth Guardians v. U.S. Bureau of Land Mgmt*., 457 F. Supp. 3d 880, 894 (D. Mont. 2020) (noting that "the global nature of climate change and greenhouse-gas emissions means that any single lease sale or BLM project likely will make up a negligible percent of state and nation-wide greenhouse gas emissions. Thus, if BLM ever hopes to determine the true impact of its projects on climate change, it can do so only by looking at projects in combination with each other, not simply in the context of state and nation-wide emissions."); *WildEarth Guardians v. Zinke*, 368 F. Supp. 3d 41, 69 (D.D.C. 2019) (NEPA requires BLM to quantify GHG emissions of leased parcels in the aggregate); *San Juan Citizens All. v. United States Bureau of Land Mgmt*., 326 F. Supp. 3d 1227 (D.N.M. 2018) (recognizing impact of challenged action alone may be significant only in combination with other actions).

[21] *See, e.g.* 42 U.S.C. § 4332(C) (requiring "a detailed statement . . . on—(i) the environmental impact of the proposed action, (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented, (iii) alternatives to the proposed action, (iv) the relationship between local short-term use of man's environment and the maintenance and enhancement of long-term productivity, and (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.").

[22] These sections illustrate the necessity of a clear declaration by BLM of which NEPA regulations were applied during the analyses for *all* sales, discussed *supra*.

one. As previously noted, BLM has been faulted in the past for not taking into consideration the cumulative and downstream impacts of its lease sales on climate change. *E.g. San Juan Citizens All. v. United States Bureau of Land Mgmt*., 326 F. Supp. 3d 1227, 1248 (D.N.M. 2018); *Wildearth Guardians v. U.S. Bureau of Land Mgmt*., 457 F. Supp. 3d 880, 894 (D. Mont. 2020). Yet the necessarily broad scale of an adequate analysis is indubitably best done once, and at the programmatic level, allowing the agency to tier to and place its subsequent, site-specific analyses within the context of the larger framework.[23] While the BLM Specialist Report initiated this process, it has yet to be completed because BLM omitted a number of important considerations, including a meaningful analysis of fossil fuels currently committed to development under existing leases, a program-wide economic analysis of the climate costs of the oil and gas program, and a meaningful discussion about how BLM land management fits within the broader framework of global climate commitments and warming thresholds. In short, preparing a programmatic NEPA analysis will help the Agency to reduce or eliminate redundant and duplicative analyses and effectively address cumulative impacts, substantially reducing the administrative burden and economic costs to the Agency and assisting the Agency in formulating comprehensive mitigation measures that apply at the national level.

2. There Is a Small Remaining Window to Avoid the Most Catastrophic Effects of Climate Change and a Programmatic Review Is Necessary to Inform Future Action.

The science is clear: there is simply no room for continuation of a "business as usual" approach on the federal mineral estate if humanity is to have a meaningful chance of curtailing truly catastrophic warming. To maintain a coin flip chance of maintaining warming below 1.5°C, *global* fossil fuel production must decrease by approximately 6% per year between 2020 and 2030, and approximately 60% of global fluid mineral resources must be left in the ground. [24, 25] For developed nations, including the U.S., in order to maintain a 50% or better chance of avoiding 1.5°C of warming, "coal production needs to fall by 50% within five years and be effectively eliminated by 2030," while oil and gas production must be cut by 74% by 2030 and end by 2035.[26] To maintain a 67% chance of avoiding 1.5°C of warming, the U.S. must *end* oil and gas production by 2031.[27] The latest reports only paint a grimmer picture of the rapidly shrinking opportunity to avert the worst consequences of climate change. It is clear that extreme weather events, and their human, ecological, and economic costs, are already harming, killing, and displacing millions of people around the world.[28] Instead of falling, greenhouse gas concentrations continue to rise, and modest reductions have done little to check their trajectory.[29]

---

[23] *See, Effective Use of Programmatic NEPA Reviews*, **Exhibit 5**.
[24] **Exhibit 6,** SEI, IISD, ODI, E3G, and UNEP, *The Production Gap Report: 2020 Special Report* (2021).
[25] **Exhibit 7,** Welsby, D., Price, J., Pye, S. et al. *Unextractable fossil fuels in a 1.5 °C world*. Nature 597, 230–234 (2021) (if 60% of remaining oil and gas is left in situ, we will retain a 50% chance of limiting warming to 1.5°C).
[26] **Exhibit 8,** Calverley, D. and Anderson, K. (2022), *Phaseout pathways for fossil fuel production within Paris-compliant carbon budgets*. Tyndall Centre, University of Manchester.
[27] *Id*.
[28] **Exhibit 9,** The 2022 report of the *Lancet* Countdown on health and climate change: health at the mercy of fossil fuels. https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(22)01540-9/fulltext
[29] **Exhibit 10,** World Meteorological Organization (2022). United in Science 2022 A multi-organization high-level compilation of the most recent science related to climate change, impacts and responses. https://library.wmo.int/doc_num.php?explnum_id=11309; **Exhibit 11,** United Nations Framework Convention on

Without drastic action, "the physical and socioeconomic impacts of climate change will be devastating. Irreversible physical changes in the climate system, known as tipping points, cannot be ruled out and could have significant global and regional consequences."[30] International pledges are insufficient to avert catastrophic temperature increases and are woefully insufficient to constrain global temperature rise below 1.5°C.[31] Moreover, most nations that pledged reductions are nowhere near meeting those pledges.[32] In light of ongoing production, BLM must not lease any further parcels for development, as doing so jeopardizes meeting the 1.5° C target.[33]

A fundamental disconnect exists between the reality of climate change, and how public lands are managed for energy production. A recent paper calculates that lifecycle emissions from federal fossil fuel development resulted in an average of 1,408 million metric tons (MMT) of Carbon Dioxide-equivalent (CO2e) per year since 2005—the equivalent of 377 coal-fired power plants, or the emissions from 303 million cars—and are projected to be around 1,130 MMT CO2e by 2030.[34] These emissions will amount to around 20% of total U.S. greenhouse gas emissions each year.[35]

Most recently, at COP28, the parties to the Paris Agreement acknowledged the need for a just transition away from fossil fuel energy sources and a phase-out of fossil fuel subsidies.[36] BLM's continued authorization of fossil fuel leasing and development is contrary to these international goals, and seriously undermines U.S. progress toward meeting them.

Similarly, the Intergovernmental Panel on Climate Change (IPCC) recently released the entirety of its sixth assessment report (AR6), including a synthesis of its findings.[37] The IPCC

Climate Change (October 26, 2022), Nationally Determined Contributions Under the Paris Agreement: Synthesis Report by the Secretariat. https://unfccc.int/documents/619180.

[30] *Id.*

[31] **Exhibit 12,** United Nations Environment Programme (2022). Emissions Gap Report 2022: The Closing Window — Climate crisis calls for rapid transformation of societies. Nairobi. https://www.unep.org/emissions-gap-report-2022.

[32] *Id.*; United Nations Framework Convention on Climate Change (October 26, 2022), Nationally Determined Contributions Under the Paris Agreement: Syntheseis Report by the Secretariat, https://unfccc.int/documents/619180, Exhibit 11.

[33] *Navigating Energy Transitions: Mapping the Road to 1.5° C*, Exhibit 11. Additional development also risks leaving stranded assets, as fields will need to be decommissioned before the end of their lifespan. *Id.*

[34] Exhibit 2**,** N. Ratledge et al., *Emissions from Fossil Fuels Produced on US Federal Lands and Waters Present Opportunities for Climate Mitigation*, 171 Climatic Change, no. 11, Mar. 14, 2022, at 2–5, https://link.springer.com/content/pdf/10.1007/s10584-021-03302-x.pdf.

[35] *Id*. at 6 fig. 2.

[36] *See* United Nations Framework on Climate Change (UNFCC), Conference of the Parties (COP28), First global Stocktake, Proposal by the President, Draft Decision (Dec. 13, 2023), at 5; *see also* UNFCC Conference of the Parties, Work Programme on Just Transition Pathways, Proposal By the President, Draft Decision (Dec. 13, 2023).

[37] **Exhibits 14** and **15**, IPCC, 2021: Summary for Policymakers and Technical Summary. **Exhibit 16,** In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson Delmotte et al. (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 3−32, doi:10.1017/9781009157896.001; **Exhibit 17**, IPCC, 2022*: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [P.R. Shukla et al. (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926; **Exhibit 18**, IPCC,

Sixth Assessment provided the remaining carbon budget from the beginning of 2020 as 400 $GtCO_2$ for a 67% probability of meeting the 1.5°C limit and 500 $GtCO_2$ for a 50% probability of 1.5°C.[38] At current emissions levels, the world will exceed the global carbon budget for a 50% chance of limiting warming to 1.5°C in just 10 years. The Sixth Assessment Report found that net anthropogenic greenhouse gas emissions during 2010 to 2019 were higher than any previous time in human history.[39] Nationally determined contributions (NDCs) make it likely that we will exceed 1.5°C this century. Policies implemented at the end of 2020 are projected to result in higher global GHG emissions than even those implied by NDCs. Projected CO_2 emissions over the lifetime of existing and planned fossil fuel infrastructure exceed the CO_2 emissions in pathways that limit warming to 1.5°C.[40] In pathways that limit warming to 1.5°C with no or limited overshoot, global GHG emissions peak between 2020 and 2025, and then fall to 48% below 2019 level by 2030, reaching net-zero by early 2050s. Without strengthening policies beyond those at present, GHG emissions are projected to rise beyond 2025, leading to global warming of 3.2°C by 2100.[41] Reducing GHG emissions across the energy sector requires substantial reduction in overall fossil fuel use and the deployment of low-emission energy sources. The continued installation of unabated fossil fuel infrastructure will 'lock-in' GHG emissions.[42]

As UN Secretary-General António Guterres stated upon the release of the Intergovernmental Panel on Climate Change's (IPCC) latest 2022 report:

> Climate scientists warn that we are already perilously close to tipping points that could lead to cascading and irreversible climate impacts. But, high-emitting Governments and corporations are not just turning a blind eye, they are adding fuel to the flames. They are choking our planet, based on their vested interests and historic investments in fossil fuels, when cheaper, renewable solutions provide green jobs, energy security and greater price stability…. Climate activists are sometimes depicted as dangerous radicals. But, the truly dangerous radicals are the countries that are increasing the production of fossil fuels. Investing in new fossil fuels infrastructure is moral and economic madness. . ..[43]

2022: *Climate Change 2022: Impacts, Adaptation, and Vulnerability.* Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner et al.]. Cambridge University Press. In Press; **Exhibit 19,** IPCC 2023: *Synthesis Report of the IPCC Sixth Assessment Report* [Paola Arias et al. (eds.)], Cambridge University Press.

[38] Intergovernmental Panel on Climate Change, Summary for Policymakers In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (2021), https://www.ipcc.ch/report/sixth-assessment-report-working-group-i/ at SPM-38, Exhibit 25.

[39] IPCC, 2022: Summary for Policymakers. In: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA. doi: 10.1017/9781009157926.001, at SPM-4, Exhibit 17.

[40] *Id.* at SPM-15, 16.

[41] *Id.* at SPM-21.

[42] *Id. at* SPM-36.

[43] United Nations Secretary-General, António Guterres (UN Secretary-General) to the press conference launch of IPCC Report (February 28, 2022) (emphasis added), https://media.un.org/en/asset/k1x/k1xcijxjhp.

BLM has yet to complete either a project or program-level NEPA document that analyzes the federal oil and gas program in light of these scientific conclusions and with an eye to developing alternatives that respond to them. A programmatic NEPA review is the ideal vehicle for such an analysis. NEPA requires analysis *before* making decisions with potentially irreversible effects: "the appropriate time for preparing an EIS is *prior* to a decision, when the decisionmaker retains a maximum range of options." *Sierra Club v. Peterson*, 717 F.2d 1409, 1414 (D.C. Cir. 1983). While this is of course true at the project level, it is no less true at the programmatic level when each project comprises an incremental part of the overall impact.

The leasing process "is the point of no return with respect to emissions," and it is therefore not only appropriate but critical that the Agency take not only a hard look but a comprehensive one before crossing that threshold. *WildEarth Guardians v. Zinke*, 368 F. Supp. 3d 41, 66 (D.D.C. 2019). At this moment in time, we have very nearly reached the point of no return, not only with regard to the lease sales at issue here, but with regard to the ability to avert the worst impacts of climate change.

3. BLM Must Complete the Analysis Begun in the Specialist Reports.

A programmatic review is particularly critical following release of the 2021 and 2022 BLM Specialist Reports and Interior Report. The former constitutes—in large part—the quantification and context of federal mineral estate-associated GHG emissions courts have faulted BLM for not providing in the past. BLM must now take the logical next step, by completing the programmatic NEPA analysis it has effectively begun with the BLM Specialist Report. It must also do what it failed to do in the Interior Report – qualitatively and quantitatively discuss the climate change impacts of these emissions in the context of the federal program, leased but as yet undeveloped federal lands, as well as national and global emissions. Failure to do so will represent a lost opportunity to meaningfully evaluate the outsized role the federal oil and gas leasing program plays in the climate crisis, and to explore alternatives to reduce its impacts through the federal oil and gas program.

BLM has, with the BLM Specialist Report, fulfilled the lowest common denominator of quantifying federal emissions against the backdrop of federal laws and climate science. It must now meaningfully analyze those emissions in light of remaining national and global carbon budgets, and must apply tools such as the Social Cost of Greenhouse Gases to describe the actual economic, ecologic, and human costs of the program at national and global scales. Section 9.1 of the BLM Specialist Report briefly describes federal fossil fuel emissions in the context of various carbon budgeting mechanisms and global emissions commitments (such as under the Paris Agreement). However, more is required by NEPA, and it must be done at a programmatic level, as the quantification of GHGs in the BLM Specialist Report was done. Just as uncertainty about the effects of an individual sale or permitted development does not absolve BLM from its duty to attempt to analyze those effects,[44] uncertainty about the United States' equitable share of the remaining carbon budget, or variability in carbon budgeting methods and social cost metrics

[44] *Wildearth Guardians v. U.S. Bureau of Land Mgmt*., 457 F. Supp. 3d 880, 894 (D. Mont. 2020) (The global nature of climate change complicates an assessment of the exact climate change impacts from the lease sales. This complication does not preclude BLM from complying with the Ninth Circuit's mandate to catalogue past, present, and reasonably foreseeable projects).

does not justify a failure to analyze meaningful ways to address climate change and the oil and gas program's contributions to it.

4. A Programmatic EIS for the Federal Oil and Gas Program Is Consistent with The Department's Review of the Federal Coal Leasing Program.

A final factor weighing in favor of the completion of a programmatic EIS is the Federal Coal Program Review. Originally initiated in response to Secretarial Order 3338 (January 15, 2016), the intent was to prepare a programmatic EIS and review of the federal coal program designed to address a range of concerns, including but not limited to questions as to the fair return to American taxpayers from federal coal royalties, market fluctuations and resultant impacts to coal-dependent communities, and the more fundamental question of whether the leasing and production of federal coal is consistent with the Nation's domestic and international goals to preserve a livable climate and meet international commitments to maintain global warming below certain critical thresholds, namely 1.5°C. Secretarial Order 3338 was rescinded by former Interior Secretary Ryan Zinke through Secretarial Order 3348, which also lifted the federal coal leasing pause that had been implemented by SO 3338. On August 20, 2021, the BLM issued a Federal Register notice in response to Secretarial Order 3398 (issued by Interior Secretary Deb Haaland), indicating its intent to reinstitute a federal coal program review and soliciting public comment. BLM received 214,866 comments in response to its request. The current status of the review itself is unknown. Until a programmatic NEPA review analyzing the climate, fiscal, and taxpayer impacts of all federal fossil fuel development occurs, no additional fossil fuel leasing should occur. BLM and Interior are compelled to do so by statutory mandates under FLPMA.

For the above-described reasons, all parcels for the New Mexico Q1 '25 lease sales, listed in Appendix A, should be withdrawn pending preparation of such an EIS.

D. BLM Must Consider a Range of Alternatives.

The NEPA alternatives analysis required by 42 U.S.C. § 4332(C)(iii) is "heart" of the NEPA process. 40 C.F.R. § 1502.14. For the reasons articulated below, BLM must comply with NEPA in its analysis of alternatives for the New Mexico Q1 '25 lease sales.[45]

1. BLM Must Consider a No-Leasing Alternative.

BLM must analyze a no-leasing or no action alternative to adequately inform the public and the decision maker under statutory NEPA requirements. The impacts to GHG emissions and climate according to the no action alternatives considered must indicate the difference in estimated GHG emissions between the proposed alternatives and the no action alternatives. BLM may not argue that Federal production levels would remain static or even increase if the leases are not developed, as courts have repeatedly rejected such "perfect substitution" arguments. *See, e.g. Friends of the Earth v. Haaland*, No. CV 21-2317 (RC), 2022 WL 254526, at *12 (D.D.C. Jan. 27, 2022) (finding argument that no action alternative would result in higher emissions

[45] *See* discussion regarding application of CEQ regulations, supra.

arbitrary); *WildEarth Guardians v. United States Bureau of Land Mgmt.*, 870 F.3d 1222, 1238 (10th Cir. 2017) (irrational and unsupported substitution argument arbitrary).

The 2016 CEQ GHG Guidance indicates that in the alternatives analysis, agencies should compare anticipated levels of GHG emissions from each alternative, including the no-action alternative, and mitigation actions to provide information to the public and enable the decision maker to make an informed decision.[46] The 2023 Interim CEQ Guidance further underscores the importance of considering alternatives that would avoid or mitigate GHG emissions.[47] In addition, the analyses of the no-action alternatives implies a "perfect substitution" argument regarding GHG emissions that the Interior Department's Bureau of Ocean Energy Management recently disavowed. We again request BLM evaluate and discuss BOEM's NEPA analysis of GHG emissions from recent offshore lease sales in its NEPA analysis of the proposed Q1 '25 lease sales.[48]

As we discussed above, BLM should develop a single NEPA document analyzing all of the proposed 2025 lease sales to better evaluate the cumulative GHG emissions estimated from the lease sales and their impact on climate change. Likewise, the no-action alternative should evaluate and discuss the cumulative effect of not leasing any of the 2025 parcels proposed for oil and gas development. This analysis should not only quantify the total GHG emissions that would be avoided as a result of not leasing but should also quantify and evaluate the co-benefits of not leasing, including the benefits of avoided air pollution, avoided water use, avoided produced water disposal, and the ability to put lands not leased to other beneficial uses.[49] The co-benefits analysis should also reflect the cumulative value of the renewable energy-generating capacity of the federal lands and mineral estate that would be preserved under the no-action alternative.

2. BLM Must Consider an Alternative That Considers Adopting a Policy of Managed Decline of Fossil Fuel Production from the Entire Federal Mineral Estate.

We request that BLM include an alternative that considers adopting a policy of managed decline of fossil fuel production from the entire federal mineral estate. Inconsistencies among BLM offices in determining the alternatives to consider would be example of the need to consider the proposed lease sales in a single impact statement rather than through individual EAs. It would also underscore the need for a programmatic review of the BLM fossil fuel program. We request BLM explain the basis for how and why it determines whether to consider proposed alternatives, and we request that BLM consider an alternative involving a policy of managed decline of fossil fuel production from the entire federal mineral estate. *See Dubois vs. USDA*, 102 F.3d 1273 (1st Cir. 1966) (agencies must legitimately assess the relative merits of reasonable alternatives before making decision); *Antipollution League vs. Nuclear Regulatory Commission*, 598 F.2d 1221, 1330 (1st Cir. 1979) (agencies must not only identify and study reasonable alternatives that they identify on their own, but also analyze and consider significant

[46] **Exhibit 20**, CEQ, Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews (Aug. 2016) at 15.
[47] 2023 CEQ Interim Guidance at 1203.
[48] Bureau of Ocean Energy Management, Draft Environmental Impact Statement for Cook Inlet Planning Area Oil and Gas Lease Sale 258 in Cook Inlet, Alaska (October 2021) at 32–42, 45–48.
[49] 2016 CEQ GHG Guidance at 23, Exhibit 20; Interior Report at 4, 12, **Exhibit 21**.

alternatives that are called to its attention by other agencies, organizations, communities, members of the public).

3. BLM Must Consider an Alternative That Protects Groundwater.

BLM must consider alternatives that would protect usable groundwater. *See WildEarth Guardians v. U.S. Bureau of Land Mgmt.*, 457 F.Supp.3d 880, 890 (D. Mont. 2020). Specifically, BLM should consider not leasing parcels within areas where there is less than 2,000 feet of vertical separation between the oil and gas formations likely to be targeted and any groundwater aquifer with 10,000 ppm TDS or less. BLM should also analyze an alternative whereby parcels would not be leased in areas overlying usable groundwater and surface water, and an alternative that includes other measures to ensure that all usable groundwater zones are protected. This might involve pre-leasing groundwater testing and adding a lease stipulation or lease notice requiring specified casing and cementing depths. Alternatively, or additionally, BLM should consider requiring a lease stipulation or lease notice requiring the lessee to perform groundwater testing prior to drilling to identify all usable water, and consultation with the U.S. Geological Survey and other agencies to identify those waters with up to 10,000 ppm TDS.

4. BLM Must Consider an Alternative that Minimizes Methane Waste Through both Technology and Regulatory Authority.

BLM must include in their analysis an alternative that applies a stipulation that mandates the use of best available methane reduction technologies to parcels. Recent research has demonstrated that the use of ten technically proven and commercially available methane emissions reduction technologies can together capture more than 80 percent of the methane currently going to waste in the oil and gas sector's operations. *See* Harvey Report referenced above. These technologies include:

- Green Completions to capture oil and gas well emissions;
- Plunger Lift Systems or other well de-liquification methods to mitigate gas well emissions;
- Tri-Ethylene Glycol (TEG) Dehydrator Emission Controls to capture emissions from dehydrators;
- Desiccant Dehydrators to capture emissions from dehydrators;
- Dry Seal Systems to reduce emissions from centrifugal compressor seals;
- Improved Compressor Maintenance to reduce emissions from reciprocating compressors;
- Low-Bleed or No-Bleed Pneumatic Controllers used to reduce emissions from control devices;
- Pipeline Maintenance and Repair to reduce emissions from pipelines;
- Vapor Recovery Units used to reduce emissions from storage tanks; and
- Leak Monitoring and Repair to control fugitive emissions from valves, flanges, seals, connections and other equipment.

In addition to these best available methane reduction technologies, BLM must also consider an alternative that implements its legal obligation to use all reasonable precautions to prevent waste, including a stipulation on leases that provides for no routine venting or flaring, similar to regulations that are already being implemented in the states of Colorado and New Mexico. Although BLM has completed a rulemaking effort pursuant to its authority to prevent waste under 30 U.S.C. §§ 187, 225, BLM's proposed rule does not go nearly far enough to prevent waste from routine flaring on BLM managed leases on Tribal and federal public lands, and is slated for suspension, revision, or recission under the Interior's Sec. Order 3418. Until methane waste is adequately addressed, BLM should not be holding lease sales or issuing leases, much less granting applications for permits to drill. Failing this, however, BLM must, at a minimum, use its existing authority under Notice to Lessees 4a (Jan. 1, 1980) ("NTL-4A) and the Inflation Reduction Act to condition such leases as it does issue to limit the environmental and human health harms caused by routine venting and flaring and to safeguard Tribal and publicly held resources from unreasonable and undue waste. Interior's standard lease form, Form 3100-11 (October 2008) provides, in section 4, that a "[l]essee . . . must prevent unnecessary damage to, loss of, or waste of leased resources," and that Interior "reserves right to specify rates of development and production in the public interest . . .." Such an alternative must also articulate the implementation of existing methane waste policies as described in NTL-4A, and provide guidance requiring strict compliance with, at a minimum, NTL-4a's existing measures as well as BLM's legal authority and responsibility pursuant to the Federal Land Policy and Management Act to prevent or reduce methane emissions, independent of the agency's MLA duty to prevent waste. In addition, such an alternative could involve the following mechanisms to prevent methane waste:

- Removal of a lease parcel from proposed sale or denial of an application for permit to drill if Interior determines that methane, nitrogen oxides, or other harmful emissions are impermissible, whether because such emissions would constitute waste or impair or cause undue or unnecessary harm to non-mineral public lands resources and values, in particular but not exclusively "air and atmospheric" values.
- Controlling the timing, location, and pace of new drilling as well as the rate of production of new or existing wells to eliminate methane or other harmful emissions to align new drilling and production with midstream system capacity.
- A requirement, whether via stipulation or condition of approval, that a lessee or operator, once flowback establishes the level of gas production, connect an oil well producing associated gas to a natural gas line with sufficient capacity prior to the commencement of full production.
- A menu of drilling-stage of conditions of approval specifying known and readily available practices or technologies typically employed to reduce methane waste in accord with the MLA or methane and other harmful emissions in accord with FLPMA.

E. BLM Must Take a Hard Look at Reasonably Foreseeable Environmental Consequences.

BLM must take the requisite "hard look" at the reasonably foreseeable environmental consequences of the proposed New Mexico Q1 '25 lease sales.[50]

1. BLM Must Take a "Hard Look" at the Climate Impacts of Resuming Federal Oil and Gas Leasing.

a. BLM Must Not Improperly Segment Its NEPA Analysis of The Proposed Lease Sales.

BLM may not improperly segment its decision to offer portions of the federal mineral estate for fossil fuel development. Rather than separate the environmental analysis, BLM must evaluate the proposed lease sales and their associated environmental impacts in a single NEPA analysis to reflect the connected nature of the leasing actions and the reasonably foreseeable cumulative climate impacts associated with the potential GHG emissions from authorized leases.

To assess the effects of a proposed action, BLM should account for the proposed action – including "connected" actions – subject to reasonable limits based on feasibility and practicality. "Connected actions" are actions that are closely related and therefore should be discussed in the same impact statement. 40 C.F.R. 1508.25(a)(1).[51] Actions are connected if, among other circumstances, the actions are interdependent parts of a larger action and depend on the larger action for their justification. *Id.* at (a)(1)(iii). Other types of actions that should be considered in a single impact statement also include "cumulative actions," actions which when viewed with other proposed actions have cumulatively significant impacts, and "similar actions," actions which when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography. *Id.* at (a)(2) and (3). Agencies should analyze similar actions in the same impact statement when the best way to assess adequately the combined impacts of similar actions or reasonable alternatives to such actions is to treat them in a single impact statement. *Id.* at (a)(3).

Rather than segment the NEPA analysis according to individual oil and gas lease sales, the CEQ NEPA regulations regarding connected actions, cumulative actions, and similar actions suggest BLM should analyze the environmental impacts of the proposed lease sales in a single NEPA analysis. The proposed 2025 lease sales meet the definition of "cumulative actions" based on their cumulatively significant emissions of GHGs and their impacts on climate change. In addition, the proposed 2025 lease sales are properly understood as "similar actions" because the NEPA analysis and proposed sale dates are expected to be common in time, and the best way to adequately assess their cumulative GHG emissions is through a single impact statement.

b. Federal Fossil Fuel Emissions Are Significant Under NEPA.

[50] *See* discussion regarding application of CEQ regulations, supra.

[51] All citations in this document are to the 1978 CEQ Regulations unless otherwise indicated, consistent with Secretarial Order 3399, which provides: "Bureaus/Offices will not apply the 2020 Rule in a manner that would change the application or level of NEPA that would have been applied to a proposed action before the 2020 Rule went into effect on September 14, 2020." Secretarial Order 3399, Sec. 5(a).

i. EPA GHG Equivalency Calculator

We request BLM contextualize the GHG emissions of the 2025 lease sales by using the EPA GHG equivalency calculator to consider the GHG emissions over the average 30-year production life of the leases. We also request BLM contextualize the cumulative GHG emissions from the federal fossil fuel program using EPA's GHG equivalency calculator.

ii. Social Cost of Greenhouse Gases

BLM must also use the social cost of greenhouse gases (SC-GHG) as another tool to assess GHG emissions and climate change effects from the proposed lease sales. The social cost of greenhouse gases provides an estimate of the monetized global damages associated with the incremental increases of GHGs.[52] BLM must not improperly segment its NEPA analysis of the proposed lease sales by only providing the social cost of GHGs for each individual lease sale rather than a cumulative total.

We request BLM contextualize the cumulative GHG emissions from the federal fossil fuel program using the social cost of GHGs. The cumulative cost of the federal fossil fuel program is an important consideration for BLM to weigh, as it is many orders of magnitude greater than the already significant costs of just the proposed 2023, 2024, and 2025 lease sales.

We also caution BLM in its understanding and weight of the social cost of GHG analysis. BLM must be clear that the SC-GHG is a measure of impacts to the human environment (reflected in 2020 U.S. dollars) that BLM is obligated to evaluate pursuant to NEPA regardless of whether or not BLM conducts a complete or partial cost cost-benefit analysis of the proposed lease sales.

Although the President's January 20, 2025, Executive Order directs agencies to rescind any social cost of carbon guidance issued by the Interagency Working Group, it does not absolve the Bureau of Land Management (BLM) of its duty under NEPA and APA to meaningfully analyze the GHG emissions associated with proposed projects. NEPA mandates that agencies take a "hard look" at environmental consequences (*Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989), (quoting *Kleppe v. Sierra Club*, 427 U.S. 390, 410 (1976). In doing so, the agencies must consider the direct, indirect, and cumulative environmental impacts of the proposed action. 40 C.F.R. §§ 1502.16 (environmental consequences), 1508.7 (cumulative impact), 1508.8 (direct and indirect effects). Even when applying 2020 NEPA regulations that removed reference to cumulative effects, Courts have found that agencies still need to analyze cumulative effects so long as they are "reasonably foreseeable" and have a "reasonably close causal relationship to the proposed action." 85 Fed. Reg. 43,304, 43,343 (July 16, 2020); *see also Indigenous Peoples of Coastal Bend v. U. S. Army Corps of Eng'rs*, 2023 WL 6226387, at *28 (S.D. Tex. July 27, 2023) (evaluating cumulative effects under the 2020 regulations). The

[52] We urge BLM to apply the Social Cost of Greenhouse Gas values contained in EPA's September 2022 Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances. Due to their incorporation of recent scientific data, as well as reliance on lower discount rates, the EPA estimates represent a more accurate and up-to-date estimate of the costs of greenhouse gas production and consumption than the 2021 Interim Estimates of the Social Cost of Carbon, Methane, and Nitrous Oxide produced by the Interagency Working Group.

obligation to analyze cumulative effects is a statutory, not regulatory, requirement. *Kleppe v. Sierra Club*, 427 U.S. 390, 410 (1976); *see also Hanly v. Kleindienst*, 471 F.2d 823, 830–31 (2d Cir. 1972). Courts have repeatedly concluded that an agency must adopt reasonable methods for considering the impacts of cumulative GHG emissions if such methods are available. See *High Country Conservation Advocates v. U.S. Forest Serv*., 52 F. Supp. 3d 1174, 1191 (D. Colo. 2014) (holding the agency acted arbitrarily and capriciously by stating there was no way to measure impact of GHG emissions when at least one recognized method, the social cost of carbon method, was available); *California v. Bernhardt*, 472 F. Supp. 3d 573, 623 (N.D. Cal. 2020) ("It is arbitrary for an agency to quantify an action's benefits while ignoring its costs where tools exist to calculate those costs."); see also *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin*., 538 F.3d 1172 (9th Cir. 2008).

Moreover, courts have repeatedly affirmed that while agencies retain discretion in selecting a methodology for assessing GHG impacts, they must use "some methodology that satisfies NEPA and the APA." (*350 Mont. v. Haaland*, 50 F.4th 1254, 1272 (9th Cir. 2022)). Simply comparing project emissions to global emissions, without providing sufficient context for evaluating significance, has been deemed inadequate (*id*.). Agencies must ensure their analysis is of "high quality" and supported by "accurate scientific analysis" (40 C.F.R. § 1500.1(b)). Where methodologies exist to assess the significance of emissions—such as those endorsed by respected international bodies like the Intergovernmental Panel on Climate Change (IPCC)—agencies cannot arbitrarily dismiss them. Rather, "the agency's methodology must be rational—and not arbitrary or capricious." *Diné C.A.R.E. v. Haaland,* 28, quoting *Silverton Snowmobile Club*, 433 F.3d at 782. Therefore, even in the absence of a mandated social cost of carbon metric, BLM must still apply a methodology that adequately quantifies and contextualizes GHG emissions to satisfy its legal obligations under NEPA and the APA. The analysis herein regarding the requirements of an agency to rationally contextualize GHG emissions related to a project applies throughout this entire Comment.

iii. Carbon Budgeting

In addition to SC-GHG, BLM must use carbon budgeting to evaluate the impact of GHG emissions associated with BLM's onshore fossil fuel authorizations on the remaining atmospheric capacity to take on further GHG emissions without exceeding different degrees of additional warming. BLM may not improperly omit a carbon budget analysis of the United States' share of the global carbon budget, as GHG emissions from the onshore federal fossil fuel program consume a tremendous amount of the global budget – 1.47% of the budget consistent with a 66% chance of limiting warming to 1.5 C.

In addition to the tools BLM may use to contextualize and evaluate federal fossil fuel GHG emissions, we request BLM evaluate and consider the impacts of climate change that have already occurred as a result of the cumulative emissions of GHGs. BLM's NEPA analysis of GHGs and climate change tends to frame the impacts of climate change as long-term impacts, estimated to be realized at some future point in time. However, the climate has already changed as a result of anthropogenic GHG emissions and the consequences of global climate change are already being realized.

BLM's NEPA analysis of the proposed lease sales must acknowledge that anthropogenic GHG emissions over the past 60 years have resulted in impacts associated with the change in global climate. In fact, the 2021 BLM Specialist Report refers to the IPCC climate assessment report, which states: "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, sea level has risen, and the concentration of greenhouse gases have increased."[53] The IPCC AR6 report indicates that the globally averaged combined land and ocean surface temperature data, as calculated by a linear trend, show shows human caused warming of 1.07 ± 0.23°C over the period 1850 to 2019.[54] Warming of 1.07 C is over half the warming the 1.5 C of warming the U.S. has committed to avoid, and scientists are increasingly able to show the significant impacts of just 1.07 C of warming in terms of the intensification of wildfires, hurricanes, drought, and other weather-related phenomena.[55] We request BLM consider, discuss, and evaluate the climate science regarding past and present impacts from climate change to further contextualize the climate impacts from the cumulative emissions of GHGs associated with the proposed lease sales and the federal fossil fuel program.

c. BLM Has the Ability to Provide for Meaningful And Measurable Mitigation Actions In The Context of Cumulative Climate Change Resulting From Global Emissions.

BLM has both the duty and authority to address climate change programmatically and in the context of project level actions. Under FLPMA, BLM has an array of responsibilities, implicated by the impacts of climate change, that it must consider when deciding whether to approve new oil and gas lease sales, including to:

- 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." 43 U.S.C. §1701(a)(8);
- Account for "the long-term needs of future generations." 43 U.S.C. § 1702(c);
- Prevent "permanent impairment of the productivity of the land and quality of the environment." 43 U.S.C. § 1702(c);
- "[T]ake any action necessary to prevent unnecessary or undue degradation of the lands." 43 U.S.C. § 1732(b); and

[53] 2022 BLM Specialist Report at Section 4.2, *citing* IPCC, 2023: Climate Change 2023.
[54] *Id.*
[55] Every extreme-weather attribution peer-reviewed study published to date is tracked and available at Carbon Brief, *Mapped: How climate change affects extreme weather around the world*, https://www.carbonbrief.org/mapped-how-climate-change-affects-extreme-weather-around-the-world (last visited Nov. 29, 2021); *see also The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (2021), Exhibit 16; **Exhibit 22**, Swain, Daniel L. *et al.*, *Attributing Extreme Events to Climate Change: A New Frontier in a Warming World*, One Earth (Jun. 2, 2020); **Exhibit 23,** Reed, Kevin A. et al., *Forecasted Attribution of the Human Influence on Hurricane Florence*, Science Advances 6 (1): eaaw9253, https://doi.org/10.1126/sciadv.aaw9253.

- Manage public lands on the basis of multiple use and sustained yield. 43 U.S.C. § 1732(a).

To carry out these responsibilities in the context of oil and gas leasing, BLM has a corresponding array of authorities to address the impacts of oil and gas leasing and development. These authorities include choosing not to lease the federal mineral estate for oil and gas development, withdrawing federal minerals from leasing, prohibiting leasing in resource management plans and through resource management plan amendments, requiring conditions of approval in new authorizations of oil and gas leases, as well as managing the rate of oil and gas production in federal leases.

To BLM's authority to choose not to lease the federal mineral estate, 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).). As we indicated above, the court in *Louisiana v. Biden* confirmed that BLM is authorized to postpone lease sales to address NEPA and similar concerns tied to particular lease proposals. *Louisiana v. Biden*, No. 2:21-cv-778-TAD-KK at *14. *See also W. Energy All. v. Biden*, No. 21-CV-13-SWS, 2022 WL 18587039 (D. Wyo. Sept. 2, 2022). Under the Mineral Leasing Act (MLA) "the DOI Secretary enjoys wide discretion when it comes to determining which federal lands will be offered for oil and gas development." *Id.* at *10 (citing 30 U.S.C. § 226(a) ("lands with known or suspected oil and gas deposits *may* be leased by the Secretary") (emphasis added).

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").

BLM's authority to mitigate environmental impacts is importantly related to BLM's NEPA obligations to consider ways to avoid, minimize, and mitigate impacts in accordance with the mitigation hierarchy. 40 C.F.R. §§ 1508.8, 1502.14, 1502.16, 1508.20. Specifically, BLM must "include appropriate mitigation measures not already included in the proposed action or alternatives." *Id.* §§ 1502.14(f), 1502.16(h). 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.[56] This includes

[56] **Exhibit 24**, Bruce. M Pendery, *BLM's Retained Rights: How Requiring Environmental Protection Fulfills Oil and Gas Lease Obligations*, 40 ENVTL. L. 599 (2010).

the robust use by BLM of conditions of approval to, in sequenced priority, avoid, mitigate, or compensate for climate, public lands, or community impacts. *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).

The Mineral Leasing Act (MLA) also authorizes BLM to reduce the rate production over a defined period of time, limiting the amount of extraction and greenhouse gas pollution that would result. The MLA authorizes 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 a plan." 30 USCA § 226(m). 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." *See* U.S. Department of the Interior, Offer to Lease and Lease for Oil and Gas, Form 3100-11 (Oct. 2008). According to these authorizations, the Secretary and BLM could set a declining rate of production over time that provides for an orderly phase-out of onshore fossil fuel production.

BLM's legal duty and authority provide a variety of mitigation actions BLM could take to meaningfully and measurably to address cumulative climate change resulting from global emissions. We request BLM perform its NEPA analyses in a way that correctly reflect its legal duties and authorities.

d. The BLM Specialist Report Omits Analysis of the Global and National Over-Commitment of Fossil Fuels Relative to Global Carbon Budgets Necessary to Avoid 1.5°C Warming.

BLM must analyze and evaluate the estimated GHG emissions from the lease sales and cumulative GHG emissions within the context of the widening production gap, or the difference between global fossil fuel production projected by governments and fossil fuel production consistent with the 1.5 C-warming pathway and other pathways.[57] The most recent UN Production Gap Report, released in November 2023, raises the alarm that despite the most recent IPCC findings, the world is running out of time to limit long-term global warming to 1.5°C as the world's governments continue to plan to produce more than double the amount of fossil fuels in 2030 than would be consistent with a 1.5°C-warming pathway.[58] We request BLM consider the United Nation production gap report discussed above, which indicates an imperative to rapidly transition away from fossil fuels using supply side policies.

e. The BLM Specialist Report Fails to Adequately Quantify and Assess All Related Past, Present, and Reasonably Foreseeable Future GHG Emissions and Climate Impacts.

[57] *See* **Exhibit 25,** SEI, Climate Analytics, E3G, IISD, and UNEP, *The Production Gap: Phasing down or phasing up? Top fossil fuel producers plan even more extraction despite climate promises,* Stockholm Environment Institute, Climate Analytics, E3G, International Institute for Sustainable Development and United Nations Environment Programme (2023), https://doi.org/10.51414/sei2023.050.
[58] *See id*.

The BLM must properly complete a cumulative impacts analysis of the proposed lease sales, including an assessment of the cumulative impact of greenhouse gas emissions from the federal fossil fuel program. 40 C.F.R. §§ 1502.14, 1508.7; *Center for Biological Diversity v. National Highway Traffic Admin.*, 538 F.3d 1172, 1215 (9th Cir. 2008). BLM must analyze greenhouse gas emissions from any and all federal, state, and private fossil fuel leasing and development projects. As discussed above, BLM may not improperly segment its NEPA analysis of the proposed lease sales and must more effectively conduct an analysis of the cumulative impacts of fossil fuel leasing and development in the context of a programmatic review of the federal fossil fuel program. Should BLM choose to carry on without a programmatic review, it must still comprehensively analyze cumulative GHG emissions pursuant to its statutory obligations under NEPA. The applicable CEQ NEPA regulations define "cumulative impacts" as:

> the impact on the environment which results from the incremental impact the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

40 C.F.R. § 1508.7 (2005).

i. GHG Emissions and Impacts from Federal Offshore Oil and Gas Leasing.

BLM must assess the cumulative greenhouse gas emissions from recent and reasonably foreseeable federal offshore oil and gas lease sales. The U.S. Bureau of Ocean Energy Management produced a Programmatic Environmental Impact Statement, analyzing the estimated GHG emissions that would potentially be produced if the 2017-2022 Outer Continental Shelf (OCS) Oil and Gas Leasing Program were implemented. That PEIS estimated that if the 2017-2022 OCS program were implemented, the estimated future lifecycle GHG emissions from that program would be 7,886,680,000 metric tons of CO_{2e}:[59]

ii. GHG Emissions and Impacts from Federal Fossil Fuel Projects.

BLM must also assess the cumulative greenhouse gas emissions from recent and reasonably foreseeable federal fossil fuel lease sales and similar federal actions, as required by NEPA. *WildEarth Guardians v. Zinke*, 368 F. Supp. 3d 41, 63 (D.D.C. 2019). This includes analyzing the emissions from pending coal lease applications.

iii. GHG Emissions and Impacts from Non-Federal Oil and Gas Leasing.

BLM must also assess cumulative greenhouse gas emissions from recent and reasonably foreseeable non-federal oil and gas leasing and development projects. For example, in 2022, 10

[59] **Exhibit 26,** Bureau of Ocean Energy Management, Outer Continental Shelf Oil and Gas Leasing Program: 2017–2022, Final Programmatic Environmental Statement, Volume I (Nov. 2016) at 4–8.

states held 45 lease sales, and in 2023, 10 states held 40 lease sales, selling tens of thousands of acres for oil and gas development.[60]

f. Emission Comparisons must meet NEPA's "Hard Look" Standard.

BLM must properly frame and weigh the context and intensity factors for assessing the significance of reasonably foreseeable GHG emissions from the proposed lease sales and their cumulative climate impacts. As all GHGs contribute incrementally to the climate change phenomenon, BLM may not compare the estimated emissions associated with the proposed actions to the total global, national, state, and other categories of GHG emissions to support its finding that the GHG emissions from the proposed actions are insignificant. Any such attempt to minimize the estimated GHG emissions from the proposed actions in this way is precisely how the 2016 CEQ GHG Guidance and 2023 Interim CEQ Guidance directed federal agencies *not* to limit assessments of the significance of GHG emissions.[61] Federal Courts, including, most recently, the Tenth Circuit, agree. *See, e.g., Diné CARE v. Haaland*, 59 F.4th at 1043–1044; *see also 350 Montana v. Haaland*, 50 F.4th 1254, 1266–1267 (9th Cir. 2022). This method of analysis doesn't reveal anything beyond the nature of the climate change challenge itself.[62]

Moreover, BLM's analysis of GHG emissions from the proposed lease sales in comparison with global, national, state, and other categories of emissions must be complete and must inform the public and decision maker of comparisons that would more effectively reveal the context and intensity of the reasonably foreseeable GHG emissions. GHGs have a long atmospheric lifetime, which allows them to become well mixed and uniformly distributed over the entirety of the Earth's surface, no matter their point of origin. Accordingly, why not compare the potential GHG emissions from one proposed lease sale with another past or present federal (or non-federal) fossil fuel action or project? Why not compare the potential emissions to different individual sources of GHG emissions, such as a gas-fired power plant? A dairy operation? A landfill?

BLM must explain the basis for any decision to limit its GHG emission comparisons to the global, national, and state levels, even though the examples of other comparisons mentioned above would provide valuable context and intensity information to the public and the decision maker. We request BLM include a more comprehensive comparison of the estimated GHG emissions associated with the lease sales proposed in 2025 and the cumulative GHG emissions from the federal fossil fuel program to other emissions source, including but not limited to other individual federal and non-federal fossil fuel leases, individual coal-fired and natural gas electric generating facilities, and individual concentrated animal feeding operations (CAFOs).

g. BLM's Analysis of Cumulative GHG Emissions in the BLM Specialist Report Fails NEPA's "Hard Look" Standard.

BLM must clearly and properly assess the significance of the cumulative impacts of the potential emissions of GHGs from the proposed 2025 lease sales and their impact

[60] Past state oil and gas lease sale data available at https://www.energynet.com/page/Government_Sales_Results.
[61] 2016 CEQ GHG Guidance at 10–11, Exhibit 20.
[62] *Id*., Exhibit 20.

on climate change. Although the BLM Specialist Report provided a discussion of cumulative GHG emissions from the BLM fossil fuel leasing program and future climate change impacts, BLM chose not to conduct an analysis of the monetized net harm to society associated with the cumulative increases in GHG emissions in the BLM Specialist Report. The BLM Specialist Report failed to analyze these cumulative impacts using the SC-GHG and failed to assess carbon budgets according to historic GHG contribution and equitable apportionment.

BLM should conduct a social cost analysis of the cumulative GHG emissions attributable to all federal fossil fuel development and production, as well as of the GHG emissions attributable to the proposed sale(s) in accordance with the 2021 United States Government, Interagency Working Group (IWG) Social Cost of Greenhouse Gas estimates. In doing so, BLM should acknowledge the fact that the IWG has consistently indicated that these numbers represent an underestimate of the actual social costs associated with a given ton of GHG pollution. This fact has been borne out by the Environmental Protection Agency's November 2023 Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances, which reflects "recent advances in the scientific literature on climate change and its economic impacts and incorporate recommendations made by the National Academies of Science, Engineering, and Medicine." The fact that the EPA's social cost estimates, which are scientifically rigorous and reflect the best and most up-to-date scientific and economic data, are significantly higher than those of the IWG further illustrates the extent to which the IWG interim numbers may be considered an underestimate. Nonetheless, the IWG numbers represent the most current official estimate of social costs, and therefore constitute an important starting point for BLM's analysis, which must include a discussion of the ways in which the IWG estimates are likely to undervalue future climate damages.

BLM's Specialist Report must also further contextualize its carbon budget analysis by evaluating carbon budgets according to the United States' historic contributions. It is well-documented that the United States is the world's largest historic contributor of GHG emissions and, thus, bears a greater global responsibility to more quickly reduce the quantity of its GHG emissions.[63] The BLM Specialist Report attempts to cast doubt on the utility of assessing GHG emissions according to carbon budgets, stating: "Carbon budgets have not yet been established on a national or subnational scale, primarily due to the lack of consensus on how to allocate the global budget to each nation, and as such the global budgets that limit warming to 1.5°C or 2.0°C are not useful for BLM decision-making as it is unclear what portion of the budget applies to emissions occurring in the United States, or how to account for BLM's authorized portion of projected U.S. emissions, and whether or not to account/deduct any fraction of federal minerals that are consumed in other countries via exports."[64] However, uncertainty in other contexts of GHG and climate change analysis has not prevented BLM from using averages, estimates, and

[63] **Exhibit 27,** Evans, Simon, *Analysis: Which countries are historically responsible for climate change?* Carbon Brief, https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change (last visited Nov. 29, 2021).
[64] 2022 BLM Specialist Report at Section 9.1.

models to address uncertainty and provide the public and decision makers helpful information.[65] As such, BLM should consult the best scientific reports and data available to determine a representative carbon budget that reasonably applies to emissions in the United States, given its historic contributions.[66] The carbon budget analysis in the BLM Specialist Report, as currently drafted, is misleading because it inappropriately compares GHG emissions from the BLM federal fossil fuel program to the remaining global carbon budget. To the public or a decision maker, this analysis minimizes the GHG emissions from the BLM federal fossil fuel program and implies the emissions are insignificant to the global carbon budget, comparatively.

h. BLM Must Take a Hard Look at Methane Emissions and Waste.

BLM must take a hard look at the impacts of methane, preferably in both a programmatic NEPA review, and an aggregated EIS for the proposed 2025 sales as discussed above. Methane is an incredibly potent greenhouse gas. Methane has contributed to approximately 30% of the global rise in temperatures to date. [67] Because of methane's potent short-term warming characteristics, curbing methane emissions is one of the most effective near-term ways to address the climate crisis. Methane emissions from fossil fuel operations represent nearly one-third of human-caused emissions.[68] These emissions represent both a major climate threat and also an opportunity. Slowing and ultimately halting fossil fuel demand will not by itself achieve needed GHG cuts, particularly in the near-term. This means that curbing wasteful methane emissions from oil and gas production are an essential element of reducing climate-warming emissions.[69]

In 2019, oil and gas operators vented or flared approximately 150 billion cubic feet of methane, resulting in the loss of over $50 million in federal royalty revenue. This is enough natural gas to meet the needs of 2.1 million households, which is nearly as many households as the states of New Mexico, North Dakota, Utah and Wyoming combined. This waste also means lost royalty revenues for taxpayers and Tribes. A recent analysis conducted by Synapse Energy Economics calculated natural gas methane emissions volumes from venting, flaring, and leaks in the production segment on federal and Tribal lands and determined the value of that lost gas in the form of (1) lost royalties, (2) lost state revenue from taxes, and (3) lost revenue from wasted natural gas that could be used for other purposes. It found that $63.3 million in royalties, $18.8 million in state revenue from taxes (from the top six states), and $509 million in gas value was

---

[65] *See, e.g.,* 2021 BLM Specialist Report, Exhibit 16, at Section 3.4 (estimating global warming potentials), Section 4.0 (using various methods and assumptions to estimate emission factors for coal, oil, and gas and short- and long-term fossil fuel emissions projections), Sections 6.2–6.4 (projecting global and U.S. emissions).

[66] *See, e.g.,* **Exhibit 28**, Van den Berg, Nicole et al., *Implications of various effort-sharing approaches for national carbon budgets and emission pathways*, Climatic Change 162: 1805–1822 (2020), https://link.springer.com/article/10.1007%2Fs10584-019-02368-y; **Exhibit 29,** Dooley, Kate *et al*., *Ethical choices behind quantifications of fair contributions under the Paris Agreement*, Nature Climate Change 11: 300-305 (2021), available at https://www.nature.com/articles/s41558-021-01015-8.

[67] **Exhibit 30**, IEA (2021) Michaels, K.C., de Oliveira, Tomás, *Curtailing Methane Emissions from Fossil Fuel Operations, Pathways to a 75% cut by 2030*, International Energy Agency.

[68] *Id.*

[69] *Id. See also* **Exhibit 31,** *The Imperative of Cutting Methane from Fossil Fuels*, International Energy Agency (Oct. 11, 2023), https://iea.blob.core.windows.net/assets/9efb310e-94d7-4c46-817b-9493fe5abb0a/Theimperativeofcuttingmethanefromfossilfuels.pdf.

lost due to venting, flaring, and leaks on federal and Tribal lands.[70] The report found that, in 2019, leaks accounted for 46% and flaring for 54% of lost gas.[71] This report also found that the six states with the highest volumes of gas lost from federal and Tribal lands are New Mexico, North Dakota, Wyoming, Utah, Pennsylvania, and Colorado.[72] The problem of flaring is particularly pernicious in North Dakota, which accounts for the vast majority of gas lost from flaring on federal and Tribal land and has the highest flaring intensity of any state in the U.S.[73]

Furthermore, further could worsen existing and disparate impacts to human health. According to a study conducted by HEI Energy in New Mexico, for example, samples show high levels of methane, ethane and other volatile organic compounds, indicating that the ozone comes from oil and gas production.[74] At a national level, such waste on federal and Tribal lands already has significant and disproportionate health and other impacts on minority and low-income communities, including Indigenous communities.[75] On federal and Tribal lands in the U.S., there are roughly 12,000 people living within a half mile of a well with flaring. This includes approximately 1,000 children under the age of five, more than 1,600 older Americans over the age of 65, 1,800 people living in poverty, and almost 6,000 people of color.[76] These groups live near flaring wells at much higher rates when compared to the nation at large. For example, Native Americans are 25% more likely to live within one mile of wells compared to the

---

[70] **Exhibit 32,** Olivia Griot et al., Onshore Natural Gas Operations on Federal and Tribal Lands in the United States: Analysis of Emissions and Lost Revenue, Synapse Energy Economics Inc., 3 (Jan. 20, 2023), https://blogs.edf.org/energyexchange/files/2023/01/EMBARGOED_EDF-TCS_Public_Lands_Analysis.pdf (hereinafter "Synapse").

[71] *Id.* at 23.

[72] *Id.* at 24.

[73] *Id.*; **Exhibit 33**, Rystad Energy, *Cost of Flaring Abatement: Final Report* 6 (Jan. 31, 2022), https://blogs.edf.org/energyexchange/files/2022/02/Attachment-W-Rystad-Energy-Report_-Cost-of-Flaring-Abatement.pdf (hereinafter "Rystad Report").

[74] *See* Jerry Redfern, *In This Tiny New Mexico Town, the Air Quality Is Worse Than in Downtown L.A*, Capital and Main (August 20, 2024), available at https://capitalandmain.com/in-this-tiny-new-mexico-town-the-air-quality-is-worse-than-in-downtown-l-a.

[75] **Exhibit 34** Jeremy Proville et al., *The demographic characteristics of populations living near oil and gas wells in the USA*, 44 Population and Environment 1 (2022), https://doi.org/10.1007/s11111-022-00403-2 (hereinafter "Proville, *The demographic characteristics*"); **Exhibit 35**, Cushing et al., *Up in Smoke: Characterizing the Population Exposed to Flaring From Unconventional Oil and Gas Development in the Contiguous U.S.*, 16 Environmental Research Letters 1, 1 (2021).; **Exhibit 36,** Caron-Beaudoin, *VOCs in indoor air and tap water samples*; **Exhibit 37**, Jill Johnston et al., *Environmental Justice Dimensions of Oil and Gas Flaring in South Texas: Disproportionate Exposure among Hispanic Communities*, Environ. Sci. Technol. (2020); **Exhibit 38**, Lara J. Cushing et al., *Flaring from Unconventional Oil and Gas Development and Birth Outcomes in the Eagle Ford Shale in South Texas*, 128 ENVIRONMENTAL HEALTH PERSPECTIVES , 077003 (2020).

[76] This data was compiled by analysts at Environmental Defense Fund (EDF). EDF used Enverus data to identify wells with reported flaring in 2019 for Texas, New Mexico, Colorado, North Dakota, Montana, Wyoming, and Mississippi. EDF then used GIS spatial files from BLM (oil and gas leases), U.S. Forest Service (mineral rights), and Bureau of Indian Affairs (surface ownership) to extract just those wells on federal and Tribal lands. (As there is not a comprehensive databased of tribal mineral ownership, surface ownership was used as a proxy for determining wells on tribal lands.) By identifying wells with flaring, we are also able to identify the local communities that are impacted by the air pollution from these wells. Using the methodology described in Proville, *The demographic characteristics*, Exhibit 53, U.S. Census Bureau's American Community Survey 5-year estimates for 2015–2019, and health data from the Centers for Disease Control and Prevention's Places dataset, we were able to estimate the populations living within a half mile radius of the previously identified wells using areal apportionment. *See* Centers for Disease Control and Prevention, PLACES: Local Data for Better Health, https://www.cdc.gov/places/index.html (last visited Jan. 30, 2023).

populations in the counties studied, while nationally they represent less than 2% of the country. [77] This proximity to oil and gas infrastructure creates disproportionate adverse health risks and impacts on Indigenous communities.[78] Moreover, the Indigenous people living on these lands are more likely to be living in poverty compared to the population of the encompassing state(s), which exacerbates the already disparate health burdens faced by these individuals and communities.[79] Waste from flared gas in particular has disparate health impacts on Indigenous people and other overburdened communities. Studies have found that "flaring is an environmental justice issue."[80] The majority of lost gas on Tribal lands is flared.[81]

Flaring has significant health impacts, and those impacts are clearly in communities near oil and gas infrastructure. A recent study found that a 1% increase in flared natural gas in North Dakota increases the respiratory-related hospitalization rate by 0.73%, for example.[82] Such effects are clearly documented in communities living near oil and gas infrastructure. According to an Environmental Defense Fund (EDF) analysis, roughly 1,100 adults with asthma, 800 adults with chronic obstructive pulmonary disease, 700 adults with coronary heart disease, and 400 adults who have experienced a stroke live within a half mile of a flaring well.[83] Another study links flaring to shorter gestation and reduced fetal growth.[84] Indigenous communities bearing the brunt of excessive flaring therefore face significant adverse health impacts. Reducing waste from flaring on federal and Tribal lands would lessen these harms.

BLM must take a hard look at the direct, indirect, and cumulative methane emissions that will result from development of these leases and their commensurate impacts in accordance with NEPA. This includes Interior's duty to quantify methane emissions and, on that basis, to assess impacts and a range of reasonable alternatives and mitigation measures to cut those emissions. BLM must also consider the other environmental impacts of this wasted resource, including the public health and welfare impacts of flaring.[85]

i. BLM Must Consider Flaring and its Impacts in the EA.

BLM is well-aware that flaring results in waste of federal and tribal minerals, loss of revenue, and social and environmental impacts. Yet, BLM has repeatedly ignored flaring in its

[77] Proville, *The demographic characteristics* at 10, Exhibit 34.
[78] *See, e.g.*, **Exhibit 39,** Clean Air Task Force, *Tribal Communities at Risk: The Disproportionate Impacts of Oil and Gas Air Pollution on Tribal Air Quality* 3, 2–5 (2018), https://www.catf.us/resource/tribal-communities-at-risk/.
[79] *Id*. at 4.
[80] Lara J. Cushing, et al., *Up in Smoke* at 7, Exhibit 35; *see* **Exhibit 40,** Wesley Blundell & Anatolii Kokoza, *Natural gas flaring, respiratory health, and distributional effect*, 208 Journal of Public Economics 104601, at 4, 10 (2022), https://doi.org/10.1016/j.jpubeco.2022.104601 (hereinafter "Blundell, *Natural gas flaring, respiratory health*").
[81] *Synapse* at 27, Exhibit 32.
[82] Blundell, *Natural gas flaring, respiratory health* at 1, Exhibit 40.
[83] *See supra* footnote discussing data compiled by analysts at Environmental Defense Fund (EDF).
[84] Cushing South Texas study at 077003-1, Exhibit 37.
[85] **Exhibit 41**, EDF, Flaring Aerial Survey Results (2021), *available at* https://www.permianmap.org/flaring-emissions/; *see also* **Exhibit 42**, Gvakharia et al., *Methane, Black Carbon, and Ethane Emissions from Natural Gas Flares in the Bakken Shale,North Dakota*, Environmental Science & Technology 5317, 5317 (2017); Cushing et al., *Up in Smoke*, Exhibit 35.

NEPA analyses for oil and gas lease sales. We urge BLM to correct this deficiency and consider flaring and its impacts in the EA for these lease sales. BLM must:

- Consider an alternative that would mitigate flaring. To fulfill its legal obligation to prevent waste under the Mineral Leasing Act, we recommend that BLM consider a stipulation limiting flaring to situations where it is infeasible or unsafe to capture the gas and not allowing routine flaring where there is simply inadequate pipeline capacity or timing issues. Similar approaches to flaring have been adopted through regulations by New Mexico and Colorado.[86]
- Consider the direct, indirect, and cumulative socioeconomic impacts of flaring. A recent analysis conducted by Synapse Energy Economics calculated natural gas methane emissions volumes from venting, flaring, and leaks in the production segment on federal and tribal lands and determined the value of that lost gas in the form of (1) lost royalties, (2) lost state revenue from taxes, and (3) lost revenue from wasted natural gas that could be used for other purposes.
- Consider the direct, indirect, and cumulative human health impacts of flaring. For example, a recent study found that a 1% increase in flared natural gas in North Dakota increases the respiratory-related hospitalization rate by 0.73%.[87] BLM must examine how flaring affects people living in the region.
- Consider the direct, indirect, and cumulative environmental justice impacts of flaring, as well as means of mitigating any adverse effects.

2. BLM Must Take a Hard Look at Impacts to Human Health.

BLM must include an analysis of reasonably foreseeable direct, indirect, and cumulative human health impacts resulting from oil and gas leasing and development. 40 C.F.R. § 1508.1(g). Protecting public health is fundamental to NEPA's underlying purpose. NEPA was enacted in part to "stimulate the health and welfare of man," 42 U.S.C § 4321, and mandates that agencies consider the degree to which their proposed actions affect public health or safety. 40 C.F.R § 1501.3(b)(2)(iii). NEPA requires federal agencies "to use all practicable means, consistent with other essential considerations of national policy" to "assure for all Americans safe, healthful, productive and aesthetically and culturally pleasing surroundings." 42 U.S.C 4331(b). "Effects" that agencies must analyze include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or *health*, whether direct, indirect, or cumulative." 40 C.F.R § 1508.1(g)(4) (emphasis added). In addition, NEPA's use of the term "human environment" expressed Congressional intent that NEPA should promote public policy attentive to the inexorable link between human well-being and environmental integrity.[88]

---

[86] *See, e.g.*, 2 Colo. Code Regs. § 404-1:903; N.M. Admin. Code § 19.15.27.8.
[87] Blundell, *Natural gas flaring, respiratory health* at 1, Exhibit 40.
[88] **Exhibit 43**, Rajiv Bhatia and Aaron Wernham, *Integrating Human Health into Environmental Impact Assessment: An Unrealized Opportunity for Environmental Health and Justice*, 116 ENVIRONMENTAL HEALTH PERSPECTIVES 991 (Apr. 16, 2008) (Noting that "the statutory and procedural requirements of EIA provide a

To protect public health and promote informed agency decision-making, transparency, and public participation, NEPA imposes "action-forcing procedures . . . requir[ing] that agencies take a hard look at environmental consequences." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989). Such consequences include all "reasonably foreseeable" direct, indirect, and cumulative effects, including health effects. *See, e.g., Middle Rio Grande Conserv. Dist. v. Norton*, 294 F.3d 1220, 1229 (10th Cir. 2002). An effect is "reasonably foreseeable" if it is "sufficiently likely to occur that a person of ordinary prudence would take it into account in reaching a decision." *Sierra Club v. Marsh,* 976 F.2d 763, 767 (1st Cir.1992). An agency's hard look "must be taken objectively and in good faith, not as an exercise in form over substance, and not as a subterfuge designed to rationalize a decision already made." *Forest Guardians v. U.S. Fish & Wildlife Serv.,* 611 F.3d 692, 712 (10th Cir. 2010).

Courts have recognized BLM's obligation to take a hard look at health impacts in its NEPA analyses at the oil and gas leasing stage. *See Wilderness Workshop v. Bureau of Land Mgmt.*, 342 F. Supp. 3d 1145 (D. Colo. 2018). In *Wilderness Workshop*, the court reasoned that it was premature to consider health effects at the planning stage, but, "in the context of oil and gas leasing, the site-specific impacts occur in the later stages of leasing and development," and therefore, health impacts should be considered at those stages. *Id.* at 1163 (citing *Pennaco Energy v. U.S. Dep't of Interior*, 377 F. 3d 1147, 1151–1152 (10th Cir. 2004)). Most recently, the Tenth Circuit held that BLM was obligated to—and failed to— take a hard look at the long-term and cumulative health impacts of Hazardous Air Pollutant (HAP) emissions from oil and gas development. *Diné CARE v. Haaland*, 59 F.4th at 1046–1047. Although that was a drilling-stage case, nothing in the decision suggests that the same obligation does not apply at the leasing stage. And the court's explicit mention of both development and leasing-stage site-specific impacts in *Wilderness Workshop* underscores the need to take a hard look at health impacts at the leasing stage.

BLM must analyze issues related to health and safety risks and impacts—whether direct, indirect, or cumulative. Importantly, BLM must adequately analyze the reasonably foreseeable future health and safety impacts that could result from this sale. NEPA and its implementing regulations require BLM to not just list generalized categories of risks, but rather analyze and take a hard look at those risks and their *effects*. *See* 40 C.F.R. § 1508.1(g). "General statements about 'possible' effects and 'some risk' do not constitute a 'hard look' absent a justification regarding why more definitive information could not be provided." *Kern v. Unites States BLM*, 284 F.3d 1062, 1075 (9th Cir. 2002). BLM cannot defer NEPA's requisite hard look at health impacts to the APD stage. The intent of NEPA is for agencies to study the impact of their actions on the environment—here, leasing—*before* the action is taken. *See Conner v. Burford,* 848 F.2d 1441, 1452 (9th Cir. 1988) (NEPA requires that agencies prepare an EIS before there is "any irreversible and irretrievable commitment of resources")*; see also Upper Pecos Ass'n v. Stans*, 500 F.2d 17 (10th Cir. 1974) (concluding that "consideration of environmental factors should come in the early stages of program and project formulation").

---

powerful and underutilized mechanism to institutionalize a holistic, cross-sectoral approach to addressing health in public policy" and describing the then-emerging and now well-established practice of health impact assessment as a "catalyst" for integrating health considerations into environmental assessments under NEPA and its state analogs).

a. Overview of Human Health Impacts and Sources of Peer-Reviewed Literature Related to Proximity to Oil and Gas Development.

An extensive and ever-growing body of peer-reviewed research has shown what people living near oil and gas operations already know firsthand—that proximity to drilling and fracking operations and other oil and gas facilities is linked to adverse health risks and impacts. These risks and impacts are discussed in further detail throughout this section, and in the numerous accompanying exhibits, but in general, they include (but are not limited to):

- Reproductive harms – including birth defects, low birth weight, preterm births, and miscarriages;
- Respiratory health effects – including asthma, lung disease, breathing difficulty, and, most recently, increased vulnerability to COVID-19;
- Eye, skin, and throat irritation and rashes;
- Cardiovascular effects – including higher blood pressure and other indicators of, or precursors to, heart disease;
- Possible disruption of the endocrine system (a system of glands producing hormones that regulate a variety of functions in the body, including metabolism, growth and development, reproduction, sleep, and mood);
- Cancer (lung cancer and other types of cancer);
- Motor vehicle injuries and fatalities, and other health and safety risks associated with increased vehicle traffic (and the air pollutants it emits) from oil and gas development;
- Injuries and fatalities from explosions, fires, spills, and leaks; and
- Trauma and psychological stress.

One excellent, frequently updated, and easy-to-use resource for keeping up with this growing body of peer-reviewed research is the Physicians, Scientists, and Engineers for Healthy Energy ("PSE Healthy Energy") database, the Repository for Oil and Gas Energy Research, or "ROGER."[89] ROGER is an extensive repository of peer-reviewed literature, "a near-exhaustive collection of bibliographic information, abstracts, and links to many of [sic] journal articles that pertain to shale and tight gas development."[90] This database is organized into several categories, and for the "Health" category alone, there are over 260 studies listed, including several recent studies from 2019-2022. BLM should avail itself of this invaluable resource in order to take NEPA's requisite hard look at health impacts.

[89] *See* Physicians, Scientists, and Engineers for Healthy Energy ("PSE Healthy Energy"), "The ROGER Citation Database," https://www.psehealthyenergy.org/our-work/shale-gas-research-library/ (last visited November 4, 2022).
[90] *Id.*

There are several other notable scientific papers BLM should consider in order to analyze and disclose to the public the health risks and impacts associated with its leasing decisions.[91] Multiple peer-reviewed papers have identified adverse health effects and risks arising from exposure to unconventional oil and gas drilling operations, even within a large radius of residences—potentially up to ten miles.[92] For example, one study found that babies whose parents lived in close proximity to multiple oil and gas wells were 30% more likely to be born with heart defects than babies born to parents who did not live close to oil and gas wells.[93] Other adverse health impacts documented among residents living near drilling and fracking operations include increased reproductive harms, asthma attacks, higher rates of hospitalization, ambulance runs, emergency room visits, self-reported respiratory problems and rashes, motor vehicle fatalities, trauma, and drug abuse. Moreover, one recent study found that fracking and drilling near people's homes "drives stress experiences that go beyond the mere presence of industrial land uses in neighborhoods," and identified two key institutional barriers driving negative mental

[91] *See, e.g.,* **Exhibit 44**, R.Z. Witter, et al*., Occupational exposures in the oil and gas extraction industry: state of the science and research recommendations*, AMERICAN JOURNAL OF INDUSTRIAL MEDICINE (2014); **Exhibit 45**, Jessica Gilman, et al., *Source signature of volatile organic compounds (VOCs) from oil and natural gas operations in northeastern Colorado*, ENVIRONMENTAL SCIENCE & TECHNOLOGY (2013); **Exhibit 46**, Roxana Z. Witter, et al., *The Use of Health Impact Assessment for a Community Undergoing Natural Gas Development,* FRAMING HEALTH MATTERS (2013); **Exhibit 47**, Nadia Steinzor, et al., *Investigating links between shale gas development and health impacts through a community survey project in Pennsylvania*, NEW SOLUTIONS, vol. 23 iss. 1. (2013); **Exhibit 48**, John L. Adgate, et al., *Potential Public Health Hazards, Exposures and Health Effects from Unconventional Natural Gas Development*, ENVIRONMENTAL SCIENCE & TECHNOLOGY (2014); **Exhibit 49**, Christopher W. Moore, et al., *Air Impacts of Increased Natural Gas Acquisition, Processing, and Use: A Critical Review*, ENVIRONMENTAL SCIENCE & TECHNOLOGY (2014); **Exhibit 50**, Avner Vengosh, et al., *The effects of shale gas exploration and hydraulic fracturing on the quality of water resources in the United States*, PROCEDIA EARTH AND PLANETARY SCIENCE (2014); **Exhibit 51**, Christopher D. Kassotis, et al., Estrogen and Androgen Receptor Activities of Hydraulic Fracturing Chemicals and Surface and Ground Water in a Drilling-Dense Region, ENDOCRINOLOGY (2014); **Exhibit 52**, Brian E. Fontenot, et al., *An Evaluation of Water Quality in Private Drinking Water Wells Near Natural Gas Extraction Sites in the Barnett Shale Formation*, ENVIRONMENTAL SCIENCE & TECHNOLOGY (2013); **Exhibit 53**, Sherilyn A. Gross, et al., *Analysis of BTEX Groundwater Concentrations from Surface Spills Associated with Hydraulic Fracturing Operations*, JOURNAL OF THE AIR & WASTE MANAGEMENT ASSOCIATION (2013); **Exhibit 54**, K.D. Retzer, *et al., Motor vehicle fatalities among oil and gas extraction workers,* ACCIDENT ANALYSIS & PREVENTION (2013); **Exhibit 55,** Gayathri Vaidyanathan, *Fracking Can Contaminate Drinking Water*, Climate Wire (April 4, 2016), available at: https://www.scientificamerican.com/article/fracking-can-contaminate-drinking-water/; **Exhibit 56**, A. Tustin, et al., *Associations Between Unconventional Natural Gas Development and Nasal and Sinus, Migraine Headache, and Fatigue Symptoms in Pennsylvania,* ENVIRONMENTAL HEALTH PERSPECTIVES (July 31, 2016), available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5289909/.

[92] *See, e.g.,* **Exhibit 57**, Lisa M. McKenzie *et al.*, *Birth Outcomes and Maternal Resident Proximity to Natural Gas Development in Rural Colorado*, 122 ENVIRONMENTAL HEALTH PERSPECTIVES 412 (April 2014) [Hereinafter McKenzie et al., *Birth Outcomes*) (Finding an increased risk of congenital heart and neural tube defects in babies born to mothers living within 10 miles of a natural gas well); **Exhibit 58**, Janet Currie *et al., Hydraulic Fracturing and Infant Health: New Evidence from Pennsylvania*, 3 SCIENCE ADVANCES e1603021(Dec. 13, 2017) (Finding evidence of negative health effects of in utero exposure to fracking sites within 3 km, or about 1.86 miles, of a mother's residence, with the largest health impacts seen within 1 km, or about 0.62 miles); **Exhibit 59**, Ellen Webb *et al., Potential Hazards of Air Pollutant Emission from Unconventional Oil and Natural Gas Operations on the Respiratory Health of Children and Infants*, 31 REV. ENVIRONMENTAL HEALTH 225–243 (Jun. 1, 2016), at 236 [hereinafter Webb et al.] (Noting that many unconventional oil and gas setback rules, for setbacks of 1000 feet or less, do not adequately protect health, especially children's respiratory health, that "the majority of municipal setback ordinances are not supported by empirical data," and calling for a one-mile minimum for setbacks between drilling facilities and schools, hospitals, and occupied dwellings).

[93] *See* McKenzie *et al.*, *Birth Outcomes*, *supra* Exhibit 57.

health impacts for people living near UOG [unconventional oil and gas] production – namely: 1) uncertainty, due to inaccessible, transparent information about environmental and public health risks and 2) powerlessness to meaningfully impact regulatory or zoning processes.[94]

In turn, "these institutional barriers make UOG production a chronic stressor – which can be more insidious, negative, and, significantly, can generate longer- term mental health impacts such as self-reported depression."[95]

A 2023 review of literature on health impacts of fracking by Physicians for Social Responsibility ("PSR") concluded that:

> In sum, the vast body of scientific studies now published on hydraulic fracturing in the peer-reviewed scientific literature confirms that the climate and public health risks from fracking are real and the range of environmental harms wide. **Our examination uncovered no evidence that fracking can be practiced in a manner that does not threaten human health directly or without imperiling climate stability upon which human health depends.**
>
> The rapidly expanding body of evidence compiled here is massive, troubling, and cries out for decisive action. Across a wide range of parameters, the data continue to reveal a plethora of recurring problems that cannot be sufficiently averted through regulatory frameworks. The risks and harms of fracking are inherent in its operation. The only method of mitigating its grave threats to public health and the climate is a complete and comprehensive ban on fracking. Indeed, a fracking phase-out is a requirement of any meaningful plan to prevent catastrophic climate change.[96]

"No Surface Occupancy" (NSO) stipulations could be implemented within a certain distance of residences, schools, or other occupied areas that might mitigate some of these effects, but they do not eliminate BLM's obligation to take a hard look at health effects at the leasing stage, as NEPA requires. Stipulations and notices are used to comply with FLPMA and the MLA, and are not a substitute for a NEPA analysis. *See, e.g.,* 43 C.F.R. § 3101.1–3; 43 U.S.C. § 1732(a). Moreover, most existing oil and gas setbacks or NSO stipulations (typically < 1000 feet) are likely inadequate to protect people and communities against health and safety risks and adverse effects. At minimum, some health experts have called for a one-mile minimum distance between drilling facilities and schools, hospitals, and occupied dwellings, in light of the heightened health risks of residing within close proximity to unconventional oil and gas drilling sites.[97] Many others call for setbacks of even greater distances. One study found adverse health

---

[94] *See* **Exhibit 60,** Stephanie A. Malin, *Depressed democracy, environmental injustice: Exploring the negative mental health implications of unconventional oil and gas production in the United States*, 70 Energy Research & Social Science, 101720 at 2 (2020).
[95] *Id*.
[96] **Exhibit 61,** Physicians for Social Responsibility and Concerned Health Professionals of NY, Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking, 9th Edition (2023). [Hereinafter PSR 2023].
[97] *See* Webb *et al*., *supra* Exhibit 59.

impacts at distances of six miles.[98] Another study found increased risk of congenital heart and neural tube defects in babies born to mothers living within 10 miles of natural gas wells.[99] Even larger setbacks may not protect against certain health hazards, especially for people already facing disproportionate health risks due to cumulative social, structural, and environmental factors, or for children and the elderly. For example, a 2016 study and Health Impact Assessment ("HIA") in Maryland's Marcellus Shale Basin found that, even with a setback of 2000 feet from residential property as a "mitigating factor," Air Quality was a fracking-related hazard of High concern for its potential negative health impacts after taking into account additional evaluation criteria, such as presence of vulnerable populations, duration and frequency of exposure, and likelihood and severity/magnitude of health effects.[100] BLM must take a hard look at the adverse health risks and effects associated with proximity to oil and gas activity and facilities and disclose them to the public.

b. Cumulative Health Risks and Impacts to Social and Structural Factors Affecting Health.

BLM must take a hard look not only at direct health impacts and proximity-related health impacts of oil and gas development, but also at cumulative health risks and impacts. *See* 40 C.F.R. § 1508.1(g)(3). Cumulative health risks and impacts can arise not only from multiple pollutant exposures, and cumulative pollution exposures over time, but also from compounding structural, social, and economic factors, many of which are rooted in systemic inequities and injustices. Researchers have begun to apply a growing body of evidence documenting how social and environmental stressors lead to health inequities and cumulative impacts[101] specifically in

---

[98] **Exhibit 62**, Kathy V. Tran et al., Residential Proximity to Oil and Gas Development and Birth Outcomes in California: A Retrospective *Cohort Study of 2006–2015 Births*, 128 Environmental Health Perspectives, 067001 (2020).

[99] Mckenzie et al., *Birth Outcomes*, *supra*, Exhibit 57.

[100] *See, e.g.*, **Exhibit 63**, *Meleah* D. Boyle et al., Hazard Ranking Methodology for Assessing Health Impacts of Unconventional Natural Gas Development and Production: The Maryland Case Study, 11 PLoS ONE e0145368 (Jan. 4, 2016) [Hereinafter Boyle et al.](Assigning setback effectiveness a "positive" value of 1 if it is anticipated to minimize health effects, and a "negative" value of 2 if it is not anticipated to minimize health effects, in evaluating the "hazard rankings" for a variety of unconventional natural gas drilling impacts. Notably, there is no "zero" value by which setbacks eliminate health risks or health effects. And, for effects related to water quality, seismic activity, social determinants of health, healthcare infrastructure, cumulative exposures/risks, and occupational health and safety, the authors determined that, at least in that study area (Marcellus Shale in Maryland), setbacks were not anticipated to minimize or mitigate health risks at all. *See* Table 3).

[101] *See, e.g.,* **Exhibit 64**, Rachel Morello-Frosch et al., *Understanding the Cumulative Impacts of Inequalities in Environmental Health: Implications for Policy*, 30 HEALTH AFFAIRS 879 (May 2011) (Identifying four key concepts underlying the emerging knowledge about cumulative impacts of environmental and social stressors: "First, health disparities between groups of different racial or ethnic makeup or socioeconomic status are significant and persistent, and exist for diseases that are linked to social and environmental factors. Second, inequalities in exposures to environmental hazards are also significant and persistent, and are linked to adverse health outcomes. Third, intrinsic biological and physiological factors—for example, age—can modify the effects of environmental factors and contribute to differences in the frequency and severity of environmentally related disease. And fourth, extrinsic social vulnerability factors at the individual and community levels—such as race, sex, and socioeconomic status—may amplify the adverse effects of environmental hazards and can contribute to health disparities."). In addition, the U.S. EPA and numerous states have called for, and developed guidance on, cumulative impact analyses, including cumulative risk assessments and health impact assessments (HIAs), that analyze multiple environmental stressors in conjunction with social stressors, environmental justice considerations, and social

the oil and gas drilling context.[102] For example, the aforementioned 2016 Marcellus Shale study and Health Impact Assessment ("HIA") ranked "social determinants of health," (in this study, social determinants included crime, injuries, mental health, sexually transmitted infections, and substance abuse) as a fracking-related hazard of the highest concern with respect to public health impacts, along with air quality and health care infrastructure.[103] Cumulative risks, too, were considered their own category of fracking-related public health hazard, and ranked as a "moderately high" concern (along with water quality, noise, and traffic).[104]

In general, the research indicates that the potential cumulative effects of social and environmental stressors and "social determinants of health" in the context of oil and natural gas activity are as follows: (1) they can increase the *risk or magnitude of exposure* and the *number and/or severity of adverse health impacts* of oil and gas drilling (e.g. pollution sources are often located closer to "environmental justice" communities; underlying health conditions can increase vulnerability to pollution-related health impacts; and pollution-related risks and impacts can exacerbate existing health, social, and economic stressors and vice versa); and (2) they can present obstacles to diagnosing, managing, treating, and mitigating adverse health impacts (e.g. lack of access to health care providers makes it more difficult to manage asthma). BLM must take a hard look at the reasonably foreseeable cumulative health impacts of its actions, including cumulative impacts as they relate to social and structural factors—often referred to as social determinants of health—and environmental justice. These "social determinants" can include both positive and negative factors. Most broadly, "social determinants of health" that BLM should consider are:

> conditions in the environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks. Conditions (e.g., social, economic, and physical) in these various environments and settings (e.g., school, church, workplace, and

---

determinants of health. *See, e.g.*, **Exhibit 65**, U.S. ENVIRONMENTAL PROTECTION AGENCY, FRAMEWORK FOR CUMULATIVE RISK ASSESSMENT (May), *Available at* https://www.epa.gov/sites/production/files/2014-11/documents/frmwrk_cum_risk_assmnt.pdf; **Exhibit 66**, MINNESOTA POLLUTION CONTROL AGENCY, CUMULATIVE IMPACT ANALYSIS *Available at* https://www.pca.state.mn.us/air/cumulative-impact-analysis (Noting that "People's health is affected by many outside factors including multiple sources of pollution and other social conditions and stressors. Some people and communities are burdened by higher levels of pollution and more social stressors than others."; **Exhibit 67**, CUMULATIVE IMPACTS SUBCOMMITTEE, ENVIRONMENTAL JUSTICE ADVISORY COUNCIL TO THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, STRATEGIES FOR ADDRESSING CUMULATIVE IMPACTS IN ENVIRONMENTAL JUSTICE COMMUNITIES (March 2009), *Available at* https://www.nj.gov/dep/ej/docs/ejac_impacts_report200903.pdf (Identifying adverse cumulative impacts of exposures to multiple environmental burdens in "environmental justice" communities as one of "the most critical and pertinent Environmental Justice issues requiring state action and attention").

[102] *See, e.g.,* **Exhibit 68**, Susan Kinnear et al., *The Need to Measure and Manage the Cumulative Impacts of Resource Development on Public Health: An Australian Perspective* (May 15, 2013). Available at https://www.intechopen.com/books/current-topics-in-public-health/the-need-to-measure-and-manage-the-cumulative-impacts-of-resource-development-on-public-health-an-au (https://www.intechopen.com/books/current-topics-in-public-health/the-need-to-measure-and-manage-the-cumulative-impacts-of-resource-development-on-public-health-an-au; *See also* **Exhibit 69**, Jill Johnston & Lara Cushing, *Chemical Exposures, Health, and Environmental Justice in Communities Living on the Fenceline of Industry*, 7 CURRENT ENVIRONMENTAL HEALTH REPORTS, 48–57 (2020).

[103] Meleah et al., Exhibit 63.

[104] Meleah et al., Exhibit 63.

> neighborhood) have been referred to as 'place.' In addition to the more material attributes of 'place,' the patterns of social engagement and sense of security and well-being are also affected by where people live. Resources that enhance quality of life can have a significant influence on population health outcomes. Examples of these resources include safe and affordable housing, access to education, public safety, availability of healthy foods, local emergency/health services, and environments free of life-threatening toxins.[105]

Moreover, the CEQ guidance on environmental justice in the NEPA process specifically directs agencies to incorporate relevant underlying health data, and what amounts to social determinants of health, into their NEPA analyses, and to use this data to identify cumulative risks and reasonably foreseeable cumulative effects.[106] It emphasizes the importance of using public health data to identify "the potential for multiple or cumulative exposure to human health or environmental hazards in the affected population and historical patterns of exposure to environmental hazards, to the extent such information is reasonably available…"[107] and notes that "[a]gencies should consider these multiple, or cumulative effects, even if certain effects are not within the control or subject to the discretion of the agency proposing the action."[108] It also embraces a broad, socio-ecological model of health that is consistent with the language and purpose of NEPA. An additional guiding principle is that "[a]gencies should recognize the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed agency action. These factors should include the physical sensitivity of the community or population to particular impacts; the effect of any disruption of the community structure associated with the proposed action; and the nature and degree of impact on the physical and social structure of the community."[109]

BLM's full analysis and disclosure of health and safety risks and impacts, including cumulative impacts, is particularly important given that typical methods of collecting and analyzing emissions data have often underestimated health risks by failing to adequately measure the intensity, frequency, and duration of community exposure to toxic chemicals from fracking and drilling; failing to examine the effects of chemical mixtures; and failing to consider vulnerable populations.[110] Of high concern, numerous studies highlight that health assessments of drilling and fracking emissions often fail to consider impacts on vulnerable populations

[105] Office of Disease Prevention and Health Promotion, *Healthy People 2020: Social Determinants of Health*, *Available at* https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health.
[106] **Exhibit 70**, Council on Environmental Quality, ENVIRONMENTAL JUSTICE: GUIDANCE UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT (December 10, 1997) at 9 [Hereinafter CEQ EJ and NEPA Guidance].
[107] *Id.*, Exhibit 70.
[108] *Id*., Exhibit 70.
[109] *Id*., Exhibit 70.
[110] **Exhibit 71**, Brown, David et al., *Understanding Exposure From Natural Gas Drilling Puts Current Air Standards to the Test.* 29 REVIEWS ON ENVIRONMENTAL HEALTH 277 (2014).

including environmental justice communities[111] and children.[112] For example, a recent analysis of oil and gas development in California found that 14 percent of the state's population totaling 5.4 million people live within a mile of at least one oil and gas well. More than a third of these residents, totaling 1.8 million people, also live in areas most burdened by environmental pollution.[113]

The existing health status and pollution burdens experienced by individuals and populations in the lease sale areas, and the disproportionate health risks they face in light of social determinants of health and environmental justice concerns, are precisely the kinds of "incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions" that NEPA requires BLM to analyze here. 40 C.F.R. § 1508.1(g)(3). BLM cannot simply dismiss the "incremental" addition of wells from a particular lease sale (or the "incremental" increase in air pollution from those wells) as insignificant merely because they constitute a small "percent increase" *compared to* state, regional/basin-wide, or national well counts or emissions. This misses the entire point of NEPA's requisite cumulative impacts analysis—it is not to determine what *fraction* of regional, state, or national wells and emissions the wells and emissions from a particular lease sale make up. Quite the opposite—rather than breaking emissions from an individual lease sale down into annual fractions or "component parts" in attempt to dismiss them as insignificant, BLM must analyze *additive* short *and* long-term emissions *and their direct, indirect, and cumulative health effects* from these lease sales—the impacts which result "from the incremental impact of the action when *added* to past, present, and reasonably foreseeable future actions" (and impacts). 40 C.F.R. § 1508.1(g)(3). In a February 2023 ruling, the Tenth Circuit agreed. *See Diné CARE v. Haaland*, 59 F.4th at 1046-1047.

In addition, BLM must not summarily dismiss health and safety *impacts* as temporary simply because some *exposures* (e.g., to emissions and fugitive dust from construction) are temporary. It is arbitrary, and contrary to scientific understanding, to assume that just because an exposure is temporary, so too are the effects resulting from that exposure. The health effects that can arise from environmental exposures, especially in conjunction with social determinants of health and environmental justice issues, may endure long after the acute exposure source is gone.[114]

BLM also cannot dismiss health impacts as "temporary," and thus avoid taking a hard look at cumulative health impacts, by simply stating that wells will be properly plugged and reclaimed "at the end of their useful lives," and thus cease to cause unspecified "aggregate"

---

[111] **Exhibit 72**, NRDC [Natural Resources Defense Council], Drilling in California: Who's At Risk?, October 2014 ("NRDC 2014"); **Exhibit 73**, Clough, Emily & Derek Bell, *Just Fracking: A Distributive Environmental Justice Analysis of Unconventional Gas Development in Pennsylvania, USA*, 11 Environmental Research Letters 025001 (2016); **Exhibit 74**, McKenzie, Lisa M. et al., *Population Size, Growth, and Environmental Justice Near Oil and Gas Wells in Colorado*, 50 ENVIRONMENTAL SCIENCE & TECHNOLOGY 11471 (2016).

[112] **Exhibit 77**, Webb, Ellen et al*., Developmental and reproductive effects of chemicals associated with unconventional oil and natural gas operations*, 29 Rev Environ Health 307 (2014).

[113] NRDC 2014, Exhibit 72.

[114] *See, e.g.,* Morello-Frosch *et al*, Exhibit 64; Some specific examples include birth defects arising from prenatal exposures, enduring cognitive difficulties arising from prenatal or early childhood exposures, or asthma that develops in childhood, affects school attendance (and health outcomes related to it), and endures into adulthood.

health risks and impacts at that time. For one, a well's "useful life" can span decades. BLM must analyze cumulative emissions and their impacts over the full life course of a well, in conjunction with other wells in the lease sale areas *and* other past, present, and reasonably foreseeable future actions and emissions. Moreover, information from several states, and nationally, indicates that wells often are *not* properly plugged and reclaimed at the end of their "useful lives." For example, while it is sometimes difficult to obtain an exact count of "orphaned" or improperly plugged and abandoned wells, reports indicate that there are hundreds, even thousands, of such wells across private, state, and federal lands in nearby Western states such as Colorado, New Mexico, and Wyoming.[115] These wells can leach toxic chemicals and contaminate water supplies, posing direct and cumulative health risks to nearby communities.[116] State and BLM bonding requirements are usually insufficient to meet the costs associated with plugging and abandoning these wells, retiring other equipment, and cleaning up the well sites. Thus, idle or orphaned wells and abandoned well sites pose not only health risks and impacts, but also financial ones,[117] which can further compound existing health impacts, including cumulative impacts, and related health inequities.[118]

c. Health and Environmental Justice.

BLM must also take a hard look at the inexorable relationship between health and environmental justice. BLM cannot not analyze, let alone take NEPA's requisite hard look at, environmental justice impacts without analyzing health and safety impacts, particularly cumulative and disproportionate risks and impacts.

As noted above, the CEQ guidance on environmental justice in the NEPA process specifically directs agencies to incorporate relevant underlying health data, and social and structural factors, into their NEPA analyses, and to use this data to identify cumulative risks and reasonably foreseeable cumulative effects.[119] An environmental justice "analysis" must contain more than tables listing demographic data and identifying the general existence of "environmental justice" populations of concern in the lease sale areas, with no discussion of actual risks and impacts to those populations. Simply *listing* and describing environmental justice populations in the lease sale areas, without engaging in any further analysis or public disclosure of the *impacts* of BLM's leasing decisions on these populations, is arbitrary and capricious and fails to satisfy NEPA's hard look mandate. *Standing Rock Sioux Tribe v. U.S. Army Corps of Engineers*, 255 F. Supp. 3d 101, 140 (D.D.C. 2017), is instructive here. In this case, concerning the Dakota Access Pipeline (DAPL), the court looked to the CEQ Guidance on Environmental Justice in the NEPA processes and ruled that it was not enough for the Army Corps EA merely to acknowledge that the Standing Rock community had a high percentage of "minorities" and "low-income individuals," and could be affected by an oil spill. The court noted

---

[115] *See, e.g.,* **Exhibit 75**, Joshua Zaffos, *'Orphaned' Oil and Gas Wells are on the Rise.* HIGH COUNTRY NEWS, Jan. 16, 2018. *Available at* https://www.hcn.org/issues/50.3/energy-industry-orphaned-oil-and-gas-wells-are-on-the-rise.
[116] *Id*. Exhibit 75.
[117] *Id.* Exhibit 75; *See also* U.S. Gov't Accountability Office, Oil and Gas Wells: Bureau of Land Management Needs to Improve its Data and Oversight of Its Potential Liabilities 1, GAO-18-250 (May 2018), available at: https://www.gao.gov/assets/700/691810.pdf; U.S. Gov't Accountability Office, Bureau of Land Management Should Address Risks from Insufficient Bonds to Reclaim Wells, GAO-19-615 (Sept. 2019).
[118] PSR 2023, Exhibit 61.
[119] CEQ EJ and NEPA Guidance, Exhibit 70.

that the EA was silent on "the distinct cultural practices of the Tribe and the social and economic factors that might amplify its experience of the environmental effects of an oil spill" and that in order to meet its NEPA "hard look" obligations, the Army Corps "needed to offer more than a bare-bones conclusion that Standing Rock would not be disproportionately harmed." *Standing Rock Soiux Tribe, 255 F. Supp. 3d at 140; see also Friends of Buckingham v. State Air Pollution Control Board*, 947 F.3d 68, 92 (4th Cir. 2020) (finding that the agency's failure to consider disproportionate impacts on those closest to a Compressor Station resulted in a "flawed analysis."). "In sum, NEPA requires more. BLM cannot discount the localized impacts to people for whom the public health impacts are of clear significance." *California v. Bernhardt*, 472 F. Supp. 3d 573, 622 (N.D. Cal. 2020) (citing *Anderson v. Evans*, 371 F.3d 475, 490 (9th Cir. 2004)).

The inequities at which BLM must take a hard look in an environmental justice analysis are not incidental, nor are they biologically determined—they are structural, systemic, and part of an unjust historical and ongoing pattern and practice of environmental racism, settler colonialism, and treatment of communities in the leasing areas as energy sacrifice zones. And, as discussed throughout these comments, there are several other health risks and impacts BLM should also analyze in the context of health and environmental justice, particularly in light of social and structural factors that affect health. BLM must engage in a thorough analysis of these and other inequities that NEPA requires, apply this analysis to its decision-making, and articulate a "rational connection between the facts found and the choices made" in coming to its ultimate conclusions in light of that analysis. *Motor Vehicle Mfr. Ass'n v. State Farm Mut. Auto. Ins. Co*., 463 U.S. 29, 43, 52 (1983). In conducting this analysis, BLM can and should synthesize existing local health, socioeconomic, and other data in the lease sale areas—for example, county health statistics and reports, locally-conducted health impact assessments,[120] where available, or mapping of pollution exposure risks and demographic data——and the best available science, including but not limited to the peer-reviewed studies and sources mentioned in these comments. NEPA and the APA require more than mere *identification* of EJ communities. BLM must take a hard look at risks and impacts to those communities that could result from these lease sales, and factor those findings into its decision-making.

d. Air Pollution and Health Impacts.

Air pollution is of particular concern with respect to health impacts of these lease sales, including not only direct impacts, but also cumulative risks and impacts and historical patterns of multiple and cumulative exposures The potential harms resulting from exposure to dangerous air pollutants associated with fracking and drilling are serious and wide-ranging. A growing body of scientific research has documented adverse health impacts from air pollution related to unconventional oil and gas development or fracking, including studies showing air pollutants at levels associated with reproductive and developmental harms and increased risk of morbidity and

[120] Health Impact Assessment, or HIA, is a process that helps evaluate the potential health effects of a plan, project, or policy before it is built or implemented. HIA brings potential positive and negative public health impacts and considerations to the decision-making process for plans, projects, and policies that fall outside traditional public health arenas, such as transportation and land use. An HIA provides practical recommendations to increase positive health effects and minimize negative health effects." Centers for Disease Control and Prevention (CDC), "Health Impact Assessment" (Sept. 19, 2016), https://www.cdc.gov/healthyplaces/hia.htm.

mortality.[121] More broadly, a recent study found that if implemented, nationwide efforts to eliminate energy-related emissions, including from oil and gas production could prevent as many as 53,200 premature deaths each year and would provide $608 billion in benefits from avoided $PM_{2.5}$-related illness and death.[122]

The range of illnesses that can result from the wide array of air pollutants from fracking were summarized in a study by Dr. Theo Colburn, which charts which fracking chemicals have been linked to certain illnesses.[123] This study analyzed air samples taken during drilling operations near natural gas wells and residential areas in Garfield County, Colorado, and detected 57 chemicals between July 2010 and October 2011, including 44 with reported health effects.[124] For example:

> Thirty-five chemicals were found to affect the brain/nervous system, 33 the liver/metabolism, and 30 the endocrine system, which includes reproductive and developmental effects. The categories with the next highest numbers of effects were the immune system (28), cardiovascular/blood (27), and the sensory and respiratory systems (25 each). Eight chemicals had health effects in all 12 categories. There were also several chemicals for which no health effect data could be found.[125]

The study found extremely high levels of methylene chloride, which may be used as cleaning solvents to remove waxy paraffin that is commonly deposited by raw natural gas in the region. These deposits solidify at ambient temperatures and build up on equipment.[126] While none of the detected chemicals exceeded governmental safety thresholds of exposure, the study noted that such thresholds are typically based on "exposure of a grown man encountering relatively high concentrations of a chemical over a brief time period, for example, during occupational exposure."[127] Consequently, such thresholds may not apply to individuals experiencing "chronic, sporadic, low-level exposure," including sensitive populations such as children, the elderly, and pregnant women.[128] For example, the study detected polycyclic aromatic hydrocarbon (PAH) levels that could be of "clinical significance," as recent studies have linked low levels of exposure to lower mental development in children who were prenatally exposed.[129] In addition, government safety standards do not take into account "the kinds of

---

[121] **Exhibit 76**, Hays, Jake & Seth B.C. Shonkoff , *Towards an Understanding of the Environmental and Public Health Impacts of Unconventional Natural Gas Development: A Categorical Assessment of the Peer-Reviewed Scientific Literature*, 11 PLoS ONE e0154164 (2016); Webb, Ellen et al., Exhibit 77; **Exhibit 78**, Clean Air Task Force, Fossil Fumes: A Public Health Analysis of Toxic Air Pollution From the Oil and Gas Industry, June 2016, *available at* http://www.catf.us/resources/publications/files/FossilFumes.pdf.

[122] **Exhibit 79**, Mailloux, N. A., Abel, D. W., Holloway, T., & Patz, J. A. (2022). Nationwide and regional PM2.5-related air quality health benefits from the removal of energy related emissions in the United States. GeoHealth, 6, e2022GH000603. https:// doi.org/10.1029/2022GH000603. ($PM_{2.5}$ is fine particulate matter that results from a number of energy production activities, including oil and gas. This study also looked at the benefits of removal of sulfur dioxide, and nitrogen oxides, pollutants often released with $PM_{2.5}$, including from the oil and gas sector).

[123] **Exhibit 80**, Theo Colborn *et al.*, *An exploratory study of air quality near natural gas operations*, HUM. ECOL. RISK ASSESS. (Nov. 9, 2012) [Hereinafter Colborn 2012].

[124] *Id.* at pp. 21–22 (pages refer to page numbers in attached manuscript and not journal pages), Exhibit 80.

[125] *Id.* at 11, Exhibit 80.

[126] *Id.* at 10, Exhibit 80.

[127] *Id.* at 11–12, Exhibit 80.

[128] *Id.* at 12, Exhibit 80.

[129] *Id.* at 10–11, Exhibit 80.

effects found from low-level exposure to endocrine-disrupting chemicals . . ., which can be particularly harmful during prenatal development and childhood.[130]

A rigorous study by Johns Hopkins University, which examined 35,000 medical records of people with asthma in Pennsylvania, found that people who live near a higher number of, or larger, active gas wells were 1.5 to 4 times more likely to suffer from asthma attacks than those living farther away, with the closest groups having the highest risk.[131] Relatedly, a 2018 study of pediatric asthma-related hospitalizations found that children and adolescents exposed to newly spudded unconventional natural gas development wells within their zip code had 1.25 times the odds of experiencing an asthma-related hospitalization compared to children who did not live in these communities. Furthermore, children and adolescents living in a zip code with any current or previous drilling activity had 1.19 times the odds of experiencing an asthma-related hospitalization compared to children who did not live in these communities. Amongst children and adolescents (ages 2–18), children between 2 and 6 years of age had the greatest odds of hospitalization in both scenarios.[132]

BLM should analyze these asthma-related effects in relation to existing asthma rates and related impacts in the communities adjacent to and counties encompassing the proposed lease sales.[133] Air pollution-related asthma, in particular, can exert profound and widespread cumulative health effects throughout a person's life course, especially when combined with social determinants of health. For example, children with asthma are much more likely to miss school, hurting their educational prospects as well as their health (with some adverse health effects enduring into adulthood), and resulting in significant funding losses for local schools.[134] As the New Mexico Department of Health has noted,[135] and nationwide studies confirm,[136] "low-income" populations and "environmental justice" populations face not only disproportionate asthma risks, but also significant difficulty managing their asthma, in part due to lack of access to health care.

Ozone is a criteria pollutant of particular concern that contributes to asthma and missed school days (and one that can, in general, adversely affect health, especially for "sensitive groups" such as children, the elderly, and those with pre-existing health issues).

---

[130] *Id.* at 12, Exhibit 80.
[131] **Exhibit 81**, Rasmussen, Sara G. *et al.*, *Association Between Unconventional Natural Gas Development in the Marcellus Shale and Asthma Exacerbations,* 176 JAMA INTERNAL MEDICINE 1334 (2016).
[132] **Exhibit 82**, Willis, Mary D. et al., *Unconventional natural gas development and pediatric asthma hospitalizations in Pennsylvania,* 166 ENVIRONMENTAL RESEARCH 402 (2018).
[133] For example, NM Dept of Health provides Health Indicator Reports tracking asthma rates and Emergency Department visits by county and comparing the rates in each county to one another and to the state average. *See* **Exhibit 83**, New Mexico Department of Health, *Health Indicator Report of Asthma Emergency Department Visits Among Children* (Last Visited November 18, 2021). *Available at* https://ibis.health.state.nm.us/indicator/complete_profile/AsthmaEDChild.html. To the extent similar information is available for the proposed lease sale, BLM should take that information into account in its analyses and decision-making.
[134] *See* **Exhibit 84**, Attendance Works, *Mapping the Early Attendance Gap* (2017). *Available at* http://www.attendanceworks.org/wp-content/uploads/2017/05/Mapping-the-Early-Attendance-Gap_Final-4.pdf.
[135] **Exhibit 85**, New Mexico Dept. of Health*, The Burden of Asthma in New Mexico: 2014 Epidemiology Report* (Jan. 2014), at 41. Available at https://nmhealth.org/data/view/environment/54/.
[136] *See, e.g.,* **Exhibit 86**, Tim Kelley and Gregory D. Kearney, *Insights Into the Environmental Health Burden of Childhood Asthma*, 12 ENVIRONMENTAL HEALTH INSIGHTS doi: 10.1177/1178630218757445 (Feb. 20, 2018).

Background concentrations of ozone in some of the lease sale areas are already at or exceed the National Ambient Air Quality Standards ("NAAQS"), leaving virtually no room for growth in emissions. Several studies that measured and/or modeled gas-related air emissions in various states have identified significant increases in ground level ozone as a result of natural gas development.[137] Ozone was once a summertime urban phenomenon but is now being seen increasingly in western rural areas during the winter due to the natural gas boom, so much so that some relatively small cities are no longer in compliance with the federal regulations that set allowable ozone levels.[138]

Ozone can cause difficulty breathing, coughing and sore throat. It can also inflame and damage the airways. It aggravates lung diseases like asthma, emphysema, and chronic bronchitis. It can make the lungs more susceptible to infection and it can continue to damage the lungs even when the symptoms have disappeared.[139] Children are particularly vulnerable because their lungs are still developing until about age 18.[140] As their lungs grow in the presence of ozone, their alveoli production is reduced, and they can end up with smaller, more brittle lungs. Women exposed during pregnancy deliver preterm, low birth weight babies with a high probability of developing asthma. In a letter to former EPA Administrator Lisa Jackson, a group of five national medical and public health groups wrote that the most vulnerable individuals, including children, teens, senior citizens, people who exercise or work outdoors, and people with chronic lung diseases like asthma, COPD, and emphysema, are most in danger of being sickened by ozone and that children who grow up in areas of high ozone pollution may never develop their full lung capacity as adults, which can put them at greater risk of lung disease throughout their lives.[141]

In addition, oil and gas air pollution exacerbates cancer risks. A recent Yale University study identified numerous fracking chemicals that are known, probable, or possible human carcinogens (20 air pollutants) and/or are linked to increased risk for leukemia and lymphoma (11 air pollutants), including benzene, 1,3-butadiene, cadmium, diesel exhaust, and polycyclic aromatic hydrocarbons.[142] And a 2018 study by McKenzie et al. conducted in the Denver Julesberg Basin on the Colorado Northern Front Range (CNFR) found that the established setback distance of 152 m (500 ft) did little to protect people in that proximity. In analyses of nonmethane concentrations from 152 to >1600 meters from oil and gas facilities, the study found that the EPA's minimum cumulative lifetime excess cancer risk benchmark of 1 in a million was exceeded. Cumulative lifetime excess cancer risk increased with decreasing distance from the nearest oil and gas facility. Residents living within 610 meters of and oil and gas facility had an overall cancer risk in excess of the EPA's upper bound for remedial action of 1 in 10,000.

---

[137] *See, e.g.,* **Exhibit 87**, Seth Lyman and Howard Shorthill, *Final Report: 2012 Uintah Basin Winter Ozone & Air Quality Study*, UTAH STATE UNIVERSITY, February 1, 2013.
[138] **Exhibit 88,** Gabrielle Pétron, *et al*., *Estimation of emissions from oil and natural gas operations in northeastern Colorado*, Power Point available at: http://www.epa.gov/ttnchie1/conference/ei20/session6/gpetron_pres.pdf.
[139] *See* **Exhibit 89,** EPA, *Ozone – Good Up High Bad Nearby*, available at: http://www.epa.gov/oar/oaqps/gooduphigh/bad.html#7.
[140] *See* **Exhibit 90,** U.S. EPA, "Children are Not Little Adults," *https://www.epa.gov/children/children-are-not-little-adults.*
[141] *See* **Exhibit 91**, Letter from American Lung Association to U.S. EPA (November 30, 2011).
[142] **Exhibit 92**, Elliot, Elise G. et al., *A Systematic Evaluation of Chemicals in Hydraulic-Fracturing Fluids and Wastewater for Reproductive and Developmental Toxicity*, 27 JOURNAL OF EXPOSURE SCIENCE AND ENVIRONMENTAL EPIDEMIOLOGY 90 (2016).

Furthermore, residents within 152 meters of an oil and gas facility had an overall excess cancer risk of 8.3 in 10,000, along with an increased likelihood of neurological, hematological, and developmental health effects. Over 95% of the total risk was due to benzene, with additional risk due to the presence of toluene, ethylbenzene, xylene, and alkanes.[143] Other studies have found that residents living closer to drilling and fracking operations had higher hospitalization rates[144] and reported more health symptoms including upper respiratory problems and rashes.[145]

As BLM acknowledges in its own 2015–2020 Air Resources Management Program Strategy,[146] the agency is also subject to the following mandates with respect to air quality under FLPMA:

(1) FLPMA declares a policy that the BLM will manage the public lands in a manner that will protect the quality of air and atmospheric values, among other resources;

(2) FLPMA requires the BLM's land use plans to provide for compliance with applicable air pollution standards or implementation plans, among other laws; and

(3) FLPMA requires the BLM's leases or other instruments authorizing use or development of public lands to include provisions allowing the BLM to revoke or to suspend the lease for violation of terms that require compliance with air quality standards or implementation plans.

With respect to the first obligation, it is difficult to see how continued authorization of oil and gas leasing and drilling, is consistent with managing the public lands "in a manner that will protect the quality of air and atmospheric values." As to the third obligation, BLM should discuss in its NEPA analysis (and ultimately, build into its Resource Management Plans) what these lease provisions are and how BLM plans to monitor for, and act on, non-compliance with air quality standards or implementation plans.

Of note, too, is BLM's own acknowledgment that it is authorized to, and sometimes must, go beyond the requirements of the Clean Air Act in fulfilling its FLPMA obligations, including its obligation to prevent unnecessary or undue degradation.[147] This includes not only its obligations to protect air quality today, but also in accounting for "the needs of future generations," who will be harmed by greenhouse gas emissions and climate change resulting from oil and gas leasing authorizations, and could face additional risks and impacts to their health from degradation of the airshed in the lease sale areas, and pollution exposures prenatally or in early childhood that can have intergenerational adverse impacts (see infra for discussion of these health impacts).

---

[143] **Exhibit 93**, McKenzie, Lisa et al., *Ambient Nonmethane Hydrocarbon Levels Along Colorado's Northern Front Range: Acute and Chronic Health Risks*, 52 ENVIRONMENTAL SCIENCE & TECHNOLOGY 4514 (2018).
[144] **Exhibit 94**, Jemielita, Thomas et al., *Unconventional Gas and Oil Drilling Is Associated with Increased Hospital Utilization Rates.* 10 PLoS ONE e0131093 (2015).
[145] **Exhibit 95**, Rabinowitz, Peter M. et al., *Proximity to Natural Gas Wells and Reported Health Status: Results of a Household Survey in Washington County, Pennsylvania*, 123 ENVT'L HEALTH PERSPECTIVES 21.
[146] *See* Bureau of Land Management, Air Resource Management Program Strategy 2015–2020 (Feb. 2015). Available at https://www.blm.gov/sites/default/files/AirResourceProgramStrategy.pdf
[147] *Id.*

e. Water Quality and Quantity and Health Impacts.

With respect to water quality and quantity and health impacts, in addition to the considerations discussed *infra*, BLM should also consider how its authorization of these lease sales and reasonably foreseeable development of the leases could exacerbate water quality-related health impacts associated with PFAS contamination. For example, a 2023 report by Physicians for Social Responsibility (PSR) reveals the staggering amount of these health-harming "forever chemicals" known to be used in oil and gas operations in New Mexico—not to mention additional PFAS chemicals that are likely present but not disclosed due to trade secret protections.[148] BLM should take this report and the concerns it raises into account in its analysis and decision-making with respect to health impacts and potential impacts to groundwater and drinking water from PFAS "forever chemicals" used in oil and gas drilling and fracking.

f. Prenatal and Child Health Impacts.

Numerous studies also suggest that higher exposure to fracking and drilling during pregnancy can increase the incidence of high-risk pregnancies, premature births, low-birthweight babies, and birth defects.[149] A study of more than 1.1 million births in Pennsylvania found evidence of a greater incidence of low-birth-weight babies and significant declines in average birth weight for babies born to people living within 3 kilometers of fracking sites.[150] The study estimated that about 29,000 U.S. births each year occur within 1 kilometer of an active fracking site and "that these births therefore may be at higher risk of poor birth outcomes." A study of 9,384 pregnant people in Pennsylvania found that those who live near active drilling and fracking sites had a 40 percent increased risk for having premature birth and a 30 percent increased risk for having high-risk pregnancies.[151] Another Pennsylvania study found that pregnant people with greater exposure to gas wells during pregnancy—measured in terms of proximity and density of wells—had a much higher risk of having low-birthweight babies; the researchers identified air pollution as the likely route of exposure.[152] In rural Colorado, those people with greater exposure to natural gas wells during pregnancy had a higher risk of having babies with congenital heart defects and possibly neural tube defects.[153] A July 2020 study found that residential proximity to flaring (the open combustion of natural gas) from oil and gas development was associated with an increased risk of preterm birth, specifically for "Hispanic" women, in the Eagle Ford Shale of Texas.[154] Here, again, these documented risks are of particular concern in certain communities near the proposed lease sales in light of environmental

---

[148] **Exhibit 96,** Horwitt, Dusty and Gottlieb, Barbara, Physicians for Social Responsibility, *Fracking with Forever Chemicals in New Mexico* (April 12, 2023) *Available at https://psr.org/new-psr-report-reveals-oil-gas-companies-fracked-new-mexico-wells-with-pfas/.*

[149] *See, e.g.,* PSR 2023 at 263–265, Exhibit 61.

[150] Currie, Janet et al., Exhibit 58.

[151] **Exhibit 97**, Casey, Joan A., *Unconventional Natural Gas Development and Birth Outcomes in Pennsylvania, USA*, 27 EPIDEMIOLOGY 163 (2016).

[152] **Exhibit 98**, Stacy, Shaina L. et al., *Perinatal Outcomes and Unconventional Natural Gas Operations in Southwest Pennsylvania*. 10 PLoS ONE e0126425 (2015).

[153] McKenzie, *Birth Outcomes* (2014), Exhibit 57.

[154] *Lara J. Cushing et al. Flaring from Unconventional Oil and Gas Development and Birth Outcomes in the Eagle Ford Shale in South Texas*, 128 ENVIRONMENTAL HEALTH PERSPECTIVES, 077003 (2020), Exhibit 38.

justice concerns, like proximity of homes to multiple wells[155] (an exacerbating factor in the Eagle Ford Shale study), and social and structural inequities, such as limited access to prenatal care. BLM should have taken local health data like this into account as part of its "hard look" at health impacts, especially as they relate to social determinants of health and environmental justice.

g. Occupational Health and Safety Impacts

Those *living* near oil and gas development aren't the only ones at risk. Oil and gas *workers* also suffer high risks from toxic exposure and accidents.[156] One study of the occupational inhalation risks caused by emissions from chemical storage tanks associated with fracking wells found that chemicals used in 12.4 percent of wells posed acute non-cancer risks, chemicals used in 7.5 percent of wells posed acute cancer risks, and chemicals used in 5.8 percent of wells posed chronic cancer risks.[157] As summarized below:

> Drilling and fracking jobs are among the most dangerous jobs in the nation with a fatality rate that is four to seven times the national average. Irregularities in reporting practices mean that counts of on-the-job fatalities among oil and gas workers are likely underestimates . . .. Occupational hazards in the fracking industry include head injuries, traffic accidents, blunt trauma, burns, inhalation of hydrocarbon vapors, toxic chemical exposures, heat exhaustion, dehydration, and sleep deprivation. An investigation of occupational exposures found high levels of benzene in the urine of wellpad workers, especially those in close proximity to flowback fluid coming up from wells following fracturing activities. Exposure to silica dust, which is definitively linked to silicosis and lung cancer, was singled out by the National Institute for Occupational Safety and Health as a particular threat to workers in fracking operations where silica sand is used. At the same time, research shows that many gas field workers, despite these serious occupational hazards, are uninsured or underinsured and lack access to basic medical care.[158]

In addition, many oilfield workers may lack basic social and economic safety nets and lack support from their employer in mitigating risks and addressing harms such as those mentioned above. A recent survey of current and former oilfield workers in New Mexico's

---

[155] *See* EDF, New Mexico Oil and Gas Data tool, available at https://www.edf.org/nm-oil-gas/, for one excellent resource for mapping proximity of homes to wells, along with other environmental-justice-relevant data, specifically in New Mexico. We recommend that BLM use this and other available tools for taking a hard look at cumulative health impacts and environmental justice impacts.

[156] **Exhibit 99**, Esswein, Eric J. et al., *Occupational Exposures to Respirable Crystalline Silica During Hydraulic Fracturing*, 10 JOURNAL OF OCCUPATIONAL AND ENVIRONMENTAL HYGIENE 347 (2013); **Exhibit 100**, Esswein, Eric et al., *Evaluation of Some Potential Chemical Exposure Risks during Flowback Operations in Unconventional Oil and Gas Extraction: Preliminary Results*, 11 J. OF OCCUPATIONAL AND ENVT'L HYGIENE D174 (2014); **Exhibit 101**, Harrison, Robert J. *et al*., *Sudden Deaths Among Oil and Gas Extraction Workers Resulting from Oxygen Deficiency and Inhalation of Hydrocarbon Gases and Vapors — United States, January 2010–March 2015*, 65 MMWR MORB. MORTAL WKLY. REP. 6 (2016); PSR 2023, Exhibit 61.

[157] **Exhibit 102**, Chen, Huan & Kimberly E. Carter, *Modeling potential occupational inhalation exposures and associated risks of toxic organics from chemical storage tanks used in hydraulic fracturing using AERMOD*, 224 ENVIRONMENTAL POLLUTION 300 (2017).

[158] PSR 2023 at 234, Exhibit 61.

Permian Basin revealed that, there, about 57 percent of workers surveyed were not provided health insurance by their employer.[159] Just 21 percent got retirement benefits and 78 percent did not have access to unemployment, yet 69% reported being laid off or having their hours cut during dips in the volatile market.[160] Almost half of respondents (46%) said they had an accident on the job.[161] BLM should take information like this into account in its NEPA analysis of health risks and impacts, socioeconomics, and environmental justice, and in particular, should factor information like this into its consideration of any purported socioeconomic benefits of oil and gas development to individuals or communities associated with the proposed lease sales.

h. Naturally Occurring Radioactive Materials and Technology Enhanced Naturally Occurring Radioactive Materials.

Radioactive wastes from oil and gas production can be found in produced water, flowback water from hydraulic fracturing, drilling waste including cuttings and mud, and/or sludge. This material can concentrate in pipes, storage tanks and facilities, and on other extraction equipment, and may be left on site or be emitted into the environment. Some of these materials, such as Radium, can penetrate the skin and raise the risk of cancer.[162] The NEPA analysis conducted here must consider the potential health impacts of radioactive materials, as well as all other potential health effects discussed herein.

Processes used to produce oil and gas often generate radioactive waste containing concentrations of naturally occurring radioactive materials (NORM) and Technologically Enhanced Naturally Occurring Radioactive Materials (TENORMS). The geological formations to be drilled will result in radioactive waste, containing both NORMS and TENORMs. The radioactive materials will show up in formation drilling, production wastes, and operations. Every single shale well that uses an on-site pit for disposal of drill cuttings and/or fluids likely will leave behind some amount of concentrated radioactive materials.[163] Further, Alpha-emitting radioactive decay elements concentrate at the pipe scale, so the waste is much more radioactive than any of the constituent parts.[164] BLM must also evaluate radiation exposure risks as part of its obligation to take a hard look at public health and safety. Further, BLM should conduct a baseline groundwater analysis in the lease sale areas before any more leasing and development occurs, to ensure that no environmental contamination occurs from disposal of radioactive sludge/scale.

3. BLM Must Take a Hard Look at Environmental Justice.

---

[159] **Exhibit 103,** Sanchez *et al.*, *Southeastern New Mexico Oil and Gas Workforce Study* (January 2024), available at https://files.constantcontact.com/b6dfe469001/7eec220a-7cab-47d8-8370-62e981dc403a.pdf?rdr=true, *see especially* p. 16.
[160] *Id.*
[161] *Id.*
[162] *See, e.g.,* **Exhibit 104**, Agency for Toxic Substances and Disease Registry (ASTDR). *Radium.* (July 1999), *Available at* https://www.atsdr.cdc.gov/toxfaqs/tfacts144.pdf; (Beta and gamma particles can penetrate the skin).
[163] *See* **Exhibit 105**, Occupational Health and Safety (Oct. 01, 2012) "Radiation Sources in Natural Gas Well Activities," https://ohsonline.com/Articles/2012/10/01/Radiation-Sources-in-Natural-Gas-Well-Activities.aspx?Page=2.
[164] **Exhibit 106**, USGS (1999) Naturally Occurring Radioactive Materials (NORM) in Produced Water and Oil-Field Equipment—An Issue for the Energy Industry https://pubs.usgs.gov/fs/fs-0142-99/fs-0142-99.pdf.

BLM must also take a hard look at environmental justice—not just in relation to health, but also in its own right. Environmental justice means the fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, in the development, implementation, and enforcement of environmental laws, regulations, and policies.[165] Environmental Justice is a "relevant factor" for which federal agencies must take a hard look under NEPA, made reviewable under the APA's arbitrary and capricious standard. *See Latin Ams. for Social & Econ. Dev. v. Fed. Highway Admin.,* 756 F.3d 447, 465 (6th Cir. 2014); *Coliseum Square Ass'n, Inc. v. Jackson*, 465 F.3d 215, 232 (5th Cir. 2006); *Cmtys. Against Runway Expansion, Inc. v. FAA*, 355 F.3d 678, 689 (D.C. Cir. 2004); *Standing Rock Sioux Tribe v. U.S. Army Corps of Engineers*, 440 F. Supp. 3d 1, 9 (D. D.C. 2020), *vacated by, in part, affirmed by, in part, Standing Rock Sioux Tribe v. United States Army Corp of Eng'rs*, 985 F.3d 1032 (D.C. Cir. 2021)*; Friends of Buckingham v. State Air Pollution Control Bd*., 947 F.3d 68, 87 (4th Cir. 2020). As courts have affirmed specifically with regard to the NEPA process, BLM *must* take environmental justice seriously. *Cmtys. Against Runway Expansion, Inc.*, 355 F.3d at 688–89 (recognizing right to environmental-justice review under NEPA and APA)).

According to prior EPA Guidance on environmental justice in the NEPA process, an environmental justice analysis must also include "the cultural values that the community and/or Indian Tribe may place on a natural resource at risk."[166] The Guidance also states that it is "essential" for the "NEPA analyst to consider the cumulative impacts from the perspective of these specific resources or ecosystems which are vital to the communities of interest."[167] BLM must incorporate Tribes' and community members' knowledge of, and concerns about, such cultural values and cumulative impacts in its NEPA analyses for the lease sales. It would be arbitrary and capricious, a failure to "articulate a rational connection between the facts found and the choices made," *Motor Vehicle Mfr. Ass'n*, 463 U.S. at 43, for BLM to acknowledge that there are "environmental justice populations" in the lease sale areas who could experience adverse and disproportionate risks or impacts, without actually *analyzing*, or in some cases even mentioning, the risks and impacts of its leasing decisions on these populations—let alone taking these risks, impacts, and concerns into account in its decision-making. "Where BLM has acknowledged increased risk, it cannot then conclude impacts are not significant absent a comprehensive analysis." *State of California*, 472 F. Supp. 3d at 622. And BLM cannot defer that analysis to the APD stage. The intent of NEPA is for agencies to study the impact of their actions on the environment *before* the action is taken. *See Conner v. Burford,* 848 F.2d 1441, 1452 (9th Cir. 1988) (NEPA requires that agencies prepare an EIS before there is "any irreversible and irretrievable commitment of resources")*; see also Upper Pecos Ass'n v. Stans*, 500 F.2d 17 (10th Cir. 1974) (concluding that "consideration of environmental factors should come in the early stages of program and project formulation").

BLM must also adhere to the "process" requirements of environmental justice—fair treatment and *meaningful involvement*. If BLM ignores or excludes the very people and communities who are most affected by its leasing decisions, BLM is not only denying them fair treatment and meaningful involvement in decision-making—and, in the case of indigenous

[165] Although the U.S. Environmental Protection Agency under the current administration has removed online references to this term, the definition offered here has been commonly used by the agency in prior years.
[166] **Exhibit 107**, 1998 EPA NEPA Final Guidance https://www.epa.gov/sites/production/files/2015-02/documents/ej_guidance_nepa_epa0498.pdf.
[167] *Id.* Exhibit 107.

peoples and Tribes, abrogating the right to self-determination and free prior and informed consent[168]—but also depriving itself, and the general public, of invaluable knowledge and expertise that would enable better-informed and more transparent decision-making. "Better decisions" are indeed a fundamental goal of NEPA, and they require extensive, meaningful public involvement throughout an agency's decision-making process—not just "input" on pre-determined agendas.[169] Indeed, "environmental justice is not merely a box to be checked." *Friends of Buckingham*, 947 F.3d at 92.

4. BLM Must Take a Hard Look at Impacts to Resources Other Than Climate from Development of The Proposed Leases.

BLM must analyze and disclose the reasonably foreseeable impacts to a variety of non-climate resources from drilling on these particular leases. In particular, BLM must take a hard look at the impacts to groundwater, wildlife and other resources that will be harmed by oil and gas development resulting for its leasing decisions.

Courts have long made clear that "the sale of leases cannot be divorced from post-leasing exploration, development, and production." *Bob Marshall All. v. Hodel*, 852 F.2d 1223, 1229 (9th Cir. 1988). BLM's issuance of leases typically is an irretrievable commitment of resources, and before taking that step the agency must consider the reasonably foreseeable impacts—such as oil and gas drilling—to other resources. Making an irreversible commitment of resources, without analyzing effects of developing those leases, is an "approve now and ask questions later" approach "is precisely the type of environmentally blind decision-making NEPA was designed to avoid." *Conner v. Burford*, 848 F.2d 1441, 1450–51 (9th Cir. 1988); *Sierra Club v. Peterson*, 717 F.2d 1409, 1413–15 (D.C. Cir. 1983).

BLM may not simply provide broad descriptions of categories of impacts that result from oil and gas development generally, without examining how severe those impacts are likely to be for the particular leases being offered here. Such boilerplate could be applied to virtually any oil and gas proposal anywhere on public lands, and provides the agency and the public no useful information about the specific leases proposed in these lease sales. This does not satisfy NEPA. "General statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided." *Conservation Cong. v. Finely*, 774 F.3d 611, 621 (9th Cir. 2014).

Similarly, an assertion that additional analysis is not feasible at the leasing stage would be arbitrary and capricious and violates NEPA. There is ample information available to forecast

---

[168] The duty to obtain free prior and informed consent (FPIC) from indigenous peoples is recognized by the International Labour Organization Convention ("ILO") 169 and the U.N. Declaration on the Rights of Indigenous Peoples ("UNDRIP"), Articles 10, 11, 19, 28, 29, and 32. *See* **Exhibit 108**, UN General Assembly, *United Nations Declaration on the Rights of Indigenous Peoples.* FPIC is embedded in the right to self-determination. "The duty of States to obtain Indigenous Peoples' FPIC entitles Indigenous people to effectively determine the outcome of decision-making that affects them, *not merely a right to be involved*." **Exhibit 109,** UN Expert Mechanism on the Rights of Indigenous Peoples, *Final report of the study on indigenous peoples and the right to participate in decision-making* (August 17, 2011), *see especially* para. 21.

[169] *See* 40 C.F.R. § 1500.1(c).

reasonably foreseeable development on the specific leases being offered, and to evaluate the potential impacts of that development on groundwater, wildlife and other resources.

As discussed below, it is entirely feasible for BLM to project future development on the leases to estimate impacts to other resources. BLM can use evidence of impacts from existing development on wildlife, groundwater, etc., to predict what will happen from allowing even more oil and gas development in these areas.

While any projection of future development impacts necessarily involves uncertainty, that uncertainty does not excuse BLM from making any projection at all. Failure to use readily available resources to forecast reasonably foreseeable impacts to these resources would be arbitrary and capricious and violate NEPA. *New Mexico ex rel. Richardson v. BLM*, 565 F.3d 683, 718–19 (10th Cir. 2009) (failure to discuss impacts from developing oil and gas lease was arbitrary and capricious where "[c]onsiderable exploration has already occurred on parcels adjacent to the" proposed lease); *N. Plains Res. Council*, 668 F.3d at 1078–79 (rejecting agency argument that impacts from future coalbed methane development were "too speculative" to evaluate where there was "available data concerning likely future development").

a. BLM Must Take a Hard Look at Impacts to Groundwater from Well Construction Practices and Hydraulic Fracturing.

NEPA requires BLM to assess all the potential environmental impacts from oil and gas leases, before it offers those leases to operators. That responsibility includes taking a "hard look" at how ensuing development could impact groundwater. *WildEarth Guardians v. U.S. Bureau of Land Mgmt.*, 457 F. Supp. 3d 880, 886–89 (D. Mont. May 1, 2020).

As federal courts have explained, the issuance of a non-NSO lease represents an irreversible commitment of resources because it gives the leaseholder the right to engage in ground-disturbing activity. Accordingly, detailed environmental analysis and ESA consultation must occur at the leasing stage. *See Center for Biological Diversity & Sierra Club v. BLM*, 937 F. Supp. 2d 1140, 1158 (N.D. Cal. 2013) ("BLM asserts the now-familiar argument that there is no controversy because any degradation of the local environment from fracking should be discussed, if ever, when there is a site-specific proposal. But the Ninth Circuit has specifically disapproved of this as a reason for holding off on preparing an EIS."); *Conner v. Burford*, 848 F.2d 1441, 1450 (9th Cir. 1988) ("The government's inability to fully ascertain the precise extent of the effects of mineral leasing . . . is not, however, a justification for failing to estimate what those effects might be before irrevocably committing to the activity.").

Groundwater is a critical resource that supplies many communities, particularly rural ones, with drinking water. Protecting both the quality and quantity of these resources is imperative to protect human health and the environment, especially because groundwater will become more important as increased aridity and higher temperatures alter water use. The U.S. Environmental Protection Agency (EPA) has noted that existing drinking water resources "may not be sufficient in some locations to meet future demand" and that future sources of fresh

drinking "will likely be affected by changes in climate and water use."[170] As a result, BLM must protect both aquifers currently used for drinking water, and deeper and higher-salinity aquifers that may be needed in coming decades.

Oil and gas drilling involves boring wells to depths thousands of feet below the surface, often through or just above groundwater aquifers. Without proper well construction and vertical separation between aquifers and fractured formations, oil and gas development can contaminate underground sources of water.[171] However, federal rules and regulations do not provide specific direction for BLM and operators to protect all usable water. Even rules that purport to do so, like Onshore Order No. 2's requirement to "protect and/or isolate all usable water zones," are inconsistently applied and often disregarded in practice.[172] State regulations are similarly inadequate to ensure protection of groundwater.

Moreover, industry has admitted that it often does not protect usable water in practice. Western Energy Alliance and the Independent Petroleum Association of America have told BLM that the "existing practice for locating and protecting usable water" does not measure the numerical quality of water underlying drilling locations, and therefore does not consider whether potentially usable water would be protected during drilling.[173] For example, reports studying samples of existing oil and gas well records in Wyoming and Montana confirm industry admissions that well casing and cementing practices do not always protect underground sources of drinking water.[174] Similarly, a study of hydraulic fracturing in Pavillion, Wyoming, confirmed that oil and gas drilling had contaminated underground sources of drinking water in that area due to lack of vertical separation between the aquifer and target formation.[175]

In light of these risks to a critical resource, BLM must evaluate potential groundwater impairment. As a threshold matter, BLM must provide a detailed account of all regional groundwater resources that could be impacted, including usable aquifers that may not currently be used as a drinking water supply. The accounting must include, at minimum, all aquifers with up to 10,000 parts per million total dissolved solids, and it cannot substitute existing drinking water wells or any other incomplete proxy for a full description of all usable or potentially usable groundwater in the region. Second, BLM must use that accounting to assess how new oil and gas wells might impact these resources. That evaluation must assess the sufficiency of protective

---

[170] U.S. Environmental Protection Agency, *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States*, EPA/600/R-16/236F, at 2–18 (Dec. 2016) (EPA 2016 Report).

[171] *See, e.g.*, *Fracking Can Contaminate Drinking Water*, Exhibit 55; **Exhibit 110**, Dominic C. DiGiulio & Robert A. Jackson, *Impact to Underground Sources of Drinking Water and Domestic Wells from Production Well Stimulation and Completion Practices in the Pavillion, Wyoming Field*, 50 Am. Chem. Society, Envtl. Sci. & Tech. 4524, 4532 (Mar. 29, 2016); EPA 2016 Report.

[172] *See* **Exhibit 111,** BLM, Regulatory Impact Analysis for the Final Rule to Rescind the 2015 Hydraulic Fracturing Rule, at 44–45 (Dec. 2017). Available at https://beta.regulations.gov/document/BLM-2017-0001-0464.

[173] **Exhibit 112**, Western Energy Alliance and the Independent Petroleum Association of America, Sept. 25, 2017 comments Re: RIN 1004-AE52, Oil and Gas; Hydraulic Fracturing on Federal and Indian Lands; Rescission of a 2015 Rule (82 Fed. Reg. 34,464) (2017 WEA comments), at 59. Available at https://www.regulations.gov/document?D=BLM-2017-0001-0412.

[174] **Exhibit 113,** Rebecca Tisherman, et al., *Examination of Groundwater Resources in Areas of Wyoming Proposed for the June 2022 BLM Lease Sale* (May 12, 2022).

[175] DiGiulio, *Impact to Underground Sources of Drinking Water and Domestic Wells*, 50 AM. CHEM. SOCIETY, ENVTL. SCI. & TECH. at 4532 (Mar. 29, 2016). Exhibit 110.

measures that will be employed, including wellbore casing and cementing and vertical separation between aquifers and the oil and gas formations likely to be hydraulically fractured. In assessing these protections, BLM cannot presume that state and federal regulations will protect groundwater, because of the shortcomings and industry noncompliance described above. BLM may not defer this analysis of groundwater impacts to the APD stage. *WildEarth Guardians*, 457 F. Supp. 3d at 888. Failure to conduct this analysis would violate NEPA. *Id.*

In order to adequately protect water resources and comply with NEPA, BLM must complete a detailed, project-specific analysis of water resources prior to approving the lease sales. See *Center for Biological Diversity*, 937 F. Supp. 2d at 1158; *Conner,* 848 F.2d at 1450.

BLM must also consider cumulative effects of the proposed action pursuant to recent case law and BLM's NEPA Handbook.

b. BLM Must Take a Hard Look at Specific Impact Threats to Groundwater in Cave and Karst Landscapes

Additionally, adequate consideration must also be given for cave and karst landscapes which are currently known to or may exist in the proposed leasing areas – landforms characterized by underground drainage through solutionally enlarged conduits. Gypsum karst terranes may contain sinkholes, sinking streams, caves, and springs. These karst features, as well as occasional fissures and discontinuities in the bedrock, provide the primary sources for rapid recharge of the groundwater aquifers of many regions. Cave and karst features provide direct conduits leading to groundwater, which can quickly transport surface and subsurface contaminants directly into underground water systems and freshwater aquifers without filtration or biodegradation.[176] Highly sensitive cave and karst areas with critical freshwater aquifer recharge concerns may have a number of special surface and subsurface planning and construction requirements based upon the risk of adverse impacts created by a specific location or process.

In cave and karst terranes, rainfall and surface runoff is directly channeled into natural underground water systems and aquifers. Changes in geologic formation integrity, runoff quantity/quality, drainage course, rainfall percolation factors, vegetation, surface contour, and other surface factors can negatively impact cave ecosystems and aquifer recharge processes.[177] Blasting, heavy vibrations, and focusing of surface drainages can lead to slow subsidence, sudden collapse of subsurface voids, and/or cave ecosystem damage.

Both construction and production operations can have specific impacts on cave and karst systems. The construction of roads, pipelines, well pads and utilities can impact bedrock integrity and reroute, impede, focus, or erode natural surface drainage systems. Increased silting and sedimentation from construction can plug downstream sinkholes, caves, springs, and other components of aquifer recharge systems and result in adverse impacts to aquifer quality and cave environments. Any contaminants released into the environment during or after construction can impact aquifers and cave systems. A possibility exists for slow subsidence or sudden surface

[176] *See*, *e.g.*, **Exhibit 114,** Koosha Kalhor, et al., *Assessment of groundwater quality and remediation in karst aquifers: A review,* 8 GROUNDWATER FOR SUSTAINABLE DEV. 104 (2019). Exhibit 297.
[177] See **Exhibit 115,** BLM Handbook H-8380-1 20–24, *Cave and Karst Resources Management Handbook* (2015).

collapse during construction operations due to collapse of underlying cave passages and voids, as well as uncontrollable losses of drilling fluid and gas kicks.[178] This would cause associated safety hazards to the operator and the potential for increased environmental impact. Subsidence processes can be triggered by blasting, intense vibrations, rerouting of surface drainages, focusing of surface drainage, and general surface disturbance. Blasting fractures in bedrock can serve as direct conduits for transfer of contaminants into cave and groundwater systems. Blasting also creates an expanded volume of rock rubble that cannot be reclaimed to natural contours, soil condition, or native vegetative condition. As such, surface and subsurface disruptions from blasting procedures can lead to permanent changes in vegetation, rainfall percolation, silting/erosion factors, aquifer recharge, and freshwater quality and can increase the risk of contaminant migration from drilling/production facilities built atop the blast area. During drilling, previously unknown cave and karst features could be encountered.[179] If a void is encountered while drilling and a loss of circulation occurs, lost drilling fluids can directly contaminate groundwater recharge areas, aquifers, and groundwater quality. Drilling operations can also lead to sudden collapse of underground voids. Cementing operations may plug or alter groundwater flow, potentially reducing the water quantity at springs and water wells. Inadequate subsurface cementing, casing, and cave/aquifer protection measures can lead to the migration of oil, gas, drilling fluids, and produced saltwater into cave systems and freshwater aquifers. Production facilities such as tank batteries, pump-jacks, compressors, transfer stations, and pipe may fail and allow contaminants to enter caves and freshwater systems. Downhole casing and cementing failures can allow migration of fluids and/or gas between formations and aquifers. Facilities may also be subject to slow subsidence or sudden collapse of the underlying bedrock.

Any industrial activities that take place upon or within karst terranes or freshwater aquifer zones have the potential to create both short-term and long-term negative impacts to freshwater aquifers and cave systems. While a number of mitigation measures can be implemented to mitigate many impacts, it is still possible for impacts to occur from containment failures, well blowouts, accidents, spills, and structural collapses. It is therefore necessary to determine if current mitigations measures are sufficient enough to prevent long-term or cumulative impacts in order to prevent degradation unnecessary to, or undue in proportion to, the proposed mineral projects.

c. BLM Must Take a Hard Look at Impacts on Big Game.

BLM must fully evaluate the reasonably foreseeable impacts to big game from development on the proposed leases. This extends beyond a description of: (a) the regulatory and management frameworks applicable to big game species, along with the scientific literature, (b) existing conditions, and which lease parcels are in different categories of habitat (such as crucial winter habitat and migration corridors), (c) the lease stipulations that would apply, and (d) how BLM selected which parcels in big game habitat to offer or defer. Such information provides a basis for analyzing the likely impacts to big game from development on the proposed leases—

[178] *See*, *e.g.*, **Exhibit 116,** Danil Maksimov, et al. *Real-Time Detection of Karstification Hazards While Drilling in Carbonates*, 15 ENERGIES 4951 (2022).
[179] See **Exhibit 117,** Anthony H. Cooper, et al., *Dealing With Gypsum Karst Problems: Hazards, Environmental Issues And Planning*, TREATISE ON GEOMORPHOLOGY 451 (6th, 2013).

but it would not substitute for that analysis.[180] Failure to analyze the likely impacts to big game populations from the leases it proposes to offer and boilerplate statements about categories of impacts would and do not satisfy NEPA. BLM instead must analyze the site-specific, direct, indirect, and cumulative impacts of leasing the parcels on the biology, ecology, reproduction, migration, connectivity, and viability of individual herds and entire populations of pronghorn, mule deer, and other big game species. This must be done for the proposed parcels in connection with parcels sold in other, past federal and non-federal oil and gas lease sales and developments.

d. Other Species and Resources

BLM must also take a hard look at impacts to other resources. For example, BLM must analyze foreseeable impacts to cultural and heritage resources, wilderness study areas and lands with wilderness characteristics, areas of critical environmental concern (ACECs), and special status species.[181] BLM almost also take a hard look at impacts to other resources, including endangered species.

e. BLM Must Analyze Impacts to State and Local Economies

BLM must also take a hard look at the economic impacts of the proposed lease sales on state and local economies. One measure of this impact is the growth and quality of oil and gas extraction ("OGE") jobs.

Job growth in the oil and gas industry has stalled. Although oil and gas extraction recently reached peak levels, OGE employment is beginning to lag behind production.[182] In New Mexico, for example, technological advances have led to a 50-700% increase in the production of natural gas and crude oil, while jobs remained steady—or even decreased—relative to production.[183] Jobs in the oil and gas industry are also precarious due to the industry's major boom-and-bust cycles. [184] Furthermore, OGE jobs have been outpaced in recent years by gains in renewable energy industries.[185] Policy changes under the Trump administration—including

[180] For an analysis of the impacts of oil and gas development on elk and mule deer, for example, *see* **Exhibit 118,** Erik Molvar et al, *Evaluating the cumulative effects of oil and gas development on elk and mule deer in the middle reaches of the Colorado River watershed near Silt, Colorado*, Western Watersheds Project & Redstone GIS (Sept. 8, 2023).
[181] These comments incorporate by reference NM Wild's scoping comments on the proposed New Mexico Q2 '24 sale and WELC's scoping comments on the proposed Q4 '24 lease sale.
[182] **Exhibit 119**, *See, e.g.*, Rebecca F. Elliot, *Why Oil Industry Jobs are Down, Even with Production Up*, New York Times, (Jan. 14, 2025), https://www.nytimes.com/2025/01/14/business/energy-environment/oil-gas-jobs.html ("[C]ompanies that extract, transport and process these fossil fuels employ roughly 25 percent fewer workers than they did a decade earlier. . . [producing] less fuel."); **Exhibit 120**, s*ee also* Megan Milliken Biven & Leo Lindner, *The American Oil & Gas Worker Survey*, True Transition, at 6 (Mar. 2023) [hereinafter True Transition], https://www.truetransition.org/_files/ugd/0ad80c_069ea867b3f044afba4dae2a1da8d737.pdf?index=true ("Workers complained that current trends places [sic] greater pressure on remaining, smaller crews and compounds the risk each worker must face each shift."). This is likely due to increases in efficiency, particularly from technological advances. *Id.*
[183] **Exhibit 121**, Rachel Moskowitz, *A Profile of Oil and Natural Gas Workers in New Mexico*, Labor Market Rev., 8 (Feb. 2022), https://www.dws.state.nm.us/Portals/0/DM/LMI/Oil_NaturalGas_Workers_NM.pdf.
[184] True Transition, *supra* note 1, at 24. While the COVID-19 pandemic led to massive OGE industry layoffs, many workers reported this was not the first time they were laid off. *Id.*
[185] Dep't Energy Off. Energy Jobs, United States Energy & Employment Report 2024, at xi, xxvi (2024). Gains in renewable industries were nearly twice those in the energy sector as a whole. *Id*.

measures to increase leasing—may negatively impact job growth across the energy sector as a whole.

BLM must also consider the quality of oil and gas extraction jobs, and the impacts of lease sales on OGE workers. General statements that OGE jobs are well paying and provide good benefits fail to account for local variances or the health and safety consequences that come with those benefits. For example, while a national level survey reported that 56% of OGE workers received retirement benefits, in New Mexico that figure is only 21%.[186] Similarly, for health insurance, 74% of workers surveyed nationally received health insurance; in New Mexico this figure was only 43%.[187] Additionally, while many OGE workers have access to higher wages, these higher wages are the result of dangerous work conditions and long hours—a tradeoff rarely considered in research.[188] Moreover, most discussions ignore the sizeable portion of workers who work long hours in dangerous conditions without receiving high pay.[189] Something also not accounted for is the emerging trend of companies increasingly using 1099 independent contractors instead of W-2 employees which is likely to depress industry wages and benefits.[190] Lastly, OGE workers are disproportionately at risk of heat-related illnesses and injuries and these risks will increase as the effects of climate change worsen.

Finally, BLM may not blindly assert that OGE jobs will have spillover, positive effects on local economies. Although some research appears to support this, it varies based on region and production levels.[191] BLM must consider and address these varied results, in addition to the impact that job growth and job quality will have on state and local economies.

F. BLM Must Not Improperly Limit the Context of Significance Analysis.

BLM must not improperly limit the context and scope of the potentially affected environment in which the proposed leasing actions, and their cumulative impacts, will occur. Significance assessments under NEPA require consideration of "context," meaning the significance of the proposed action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality.[192] Significance varies with the setting of the proposed action.[193] BLM may not limit the consideration of context to the localities wherein the oil and gas development would take place, if authorized, and find that the impacts of oil and gas development would not have international, national, regional, or state-wide importance. We request BLM consider a wide array of contexts,

---

[186] *Compare* N.M. Workforce Study, *supra*, at 16, *with* True Transition, *supra,* at 29, Exhibit 120.
[187] True Transition, *supra*, at 29, Exhibit 120; N.M. Workforce Study, *supra*, at 16. These disparities may be explained by the number of immigrant workers or 1099 workers employed in a particular location because they do not have access to the same benefits.
[188] N.M. Workforce Study, *supra*, at 36, (finding that many workers with good salaries worked twelve-hour days).
[189] *See* N.M. Workforce Study, *supra*, at 36, (finding nearly a quarter of workers surveyed made less than $25,000 a year).
[190] *See* True Transition, *supra*, at 5, (noting about 25% of respondents were independent contractors). Exhibit 120.
[191] *See e.g.* Zhengyu Cai, *Who Benefits from Local Oil and Gas Employment? Labor Market Composition in the Oil and Gas Industry in Texas,* Institute of Labor Econ., 7–8, 30–33 (2019) (discussing results from study on indirect impacts and summarizing other studies with varied results on impact). **Exhibit 122**.
[192] 40 CFR 1508.27(a).
[193] *Id*.

including society as whole, global, national, and regional contexts, that reflect the cumulative and global nature of climate change impacts.

1. BLM Must Take a Hard Look at the Impact of Waste, Including Produced Water, That Will Result from the Proposed Project.

Produced water is a term used in the oil and gas industry to refer to the water that comes out of a well during the oil and gas production process.[194] As the main waste stream arising from oil and gas development, which is typically heavily contaminated with multiple hazardous substances and must be disposed of carefully. As a potential significant source of environmental impacts to air, groundwater, surface water, and public health, the BLM must take a hard look at the impacts of produced water in particular.

Like oil and gas, water exists naturally underground. Depending on the chemistry of the rocks, it may contain many different chemical constituents, including mineral salts, organic compounds, heavy metals, naturally occurring radioactive materials, critical minerals, and other minerals. When it flows back to the surface during oil and gas production the water will contain hydrocarbons as well as naturally occurring toxic substances like arsenic and radium,[195] salts and a mixture of chemical additives injected into the well to facilitate extraction. These additives can include carcinogens and numerous other toxic substances that have the potential to harm human health and contaminate the environment. The content and toxicity of produced water vary considerably, depending on the geology of the petroleum deposit.

Produced water is the largest waste stream from fossil fuel extraction.[196] Methods to extract fuels from aging oil fields and unconventional, or fracked, shale formations typically require far more water than conventional operations. Oil and gas operators recycle some of their wastewater to extract more fuels but some operations require freshwater. Produced water is generated wherever oil and gas is extracted. Depending on factors such as the level of contamination and the availability of water treatment options, some produced water may return to the drilling production cycle. The preferred method for industry to dispose of excess produced water is the injection of the waste into injection wells and saltwater disposal wells ("SWDs"),[197] which have been linked with induced seismicity.[198] Other than injection disposal, operators may seek to treat and reuse produced water outside the oilfields.[199] Produced water may be piped to disposal locations or alternatively transported by truck and/or rail. BLM must analyze the environmental impacts of produced water disposal, including transportation and storage of

---

[194] **Exhibit 123,** U.S. DOE, *Produced Water from Oil and Gas Development and Critical Minerals* (June 2024).
[195] *See*, discussion of TNORM and threats from radioactivity associated with oil and gas development, *supra* at Exhibit 123.
[196] **Exhibit 124,** Molly C McLaughlin, et al., *Water quality assessment downstream of oil and gas produced water discharges intended for beneficial reuse in arid regions*, 15 SCI. TOTAL ENV. 136607 (2020).
[197] *See* **Exhibit 125,** Casee R. Lemons, et al., Spatiotemporal and stratigraphic trends in salt-water disposal practices of the Permian Basin, Texas and New Mexico, United States, 26 ENV. GEOSCI. 107 (2019).
[198] **Exhibit 126,** U.S. EPA, *Distribution of Final Work Product from the National Underground Injection Control (UIC) Technical Workgroup- Minimizing and Managing Potential Impacts of Injection Induced Seismicity from Class II Disposal Wells: Practical Approaches* (Feb. 6, 2015).
[199] Ground Water Protection Council, *U.S. Produced Water Volumes and Management Practices* (2021). **Exhibit 127.** *See also* **Exhibit 128,** Scanlon et al., *Can we beneficially reuse produced water from oil and gas extraction in the U.S.?* 717 SCI. OF THE TOTAL ENV'T 137085 (2020).

produced water, treatment for proposed reuse including associated air emissions, the potential for induced seismicity, potential for spills and leaks of produced water and concomitant hazardous substances, and ultimate disposal methods.

a. BLM Must Analyze the Climate and Non-Climate Public Health and Safety Effects of Downstream Use of Fossil Fuels from Oil and Gas Leases.

BLM must take a hard look at the climate and non-climate public health impacts of downstream use of fossil fuels. *See WORC v. BLM*, No. 4:20-CV-00076-GF-BMM, 2022 WL 3082475, at *8 (D. Mont. Aug. 3, 2022) (in which BLM's failure to perform such an analysis rendered a Resource Management Plan analysis inadequate and BLM was instructed to correct the deficiency in any subsequent lease sale analyses). NEPA requires BLM to analyze foreseeable indirect effects, 40 C.F.R. § 1508.1(g)(2), and this provides BLM with the obligation to analyze non-climate, public health effects of its leasing decisions for the Montana-Dakotas, including non-climate public health effects of foreseeable downstream end-use of fossil fuels. Several of the Commenters joining this letter recently identified for BLM the myriad non-climate public health effects of fossil fuel combustion, which BLM should use as part of its analysis here.[200] Additionally, the recent decision in *Held v. Montana* illustrates the need to take into account many climate and public health impacts of downstream use of fossil fuels, particularly with regards to children's health, now and for future generations.[201]

G. BLM Must Properly Analyze Uncertainty.

The 2022 BLM Specialist Report identifies countless areas of uncertainty regarding the analysis of GHGs and climate change, including:

- [Global warming potentials] have a large uncertainty: ±26 percent and ±11 percent for the 20-year and 100-year CH_4 GWPs, respectively, and ±118 percent and ±130 percent for the 20-year and 100-year N_2O GWPs, respectively.[202]
- The earth's climate system is complex and interwoven in ways that are not yet fully understood. There are several known climate feedback mechanisms that add uncertainty in terms of timing (fast and slow feedbacks) and overall sensitivity within the evaluation of the climate system.[203]
- As with the forcing components, there are also positive and negative feedback mechanisms, and there is a relatively large range of uncertainty concerning estimates of the climate sensitivity that leaves the subject open to further investigation.[204]

[200] **Exhibit 119,** Letter of Sierra Club, et al. to BLM on the Buffalo and Miles City NEPA Scoping Process, at 47–54 (Nov. 2, 2022).
[201] *Held v. Mont*., No. CDV-2020-307 (1st Jud. Dist. Ct. Aug. 14, 2023).
[202] 2022 BLM Specialist Report at Section 8.5., Exhibit 17.
[203] *Id.* at Section 8.2.
[204] *Id.*

- Melting glaciers are likely to produce uncertainties for hydrologic power generation, which is an important resource in Alaska.[205]
- Analysis by IPCC scientists in AR6 suggest the 1.5°C temperature target is likely to be exceeded by 2030, which is in line with the carbon budget estimates. These estimates contain uncertainties that are characteristic of scientists' current understanding of the earth's climate-influencing systems, such as feedbacks and the forcing and response associated with the non-CO2 GHG species, and historical emissions accounting. The uncertainty range associated with the latest estimates is approximately ±400 Gt CO2.[206]
- As expected with such a complex model, there are multiple sources of uncertainty inherent in the SC-GHG estimates. Some sources of uncertainty relate to physical effects of GHG emissions, human behavior, future population growth and economic changes, and potential adaptation.

Well-documented scientific research and BLM's own analysis demonstrate that the potential effects of climate change are highly uncertain and involve unique and unknown risks. BLM must properly address this NEPA intensity factor in light of these impacts, and we request BLM do so for all 2025 lease sales in a single EIS.

H. BLM Must Properly Analyze Controversy Over Impacts from GHGs.

As the global body of scientific research and understanding of climate change reflects, there is controversy concerning critical aspects of the nature and effect of GHG emissions and their impact on climate change. This controversy is exemplified by the BLM's conclusions that the emissions from the proposed lease sales and the cumulative emissions from the federal fossil fuel program are not significant as compared to a robust scientific literature, indicating current and foreseeable fossil fuel development is not aligned with GHG reductions necessary to prevent warming exceeding 1.5°C.[207] We request BLM address the NEPA intensity factor for controversy and do so for all 2025 lease sales in a single EIS.

I. BLM Must Properly Analyze Cumulative Impacts of GHG Emissions.

BLM must evaluate the estimated GHG emissions from the proposed lease sales as another NEPA intensity factor, due to the seriousness and cumulative nature of climate change. Considering both the impacts of climate change that are already occurring as a result of historic anthropogenic emissions of GHGs and forecast impacts of continued GHG emissions, it is clear that significant cumulative effects are expected from the proposed oil and gas lease sales. We request BLM fully inform the public and the decision makers by providing a complete and comprehensive justification for how the agency reaches its significance determination on this NEPA intensity factor.

J. BLM Must Properly Analyze Federal or State Law and Policy.

[205] *Id.* at Section 8.4.
[206] *Id.* at Section 9.1.
[207] *See*, *e.g.* The Production Gap Report 2021, Exhibit 6.

BLM must analyze the potential for conflict between state laws and policies that set GHG emission reduction targets or commitments and the authorization of the proposed leases. Both Colorado and New Mexico, for example, have statutes and executive orders setting emission reduction goals. In Colorado, HB19-1261 requires the state to reduce GHG emissions by at least 26 percent in 2025, at least 50 percent by 2030, and at least 90 percent by 2050, relative to 2005 pollution levels. In New Mexico, Executive Order 2019-003 declares the state's support of the 2015 Paris Agreement goals and orders the state to achieve statewide reduction of GHG emissions of at least 45% by 2030, relative to 2005 levels. BLM must discuss and evaluate how the proposed lease sales and its estimated GHG emissions may threaten violation of these state laws and policies.

For the reasons set forth above, all parcels in the New Mexico Q1 '25 lease sales, listed in Appendix A, in addition to all parcels proposed and expected for lease in 2025, require an adequate NEPA analysis.

II. FEDERAL LAND POLICY AND MANAGEMENT ACT (FLPMA)

For the reasons discussed below, BLM's proposed Q1 '25 New Mexico lease sales violate FLPMA. As a result, the Agency should withdraw all parcels listed in Appendix A.

A. Leasing New Federal Fossil Fuels for Development Would Cause Unnecessary and Undue Degradation That Is Prohibited Under FLPMA.

The Federal Land Policy and Management Act ("FLPMA"), 43 U.S.C. § 1701 *et seq.*, directs that "the public lands be managed in a manner that will protect the quality of [critical resource] values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use." 43 U.S.C. § 1701(a)(8). This substantive mandate requires that BLM not elevate the development of oil and gas resources above other critical resource values in the planning area. To the contrary, FLPMA requires that where oil and gas development would threaten the quality of critical resources, conservation of these resources should be the preeminent goal.

Congress has declared through FLPMA that it is the policy of the United States that "the public lands [shall] be managed in a manner that will protect the quality of . . . air and atmospheric … values." 43 U.S.C. § 1701(a)(8). Under FLPMA's "multiple use and sustained yield" management directive, *id.* § 1701(a)(7), the federal government must manage public lands and resources in a manner that "takes into account the *long-term needs of future generations* for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and *harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land*[.]" *Id.* § 1702(3) (emphasis added). BLM's obligation to manage for multiple use does not mean that development *must* be allowed. Rather, [d]evelopment is a *possible* use, which BLM must weigh against other possible uses—including conservation to protect environmental values[.]" *New Mexico ex rel. Richardson v. Bureau of Land Mgmt.*, 565 F.3d 683, 710 (10th Cir. 2009) (emphasis original). Under these authorities,

BLM is required not only to evaluate the impacts that federal fossil fuel leasing has on public lands, waters, and wildlife resources, but to avoid harm to those resources whenever possible.

These directives are not simply aspirational, but grounded in the substantive requirements of FLPMA. "In managing the public lands," the agency "shall, by regulation or otherwise, take any action necessary to prevent unnecessary or undue degradation of the lands." 43 U.S.C. § 1732(b). Written in the disjunctive, BLM must prevent degradation that is "unnecessary" and degradation that is "undue." *Mineral Policy Ctr. v. Norton*, 292 F.Supp.2d 30, 41-43 (D.D.C. 2003). This protective mandate applies to BLM planning and management decisions, and should be considered in light of its overarching mandate that the agency employ "principles of multiple use and sustained yield." 43 U.S.C. § 1732(a); *see also, Utah Shared Access Alliance v. Carpenter*, 463 F.3d 1125, 1136 (10th Cir. 2006) (finding that BLM's authority to prevent degradation is not limited to the RMP planning process). While these obligations are distinct, they are interrelated and highly correlated. The Bureau must balance multiple uses in its management of public lands, including "recreation, range, timber, minerals, watershed, wildlife and fish, and [uses serving] natural scenic, scientific and historical values." 43 U.S.C. § 1702(c). It must also plan for sustained yield— "control [of] depleting uses over time, so as to ensure a high level of valuable uses in the future." *Norton v. S. Utah Wilderness Alliance,* 542 U.S. 55, 58 (2004).

"Application of this standard is necessarily context-specific; the words 'unnecessary' and 'undue' are modifiers requiring nouns to give them meaning, and by the plain terms of the statute, that noun in each case must be whatever actions are causing 'degradation.'" *Theodore Roosevelt Conservation Partnership v. Salazar*, 661 F.3d 66, 76 (D.C. Cir. 2011) (citing *Utah v. Andrus,* 486 F. Supp. 995, 1005 n. 13 (D. Utah 1979) (defining "unnecessary" in the mining context as "that which is not necessary for mining"—or, in this context, "for oil and gas development"—and "undue" as "that which is excessive, improper, immoderate or unwarranted.")); *see also Colorado Env't Coalition,* 165 IBLA 221, 229 (2005) (concluding that in the oil and gas context, a finding of "unnecessary or undue degradation" requires a showing "that a lessee's operations are or were conducted in a manner that does not comply with applicable law or regulations, prudent management and practice, or reasonably available technology, such that the lessee could not undertake the action pursuant to a valid existing right.").

Here, the actions that BLM must determine meet the substantive requirements of FLPMA as outlined above include: (1) the programmatic resumption of oil and gas leasing on federal lands; and (2) the decision of whether to offer to sell and issue oil and gas leases on each of the specific parcels identified. Critically, however, BLM's consideration of these substantive requirements must not be viewed in the abstract, but within the specific "context" of the agency's analysis and the scientific information available to it. 40 C.F.R. §§ 1502.24 (requiring "scientific integrity" of analysis), 1508.27(a) (requiring consideration of "both short and long-term effects" (1978)).[208] Accordingly, and of foundational importance, is whether the continued leasing and development of oil and gas will result in unnecessary and undue degradation to lands, resources, and species as a result of climate impacts.

[208] *See* discussion of CEQ NEPA regulations *supra.*

Courts have recognized, "[t]he impact of [GHG] emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct." *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin*., 538 F.3d 1172, 1217 (9th Cir. 2008); *see also San Juan Citizens Alliance v. Bureau of Land Mgmt.,* 326 F. Supp. 3d 1227, 1248 (D.N.M. 2018); 40 C.F.R. § 1508.7 (1978) ("Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."). Moreover, BLM has a duty to "consider the cumulative impact of GHG emissions generated by past, present, or reasonably foreseeable BLM lease sales in the region and nation." *WildEarth Guardians v. Zinke,* 368 F. Supp. 3d 41, 77 (D.D.C. 2019). This consideration must be contextual. An "agency's [environmental analysis] must give a realistic evaluation of the total impacts and cannot isolate a proposed project, viewing it in a vacuum." *Grand Canyon Trust v. F.A.A.*, 290 F.3d 339, 342 (D.C. Cir. 2002). In other words, it is not sufficient to simply list estimated emissions in a table, without relating those emissions to other BLM decisions and without "analysis of that catalogue and 'their combined environmental impacts.'" *WildEarth Guardians v. Bureau of Land Mgmt*., 457 F. Supp. 3d 880, 892 (D. Mont. 2020).

As discussed above, BLM has endeavored to satisfy the requirement to consider the cumulative climate impacts of its leasing decisions by preparing the 2020 and 2021 Specialist Reports. Setting aside the deficiencies of the Specialist Report, discussed above, the underlying conclusions are chilling. Annual greenhouse gas emissions from *existing* federal fossil fuel production totals 913.9 $MTCO_2e$, with total projected cumulative "life-of-project" emissions of 3,774.2 $MTCO_2e$ over the next 12 months. 2021 Specialist Report at Executive Summary, Table ES-1, Table ES-2; Table ES-3; 7.0 Emissions Analysis, Table 7-1. Already permitted but not yet producing leases add 800.6 $MTCO_2e$ to this total over the next 12 months. Report at Executive Summary, Table ES-3. And the long-term onshore fossil fuel emissions projection is 24,298.99 $MTCO_2e$. Report at Executive Summary, Table ES-4; 5.0 GHG Emissions and Projections from BLM-Authorized Actions, Table 5-18. BLM also applies these emissions in the context of the remaining Global Carbon Budget, which recognizes that there are 420 $GtCO_2$ that remain for a 66% chance to prevent warming above a 1.5C threshold. Report at 7.2 Carbon Budgets and Carbon Neutrality. With a federal fossil fuel emissions estimate of 2.24 $GtCO_2$ during that timeframe, this represents 1.47% of the total remaining global budget to avoid catastrophic warming. The 2021 Specialist Report at 7.2 Carbon Budgets and Carbon Neutrality, Table 7-3. In other words, *any* additional emissions are entirely incompatible with maintaining a livable planet. The 2021 Specialist Report also details past and present climate impacts, at Section 8.3, projected future climate impacts under varying mitigation pathways, at Sections 7.2 and 9.2, as well as state specific climate projections, at Sections 8.4 and 9.4.

BLM must apply this analysis to its substantive duty to avoid unnecessary and undue degradation under FLPMA. 43 U.S.C. § 1732(b). These requirements are distinct from BLM's requirements under NEPA. "A finding that there will not be significant impact [under NEPA] does not mean either that the project has been reviewed for unnecessary and undue degradation or that unnecessary or undue degradation will not occur." *Ctr. for Biological Diversity v. United States DOI,* 623 F.3d 633, 645 (9th Cir. 2010) (quoting *Kendall's Concerned Area Residents,* 129 I.B.L.A. 130, 140 (1994)). In the instant case, the BLM's failure to specifically account for unnecessary and undue degradation in its decision to continue the leasing and development of oil and gas—which is distinct from its compliance under NEPA—is actionable on procedural grounds and must occur before the leasing decision is approved.

BLM must therefore take sufficient measures to prevent degradation unnecessary to, or undue in proportion to, its oil and gas leasing decisions. *See Theodore Roosevelt Conservation Partnership*, 661 F.3d at 76. BLM must define what constitutes "unnecessary or undue degradation" in the context of continued oil and gas leasing and development, either at a programmatic level or within these specific sales—and with particular consideration of greenhouse gas emissions and resulting climate impacts—and explain why its chosen alternative will not result in such degradation, as required by FLPMA, 43 U.S.C. § 1732(b). BLM cannot defer the fulfillment of this substantive duty to the APD stage. The failure to define, analyze, or take action to prevent the unnecessary or undue degradation of lands in the context of climate impacts from these lease sales and the federal fossil fuel program as a whole would be arbitrary and capricious agency action, an abuse of discretion, and action without observance of procedures required by law, pursuant to the APA. 5 U.S.C. § 706(2).

B. BLM is Required by FLPMA to Take Every Opportunity to Reduce Methane Emissions from Mineral Production on Federal Lands.

As discussed above, methane represents an opportunity for BLM to meaningfully reduce GHG emissions associated with the federal oil and gas program. BLM is not only required to analyze alternatives that address this highly potent short-term GHG, it also has substantive mandates under FLPMA to prevent, reduce, or mitigate methane emissions, independent of the agency's MLA duty to prevent waste. We note in particular FLPMA's mandates that Interior:

- Protect "air and atmospheric" values (43 U.S.C. § 1701(a)(8));
- Account for "the long-term needs of future generations" (43 U.S.C. § 1702(c));
- Prevent "permanent impairment of the productivity of the land and quality of the environment" (43 U.S.C. § 1702(c)); and
- "[T]ake any action necessary to prevent unnecessary or undue degradation of the lands." (43 U.S.C. § 1732(b)).

These statutory directives enable Interior to take action before lease rights are conferred, whether at the planning or leasing stages, that will eliminate methane emissions and otherwise protect public lands. That includes the authority *and responsibility* to (1) reduce acres available for leasing to address the contribution of methane emissions to the climate crisis and the impacts of the crisis to public lands, (2) attach methane and other harmful emission reduction stipulations to an oil and gas lease to protect air and atmospheric resources and to mitigate climate impacts to public lands, and (3) condition lease development at the permitting stage. See 43 C.F.R. § 3101.1-2. In the absence of existing methane waste and air quality regulations, and even following the conclusion of current EPA and BLM rulemaking efforts with regard to methane, BLM has a duty to leverage its considerable authority under FLPMA to the fullest extent permitted by law, including by identifying stipulations and conditions of approval for *all* of the proposed 2025 lease sales, to minimize, reduce, and mitigate methane impacts to the greatest extent possible.

C. BLM May Not Arbitrarily Assume the Potential Benefits of Leasing Outweigh the Social and Environmental Costs.

BLM must analyze an important aspect of the problem: what justification does BLM have for proceeding with these lease sales, given the enormous social and environmental costs of the sale? Offering hundreds of leases that will impose billions of dollars in social and environmental harms without offering any justification for such a decision would be arbitrary and capricious and inconsistent with FLPMA. An action is arbitrary and capricious, *inter alia*, "if the agency has . . . failed to consider an important aspect of the problem [or] offered an explanation for its decision that runs counter to the evidence before the agency." *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto Ins. Co.*, 463 U.S. 29, 43 (1983). Here, it would be arbitrary and capricious to quantify the costs of selling so many leases, but disregard the other side of the cost-benefit scale. *See High Country Conserv. Advocs. v. U.S. Forest Serv.*, 52 F. Supp. 3d 1174, 1191 (D. Colo. 2014) (holding it was "arbitrary and capricious to quantify the *benefits* of the lease modifications and then explain that a similar analysis of the *costs* was impossible when such an analysis was in fact possible"); *Montana Env. Info. Ctr. v. U.S. Office Surf. Mining*, 274 F. Supp. 3d 1074, 1098 (D. Mont. 2017) (ruling in favor of plaintiff's argument that it was "arbitrary and capricious for [agency] to quantify socioeconomic benefits while failing to quantify costs"). Such a one-sided analysis also violates NEPA. *Id.*

III. ENDANGERED SPECIES ACT (ESA)

A. BLM Must Consult with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service on the Greenhouse Gas Emissions Caused by Its Leasing Proposal.

For every discretionary action, Section 7(a)(2) of the Endangered Species Act ("ESA") requires each federal agency, in consultation with the nation's wildlife agencies, to "insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species" using the best scientific data available. 16 U.S.C. § 1536(a)(2). The Supreme Court has unequivocally stated that the Act's "language, history, and structure" made clear "beyond doubt" that "Congress intended endangered species to be afforded the highest of priorities" and endangered species should be given "priority over the 'primary missions' of federal agencies" especially during such consultations. *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 174, 185 (1978). Even with a global threat to biodiversity such as climate change, "the plain intent of Congress in enacting this statute was to halt and reverse the trend toward species extinction, *whatever the cost*." *Id*. at 184 (emphasis added). Because resuming federal oil and gas leasing will have an appreciable, cumulative impact on climate-threatened species, BLM must include these species as part of its consultation with both the National Marine Fisheries Service and the U.S. Fish and Wildlife Service (collectively the "Services").[209]

While many of the ESA's provisions work to effectuate the conservation goals of the statute, the "heart of the ESA" is the interagency consultation requirements of Section 7 of the ESA. *W. Watersheds Project v. Kraayenbrink*, 632 F.3d 472, 495 (9th Cir. 2011); 16 U.S.C. §

[209] In *Massachusetts v. EPA*, the Supreme Court found that U.S. vehicle emissions represented a "meaningful contribution" to global emissions, and even addressing a fraction of these emissions was sufficient for standing purposes and requires EPA to take action. *Massachusetts v. EPA*, 549 U.S. 497 (2007).

1536. At the first step of the consultation process, an action agency must determine if its action either "may affect" listed species or will have "no effect" on listed species within the action area. Under the ESA, "action" is broadly defined to include "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas" and include, but are not limited to "(a) actions intended to conserve listed species or their habitat; (b) the promulgation of regulations; (c) the granting of licenses, contracts, leases, easements, rights-of-way, permits, or grants-in-aid; or (d) actions directly or indirectly causing modifications to the land, water, or air." 50 C.F.R. § 402.02. Similarly, the "action area" is equally broadly defined as "all areas to be affected directly *or indirectly* by the Federal action and not merely the immediate area involved in the action." 50 C.F.R. § 402.02 (emphasis added).

For these proposed actions, it is clear that the anticipated greenhouse gas pollution from federal oil and gas leasing will harm listed species far beyond the immediate area of the proposed activity in a manner that is attributable to the agency action.

1. Greenhouse Gas Emissions Have Direct, Predictable, and Devastating Effects on Endangered Species and Habitats.

As an initial matter, the science is overwhelmingly clear that climate change represents a stark threat to the future of biodiversity within the United States and around the world. The Fifth National Climate Assessment warns that "that "the effects of human-caused climate change are already far-reaching and worsening across every region of the United States."[210] The best available science shows that anthropogenic climate change is causing widespread harm to life across the planet, disrupting species' distribution, timing of breeding and migration, physiology, vital rates, and genetics—in addition to increasing species extinction risk.[211] Climate change is already affecting 82% of key ecological processes that underpin ecosystem function and support basic human needs.[212] Climate change-related local extinctions are widespread and have occurred in hundreds of species, including almost half of the 976 species surveyed.[213] Nearly half of terrestrial non-flying threatened mammals and nearly one-quarter of threatened birds are estimated to have been negatively impacted by climate change in at least part of their range.[214] Furthermore, across the globe, populations of terrestrial birds and mammals that are experiencing greater rates of climate warming are more likely to be declining at a faster rate.[215] Genes are changing, species' physiology and physical features such as body size are changing, species are

[210] **Exhibit 130,** U.S. Global Change Research Program, *Fifth National Climate Assessment,* (2023), https://nca2023.globalchange.gov.
[211] **Exhibit 131,** Rachel Warren et al., *Increasing impacts of climate change upon ecosystems with increasing global mean temperature rise*, 106 CLIMATIC CHANGE 141 (2011).
[212] **Exhibit 132,** Brett R. Scheffers*, The broad footprint of climate change from genes to biomes to people,* 354 SCIENCE 719 (2016).
[213] **Exhibit 133,** John J. Wiens, *Climate-related local extinctions are already widespread among plant and animal species*, 14 PLoS Biology e2001104 (2016).
[214] **Exhibit 134,** Michela Pacifici et al., *Species' traits influenced their response to recent climate change*, 7 Nature Climate Change 205 (2017). The study concluded that "populations of large numbers of threatened species are likely to be already affected by climate change, and … conservation managers, planners and policy makers must take this into account in efforts to safeguard the future of biodiversity."
[215] **Exhibit 135,** Fiona E.B. Spooner et al., *Rapid warming is associated with population decline among terrestrial birds and mammals globally*, 24 GLOBAL CHANGE BIO. 4521 (2018).

moving to try to keep pace with suitable climate space, species are shifting their timing of breeding and migration, and entire ecosystems are under stress.[216]

Species extinction risk will accelerate with continued greenhouse gas pollution. One million animal and plant species are now threatened with extinction, with climate change as a primary driver.[217] At 2°C compared with 1.5°C of temperature rise, species' extinction risk will increase dramatically, leading to a doubling of the number of vertebrate and plant species losing more than half their range, and a tripling for invertebrate species.[218] Numerous studies have projected catastrophic species losses during this century if climate change continues unabated: 15 to 37% of the world's plants and animals committed to extinction by 2050 under a mid-level emissions scenario[219]; the potential extinction of 10 to 14% of species by 2100[220]; global extinction of 5% of species with 2°C of warming and 16% of species with business-as-usual warming[221]; the loss of more than half of the present climatic range for 58% of plants and 35% of animals by the 2080s under the current emissions pathway, in a sample of 48,786 species[222]; and the loss of a third or more of animals and plant species in the next 50 years.[223]

Methane emissions are particularly alarming. Immediate, deep reductions in methane emissions are critical for lowering the rate of global warming in the near-term, preventing the crossing of irreversible planetary tipping points, and avoiding harms to species and ecosystems from methane's intensive near-term heating effects and ground-level ozone production.[224] Methane is a super-pollutant 87 times more powerful than CO_2 at warming the atmosphere over a 20-year period,[225] and is second only to CO_2 in driving climate change during the industrial

---

[216] **Exhibit 136,** Camille Parmesan & Gary Yohe, *A globally coherent fingerprint of climate change impacts across natural systems*, 421 NATURE 37 (2003); **Exhibit 137,** Terry L. Root et al., *Fingerprints of global warming on wild animals and plants*, 421 NATURE 57 (2003); Camille Parmesan, *Ecological and evolutionary responses to recent climate change*, 37 ANNUAL REVIEW OF ECOLOGY EVOLUTION AND SYSTEMATICS 637 (2006), Exhibit 182; **Exhibit 138,** I-Ching Chen et al., *Rapid range shifts of species associated with high levels of climate warming*, 333 SCIENCE 1024 (2011); **Exhibit 139,** Ilya M. D. Maclean & Robert J. Wilson, *Recent ecological responses to climate change support predictions of high extinction risk*, 108 PNAS 12337 (2011); *Increasing impacts of climate change upon ecosystems with increasing global mean temperature rise*, Exhibit 134; **Exhibit 140,** Abigail E. Cahill et al., *How does climate change cause extinction?*, 280 PROCEEDINGS OF THE ROYAL SOCIETY B 20121890 (2012).

[217] **Exhibit 141,** IPBES, Global Assessment Report on Biodiversity and Ecosystem Services (E.S. Brondízio et al eds., 2019), https://ipbes.net/news/Media-Release-Global-Assessment.

[218] Intergovernmental Panel on Climate Change, *Summary for Policymakers,* in Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (V. Masson-Delmotte et al eds., 2021), https://www.ipcc.ch/report/ar6/wg1/, Exhibit 22.

[219] **Exhibit 142,** Chris D. Thomas et al., *Extinction risk from climate change*, 427 NATURE 145 (2004).

[220] *Recent ecological responses to climate change support predictions of high extinction risk*, Exhibit 143.

[221] **Exhibit 143,** Mark C. Urban, *Accelerating extinction risk from climate change*, 348 SCIENCE 571 (2015).

[222] **Exhibit 144,** Rachel Warren et al., *Quantifying the benefit of early climate change mitigation in avoiding biodiversity loss*, 3 NATURE CLIMATE CHANGE 678 (2013).

[223] **Exhibit 145,** Cristian Román-Palacios & John J. Wiens*, Recent responses to climate change reveal the drivers of species extinction and survival*, 117 PNAS 4211 (2020).

[224] **Exhibit 146,** United Nations Environment Programme & Climate and Clean Air Coalition, *Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions* 11 (2021), https://www.unep.org/resources/report/global-methane-assessment-benefits-and-costs-mitigating-methane-emissions.

[225] G. Myhre et al., *Anthropogenic and Natural Radiative Forcing*, in: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (T.F. Stocker et al. eds., 2013), https://www.ipcc.ch/report/ar5/wg1/ at Table 8.7.

era.[226] Methane also leads to the formation of ground-level ozone, a dangerous air pollutant, that harms ecosystems and species by suppressing plant growth and reducing plant productivity and carbon uptake.[227] Because methane is so climate-damaging but also comparatively short-lived with an atmospheric lifetime of roughly a decade, cutting methane has a relatively immediate effect in slowing the rate of temperature rise in the near-term. Critically, deep cuts in methane emissions of ~45% by 2030 would avoid 0.3°C of warming by 2040 and are considered necessary to achieve the Paris Agreement's 1.5°C climate limit and prevent the worst damages from the climate crisis.[228] Deep cuts in methane emissions that reduce near-term temperature rise are also critical for avoiding the crossing of planetary tipping points—abrupt and irreversible changes in Earth systems to states wholly outside human experience, resulting in severe physical, ecological and socioeconomic harms.[229]

What is more, scientists can now predict specific harms to individual species from the incremental emissions increases directly attributable to the federal agency actions, and can also assess the consequences of emissions for listed species' conservation and recovery. For example, the recovery plan for the polar bear predicts three different scenarios for polar bear populations under scenarios where emissions are abated early, emissions are abated later, and where emissions continue unabated.[230] Likewise, with respect to particular agency actions, scientists were able to calculate that the rollback of vehicle emissions standards by the Trump administration would have resulted in a sustained loss of more than 1,000 square miles of summer sea ice habitat for the polar bear and nearly one full additional day of ice-free conditions in Alaska and many other parts of the Arctic, which would reduce the length of the polar bear feeding season and lower reproductive success and survival.[231] Thus as a scientific matter, there is no basis for any federal agency to assert that climate change does not harm endangered and threatened species or that it is scientifically impossible to ascertain the particular harm caused by an agency's contribution to greenhouse gas emissions.

Furthermore, there are no defensible legal rationales for ignoring climate-threatened species that are harmed by the emissions that will result from a proposed agency action. Since 2008, federal agencies have taken cover behind a cursory, two-page memorandum from the Fish and Wildlife Service, which asserted, without any citation or acknowledgement of the scientific literature, that the "best scientific data available today do not allow us to draw a causal connection between GHG emissions from a given facility and effects posed to listed species or their habitats, nor are there sufficient data to establish that such impacts are reasonably certain to

---

[226] United Nations Environment Programme & Climate and Clean Air Coalition, Exhibit 146, at 11.
[227] *Id.* at 11, 69.
[228] *Id.* at 11.
[229] **Exhibit 147,** O. Hoegh-Guldberg et al., *Impacts of 1.5°C Global Warming on Natural and Human Systems*, in: Global Warming of 1.5°C, An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty 262 (V. Masson-Delmotte et al. eds., 2018), https://www.ipcc.ch/sr15/chapter/chapter-3/.
[230] **Exhibit 148,** U.S. Fish and Wildlife Service, *Polar bear (*Ursus maritimus*) Conservation Management Plan, Final* (2016).
[231] Declarations of Shaye Wolf and Steven Amstrup, *Competitive Enterprise Inst. et al. v. National Highway Traffic Safety Admin. et al.,* Case No. 20-1145, Document No. 1880214 (filed Jan. 14, 2021) and Dirk Notz & Julienne Stroeve, *Observed Arctic sea ice loss directly follows anthropogenic CO_2 emission*, 354 SCIENCE 747 (2016), https://science.sciencemag.org/content/354/6313/747/tab-pdf.

occur."[232] Several months later, David Bernhardt — then Department of Interior Solicitor during the George W. Bush administration—issued a five-page memorandum concurring with the FWS.[233] Even if these memoranda were correct at the time — and they were not — as the FWS memorandum stated: that "As new information and knowledge about emissions and specific impacts to species and their habitats is developed, we will adapt our framework for consultations accordingly. This is particularly important as more regionally-based models are developed and refined to the level of specificity and reliability needed for the Service to execute its implementation of the Act's provisions ensuring consistency with the statute's best available information standard."[234] Thus, the FWS and Bernhardt Memoranda were never intended to provide a permanent shield to avoid consultations, and any reliance on it today would simply be arbitrary and capricious. Accordingly, all federal agencies must assess whether the emissions that result from their activities harm climate-threatened species.

2. The BLM's Proposed Leasing Action Clearly Crosses the "May Affect" Threshold for Climate-Threatened Species and Requires Consultation.

If the agency determines that an action *may affect* a species—even if the effect is small, indirect, or the result of cumulative actions—it must formally consult with the Services. 50 C.F.R. §§ 402.02, 402.14(a), (g) (2020). Federal courts have repeatedly held that the "may affect" threshold is "very low" and that any effect — whether "beneficial, benign, adverse or of an undetermined character" — is sufficient to cross that threshold. *Karuk Tribe of Cal. v. U.S. Forest Serv*., 681 F.3d 1006, 1027 (9th Cir. 2012). Only a scientific finding of "no effect" is sufficient to avoid the consultation process altogether.[235] In essence, as the Joint Consultation Handbook explains, a "no effect" finding means exactly what it says, and is only properly made "when the action agency determines its proposed action will not affect a listed species or designated critical habitat";[236] it cannot be employed when an agency simply believes it is too hard to determine the impacts of its actions. *Am. Fuel & Petrochemical Mfrs. v. EPA*, 937 F.3d 559, 598 (D.C. Cir. 2019) (A finding that "it is impossible to know" an agency action will affect listed species or critical habitat "is not the same as" a no effect determination.).

It is abundantly clear in this instance the proposed agency action will result in a significant fraction of all global greenhouse gas emissions, and consequently there are real impacts that cross the "may affect" threshold, even if some of those impacts are still of an undetermined character at this point. The purpose of the consultation process, by Congressional design, is to allow the expert wildlife agencies to assess these impacts using the best available science, so that they can evaluate the harm that may be caused. Any attempt by the Bureau of

---

[232] **Exhibit 149,** Memorandum from H. Dale Hall, Director Fish & Wildlife Service, to Regional Directors, Regions 1–8 (May 14, 2008), https://www.fws.gov/policy/m0331.pdf ("FWS Memorandum").
[233] **Exhibit 150,** Memorandum from David L. Bernhardt, Department of the Interior, Office of the Solicitor to the Secretary of the Department of the Interior Director (Oct. 3, 2008), https://doi.opengov.ibmcloud.com/sites/doi.opengov.ibmcloud.com/files/uploads/M-37017.pdf.
[234] FWS Memorandum at 2–3, Exhibit 149.
[235] **Exhibit 150,** U.S. Fish and Wildlife Service & National Marine Fisheries Service, *Endangered Species Consultation Handbook: Procedures for Conducting Consultation and Conference Activities under Section 7 of the Endangered Species Act* xvi (1998), https://www.fws.gov/endangered/esa-library/pdf/esa_section7_handbook.pdf.
[236] *Id.* at xvi. However, the agencies are still encouraged to obtain written concurrence from the Services. *See id.* definitions of "Formal consultation" and "Informal consultation" at xiv, xv.

Land Management (or U.S. Fish and Wildlife Service) to simply assert that it is unable to determine the impacts of greenhouse gas emissions on listed species is illegal and *ultra vires*. Only the expert wildlife agencies, with best scientific data available, can determine the effects of a federal action on species or habitat.

Indeed, the second step of the consultation process reinforces the basic notion that an action agency may not unilaterally assert that the greenhouse gases that will be emitted will not harm listed species. Once the "may affect" threshold is crossed, the action agency must then prepare a "biological assessment" to determine whether the listed species may be adversely affected by the proposed action. If the action agency believes that the impacts of its greenhouse gas emissions are not significant, it may make a finding that such impacts are "not likely to adversely affect" listed species, which is defined as all impacts being "discountable" or "insignificant."[237] Critically, however, the expert wildlife agencies must themselves concur regarding whether the action agency's scientific assessment of the impacts to climate-threatened species is correct. 50 C.F.R. § 402.14(b)(1).

At the formal consultation phase, the Services must provide the action agency with a "biological opinion" explaining how the proposed action will affect the listed species or habitat. 16 U.S.C. § 1536(b); 50 C.F.R. §§ 402.14(g), (h). If the Services conclude that the proposed action will jeopardize the continued existence of a listed species, including those that are not in the immediate project area and that are harmed by greenhouse gas emissions, or will result in the destruction or adverse modification of critical habitat, the Services must provide "reasonable and prudent alternatives" ("RPAs") to the proposed action that they believes would address those impacts. 16 U.S.C. § 1536(b)(3). If the Services conclude that the proposed action will not likely to jeopardize listed species, or result in the destruction or adverse modification of critical habitat, then they must provide an "incidental take statement" ("ITS"), specifying the amount or extent of such incidental taking on the species, any "reasonable and prudent measures" ("RPMs") that they consider necessary or appropriate to minimize such impact. 16 U.S.C. § 1536(b)(4); 50 C.F.R. §§ 402.14(h)(4)(i).

With respect to the greenhouse gas emissions that will result from federal fossil fuel leasing, the best available science suggests that this action, along with other federal onshore mineral production will result in approximately 24,112 megatons of carbon dioxide equivalent through 2050.[238] These emissions are appreciable and significant, and must be assessed under the ESA's consultation framework.

Consultation on climate-threatened species that may be affected by cumulative impacts of emissions caused by the agency's action is similar to many other complex consultations undertaken by the Services. The Services must first attempt to quantify any take of listed species, but if such harms cannot be quantified, the Services can qualitatively assess the harm, something Congress contemplated when it passed the 1982 amendments to the Endangered Species Act. The legislative history of those amendments reflects Congress' recognition that a numerical determination of take would not always be obtainable— such as when the eggs of listed species are boiled alive in power plant cooling systems—and intention that such challenges not present

[237] U.S. Fish and Wildlife Service & National Marine Fisheries Service, at xv, Exhibit 151.
[238] 2020 BLM Specialist Report at Section 6.0 and Table ES-4.

an insurmountable barrier to completing consultations.[239] Furthermore, the Services have regularly relied on surrogates, such as habitat, ecological conditions, or a similarly-affected species that are easier to monitor in instances where the biology of a listed species or the nature of the proposed action makes it difficult to detect or monitor take of individual animals.

Similarly, the Services must also assess the negative impacts of greenhouse gases on critical habitat. Assessing the loss of critical habitat in a climate consultation is complex, but no more difficult than assessing critical habitat in other nationwide programmatic consultations. Under the Services' regulations,[240] critical habitat is only adversely modified or destroyed when it appreciably diminishes the value of the "whole" designation. In many cases, climate impacts to critical habitat will affect the entirety of a designation — likely to the same extent in a relatively similar manner. For example, acidification impacts to a listed coral are likely to be roughly equivalent across the range of each species, and sea level rise would likely harm the habitat of Florida Keys species relatively equally across the range, making it more likely that an adverse modification determination would be needed at the end of the assessment process. But the fact that the outcome of such an analysis is a positive adverse modification or destruction determination is not a legal justification for not conducting an analysis at all. Thus, to the extent that the impacts to critical habitat are significant, the Services must develop RPAs and RPMs — including through surrogate metrics — to address the habitat degradation that climate change is bringing.

For both the jeopardy analysis and critical habitat analysis, the Services will need to develop analytical tools and methods that meet the standards of the Endangered Species Act, just as it does in traditional consultations, to address complex threats that are hard to assess quantitatively. The National Marine Fisheries Service can use the amount of sea ice lost as a surrogate for determining anticipated take of bearded seals, while the Fish and Wildlife Service can use declining stream flows and increasing water temperatures as a surrogate to infer the status of the western glacier stonefly or its critical habitat. This has been a pre-existing practice and the Services already have the knowledge and expertise to do this.

If the Services ultimately determine that the proposed action will result in jeopardy, the Services must provide RPAs that will allow the agency to move forward in a way that avoids jeopardy to the species or destruction or adverse modification of designated critical habitat. 16 U.S.C. 1536(b)(3)(A). While jeopardy determinations are rare, in the context of climate consultations they are all the more critical to the survival not only of listed species, but of humanity itself. If a federal agency action substantially increases the likelihood of overshooting the 1.5-degree Celsius goal of the Paris Agreement, it is likely to not only jeopardize climate-threatened species, but people everywhere. As the Endangered Species Act makes clear, the action agency must not take such an action, or it must implement RPAs that ensure that GHG emissions decrease such that they are consistent with the reports of the Intergovernmental Panel on Climate Change, and the best available science.

[239] H.R. Rep. No. 97-567, at 27 (1982).
[240] These regulations were challenged in federal court, subsequently revised in April 2024, and are once again being challenged for similar deficiencies.

In instances where the federal agency actions will not rise to the level of jeopardy but will result in incidental take in areas that are geographically remote from the agency action itself, the Services must *still* issue RPMs to minimize the take of climate-threatened species. The most durable and effective approach for climate consultations to implement RPMs would be for the Services to condition the receipt of an ITS through the implementation of RPMs within a climate-focused Section 7(a)(1) conservation program for each climate-threatened species identified in the biological opinion where the Services anticipate take.[241] Section 7(a)(1) requires all federal agencies to "utilize their authorities…by carrying out programs for the conservation of endangered species and threatened species."[242] As the Supreme Court noted in *Tennessee Valley Authority v. Hill* noted, section 7(a)(1) is no less than "stringent, mandatory language,"[243] that "reveals an explicit congressional decision to require agencies to afford first priority to the declared national policy of saving endangered species."[244] By requiring agencies to develop a climate-focused Section 7(a)(1) conservation program as a condition to obtaining an ITS, the Services can require agencies to finally comply with the law and ensure that their activities are consistent with the recovery of listed species and address the take they cause.

For this proposed action, it is clear that the anticipated greenhouse gas pollution from federal oil and gas leasing will harm listed species far beyond the immediate area of the proposed activity in a manner that is attributable to the agency action. Pending consultation, BLM should postpone the New Mexico Q1 '25 lease sales.

IV. CONCLUSION

Prior to any decision to conduct new leasing of federal public lands for fluid mineral development, BLM must comply with its obligations under the National Environmental Policy Act, the Federal Land Policy and Management Act, and the Endangered Species Act, to consider the impacts of its nationwide policy with respect to federal fossil fuel production on resources including global climate, environmental justice, wildlife habitat, air quality, and surface and groundwater quality. BLM's current plan- and lease-level NEPA compliance cannot support a decision to lawfully engage in new leasing, and therefore all new leasing must be deferred until BLM prepares a comprehensive environmental review, including an analysis of the cumulative impacts of past, ongoing, and reasonably foreseeable fossil fuel development. In order to comply with the United States' legal and moral obligations to its citizens, and to future generations, that review must include meaningful consideration of alternatives that could allow the Department of Interior to fulfill its role in putting the nation on a path towards an emissions future compatible with limiting warming to 1.5°C and mitigating the worst effects of global climate change. The Commenters appreciate your consideration of the information and concerns addressed in this letter, as well as the information included in the attached exhibits, sent under separate cover.

---

[241] H.R. Rep. No 97-567, at 44 ("I]n many cases in which a proposed action will not result in jeopardy, there may be minor modifications to the project which will minimize the effects on the species and which the action agency could easily and inexpensively adopt. We believe that providing such information to the action agency is important for the continued protection of endangered species and assists other federal agencies in fulfilling their obligations under section 7(a)(1) of the Act").
[242] 16 U.S.C. 1536(a)(1).
[243] *TVA v. Hill*, 437 U.S. at 183.
[244] *Id.* at 185.

Should you have any questions, please do not hesitate to contact me.

Sincerely,

/s/ Morgan O'Grady

Morgan O'Grady
Western Environmental Law Center
409 East Palace Ave #2
Santa Fe, New Mexico 87501
505-570-5566
ogrady@westernlaw.org

On behalf of:

Randi Spivak
Public Lands Program Director
Center for Biological Diversity
1411 K Street NW Suite 1300
Washington, DC 20005
(310) 779-4894
rspivak@biologicaldiversity.org

Haley Jones
Organizer
Citizens Caring for the Future
PO Box 27162
Albuquerque, NM 87125-7162
haley@ccffnm.org

Mary Gutierrez,
Executive Director
Earth Ethics, Inc.
PO Box 1783
Pensacola Florida 32591

Desirée Bernard
Executive Director
Interfaith Power & Light, New Mexico & El Paso Region
PO Box 27162
Albuquerque, NM 87125
831-420-1348
desiree@nm-ipl.org

John Weisheit
Conservation Director
Living Rivers & Colorado Riverkeeper

PO Box 466
Moab, UT 84532
435-260-2590 (cell)
john@livingrivers.org

Mike Eisenfeld
Energy and Climate Program Manager
San Juan Citizens Alliance
PO Box 2461
1309 E 3rd Avenue, Suite 5
Durango, CO 81302
(970) 259-3583
mike@sanjuancitizens.org

Eric Huber
Managing Attorney
Sierra Club Environmental Law Program
1650 38th St. Ste. 103W
Boulder, CO 80301
(303) 449-5595 ext. 101
eric.huber@sierraclub.org

Miya King-Flaherty
Our Wild New Mexico Organizing Representative
Sierra Club-Rio Grande Chapter
2215 Lead Ave. SE
Albuquerque, NM 87106
Miya.king-flaherty@sierraclub.org

Mario Atencio
Executive Director
Torreon Community Alliance
PO Box 1054
Cuba, NM 87013
(505) 321-9974
mpatencio@gmail.com

Daniel Tso
92 Rd 3050
Aztec, NM 87410
(505) 576-0289
detso49@yahoo.com

Daniel E. Estrin
General Counsel and Legal Director
Waterkeeper Alliance
180 Maiden Lane, Suite 603

New York, NY 10038
212.747.0622
destrin@waterkeeper.org

Erik Molvar
Executive Director
Western Watersheds Project
P.O. Box 1770
Hailey, ID 83333
208.788.2290
emolvar@westernwatersheds.org

Daniel Timmons
Climate and Health Program Director
WildEarth Guardians
301 N. Guadalupe St., Ste 201
Santa Fe, NM 87501
505-570-7014
dtimmons@wildearthguardians.org

U.S. Bureau of Land Management
New Mexico State Office
Attn: Catherine Brewster
301 Dinosaur Trail
Santa Fe, NM 87508

Re: Scoping for the New Mexico Q1 2026 Oil and Gas Lease Parcel Sales (DOI-BLM-NM-F010-2025-0033-EA & DOI-BLM-NM-P020-2025-1005-EA)

Appendix A

January 2026 Oil & Gas Preliminary Parcel List

Total Parcel Count: 2 Total Acres: 831.28

New Mexico

NM-2026-02-0558

NM, Farmington Field Office, Bureau of Land Management, PD

T. 24 N., R. 6 W., New Mexico principal

Sec. 33 LOTS 1 thru 16.

Rio Arriba County

671.28 Acres

16.67% Royalty Rate

EOI# NM00019858

NM-2026-02-0582

NM, Farmington District Office, Bureau of Land Management, PD

T. 22 N., R. 6 W., New Mexico Principal

Sec. 26 NW1/4.

Sandoval County

160 Acres

16.67% Royalty Rate

EOI# NM00019903

January 2026 Oil & Gas Preliminary Parcel List

Total Parcel Count: 28 Total Acres: 19527.56

NM-2026-02-6875

NM, Carlsbad Field Office, Bureau of Land Management, PD

T. 21 S., R. 24 E., New Mexico principal

Sec. 13 LOTS 1 thru 8;
Sec. 13 S1/2;
Sec. 14 LOTS 1 thru 8;
Sec. 14 S1/2;
Sec. 15 LOTS 1 thru 12;
Sec. 15 NE1/4.

Eddy County
2027.86 Acres
16.67% Royalty Rate
EOI# NM00019635, NM00019637, NM00019638

NM-2026-02-6874 Split Estate

NM, Carlsbad Field Office, Bureau of Land Management, PD

T. 21 S., R. 25 E., New Mexico principal

Sec. 5 LOTS 1,2, 7 thru 10,15,16;
Sec. 5 SE1/4.

Eddy County
458.89 Acres
16.67% Royalty Rate
EOI# NM00019686

NM-2026-02-0549

NM, Carlsbad Field Office, Bureau of Land Management, PD

T. 17 S., R. 28 E., New Mexico principal

Sec. 11 NW1/4.

Eddy County
160 Acres
16.67% Royalty Rate
EOI# NM00019727

NM-2026-02-0559 Split Estate
NM, Carlsbad Field Office, Bureau of Land Management, PD
T. 18 S., R. 32 E., New Mexico principal
Sec. 13 NE1/4NE1/4.
Lea County
40 Acres
16.67% Royalty Rate
EOI# NM00019853

NM-2026-02-0542 Split Estate
NM, Carlsbad Field Office, Bureau of Land Management, PD
T. 14 S., R. 33 E., New Mexico principal
Sec. 6 SE1/4NW1/4,NE1/4SW1/4,SE1/4.
Lea County
240 Acres
16.67% Royalty Rate
EOI# NM00019685

NM-2026-02-6891 Split Estate
NM, Carlsbad Field Office, Bureau of Land Management, PD
T. 17 S., R. 33 E., New Mexico principal
Sec. 31 LOTS 1,3,4;
Sec. 31 E1/2SW1/4.
Lea County
206.57 Acres
16.67% Royalty Rate
EOI# NM00019850

NM-2026-02-0554
NM, Carlsbad Field Office, Bureau of Land Management, PD
T. 18 S., R. 33 E., New Mexico principal
Sec. 8 NW1/4NW1/4.
Lea County
40 Acres
16.67% Royalty Rate
EOI# NM00019686

NM-2026-02-6881 Split Estate
NM, Carlsbad Field Office, Bureau of Land Management, PD
T. 22 S., R. 33 E., New Mexico principal
Sec. 20 NW1/4.
Lea County
160 Acres
16.67% Royalty Rate
EOI# NM00019848

NM-2026-02-0555 Split Estate
NM, Carlsbad Field Office, Bureau of Land Management, PD
T. 19 S., R. 36 E., New Mexico principal
Sec. 7 LOTS 3;
Sec. 7 NE1/4SW1/4.
Lea County
77.13 Acres
16.67% Royalty Rate
EOI# NM00019686

NM-2026-02-6878 Split Estate
NM, Carlsbad Field Office, Bureau of Land Management, PD
T. 17 S., R. 38 E., New Mexico principal
Sec. 7 LOTS 1,2.
Lea County
75.57 Acres
16.67% Royalty Rate
EOI# NM00019851

NM-2026-02-0561 Split Estate
NM, Carlsbad Field Office, Bureau of Land Management, PD
T. 17 S., R. 38 E., New Mexico principal
Sec. 29 SE1/4NE1/4, NE1/4SE1/4.
Lea County
80 Acres
16.67% Royalty Rate
EOI# NM00019852

NM-2026-02-6884

NM, Carlsbad Field Office, Bureau of Land Management, PD

T. 26 S., R. 24 E., New Mexico Principal

Sec. 1 ALL;
Sec. 12 N1/2,N1/2S1/2,SW1/4SW1/4.

T. 26 S., R. 25 E., New Mexico Principal

Sec. 6 LOTS 4;
Sec. 7 LOTS 1 thru 3.

Eddy County

1321.44 Acres

16.67% Royalty Rate

EOI# NM00019893

NM-2026-02-6885

NM, Carlsbad Field Office, Bureau of Land Management, PD

T. 26 S., R. 24 E., New Mexico Principal

Sec. 4 LOTS 9,10.

Eddy County

100.61 Acres

16.67% Royalty Rate

EOI# NM00019892

NM-2026-02-6883

NM, Carlsbad Field Office, Bureau of Land Management, PD

T. 26 S., R. 24 E., New Mexico Principal

Sec. 10 SE1/4SE1/4;
Sec. 11 LOTS 1 thru 4;
Sec. 11 E1/2;
Sec. 13 N1/2;
Sec. 14 NE1/4.

Eddy County

994.93 Acres

16.67% Royalty Rate

EOI# NM00019894

NM-2026-02-6862
NM, Carlsbad Field Office, Bureau of Reclamation: Upper Colorado Region, PD
T. 19 S., R. 26 E., New Mexico Principal
Sec. 12 E1/2NW1/4.
Eddy County
80 Acres
16.67% Royalty Rate
EOI# NM00019372

NM-2026-02-0510
NM, Carlsbad Field Office, Bureau of Reclamation: Upper Colorado Region, PD
T. 19 S., R. 26 E., New Mexico Principal
Sec. 24 SE1/4NE1/4, SE1/4.
Eddy County
200 Acres
16.67% Royalty Rate
EOI# NM00019372

NM-2026-02-0511
NM, Carlsbad Field Office, Bureau of Reclamation: Upper Colorado Region, PD
T. 19 S., R. 26 E., New Mexico Principal
Sec. 26 SE1/4SW1/4, E1/2SE1/4, SW1/4SE1/4.
Eddy County
160 Acres
16.67% Royalty Rate
EOI# NM00019372

NM-2026-02-0550
NM, Carlsbad Field Office, Bureau of Reclamation: Upper Colorado Region, PD
T. 20 S., R. 26 E., New Mexico Principal
Sec. 1 NE1/4, SE1/4NW1/4, E1/2SW1/4, SW1/4SW1/4, NW1/4SE1/4;
Sec. 2 LOTS 1 thru 4;
Sec. 2 S1/2NE1/4,S1/2NW1/4,SW1/4;
Sec. 11 E1/2, SE1/4NW1/4, E1/2SW1/4, SW1/4SW1/4;
Sec. 12 NW1/4, SE1/4NE1/4.
Eddy County
1520.36 Acres
16.67% Royalty Rate
EOI# NM00019333, NM00019334, NM00019339, NM00019340

NM-2026-02-0552

NM, Carlsbad Field Office, Bureau of Reclamation: Upper Colorado Region, PD

T. 20 S., R. 26 E., New Mexico Principal

Sec. 3 LOTS 1,2;
Sec. 3 S1/2NE1/4,SE1/4,W1/2SW1/4, SE1/4SW1/4;
Sec. 9 E1/2E1/2, SW1/4SE1/4;
Sec. 10 N1/2, N1/2S1/2.

Eddy County

1119.27 Acres

16.67% Royalty Rate

EOI# NM00019335, NM00019337, NM00019338

NM-2026-02-0548

NM, Carlsbad Field Office, Bureau of Reclamation: Upper Colorado Region, ACQ

T. 20 S., R. 26 E., New Mexico Principal

Sec. 4 SE1/4NE1/4, E1/2SE1/4.

Eddy County

120 Acres

16.67% Royalty Rate

EOI# NM00019336

NM-2026-02-0528

NM, Carlsbad Field Office, Bureau of Reclamation: Upper Colorado Region, PD

T. 20 S., R. 26 E., New Mexico Principal

Sec. 14 W1/2, NE1/4, W1/2SE1/4, SE1/4SE1/4;
Sec. 23 N1/2;
Sec. 23 S1/2;
Sec. 26 N1/2, E1/2SW1/4, SE1/4;
Sec. 35 E1/2W1/2, E1/2.

Eddy County

2280 Acres

16.67% Royalty Rate

EOI# NM00019341, NM00019358, NM00019345, NM00019290

NM-2026-02-0514

NM, Carlsbad Field Office, Bureau of Reclamation: Upper Colorado Region, PD

T. 20 S., R. 26 E., New Mexico Principal

Sec. 15 ALL;
Sec. 16 N1/2NE1/4, SW1/4NE1/4, SE1/4NW1/4, SW1/4, E1/2SE1/4, NW1/4SE1/4;
Sec. 21 NE1/4, W1/2SW1/4, N1/2SE1/4, SE1/4SE1/4;
Sec. 22 ALL.

Eddy County

2080 Acres

16.67% Royalty Rate

EOI# NM00019360, NM00019368, NM00019342, NM00019344, NM00019359

NM-2026-02-0481

NM, Carlsbad Field Office, Bureau of Reclamation: Upper Colorado Region, PD

T. 20 S., R. 26 E., New Mexico Principal

Sec. 27 NE1/4, N1/2NW1/4, SE1/4NW1/4, S1/2SW1/4, SW1/4SE1/4;
Sec. 28 NE1/4NE1/4, S1/2NE1/4, W1/2, SE1/4;
Sec. 29 SE1/4;
Sec. 33 ALL;
Sec. 34 N1/2.

Eddy County

2120 Acres

16.67% Royalty Rate

EOI# NM00019346, NM00019347, NM00019348, NM00019290, NM00019361

NM-2026-02-6839 Split Estate

NM, Carlsbad Field Office, Bureau of Land Management, PD

T. 21 S., R. 26 E., New Mexico Principal

Sec. 8 NE1/4,NW1/4,N1/2SW1/4,SE1/4SW1/4,SE1/4;
Sec. 17 LOTS 1 thru 4;
Sec. 17 S1/2NE1/4,N1/2SE1/4.

Eddy County

921.53 Acres

16.67% Royalty Rate

EOI# NM00019091, NM00019092

NM-2026-02-0457 Split Estate
NM, Carlsbad Field Office, Bureau of Land Management, PD
T. 22 S., R. 26 E., New Mexico Principal
Sec. 23 S2NW,W2SW.
Eddy County
160 Acres
16.67% Royalty Rate
EOI# NM00019166

NM-2026-02-0518
NM, Carlsbad Field Office, Bureau of Land Management, PD
Bureau of Reclamation: Upper Colorado Region
T. 19 S., R. 27 E., New Mexico Principal

Sec. 19 LOTS 1 thru 3;
Sec. 19 S1/2NE1/4, SE1/4;
Sec. 20 SE1/4NE1/4, W1/2, SE1/4;
Sec. 29 NW1/4,N1/2SW1/4,SW1/4SW1/4;
Sec. 30 LOTS 1 thru 4;
Sec. 30 E1/2;
Sec. 30 E1/2NW1/4,E1/2SW1/4;
Sec. 31 LOTS 1 thru 4;
Sec. 31 NE1/4,E1/2NW1/4,NE1/4SW1/4,NW1/4SE1/4.
Eddy County
2263.4 Acres
16.67% Royalty Rate
EOI# NM00019323, NM00019465, NM00019326, NM00001288, NM00019327

NM-2026-02-0581
NM, Carlsbad Field Office, Bureau of Land Management, PD
T. 26 S., R. 31 E., New Mexico Principal
Sec. 26 NE1/4,SW1/4.
Eddy County
320 Acres
16.67% Royalty Rate
EOI# NM00019902

NM-2026-02-6892

NM, Carlsbad Field Office, Bureau of Land Management, PD

T. 21 S., R. 32 E., New Mexico Principal

Sec. 25 NE1/4SE1/4,S1/2S1/2.

Lea County

200 Acres

16.67% Royalty Rate

EOI# NM00019900

U.S. Bureau of Land Management
New Mexico State Office
Attn: Catherine Brewster
301 Dinosaur Trail
Santa Fe, NM 87508

Re: Scoping for the New Mexico Q1 2026 Oil and Gas Lease Parcel Sales (DOI-BLM-NM-F010-2025-0033-EA & DOI-BLM-NM-P020-2025-1005-EA)

Appendix B

Exhibit 1, Katherine R. Scarlett, *Memorandum for Heads of Federal Departments and Agencies*, Council on Environmental Quality (Feb. 19, 2025) https://ceq.doe.gov/docs/ceq-regulations-and-guidance/CEQ-Memo-Implementation-of-NEPA-02.19.2025.pdf.

Exhibit 2, N. Ratledge et al., *Emissions from Fossil Fuels Produced on US Federal Lands and Waters Present Opportunities for Climate Mitigation*, 171 Climatic Change, no. 11, Mar. 14, 2022, at 2–5, https://link.springer.com/content/pdf/10.1007/s10584-021-03302-x.pdf.

Exhibit 3, Merrill, M.D., Sleeter, B.M., Freeman, P.A., Liu, J., Warwick, P.D., and Reed, B.C., Federal lands greenhouse gas emissions and sequestration in the United States—Estimates for 2005–14: U.S. Geological Survey Scientific Investigations Report 2018–5131, 31 (2018).

Exhibit 4, Members of petitioner groups made this point initially in their comments submitted in response to Executive Order 14008, with the title: WELC et al Recommendations for Scope and Criteria for Review of the Federal Fossil Fuel Programs**.** (April 16, 2021).

Exhibit 5, Memorandum for Heads of Federal Departments and Agencies, *Effective Use of Programmatic NEPA Reviews*, Counsel on Environmental Quality, December 18, 2014 (emphasis added).

Exhibit 6, SEI, IISD, ODI, E3G, and UNEP, *The Production Gap Report: 2020 Special Report* (2021).

Exhibit 7, Welsby, D., Price, J., Pye, S. et al. *Unextractable fossil fuels in a 1.5 °C world*. Nature 597, 230–234 (2021) (if 60% of remaining oil and gas is left in situ, we will retain a 50% chance of limiting warming to 1.5°C).

Exhibit 8, Calverley, D. and Anderson, K. (2022), *Phaseout pathways for fossil fuel production within Paris-compliant carbon budgets*. Tyndall Centre, University of Manchester.

Exhibit 9, The 2022 report of the *Lancet* Countdown on health and climate change: health at the mercy of fossil fuels. https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(22)01540-9/fulltext

Exhibit 10, World Meteorological Organization (2022). United in Science 2022 A multi-organization high-level compilation of the most recent science related to climate change, impacts and responses. https://library.wmo.int/doc_num.php?explnum_id=11309.

Exhibit 11, United Nations Framework Convention on Climate Change (October 26, 2022), Nationally Determined Contributions Under the Paris Agreement: Synthesis Report by the Secretariat. https://unfccc.int/documents/619180.

Exhibit 12, United Nations Environment Programme (2022). Emissions Gap Report 2022: The Closing Window — Climate crisis calls for rapid transformation of societies. Nairobi. https://www.unep.org/emissions-gap-report-2022.

Exhibit 13, International Institute for Sustainable Development, *Navigating Energy Transitions: Mapping the Road to 1.5° C*, October 2022.

Exhibits 14 and **15**, IPCC, 2021: Summary for Policymakers and Technical Summary.

Exhibit 16, In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.

Exhibit 17, IPCC, 2022*: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*.

Exhibit 18, IPCC, 2022: *Climate Change 2022: Impacts, Adaptation, and Vulnerability.* Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.

Exhibit 19, IPCC 2023: *Synthesis Report of the IPCC Sixth Assessment Report.*

Exhibit 20, CEQ, Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews (Aug. 2016).

Exhibit 21, *Report on the Federal Oil and Gas Leasing Program, Prepared in Response to Executive Order 14008* (November, 2021) (Hereinafter "Interior Report") (the Report focused entirely on necessary fiscal reforms but ignored climate, in direct contravention of the language of §208 of Executive Order 14008.)

Exhibit 22, Swain, Daniel L. et al., *Attributing Extreme Events to Climate Change: A New Frontier in a Warming World*, One Earth (Jun. 2, 2020).

Exhibit 23, Reed, Kevin A. et al., *Forecasted Attribution of the Human Influence on Hurricane Florence*, Science Advances 6 (1): eaaw9253, https://doi.org/10.1126/sciadv.aaw9253.

Exhibit 24, Bruce. M Pendery, *BLM's Retained Rights: How Requiring Environmental Protection Fulfills Oil and Gas Lease Obligations*, 40 Envtl. L. 599 (2010).

Exhibit 25, SEI, Climate Analytics, E3G, IISD, and UNEP, The Production Gap: Phasing down or phasing up? Top fossil fuel producers plan even more extraction despite climate promises, Stockholm Environment Institute, Climate Analytics, E3G, International Institute for Sustainable Development and United Nations Environment Programme (2023), https://doi.org/10.51414/sei2023.050.

Exhibit 26, Bureau of Ocean Energy Management, Outer Continental Shelf Oil and Gas Leasing Program: 2017-2022, Final Programmatic Environmental Statement, Volume I (Nov. 2016) at 4-8 to 4-10.

Exhibit 27, Evans, Simon, Analysis: Which countries are historically responsible for climate change? Carbon Brief, https://www.carbonbrief.org/analysis-which-countries-are-historically-responsible-for-climate-change (last visited Nov. 29, 2021).

Exhibit 28, Van den Berg, Nicole et al., *Implications of various effort-sharing approaches for national carbon budgets and emission pathways*, Climatic Change 162: 1805-1822 (2020), https://link.springer.com/article/10.1007%2Fs10584-019-02368-y

Exhibit 29, Dooley, Kate et al., *Ethical choices behind quantifications of fair contributions under the Paris Agreement*, Nature Climate Change 11: 300-305 (2021), available at https://www.nature.com/articles/s41558-021-01015-8.

Exhibit 30, IEA (2021) Michaels, K.C., de Oliveira, Tomás, *Curtailing Methane Emissions from Fossil Fuel Operations, Pathways to a 75% cut by 2030*, International Energy Agency.

Exhibit 31, *The Imperative of Cutting Methane from Fossil Fuels*, International Energy Agency (Oct. 11, 2023), https:iea.blob.core.windows.netassets/9efb310e-94d7-4c46-817b-9493fe5abb0a/Theimperativeofcuttingmethanefromfossilfuels.pdf.

Exhibit 32, Olivia Griot et al., Onshore Natural Gas Operations on Federal and Tribal Lands in the United States: Analysis of Emissions and Lost Revenue, Synapse Energy Economics Inc., 3 (Jan. 20, 2023), https://blogs.edf.org/energyexchange/files/2023/01/EMBARGOED_EDF-TCS_Public_Lands_Analysis.pdf

Exhibit 33, Rystad Energy, *Cost of Flaring Abatement: Final Report* 6 (Jan. 31, 2022), https://blogs.edf.org/energyexchange/files/2022/02/Attachment-W-Rystad-Energy-Report_-Cost-of-Flaring-Abatement.pdf

Exhibit 34, Jeremy Proville et al., *The demographic characteristics of populations living near oil and gas wells in the USA*, 44 Population and Environment 1 (2022), https://doi.org/10.1007/s11111-022-00403-2

Exhibit 35, Cushing et al., *Up in Smoke: Characterizing the Population Exposed to Flaring From Unconventional Oil and Gas Development in the Contiguous U.S.*, 16 Environmental Research Letters 1, 1 (2021).

Exhibit 36, Caron-Beaudoin et al., Volatile organic compounds (VOCs) in indoor air and tap water samples in residences of pregnant women living in an area of unconventional natural gas operations: Findings from the EXPERIVA study, Sci Total Environ. (2022).

Exhibit 37, Jill Johnston et al., *Environmental Justice Dimensions of Oil and Gas Flaring in South Texas: Disproportionate Exposure among Hispanic Communities*, Environ. Sci. Technol. (2020).

Exhibit 38, Lara J. Cushing et al., *Flaring from Unconventional Oil and Gas Development and Birth Outcomes in the Eagle Ford Shale in South Texas*, 128 Environmental Health Perspectives, 077003 (2020).

Exhibit 39, Clean Air Task Force, *Tribal Communities at Risk: The Disproportionate Impacts of Oil and Gas Air Pollution on Tribal Air Quality* 3, 2-5 (2018), https://ww2w.catf.us/resource/tribal-communities-at-risk/.

Exhibit 40, Wesley Blundell & Anatolii Kokoza, *Natural gas flaring, respiratory health, and distributional effect*, 208 Journal of Public Economics 104601, at 4, 10 (2022), https://doi.org/10.1016/j.jpubeco.2022.104601

Exhibit 41, Environmental Defense Fund, *PermianMAP Final Report*, 2021. Available here: https://blogs.edf.org/energyexchange/wp-content/blogs.dir/38/files/2022/11/PermianMAPFinalReport.pdf.

Exhibit 42, Gvakharia et al., *Methane, Black Carbon, and Ethane Emissions from Natural Gas Flares in the Bakken Shale,North Dakota*, Environmental Science & Technology 5317, 5317 (2017).

Exhibit 43, Rajiv Bhatia and Aaron Wernham, *Integrating Human Health into Environmental Impact Assessment: An Unrealized Opportunity for Environmental Health and Justice*, 116 ENVIRONMENTAL HEALTH PERSPECTIVES 991 (Apr. 16, 2008).

Exhibit 44, R.Z. Witter, et al*., Occupational exposures in the oil and gas extraction industry: state of the science and research recommendations*, AMERICAN JOURNAL OF INDUSTRIAL MEDICINE (2014).

Exhibit 45, Jessica Gilman, et al., *Source signature of volatile organic compounds (VOCs) from oil and natural gas operations in northeastern Colorado*, ENVIRONMENTAL SCIENCE & TECHNOLOGY (2013).

Exhibit 46, Roxana Z. Witter, et al., *The Use of Health Impact Assessment for a Community Undergoing Natural Gas Development,* FRAMING HEALTH MATTERS (2013).

Exhibit 47, Nadia Steinzor, et al., *Investigating links tribalbetween shale gas development and health impacts through a community survey project in Pennsylvania*, NEW SOLUTIONS, vol. 23 iss. 1. (2013).

Exhibit 48, John L. Adgate, et al., *Potential Public Health Hazards, Exposures and Health Effects from Unconventional Natural Gas Development*, ENVIRONMENTAL SCIENCE & TECHNOLOGY (2014).

Exhibit 49, Christopher W. Moore, et al., *Air Impacts of Increased Natural Gas Acquisition, Processing, and Use: A Critical Review*, ENVIRONMENTAL SCIENCE & TECHNOLOGY (2014)

Exhibit 50, Avner Vengosh, et al., *The effects of shale gas exploration and hydraulic fracturing on the quality of water resources in the United States*, PROCEDIA EARTH AND PLANETARY SCIENCE (2014).

Exhibit 51, Christopher D. Kassotis, et al., Estrogen and Androgen Receptor Activities of Hydraulic Fracturing Chemicals and Surface and Ground Water in a Drilling-Dense Region, ENDOCRINOLOGY (2014).

Exhibit 52, Brian E. Fontenot, et al., *An Evaluation of Water Quality in Private Drinking Water Wells Near Natural Gas Extraction Sites in the Barnett Shale Formation*, ENVIRONMENTAL SCIENCE & TECHNOLOGY (2013).

Exhibit 53, Sherilyn A. Gross, et al., *Analysis of BTEX Groundwater Concentrations from Surface Spills Associated with Hydraulic Fracturing Operations*, JOURNAL OF THE AIR & WASTE MANAGEMENT ASSOCIATION (2013).

Exhibit 54, K.D. Retzer, *et al., Motor vehicle fatalities among oil and gas extraction workers,* ACCIDENT ANALYSIS & PREVENTION (2013).

Exhibit 55, Gayathri Vaidyanathan, *Fracking Can Contaminate Drinking Water*, Climate Wire (April 4, 2016), available at: https://www.scientificamerican.com/article/fracking-can-contaminate-drinking-water/.

Exhibit 56, A. Tustin, et al., *Associations Between Unconventional Natural Gas Development and Nasal and Sinus, Migraine Headache, and Fatigue Symptoms in Pennsylvania,* ENVIRONMENTAL HEALTH PERSPECTIVES (July 31, 2016), available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5289909/.

Exhibit 57, Lisa M. McKenzie *et al.*, *Birth Outcomes and Maternal Resident Proximity to Natural Gas Development in Rural Colorado*, 122 ENVIRONMENTAL HEALTH PERSPECTIVES 412 (April 2014).

Exhibit 58, Janet Currie *et al., Hydraulic Fracturing and Infant Health: New Evidence from Pennsylvania*, 3 SCIENCE ADVANCES e1603021(Dec. 13, 2017).

Exhibit 59, Ellen Webb *et al., Potential Hazards of Air Pollutant Emission from Unconventional Oil and Natural Gas Operations on the Respiratory Health of Children and Infants*, 31 REV. ENVIRONMENTAL HEALTH 225-243 (Jun. 1, 2016).

Exhibit 60, Stephanie A. Malin, *Depressed democracy, environmental injustice: Exploring the negative mental health implications of unconventional oil and gas production in the United States*, 70 Energy Research & Social Science, 101720 at 2 (2020).

Exhibit 61, Physicians for Social Responsibility and Concerned Health Professionals of NY, Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking, 9th Edition (2023). [Hereinafter PSR 2023].

Exhibit 62, Kathy V. Tran et al., Residential Proximity to Oil and Gas Development and Birth Outcomes in California: A Retrospective *Cohort Study of 2006–2015 Births*, 128 Environmental Health Perspectives , 067001 (2020).

Exhibit 63, *Meleah* D. Boyle et al., Hazard Ranking Methodology for Assessing Health Impacts of Unconventional Natural Gas Development and Production: The Maryland Case Study, 11 PLOS ONE e0145368 (Jan. 4, 2016).

Exhibit 64, Rachel Morello-Frosch et al., *Understanding the Cumulative Impacts of Inequalities in Environmental Health: Implications for Policy*, 30 HEALTH AFFAIRS 879 (May 2011).

Exhibit 65, U.S. ENVIRONMENTAL PROTECTION AGENCY, FRAMEWORK FOR CUMULATIVE RISK ASSESSMENT (May), *Available at* https://www.epa.gov/sites/production/files/2014-11/documents/frmwrk_cum_risk_assmnt.pdf

Exhibit 66, MINNESOTA POLLUTION CONTROL AGENCY, CUMULATIVE IMPACT ANALYSIS *Available at* https://www.pca.state.mn.us/air/cumulative-impact-analysis

Exhibit 67, CUMULATIVE IMPACTS SUBCOMMITTEE, ENVIRONMENTAL JUSTICE ADVISORY COUNCIL TO THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, STRATEGIES FOR ADDRESSING CUMULATIVE IMPACTS IN ENVIRONMENTAL JUSTICE COMMUNITIES (March 2009), *Available at* https://www.nj.gov/dep/ej/docs/ejac_impacts_report200903.pdf

Exhibit 68, Susan Kinnear et al., *The Need to Measure and Manage the Cumulative Impacts of Resource Development on Public Health: An Australian Perspective* (May 15, 2013), Available at https://www.intechopen.com/books/current-topics-in-public-health/the-need-to-measure-and-manage-the-cumulative-impacts-of-resource-development-on-public-health-an-au (https://www.intechopen.com/books/current-topics-in-public-health/the-need-to-measure-and-manage-the-cumulative-impacts-of-resource-development-on-public-health-an-au

Exhibit 69, Jill Johnston & Lara Cushing, *Chemical Exposures, Health, and Environmental Justice in Communities Living on the Fenceline of Industry*, 7 Current Environmental Health Reports, 48-57 (2020).

Exhibit 70, Council on Environmental Quality, ENVIRONMENTAL JUSTICE: GUIDANCE UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT (December 10, 1997).

Exhibit 71, Brown, David et al., *Understanding Exposure From Natural Gas Drilling Puts Current Air Standards to the Test.* 29 REVIEWS ON ENVIRONMENTAL HEALTH 277 (2014).

Exhibit 72, NRDC [Natural Resources Defense Council], Drilling in California: Who's At Risk? October 2014.

Exhibit 73, Clough, Emily & Derek Bell, *Just Fracking: A Distributive Environmental Justice Analysis of Unconventional Gas Development in Pennsylvania, USA*, 11 Environmental Research Letters 025001 (2016).

Exhibit 74, McKenzie, Lisa M. et al., *Population Size, Growth, and Environmental Justice Near Oil and Gas Wells in Colorado*, 50 ENVIRONMENTAL SCIENCE & TECHNOLOGY 11471 (2016).

Exhibit 75, Joshua Zaffos, *'Orphaned' Oil and Gas Wells are on the Rise."* High Country News, Jan. 16, 2018. *Available at* https://www.hcn.org/issues/50.3/energy-industry-orphaned-oil-and-gas-wells-are-on-the-rise.

Exhibit 76, Hays, Jake & Seth B.C. Shonkoff , *Towards an Understanding of the Environmental and Public Health Impacts of Unconventional Natural Gas Development: A Categorical Assessment of the Peer-Reviewed Scientific Literature*, 11 PLoS ONE e0154164 (2016).

Exhibit 77, Webb, Ellen et al*., Developmental and reproductive effects of chemicals associated with unconventional oil and natural gas operations*, 29 REV ENVIRON HEALTH 307 (2014).

Exhibit 78, Clean Air Task Force, Fossil Fumes: A Public Health Analysis of Toxic Air Pollution From the Oil and Gas Industry, June 2016, *available at* http://www.catf.us/resources/publications/files/FossilFumes.pdf.

Exhibit 79, Mailloux, N. A., Abel, D. W., Holloway, T., & Patz, J. A. (2022).

Exhibit 80, Theo Colborn et al., *An exploratory study of air quality near natural gas operations*, HUM. ECOL. RISK ASSESS (Nov. 9, 2012).

Exhibit 81, Rasmussen, Sara G. et al., *Association Between Unconventional Natural Gas Development in the Marcellus Shale and Asthma Exacerbations,* 176 JAMA INTERNAL MEDICINE 1334 (2016).

Exhibit 82, Willis, Mary D. et al., *Unconventional natural gas development and pediatric asthma hospitalizations in Pennsylvania,* 166 ENVIRONMENTAL RESEARCH 402 (2018).

Exhibit 83, New Mexico Department of Health, *Health Indicator Report of Asthma Emergency Department Visits Among Children* (Last Visited November 18, 2021). *Available at* https://ibis.health.state.nm.us/indicator/complete_profile/AsthmaEDChild.html.

Exhibit 84, Attendance Works, *Mapping the Early Attendance Gap* (2017). *Available at* http://www.attendanceworks.org/wp-content/uploads/2017/05/Mapping-the-Early-Attendance-Gap_Final-4.pdf.

Exhibit 85, New Mexico Dept. of Health*, The Burden of Asthma in New Mexico: 2014 Epidemiology Report* (Jan. 2014), at 41. Available at https://nmhealth.org/data/view/environment/54/.

Exhibit 86, Tim Kelley and Gregory D. Kearney, *Insights Into the Environmental Health Burden of Childhood Asthma*, 12 Environmental Health Insights doi: 10.1177/1178630218757445 (Feb. 20, 2018).

Exhibit 87, Seth Lyman and Howard Shorthill, *Final Report: 2012 Uintah Basin Winter Ozone & Air Quality Study*, UTAH STATE UNIVERSITY, February 1, 2013.

Exhibit 88, Gabrielle Pétron, *et al*., *Estimation of emissions from oil and natural gas operations in northeastern Colorado*, Power Point available at: http://www.epa.gov/ttnchie1/conference/ei20/session6/gpetron_pres.pdf

Exhibit 89, EPA, *Ozone – Good Up High Bad Nearby*, available at: http://www.epa.gov/oar/oaqps/gooduphigh/bad.html#7.

Exhibit 90, U.S. EPA, "Children are Not Little Adults," *https://www.epa.gov/children/children-are-not-little-adults*

Exhibit 91, Letter from American Lung Association to U.S. EPA (November 30, 2011).

Exhibit 92, Elliot, Elise G. et al., *A Systematic Evaluation of Chemicals in Hydraulic-Fracturing Fluids and Wastewater for Reproductive and Developmental Toxicity*, 27 JOURNAL OF EXPOSURE SCIENCE AND ENVIRONMENTAL EPIDEMIOLOGY 90 (2016).

Exhibit 93, McKenzie, Lisa et al., *Ambient Nonmethane Hydrocarbon Levels Along Colorado's Northern Front Range: Acute and Chronic Health Risks*, 52 ENVIRONMENTAL SCIENCE & TECHNOLOGY 4514 (2018).

Exhibit 94, Jemielita, Thomas et al., *Unconventional Gas and Oil Drilling Is Associated with Increased Hospital Utilization Rates.* 10 PLoS ONE e0131093 (2015).

Exhibit 95, Rabinowitz, Peter M. et al., *Proximity to Natural Gas Wells and Reported Health Status: Results of a Household Survey in Washington County, Pennsylvania*, 123 ENVIRONMENTAL HEALTH PERSPECTIVES 21.

Exhibit 96, Horwitt, Dusty and Gottlieb, Barbara, Physicians for Social Responsibility, "Fracking with Forever Chemicals in New Mexico" (April 12, 2023) Available at https://psr.org/new-psr-report-reveals-oil-gas-companies-fracked-new-mexico-wells-with-pfas/.

Exhibit 97, Casey, Joan A., *Unconventional Natural Gas Development and Birth Outcomes in Pennsylvania, USA*, 27 EPIDEMIOLOGY 163 (2016).

Exhibit 98, Stacy, Shaina L. et al., *Perinatal Outcomes and Unconventional Natural Gas Operations in Southwest Pennsylvania*. 10 PLoS ONE e0126425 (2015).

Exhibit 99, Esswein, Eric J. et al., *Occupational Exposures to Respirable Crystalline Silica During Hydraulic Fracturing*, 10 JOURNAL OF OCCUPATIONAL AND ENVIRONMENTAL HYGIENE 347 (2013).

Exhibit 100, Esswein, Eric et al., *Evaluation of Some Potential Chemical Exposure Risks during Flowback Operations in Unconventional Oil and Gas Extraction: Preliminary Results*, 11 JOURNAL OF OCCUPATIONAL AND ENVIRONMENTAL HYGIENE D174 (2014).

Exhibit 101, Harrison, Robert J. et al., *Sudden Deaths Among Oil and Gas Extraction Workers Resulting from Oxygen Deficiency and Inhalation of Hydrocarbon Gases and Vapors — United States, January 2010–March 2015*, 65 MMWR MORB MORTAL WKLY REP 6 (2016).

Exhibit 102, Chen, Huan & Kimberly E. Carter, *Modeling potential occupational inhalation exposures and associated risks of toxic organics from chemical storage tanks used in hydraulic fracturing using AERMOD*, 224 ENVIRONMENTAL POLLUTION 300 (2017).

Exhibit 103, Sanchez et al., Southeastern New Mexico Oil and Gas Workforce Study (January 2024), available at https://files.constantcontact.com/b6dfe469001/7eec220a-7cab-47d8-8370-62e981dc403a.pdf?rdr=true, *see especially* p. 16.

Exhibit 104, Agency for Toxic Substances and Disease Registry (ASTDR). *Radium.* (July 1999), *Available at* https://www.atsdr.cdc.gov/toxfaqs/tfacts144.pdf.

Exhibit 105, Occupational Health and Safety (Oct. 01, 2012) "Radiation Sources in Natural Gas Well Activities," https://ohsonline.com/Articles/2012/10/01/Radiation-Sources-in-Natural-Gas-Well-Activities.aspx?Page=2.

Exhibit 106, USGS (1999) Naturally Occurring Radioactive Materials (NORM) in Produced Water and Oil-Field Equipment— An Issue for the Energy Industry https://pubs.usgs.gov/fs/fs-0142-99/fs-0142-99.pdf.

Exhibit 107, 1998 EPA NEPA Final Guidance https://www.epa.gov/sites/production/files/2015-02/documents/ej_guidance_nepa_epa0498.pdf.

Exhibit 108, UN General Assembly, *United Nations Declaration on the Rights of Indigenous Peoples.*

Exhibit 109, UN Expert Mechanism on the Rights of Indigenous Peoples, *Final report of the study on indigenous peoples and the right to participate in decision-making* (August 17, 2011).

Exhibit 110, Dominic C. DiGiulio & Robert A. Jackson, *Impact to Underground Sources of Drinking Water and Domestic Wells from Production Well Stimulation and Completion Practices in the Pavillion, Wyoming Field*, 50 Am. Chem. Society, Envtl. Sci. & Tech. 4524, 4532 (Mar. 29, 2016); EPA 2016 Report.

Exhibit 111, BLM, Regulatory Impact Analysis for the Final Rule to Rescind the 2015 Hydraulic Fracturing Rule, at 44–45 (Dec. 2017). Available at https://beta.regulations.gov/document/BLM-2017-0001-0464.

Exhibit 112, Western Energy Alliance and the Independent Petroleum Association of America, Sept. 25, 2017 comments Re: RIN 1004-AE52, Oil and Gas; Hydraulic Fracturing on Federal and Indian Lands; Rescission of a 2015 Rule (82 Fed. Reg. 34,464) (2017 WEA comments), at 59. Available at https://www.regulations.gov/document?D=BLM-2017-0001-0412.

Exhibit 113, Rebecca Tisherman, et al., *Examination of Groundwater Resources in Areas of Wyoming Proposed for the June 2022 BLM Lease Sale* (May 12, 2022).

Exhibit 114, Koosha Kalhor, et al., *Assessment of groundwater quality and remediation in karst aquifers: A review,* 8 GROUNDWATER FOR SUSTAINABLE DEV. 104 (2019).

Exhibit 115, BLM Handbook H-8380-1 20–24, *Cave and Karst Resources Management Handbook* (2015).

Exhibit 116, Danil Maksimov, et al. *Real-Time Detection of Karstification Hazards While Drilling in Carbonates*, 15 ENERGIES 4951 (2022).

Exhibit 117, Anthony H. Cooper, et al., *Dealing With Gypsum Karst Problems: Hazards, Environmental Issues And Planning*, TREATISE ON GEOMORPHOLOGY 451 (6th, 2013).

Exhibit 118, Erik Molvar et al, Evaluating the cumulative effects of oil and gas development on elk and mule deer in the middle reaches of the Colorado River watershed near Silt, Colorado, Western Watersheds Project & Redstone GIS (Sept. 8, 2023).

Exhibit 119, Rebecca F. Elliot, *Why Oil Industry Jobs are Down, Even with Production Up*, New York Times, (Jan. 14, 2025), https://www.nytimes.com/2025/01/14/business/energy-environment/oil-gas-jobs.html

Exhibit 120, Megan Milliken Biven & Leo Lindner, *The American Oil & Gas Worker Survey*, True Transition, at 6 (Mar. 2023) [hereinafter True Transition], https://www.truetransition.org/_files/ugd/0ad80c_069ea867b3f044afba4dae2a1da8d737.pdf?index=true

Exhibit 121, Rachel Moskowitz, *A Profile of Oil and Natural Gas Workers in New Mexico*, Labor Market Rev., 8 (Feb. 2022), https://www.dws.state.nm.us/Portals/0/DM/LMI/Oil_NaturalGas_Workers_NM.pdf.

Exhibit 122, *See e.g.* Zhengyu Cai, *Who Benefits from Local Oil and Gas Employment? Labor Market Composition in the Oil and Gas Industry in Texas,* Institute of Labor Econ., 7-8, 30-33 (2019)

Exhibit 123, U.S. DOE, *Produced Water from Oil and Gas Development and Critical Minerals* (June 2024).

Exhibit 124, Molly C McLaughlin, et al., *Water quality assessment downstream of oil and gas produced water discharges intended for beneficial reuse in arid regions*, 15 SCI. TOTAL ENV. 136607 (2020).

Exhibit 125, Casee R. Lemons, et al., Spatiotemporal and stratigraphic trends in salt-water disposal practices of the Permian Basin, Texas and New Mexico, United States, 26 ENV. GEOSCI. 107 (2019).

Exhibit 126, U.S. EPA, *Distribution of Final Work Product from the National Underground Injection Control (UIC) Technical Workgroup- Minimizing and Managing Potential Impacts of Injection Induced Seismicity from Class II Disposal Wells: Practical Approaches* (Feb. 6, 2015).

Exhibit 127, Ground Water Protection Council, *U.S. Produced Water Volumes and Management Practices* (2021).

Exhibit 128, Scanlon et al., *Can we beneficially reuse produced water from oil and gas extraction in the U.S.?* 717 SCI. OF THE TOTAL ENV'T 137085 (2020).

Exhibit 129, Letter of Sierra Club, et al. to BLM on the Buffalo and Miles City NEPA Scoping Process, at 47-54 (Nov. 2, 2022).

Exhibit 130, U.S. Global Change Research Program, *Fifth National Climate Assessment,* (2023), https://nca2023.globalchange.gov.

Exhibit 131, Rachel Warren et al., *Increasing impacts of climate change upon ecosystems with increasing global mean temperature rise*, 106 Climatic Change 141 (2011).

Exhibit 132, Brett R. Scheffers*, The broad footprint of climate change from genes to biomes to people,* 354 Science 719 (2016).

Exhibit 133, John J. Wiens, *Climate-related local extinctions are already widespread among plant and animal species*, 14 PLoS Biology e2001104 (2016).

Exhibit 134, Michela Pacifici et al., *Species' traits influenced their response to recent climate change*, 7 Nature Climate Change 205 (2017).

Exhibit 135, Fiona E.B. Spooner et al., *Rapid warming is associated with population decline among terrestrial birds and mammals globally*, 24 Global Change Biology 4521 (2018).

Exhibit 136, Camille Parmesan & Gary Yohe, *A globally coherent fingerprint of climate change impacts across natural systems*, 421 Nature 37 (2003).

Exhibit 137, Terry L. Root et al., *Fingerprints of global warming on wild animals and plants*, 421 Nature 57 (2003).

Exhibit 138, I-Ching Chen et al., *Rapid range shifts of species associated with high levels of climate warming*, 333 Science 1024 (2011).

Exhibit 139, Ilya M. D. Maclean & Robert J. Wilson, *Recent ecological responses to climate change support predictions of high extinction risk*, 108 PNAS 12337 (2011).

Exhibit 140, Abigail E. Cahill et al., *How does climate change cause extinction?*, 280 Proceedings of the Royal Society B 20121890 (2012).

Exhibit 141, IPBES, Global Assessment Report on Biodiversity and Ecosystem Services (E.S. Brondízio et al eds., 2019), https://ipbes.net/news/Media-Release-Global-Assessment.

Exhibit 142, Chris D. Thomas et al., *Extinction risk from climate change*, 427 Nature 145 (2004).

Exhibit 143, Mark C. Urban, *Accelerating extinction risk from climate change*, 348 Science 571 (2015).

Exhibit 144, Rachel Warren et al., *Quantifying the benefit of early climate change mitigation in avoiding biodiversity loss*, 3 Nature Climate Change 678 (2013).

Exhibit 145, Cristian Román-Palacios & John J. Wiens*, Recent responses to climate change reveal the drivers of species extinction and survival*, 117 PNAS 4211 (2020).

Exhibit 146, United Nations Environment Programme & Climate and Clean Air Coalition, *Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions* 11 (2021), https://www.unep.org/resources/report/global-methane-assessment-benefits-and-costs-mitigating-methane-emissions.

Exhibit 147, O. Hoegh-Guldberg et al., *Impacts of 1.5°C Global Warming on Natural and Human Systems*, in: Global Warming of 1.5°C, An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty 262 (V. Masson-Delmotte et al. eds., 2018), https://www.ipcc.ch/sr15/chapter/chapter-3/.

Exhibit 148, U.S. Fish and Wildlife Service, *Polar bear (*Ursus maritimus*) Conservation Management Plan, Final* (2016).

Exhibit 149, Memorandum from H. Dale Hall, Director Fish & Wildlife Service, to Regional Directors, Regions 1-8 (May 14, 2008), https://www.fws.gov/policy/m0331.pdf ("FWS Memorandum").

Exhibit 150, Memorandum from David L. Bernhardt, Department of the Interior, Office of the Solicitor to the Secretary of the Department of the Interior Director (Oct. 3, 2008), https://doi.opengov.ibmcloud.com/sites/doi.opengov.ibmcloud.com/files/uploads/M-37017.pdf.

Exhibit 151, U.S. Fish and Wildlife Service & National Marine Fisheries Service, *Endangered Species Consultation Handbook: Procedures for Conducting Consultation and Conference Activities under Section 7 of the Endangered Species Act* xvi (1998), https://www.fws.gov/endangered/esa-library/pdf/esa_section7_handbook.pdf.

U.S. Bureau of Land Management
New Mexico State Office
Attn: Catherine Brewster
301 Dinosaur Trail
Santa Fe, NM 87508

Re: Scoping for the New Mexico Q1 2026 Oil and Gas Lease Parcel Sales (DOI-BLM-NM-F010-2025-0033-EA & DOI-BLM-NM-P020-2025-1005-EA)

Appendix C

June 10, 2025

Dear Customer,

The following is the proof-of-delivery for tracking number: 881896328965

Delivery Information:

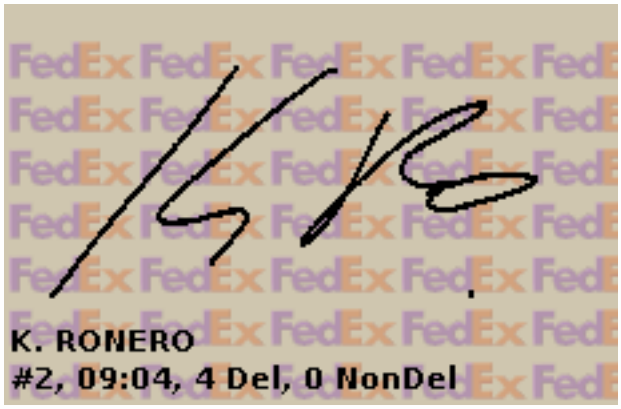
Status:	Delivered	**Delivered To:**	Shipping/Receiving
Signed for by:	K.Ronero	**Delivery Location:**	301 Dinosaur Trl
Service type:	FedEx 2Day		
Special Handling:	Deliver Weekday		SANTA FE, NM, 87508
		Delivery date:	Jun 10, 2025 09:01

Shipping Information:

Tracking number:	881896328965	**Ship Date:**	Jun 9, 2025
		Weight:	0.5 LB/0.23 KG

Recipient:
us bureau of land management, NM state OFC ATTNcatherine brewster
301 Dinosaur Trl
SANTA FE, NM, US, 87508

Shipper:
MORGAN O'GRADY, western environmental
Ste 2
409 E Palace Ave Ste 2
SANTA FE, NM, US, 87501



Thank you for choosing FedEx

U.S. Bureau of Land Management
New Mexico State Office
Attn: Catherine Brewster
301 Dinosaur Trail
Santa Fe, NM 87508

Via Eplanning (*Exhibits sent via FedEx*)

Re: Scoping for the New Mexico Q1 2026 Oil and Gas Lease Parcel Sales (DOI-BLM-NM-F010-2025-0033-EA & DOI-BLM-NM-P020-2025-1005-EA)

Appendix D

Below please find additional scoping comments on the New Mexico lease sales.

Introduction re: Rio Puerco Field Office and Farmington Field Office Parcels

The Greater Chaco region is an ancient and living cultural landscape, spanning some 75,000 miles square miles of NM, AZ, CO and UT. Chaco Canyon, in Northwest New Mexico, was the cultural and economic center of many ancient indigenous cultures throughout the Southwest. Chaco Canyon itself is surrounded on all sides by ancient structures of enduring significance, as well as living communities, many of whom are Diné people living in their traditional homeland, within the boundaries of the four sacred mountains. The landscape itself, from the dramatic mesas to the wide, colorful sky, is teeming with physical and spiritual life of great significance to the indigenous peoples of the region.

Now, the vast majority of lands across the region are leased for fracking, with over 40,000 oil and gas wells scarring the landscape, exacerbating the climate crisis, and adversely affecting the land, air, water, health, and cultural resources of local people and communities.

Oil and gas development in the Greater Chaco region, originating with the dispossession of Indigenous lands and subsequent designation of the region as a "sacrifice zone," has left a legacy of adverse impacts on the largely Indigenous population that lives there. Once the oil and gas that is removed from the Greater Chaco region is shipped elsewhere and consumed, the greenhouse gases emitted contribute to the worsening climate catastrophe that threatens all life on Earth—and especially harms people and communities already experiencing heavy burdens of pollution and extraction, environmental injustices, and adverse health, environmental, and cumulative impacts. The miles of roads, pipelines, heavy machinery and truck traffic scar the landscape, generate toxic gases, and degrade necessary public infrastructure relied on by the residential communities. The already-limited water sources in the region are both poisoned by fracking and consumed by oil and gas in ways that tangibly impact the residents of the Greater Chaco landscape: seeps that have fed sheep herds for generations dry up, and residents haul water for hours from Farmington or Gallup, rather than risk poisoned groundwater. It is in this context that we offer these comments.

As discussed above, nothing in the IRA or other recent and upcoming legislation or regulatory changes obviates the need for BLM to take a hard look at potentially significant impacts of oil and gas leasing and development, and otherwise meet its NEPA obligations for this lease sale and the federal oil and gas program as a whole.

Commenters have consistently participated in BLM decision-making for prior oil and gas leasing (and planning and permitting) in the Greater Chaco Region, including for the lease sales subject to these supplemental NEPA analyses. Therefore, Commenters incorporate by reference the prior administrative comments, protests, and exhibits submitted for these lease sales, for the Farmington RMPA-EIS, and for the Chaco Proposed Withdrawal, and other relevant comments and protests, including our:

- October 2014 Scoping Comments (submitted March 24, 2014), Draft Environmental Assessment Comments (May 28, 2014), and Protest (August 14, 2014);
- January 2015 Draft Environmental Assessment Comments (September 23, 2014) and Protest (November 19, 2014);
- October 2016 Scoping Comments (March 14, 2016);
- January 2017 Scoping Comments (June 17, 2016), Draft Environmental Assessment Comments (September 2, 2016), and Protest (December 6, 2016);
- March 2018 Draft Environmental Assessment Comments (October 20, 2017) and Protest (January 3, 2018);
- December 2018 Scoping Comments (July 20, 2018) and Protest (October 31, 2018);
- March 2019 Scoping Comments (October 19, 2018) and Protest (February 20, 2019);
- June 2019 Scoping Comments (February 10, 2019), Draft Environmental Assessment Comments (March 22, 2019), and Protest (April 31, 2019);
- September 2019 Draft Environmental Assessment Comments (May 24, 2019) and Protest (July 16, 2019);
- November 2019 Scoping Comments (June 10, 2019), Draft Environmental Assessment Comments (July 26, 2019), and Protest Comments (September 20, 2019);
- February 2020 Scoping Comments (September 9, 2019), and Draft Environmental Assessment Comments (October 28, 2019); and Protest Comments
- May 2020 Scoping Comments (December 4, 2019), Draft Environmental Assessment Comments and Protest Comments
- September 2020 Comments on Draft Farmington RMPA-EIS (September 25, 2020) and 2017 Scoping Comments
- May 2022 Comments on Proposed Chaco Withdrawal (May 6, 2022)
- July 2022 Comments on BLM's Supplemental Analyses
- December 2022 Comments on Proposed Chaco Withdrawal

Many of the exhibits for these comments were attached in our prior comments and protests for these leases sales, and are also incorporated by reference here. We have also attached additional exhibits with these comments. These incorporated comments and exhibits offer detailed technical information, expert reports, and legal analysis that BLM is required to consider in its decision- making process for the proposed action. *See Forest Guardians v. U.S. Fish and Wildlife Serv.*, 611 F.3d 692, 717 (10th Cir. 2010) ("The purpose behind NEPA is to ensure that the agency will only reach a decision on a proposed action after carefully considering the environmental impacts of several alternative courses of action and *after taking public comment into account*.") *Emphasis added*.

I. BLM Must Consider Flaring and its Impacts in the EA.

BLM must consider the impacts of methane emissions. Initial ground and aerial surveys conducted by the Environmental Defense Fund shows methane in the Permian Basin escaping at a rate three times higher than the national average.[1] Furthermore, aircraft measurements by the same project have revealed Permian emissions are 2-3 times higher than what the Environmental Protection Agency estimates in their inventory of greenhouse gas emissions.[2] Of the 1,320 emissions sources detected, 362, or approximately 27%, of these sources were malfunctioning flares – meaning that emissions may not be captured by state or federal estimates.[3] Also, 50% of "super emitters" came from midstream operations, which also may not be accounted for in existing analysis of new development. Furthermore, 2024 data showed that oil and gas producers across the US are emitting methane into the atmosphere at over four times the rates estimated by the Environmental Protection Agency – and the highest total methane emissions amongst the country's 12 major productions basins were in the Permian Basin.[4] BLM cannot defer the analysis of adding more methane to the already-saturated region to the APD stage, they should take a hard look now at the impact of authorizing more oil and gas and subsequently more methane pollution in the region at the leasing stage.

We urge BLM to correct this deficiency and consider flaring and its impacts in the EA for this lease sale. BLM must:

- Consider an alternative that would mitigate flaring. To fulfill its legal obligation to prevent waste under the Mineral Leasing Act, we recommend that BLM consider a stipulation limiting flaring to situations where it is infeasible or unsafe to capture the gas and not allowing routine flaring where there is simply inadequate pipeline capacity or timing issues.

---

[1] Environmental Defense Fund, *PermianMAP Final Report*, 2021. Available here: https://blogs.edf.org/energyexchange/wp-content/blogs.dir/38/files/2022/11/PermianMAPFinalReport.pdf, and attached as Exhibit 221.
[2] *Id* at 8.
[3] *Id.*
[4] **Exhibit 222,** Environmental Defense Fund (July 31, 2024), "As regulators, operators and investors face growing worldwide pressure to cut emissions, aircraft data offer crucial preview of new satellite capabilities." https://www.edf.org/media/new-data-show-us-oil-gas-methane-emissions-over-four-times-higher-epa-estimates-eight-times

- Consider the direct, indirect, and cumulative socioeconomic impacts of flaring. A recent analysis conducted by Synapse Energy Economics calculated natural gas methane emissions volumes from venting, flaring, and leaks in the production segment on federal and tribal lands and determined the value of that lost gas in the form of (1) lost royalties, (2) lost state revenue from taxes, and (3) lost revenue from wasted natural gas that could be used for other purposes.

- Consider the direct, indirect, and cumulative human health impacts of flaring, including environmental justice impacts as mandated by NEPA.

II. BLM Must Take a Hard Look at Impacts of Oil and Gas Leasing and Development on the Endangered Dunes Sagebrush Lizard. BLM Should Defer Parcels Within, and Within 10 Miles of the Dunes Sagebrush Lizard Habitat.

The Dunes Sagebrush Lizard (*Sceloporus arenicolus*) ("DSL") was recently listed by the United States Fish & Wildlife Service ("The Service") as an endangered species under the Endangered Species Act ("ESA"). 89 Fed. Reg. 43,748–43,769 (May 20, 2024) (codified at 50 C.F.R. pt. 17). DSL are endemic to the shinnery oak dunelands and shrublands of the Mescalero Sandhills in southeastern New Mexico. The DSL is a habitat specialist, dependent upon shinnery oak duneland habitat to provide appropriate substrate for nests, cover for young, and to provide food resources as juvenile lizards mature into adults. DSL form small, localized populations called "neighborhoods" that are inter-connected through dispersal. Since the Mescalero and Monahans Sandhills are dynamic ecosystems, appropriate habitat patches for DSL can shift over time. Long-term stability is maintained through inter-connected neighborhoods. The DSL is composed of three evolutionary lineages that are both divergent and spatially discrete as identified by the Service: Northern Mescalero, Southern Mescalero, and Monahans. Both the Northern Mescalero and Southern Mescalero lineages are present only in New Mexico.

Due to their reliance on a very specific and restricted habitat within these sandhills, DSL are highly vulnerable to habitat loss and fragmentation. Destruction of habitat harms breeding, feeding, sheltering, dispersal, and survival, causing population losses and even destruction of whole populations. Habitat loss and fragmentation injure local population dynamics by reducing dispersal and inter-colonization. Unfortunately, degradation and fragmentation of shinnery oak dunelands are likely irreversible. Once disturbed, they shift to alternative stable states and attempts to restore this habitat have been unsuccessful.

The entire range of the DSL overlaps with the Permian Basin. The Permian Basin has experienced widespread development associated with the petroleum industry. DSL experience declines as density of oil well pads and associated infrastructure increases. Additionally, DSL are under increasing threat from mining of frac sand for use in hydraulic fracturing of oil and gas wells. Extraction of frac sand results in the loss of shinnery oak duneland habitat and promotes the degradation of surrounding sand dune landforms, creating further habitat degradation if the frac sand from mining and the hydrofracturing for oil and gas both occur within DSL habitat. Although there are other sources of habitat loss, oil extraction and frac sand mining are the primary drivers of landscape change in this region.

BLM administers the majority of DSL's remaining habitat within New Mexico. As such, BLM has a significant decision-making authority to either protect New Mexican DSL or to further threaten the existence of the species by leasing DSL inhabited federal lands for oil and gas exploration. BLM's lease sale in New Mexico, includes parcels within Lea and Eddy County that are DSL habitat. Leasing any parcels within DSL habitat will contribute to the exact threats that have eroded the species down to endangered status.

Preserving remaining DSL habitat is critical because the South Mescalero population already faces significant threats to its survival, specifically. BLM must take a hard look at the following threats DSL that will arise from leasing parcels in and near occupied habitat, and unoccupied habitat that, critically, may in the future be necessary to ensure the newly-ESA-listed lizard's survival and recovery. For these reasons, BLM should defer all parcels within or within 10 miles of the endangered DSL duneland, scrubland, and supportive habitat.

a. New Mexico Contains the Most Intact DSL Population (Northern Mescalero) and the Most Vulnerable DSL Population (Southern Mescalero), both located on BLM land.

Two populations of DSL call New Mexico home, Northern Mescalero and Southern Mescalero. A third distinct lineage is identified in Texas as the Monahans population. There are distinguishable phylogenetic lineages between the Northern and Southern Mescalero populations. [5] These two Mescalero population lineages represent separate colonization events that are estimated based on genetic data to have occurred 34,000 years ago (Northern Mescalero) and 16,000 years ago (Southern Mescalero).[6] These two lineages cover distinct portions of the species range, occur across a gradient of environmental conditions, and evolved in isolation, and thus the Service views these populations to represent critical contributions to the adaptive capacity of DSL. There appears to be no contemporary gene flow between these populations, except for a narrow contact zone between the North and South Mescalero lineages.[7] The Northern Mescalero unit represents 39 percent of DSL's range and contains the most DSL habitat by acreage, as well as the most habitat by acreage that is minimally disturbed.[8] In other words, the Northern Mescalero unit contains the largest quantities of intact DSL habitat.

In contrast, the Southern Mescalero unit contains the most degraded, most segmented, DSL habitat of the three population lineages, representing 35 percent of DSL range.[9] "Both Analysis Units in the Southern Mescalero are in Low condition. The low viability of these units suggests that an entire phylogenetic lineage is currently at high risk for extirpation".[10] The Southern Mescalero population is graded low in its entirety placing it as the population most

[5] **Exhibit 223,** U.S. Fish and Wildlife Services, *Species Status Assessment for the Dunes Sagebrush Lizard*, 51 (April 2024) (Version 1.3) (hereafter "2024 DSL SSA"); Chan et al. 2009, p. 136; Chan et al. 2020, p. 6.
[6] **Exhibit 224.** Chan, L., C. Painter, M. Hill, T. Hibbitts, D. Leavitt, W. Ryberg, D. Walkup, and L. Fitzgerald. 2020. *Phylogeographic structure of the dunes sagebrush lizard, an endemic habitat specialist.* PLoS One 15(9): e0238194 p. 7 [hereinafter Chan et al. 2020].
[7] *Id.*
[8] Exhibit 223, 2024 DSL SSA at 98–110.
[9] *Id.*
[10] Exhibit 223, 2024 DSL SSA at 110

vulnerable to extirpation of the three. Since each of these populations are phylogenetically distinct the loss of any of these populations would be extremely detrimental to the species' adaptive capacity. *Id.* "Southern populations experience higher temperatures and drier conditions (See Chapter 3) and may have higher capacity to withstanding climate change. However, their poor current condition limits their potential to contribute to long-term adaptation of the species."[11] BLM's lease sale in New Mexico includes four parcels that are within the Southern Mescalero population, specifically the USFWS analysis unit titled South Mescalero 1 which has the lowest proportion of minimally disturbed duneland habitat.[12] In other words, this unit is the most degraded of all DSL population units within the most vulnerable of DSL populations. Any further oil and gas development on South Mescalero 1 risks tipping this lineage towards extinction. The four parcels in question are NM-2025-07-0477, NM-2025-07-0479, NM-2025-07-6858, and NM-2025-07-0490. [13]

b. BLM Must Take a Hard Look at all Facets of Oil and Gas Detrimental Impacts to DSL.

The Service has analyzed multiple ways in which Oil and gas development harms DSL. When analyzing threats to the species the Service discussed oil and gas development under multiple threat factors including: Factor 1: Habitat Loss and Modification; Factor 2: Pollution and Contamination; Factor 4: Groundwater Depletion; and Factor 5: Direct Mortality.[14]

i. Habitat Loss, Fragmentation, and Modification

Habitat specialists such as DSL are more sensitive to habitat loss and fragmentation because of dependence on a limited range of habitat.[15] Due to their reliance on shinnery oak duneland habitat, DSL is highly susceptible to habitat loss and fragmentation.[16] At the individual-level, the removal of shinnery oak vegetation can impair DSL breeding including female nesting movements and juvenile dispersal, as well as feeding, sheltering for thermoregulation and predator avoidance, dispersal, and survival.[17] At population-levels, habitat

---

[11] *Id.*
[12] Exhibit 223, 2024 DSL SSA at 103.
[13] BLM, *July 2025 Oil & Gas Preliminary Parcel List*
[14]Exhibit 223, 2024 DSL SSA at 11–12.
[15] **Exhibit 225,** Henle, K., K. Davies, M. Kleyer, C. Margules, and J. Settele. 2004. *Predictors of Species Sensitivity to Fragmentation.* Biodiversity and Conservation 13: 207-251, 239 [hereinafter Henle et al. 2004]; **Exhibit 226,** Devictor, V., R. Julliard, and F. Jiguet. 2008. *Distribution of Specialist and Generalist Species along Spatial Gradients of Habitat Disturbance and Fragmentation.* Oikos 117: 507-514, 511 [hereinafter Devictor et al. 2008].
[16] **Exhibit 227,** Walkup, D.K., D.J. Leavitt, and L.A. Fitzgerald. 2017. *Effects of Habitat Fragmentation on Population Structure of Dune-Dwelling Lizards.* Ecosphere 8 (3):1-14 p. 2 [hereinafter Walkup et al. 2017].
[17] **Exhibit 228,** Machenberg, M. 1984. *Geology of Monahans Sandhills State Park, Texas.* Guidebook 21. University of Texas at Austin. Bureau of Economic Geology pp. 16, 20-21 [hereinafter Machenberg 1984]; **Exhibit 229,** Degenhardt, W.G., C.W. Painter, and A.H. Price. 1996. *Amphibians and Reptiles of New Mexico.* University of New Mexico Press. Albuquerque. 431 pp., p. 160 [hereinafter Degenhardt et al. 1996]; **Exhibit 230,** Snell, H.L., L.W. Gorum, L.J.S. Pierce, and K.W. Ward. 1997. *Results from the fifth year (1995) research on the effect of shinnery oak removal on populations of sand dune lizards, Sceloporus arenicolus, in New Mexico.* Final Report to New Mexico Department of Game and Fish. Contract #80-516.6-01 13 pp, pp. 1-2, 6-11 [hereinafter Snell et al. 1997]; **Exhibit 231,** Fitzgerald, L., C. Painter, D. Sias, and H. Snell. 1997. *The Range, Distribution and Habitat of Sceloporus arenicolus in New Mexico*. Final Report submitted to New Mexico Department of Game and Fish

destruction and fragmentation can affect DSL viability in multiple ways. Loss of habitat can lead to the reduction or even loss of populations. DSL are short lived and exhibit low reproductive potential and low population recovery potential.[18] Species that exhibit these traits decline when confronted with fragmentation and are prone to extirpation.[19] Smaller populations occupying smaller patches are even more vulnerable to stochastic events. Fragmentation also disrupts landscape-scale dynamics of the dune-blowout DSL ecosystem, resulting in degradation of dune-blowout landforms beyond the immediate footprint of developed areas, so fragmentation disruptions are not limited to oil/gas immediate development footprint.[20] Fragmented sites are often of lower quality, possessing fewer, more dispersed large dune blowouts as well as more large patches of flat open sand and barren ground, thus deterring DSL habitation.[21]. Declines in population abundance due to reductions in habitat results in genetic diversity losses, reduced dispersal of DSL due to fragmentation, and reduced gene flow. This in turn leads to inbreeding depression and genetic drift, resulting in further reductions of DSL population viability beyond its already endangered status.[22]

DSL are not known to disperse across expanses of unsuitable habitat. Unfortunately, this means DSL populations may have little chance of dispersing across areas where suitable habitat has been removed.[23] Movements of individual DSL between populations are hindered or precluded totally by fragmentation and sadly remain insufficient to sustain DSL demographics

---

(Contract #80-516.6-01) p. 26 [hereinafter Fitzgerald et al. 1997]; **Exhibit 232,** Peterson, R., and C.S. Boyd. 1998. *Ecology and management of sand shinnery communities: a literature review.* Gen. Tech. Rep. RMRS-GTR-16. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 44 p., p.21 [hereinafter Peterson and Boyd 1998]; **Exhibit 233,** Painter, C., D. Sias, L. Fitzgerald, L. Pierce, and H. Snell. 1999. *Management Plan for the Sand Dune Lizard Sceloporus arenicolus in New Mexico*, pp. 1, 27 [hereinafter Painter et al. 1999]; **Exhibit 234,** Sartorius, S.S., J.P.S. do Amaral, R.D. Durtsche, C.M. Deen, and W.I. Luterschmidt. 2002. *Thermoregulatory accuracy, precision, and effectiveness in two sand-dwelling lizards under mild environmental conditions.* Canadian Journal of Zoology 80:1966-1976, pp. 1972-1975 [hereinafter Sartorius et al. 2002]; **Exhibit 235,** Painter, C., D. Sias, L. Fitzgerald, L. Pierce, and H. Snell. 1999. *Management Plan for the Sand Dune Lizard Sceloporus arenicolus in New Mexico*, p. 3-4 [hereinafter Painter 2004]; **Exhibit 236,** Dhillion, S.S., and M.H. Mills. 2009. The Sand Shinnery Oak (Quercus havardii) Communities of the Llano Estacado: History, Structure, Ecology, and Restoration in: R.A.Anderson, J.S. Fralish, and J.M. Baskin, eds. *Savannas, Barrens, and Rock Outcrop Plant Communities of North America*. 1999, p. 264 [hereinafter Dhillion and Mills 2009]; **Exhibit 237,** Leavitt, D.J., and M.R. Acre. 2014. *Sceloporus arenicolus (Dunes Sagebrush Lizard). Activity Patterns and Foraging Mode.* Herpetological Review 45(4). 699-700, p. 700 [hereinafter Leavitt and Acre 2014]; **Exhibit 238,** Hibbitts, T., and T. Hibbitts. 2015. *Texas Lizards: A Field Guide.* University of Texas Press. 352 pp, p. 157 [hereinafter Hibbitts and Hibbitts 2015].

[18] 2024 DSL SSA at 57.

[19] Henle 2004, p. 239; Devictor et al. 2008, p. 511; **Exhibit 239,** Hibbitts, T.J., W.A. Ryberg, C.S. Adams, A.M. Fields, D. Lay, and M.E. Young. 2013. *Microhabitat Selection by a Habitat Specialist and a Generalist in both Fragmented and Unfragmented Landscapes.* Herpetological Conservation and Biology 8(1): 104-113, p. 111 [hereinafter Hibbitts et al. 2013]; **Exhibit 240,** Leavitt, D., and L. Fitzgerald. 2013. *Disassembly of a Dune-dwelling Lizard Community due to Landscape Fragmentation.* Ecosphere 4(8): 97, p. 6 [hereinafter Leavitt and Fitzgerald 2013]; Walkup et al. 2017, p. 2.

[20] Leavitt and Fitzgerald 2013, p. 9; Walkup et al. 2017, p. 11.

[21] Leavitt and Fitzgerald 2013, pp. 9-10.

[22] **Exhibit 241,** Hokit, D.G., and L.C. Branch. 2003. *Habitat Patch Size Affects Demographics of the Florida Scrub Lizard (Sceloporus woodi).* Journal of Herpetology 37 (2): 257-265, p. 263 [hereinafter Hokit and Branch 2003]; **Exhibit 242,** Chan, L., L. Fitzgerald, and K. Zamudio. 2009. *The Scale of Genetic Differentiation in the Dunes Sagebrush-Lizard, an Endemic Habitat Specialist.* Conservation Genetics 10:131-142, p. 140 [hereinafter Chan et al. 2009].

[23] Fitzgerald et al. 1997, p. 27.

necessary to prevent localized extirpations.[24] Over time, fragmentation isolates DSL populations and results in an accelerated decline in populations, until ultimately the species becomes extirpated.[25]

Fragmentation of the shinnery oak ecosystem and DSL habitat has been shown to be irreversible, despite restoration efforts. The science indicates that once shinnery oak dunelands are disturbed, these landforms shift to "alternative stable states" that do not self-regenerate.[26] Trials to restore and recreate shinnery oak dunelands have not been successful. Furthermore, it is "far from certain that artificial dune blowouts could support populations of the species".[27] Successful restoration of shinnery oak dune habitat is unlikely, due to the complexities of the natural processes that form and maintain these landforms, and the difficulty of replicating these processes. Simply put, restoration of shinnery oak vegetation and sand dune-blowout topography is not feasible.[28] All of this amounts to one conclusion, once these DSL ecosystems are developed directly for oil and gas or tangentially harmed by these developments, they are gone forever.

Oil and Gas development is by far and away the largest cause of DSL habitat loss, fragmentation, and modification. Currently, 70 percent of land within the New Mexico range of the DSL has been leased for oil and gas exploration and development. [29] Seventy-one percent of the mineral rights within the range of the DSL in New Mexico are federally owned and fall under BLM lease stipulations and the Pecos District (New Mexico) Special Status Species Resource Management Plan Amendment (RMPA).[30] Oil and Gas development harms to habitat can be further delineated into well pad density, roads, pipelines, and harms affiliated with frac sand mining.

Fragmentation of DSL habitat and the consequential subdivision of populations into smaller, more vulnerable groups is attributed to high densities of oil and gas well pads on the landscape. Several studies have demonstrated a negative relationship between well pad density and the number of DSL present at a site.[31] One such study, Sias and Snell 1998, used a regression analysis to predict a 25 percent reduction in the abundance of DSL at densities of

---

[24] Leavitt and Fitzgerald 2013, p. 11; **Exhibit 243,** Ryberg, W., M. Hill, C. Painter, and L. Fitzgerald. 2013. *Landscape Pattern Determines Neighborhood Size and Structure within a Lizard Population.* PLOS ONE: 8(2), p. 4 [hereinafter Ryberg et al. 2013]; Walkup et al. 2017, p. 12; **Exhibit 244,** Young, M.E., W.A. Ryberg, L.A. Fitzgerald, and T.J. Hibbitts. 2018. *Fragmentation alters home range and movements of the Dunes Sagebrush Lizard.* Canadian Journal of Zoology 96: 905-912, p. 910 [hereinafter Young et al. 2018].

[25] Leavitt and Fitzgerald 2013, p. 12.

[26] **Exhibit 245,** Ryberg, W., M. Hill, C. Painter, and L. Fitzgerald. 2015. *Linking irreplaceable landforms in a self-organizing landscape to sensitivity of population vital Rates for an Ecological Specialist.* Conservation Biology 29 (3): 888-898, p. 896 [hereinafter Ryberg et al. 2015].

[27] *Id.*

[28] **Exhibit 246,** Johnson, K., M. Horner, E. Muldavin, P. Neville, T. Neville, and J. Smith. 2016. *Dunes sagebrush lizard habitat map and models, New Mexico.* Natural Heritage New Mexico Publ. No. 15-387. Natural Heritage New Mexico, University of New Mexico, Albuquerque, NM, p. 34 [hereinafter Johnson et al. 2016].

[29] 2024 DSL SSA at 58–59.

[30] *Id.*

[31] **Exhibit 247,** Sias, D.S., and H.L. Snell. 1998. *The Sand Dune Lizard Sceloporus arenicolus and Oil and Gas Development in Southeastern New Mexico.* Final Report of field studies 1995-1997. Report to New Mexico Department of Game and Fish, p. 1 [hereinafter Sias and Snell 1998]; Leavitt and Fitzgerald 2013, p. 9; Ryberg et al. 2015, p. 893; Johnson et al. 2016, p. 41; Walkup et al. 2017, p. 9.

13.64 wells pads/mi^2.[32] At a density of 29.82 well pads/mi^2, reductions of 50 percent were predicted.[33] Based on this study, Painter et al. (1999, p. 3) recommended that densities in New Mexico be limited to 13 well pads/mi^2.[34] Leavitt and Fitzgerald 2013 also found that areas with 13 well pads/mi^2 or greater had considerably lower abundance of DSL than non-fragmented sites.[35] They also found that high well and road density at the landscape scale resulted in smaller, fewer, and more dispersed sand dune blowouts, further harming DSL persistence.[36] Walkup et al. 2017 further confirmed that DSL populations had a high susceptibility to local extinction in landscapes with 13 or more well pads/mi^2.[37] They concluded that the network-like development of well pads and their connecting roads both isolate populations and disrupt the underlying geomorphologic processes that maintain the shinnery oak dune blowout formations. Johnson et al. 2016 found a marked decline in DSL occurrence at well densities of 5 and 8 well pads/mi^2 with no lizards found at well densities above 23 well pads/mi^2.[38] They suggested that 13 well pads/mi^2 should be considered "degraded" habitat as a standard in the scientific literature.[39] The collective science has clearly found that increases in well density directly harm DSL. BLM must conduct a hard look at the oil well density surrounding each parcel proposed within DSL habitat. Density calculations must be explicit, following the same measurement methodology these studies utilized, and the expected impacts must be assessed accordingly. This analysis will also play a large role for ESA take calculations, as any oil and gas development on DSL habitat should be considered a take.

Oil and gas development, results in caliche roads constructed in a grid-like network.[40] Roads fragment habitat and impede DSL movement, reducing access to habitat, mates, and prey, decreasing population size and population persistence. Roads create fugitive road dust that can blow and land on the surrounding dunelands, changing the composition of the top layer of sand. Studies show that DSL avoid roads and they are a major source of fragmentation.[41] In experimental trials, scientists found that approximately 20 percent of DSL crossed a road bisecting their enclosure.[42] In another study, Young et al. 2018 reported that among DSL specimen with attached radio transmitters, only 1 of 799 documented movements involved the crossing of a road.[43] The one instance of crossing occurred where sand had blown over to cover the caliche road. There have been rare observations of DSL basking on caliche roads, but

[32] Sias and Snell 1998, p. 23.
[33] *Id.*
[34] Painter et al. 1999, p. 3.
[35] Leavitt and Fitzgerald 2013, p. 9.
[36] *Id.*
[37] Walkup et al. 2017, p. 10.
[38] Johnson et al. 2016, p. 41.
[39] *Id.*
[40] Young et al. 2018, p. 6.
[41] **Exhibit 248,** Hibbitts, T., L. Fitzgerald, D. Walkup, and W. Ryberg. 2017. *Why Didn't the Lizard Cross the Road? Dunes Sagebrush Lizards Exhibit Road-avoidance Behavior.* Wildlife Research 44 (3): 194-199, p. 197 [hereinafter Hibbitts et al. 2017].
[42] *Id.*
[43] Young et al. 2018, p. 910.

otherwise roads are recognized as a barrier to movement.[44] When road crossings do occur, the lizards are directly at risk from vehicle strikes, resulting in fatality.[45]

While none of these parcels include the potential for pipeline construction, it should be noted that any further oil and gas development on virgin DSL habitat incentivizes and sometimes results in the need for further pipeline infrastructure. Harms to the species from pipelines include: (1) the staging and storage of equipment, materials, and vehicles; (2) clearing of right-of-ways; (3) trenching for the pipeline; and (4) constructing appurtenant facilities such as "pigging" stations, and compression and pumping stations. 2024 DSL SSA at 62. Since construction does not occur in a vacuum these projects also require access roads, parking lots, and fencing. Such activities remove vegetation and can destabilize the overall dune structure.[46] Heavy equipment used to remove shinnery oak and bury the lines in the sand can cause direct mortality. The large open trenches can form linear pitfall traps for DSL, unable to escape the trench.[47] Ongoing pipeline maintenance crews sometimes travel by off-highway vehicles (OHV), directly and indirectly contributing to DSL habitat decline. Beyond OHV strikes, OHV use may result in soil compaction, reduced plant cover, and tire ruts that exacerbate erosional processes in the dune complexes, further degrading habitat.[48] The cumulative impacts from vehicle infrastructure more generally is immense in scope and scale.

Much of Oil and Gas drilling within this area of New Mexico involves hydrofracturing. Frac sand is a naturally occurring sand used as a proppant during hydraulic fracturing of oil and gas wells to maximize production of unconventional reservoirs. [49] Frac sand mining has occurred within Texas portions of DSL habitat including the Southernmost unit of the Southern Mescalero population and the entire Monahans population.[50] The harms of frac sand mining to DSL habitat

---

[44] Johnson et al. 2016, p. 11.

[45] **Exhibit 249,** Delgado-Garcia, J.D., J.R. Arevalo, and J.M. Fernandez-Palacios. 2007. *Road Edge Effect on the Abundance of the Lizard Gallotia galloti (Sauria: Lacertidae) in two Canary Islands Forests.* Biodiversity and Conservation 16: 2949-2963, p. 2950 [hereinafter Delgado-Garcia et al. 2007]; **Exhibit 250,** Goncalves, L., D. Alvares, F. Teixeira, G. Schuck, I. Coelho, I. Esperandio, J. Anza, J. Beduschi, V. Bastazini, and A. Kindel. 2018. Reptile Road-kills in Southern Brazil: Composition, Hot Moments and Hotspots. Science of the Total Environment 615: 1438-1445, p. 1441 [hereinafter Goncalves et al. 2018].

[46] **Exhibit 251,** Van Pelt, W.E., S. Kyle, J. Pitman, D. Klute, G. Beauprez, D. Schoeling, and A. Janus. 2013. *The Lesser Prairie-chicken Range-wide Conservation Plan.* 373 pp, p. 37 [hereinafter Van Pelt et al. 2013].

[47] **Exhibit 252,** Romano, A., D. Leavitt, C. Schalk, D. Dittmer, and L. Fitzgerald. 2014. *Vertebrate by-catch of Pipeline Trenches in the Mescalero-Monahans Shinnery Sands of Southeastern New Mexico.* p.95, p. 95 [hereinafter Romano et al. 2014].

[48] Van Pelt et al. 2013, p. 29.

[49] **Exhibit 253,** Mossa, J., and L.A. James. 2013. *Changing Fluvial Systems.* Physical Geography 34(4-5): 267-272, pp [hereinafter Mossa and James 2013]; **Exhibit 254,** Benson, M.E., and Wilson, A.B., 2015, *Frac sand in the United States—A geological and industry overview: U.S. Geological Survey Open-File Report 2015–1107*, 78 p, pp. 1-50 [hereinafter Benson and Wilson 2015]; **Exhibit 255,** Engel, M., F. Boesl, and H. Bruckner. 2018. Migration of Barchan Dunes in Qatar-Controls of the Shamal, Telconnections, Sea-Level Changes and Human Impact. Geosciences 8 (240): 1-16, pp. 1-13 [hereinafter Engel et al. 2018]; Forstner, M.J. D. Neuharth, M. Kiehne, D. Foley III, T. Hardy, J. Jensen. 2018. West Texas Frac-sands Threat Analysis to the Dune Sagebrush Lizard (Sceloporus arenicolus). Report Prepared for Comptroller of Public Accounts State of Texas. 30 pp, pp. 1-19 [hereinafter Forstner et al. 2018]; **Exhibit 257,** Mace, R. 2019. *Frac Sand Facilities and their Potential Effects on the Groundwater Resources of the Monahans-Mescalero Sand Ecosystem Permian Basin, Texas. A Report for the TX Comptroller of Public Accounts Contract* CMD No. 19-6754CS [Mace 2019].

[50] 2024 DSL SSA at 64.

are substantial. [51] While none of the parcels for this leasing proposal include frac sand mining on DSL habitat, the oil and gas development will likely incorporate hydrofracturing processes that utilize frac sand. Any oil and gas development within DSL habitat not only contributes to the direct impacts upon that specified area of habitat, but will also contribute to further DSL habitat degradation elsewhere through its links to frac sand mines. BLM must include frac sand mining impacts to its hard look and ESA consultation processes.

ii. Pollution and Contamination From Oil and Gas.

Oil and gas activities release pollutants into DSL ecosystems including hydrogen sulfide, oil spills, and tebuthiuron.[52] Hydrogen sulfide is a naturally occurring gas generated through oil and gas extraction and storage.[53] Since hydrogen sulfide is heavier than air, DSL are likely more prone to gas poisoning because of their association with the bottoms of dune valleys.[54] One study estimated that DSL could display adverse effects from hydrogen sulfide at concentrations greater than 14 ppm.[55] Site testing of oil and gas infrastructure and surrounding area in New Mexico have found sites with concentrations that reach this level.[56] The Service acknowledges that more research must be done including further site testing.[57] This is yet another contributing harm to the DSL population that must be taken into account when analyzing environmental impacts.

Regarding oil spills, studies of other lizard species have shown that carcinogenic polycyclic aromatic hydrocarbons, a group of chemicals formed during incomplete burning of oil and gas, can accumulate in lizards and the ants they consume.[58] The accumulation of pollutants in lizards can cause severe organ abnormalities and diseases.[59] Oil pollution can also cause behavioral effects since it can darken substrate causing lizards to emerge earlier due to faster substrate warming.[60] Exposure to oil pollution has long lasting, chronic effects on wildlife.[61]

---

[51] *Id.* at 62–65.
[52] 2024 DSL SSA at 72.
[53] **Exhibit 258,** Brenneman, K.A., R.A. James, E.A. Gross, and D.C. Dorman. 2000. *Olfactory Neuron Loss in Adult Male CD Rats Following Subchronic Inhalation Exposure to Hydrogen Sulfide.* Toxicologic Pathology 28 (2): 326-333, p. 326 [hereinafter Brenneman et al. 2000].
[54] Sias and Snell 1998, p. 23.
[55] **Exhibit 259,** Lusk, J., and E. Kraft. 2010. *Hydrogen Sulfide Monitoring Near Oil and Gas Production Facilities in Southeastern New Mexico and Potential Effects of Hydrogen Sulfide to Migratory Birds and other Wildlife. U.S. Fish and Wildlife Service Environmental Contaminants Program* Project ID: FFS 2F41-200220006.1. 92 pp, p. 15 [hereinafter Lusk and Kraft 2010].
[56] Lusk and Kraft 2010, pp. 7, 12, 33, 34, 36, 61.
[57] 2024 DSL SSA at 72–73.
[58] **Exhibit 260,** Al-Hashem, M.A., P.F. Brain, and S.A. Omar. 2007. *Effects of Oil Pollution at Kuwait's great Al-Burgan Oil Field on Polycyclic Aromatic Hydrocarbon Concentrations in the Tissues of the Desert Lizard Acanthodactylus scutellatus and their Ant Prey.* Ecotoxicology 16: 551-555, pp. 552, 554-555 [hereinafter Al-Hashem et al. 2007].
[59] **Exhibit 261,** Al-Hashem, M.A. 2011. *Evidence of Hepatotoxicity in the Sand Lizard Acnthodactylus scutellatus from Kuwait's Greater Al-Burgan Oil Field.* Ecotoxicology and Environmental Safety 74: 1391-1395, p. 1394-1395 [hereinafter Al-Hashem 2011].
[60] Al-Hashem et al. 2007, p. 592.
[61] Al-Hashem 2011, p. 1395; **Exhibit 262,** Esler, D., B. Ballachey, C. Matkin, D. Cushing, R. Kaler, J. Bodkin, D. Monson, G. Esslinger, K. Kloecker. 2018. *Timelines and mechanisms of wildlife population recovery following the Exxon Valdez oil spill.* Deep Sea Research Part II: Topical Studies in Oceanography 147: 36-42, p. 41 [hereinafter

Since DSL have a limited, heavily disturbed range, an oil spill could disproportionately degrade more habitat and restrict the range further, compared to spills in other regions. As the Service acknowledges, the probability of a large oil spill increases as oil production and transportation increase. A hard look for oil spill risks to DSL must include an analysis of oil spill data and reports within the region in order to ascertain the propensity for future impacts.

Further pollution from oil and gas activities previously included the spraying of tebuthiuron. Leasee's should be asked whether that practice is expected within any of these parcels. If so, the environmental impacts from spraying tebuthiuron must be fully analyzed including harms to DSL.[62] Other major chemicals, and waste water spills also occur throughout this region. Again, a hard look into this subject matter must include thorough investigations into spill data, including via transportation, in order to properly account for the risks to DSL populations.

iii. Groundwater Depletion

Within the Mescalero and Monahans Sandhills, the water table is relatively shallow, with depths ranging from a meter below the surface to approximately 15 to 23 m (50-75 ft) below ground.[63] Water needs throughout the Pecos River Valley are fulfilled primarily via extraction of water from the Pecos Valley and Dockum Aquifers, resulting in multifaceted demands upon the water table. Production of oil and gas is heavily dependent on groundwater.[64] Additionally frac sand mines have recently become established throughout the region and extract water from both the Pecos Valley and Dockum Aquifers.[65] This again leads to the double hit of impacts on the parcel being leased within DSL habitat for oil and gas as well as DSL habitat degraded from frac sand mining activities used in the hydrofracturing of the first leased parcel in question. In areas where sand mine operations are underway, mining-related ground water consumption may meet, or exceed, the consumption of all other water users combined.[66]

Esler et al. 2018]; **Exhibit 263,** Rosell-Mele, A., N. Moraleda-Cibrian, M. Cartro-Sabate, F. Colomer-Venturay, P. Mayor, M. Orta-Martinez. 2018. *Oil Pollution in Soils and Sediments from the Northern Peruvian Amazon.* Science of the Total Environment 610-611:1010-1019, p. 1017 [hereinafter Rosell-Mele et al. 2018].

[62] **Exhibit 264,** Emmerich, W. 1985. *Tebuthiron – Environmental Concerns.* Rangelands 7 (1):14-16, p. 15 [hereinafter Emmerich 1985].

[63] **Exhibit 265,** Shafer, G. 1956. *Ground-water Resources of the Crane Sandhills, Crane County, Texas.* Bulletin 5604. Texas Board of Water Engineers [hereinafter Shafer 1956]; **Exhibit 266,** Garza, S. and J. Wesselman. 1959. *Geology and Ground-water Resources of Winkler County, Texas.* Bulletin 5916. Texas Board of Water Engineers. 221 pp, p. 13 [hereinafter Garza and Wesselman 1959]; **Exhibit 267,** White, D.E. 1971. *Water Resources of Ward County, TX.* Report 125. Texas Water Development Board. 124 pp, p. 17 [hereinafter White 1971]; **Exhibit 268,** Jones, I.C. 2008. *Investigating Recharge in Arid Alluvial Basin Aquifers: The Pecos River Valley Aquifer, TX.* Gulf Coast Association of Geological Societies Transactions 58: 489-500, p. 489 [Jones 2008]; Mace 2019, p. 12; **Exhibit 269** Rainwater, K. 2020. *Sand Mining Water Use in West Texas.* Environmental Consultant Report, p. 18 [hereinafter Rainwater 2020].

[64] **Exhibit 270,** Ashworth, J. 1990. *Evaluation of Ground-Water Resources in Parts of Loving, Pecos, Reeves, Ward, and Winkler Counties, TX.* Texas Water Development Board Report 317, pp. v, 3 [hereinafter Ashworth 1990]; **Exhibit 271,** Scanlon, B., S. Ikonnikova, Q. Yang, and R. Reedy. 2020. *Will Water Issues Constrain Oil and Gas Production in the United States.* Environ. Sci. Technol.54: 3510-3519 [hereinafter Scanlon et al. 2020].

[65] Mace 2019, pp. 46-48, 57-59; Rainwater 2020, p. 13, Table 2.

[66] Mace 2019, pp. 2, 57-59.

Shinnery oaks are phreatophytes which means they draw their water supply from near the water table. Shinnery oak taproots often go as deep as 30 ft (9.1m).[67] In some cases, the shinnery oak taproot can directly reach the aquifer. In other cases, if an aquifer is connected to the local water table, then pumping can lower the water table and its capillary fringe, reducing its contribution to intradunal soil water, a.k.a. water occurring between dunes. This can destabilize sand dunes by reducing sand grain cohesiveness, making dunes susceptible to wind erosion and deflation, degrading DSL habitat.[68] Groundwater pumping can also reduce blowout stability and cohesion, again degrading DSL supportive habitat.[69]

Groundwater depletion can stress phreatophytes through reduced photosynthesis and growth, which can lead to their deterioration and death.[70] As water table depths sink deeper, phreatophytes become scattered, weakened, and gradually diminish in size until they cease to exist altogether due to a reduction in the ability of plants to obtain water necessary for normal growth and survival.[71] Reduced growth rates can hinder plant growth, sand accumulation, and dune formation.[72] Death or deterioration of dune-anchoring phreatophytes, including shinnery oak, leads to the erosion and deflation of dune landforms by strong winds.[73] Again, once these DSL ecosystems are destroyed, they are gone, since restoration attempts have failed.

Groundwater depletion can also prevent young plants from becoming established further precluding dune formation.[74] Reduced recruitment of young plants into phreatophyte populations can lead to vegetation declines over time, and thus DSL duneland habitat disappearance.[75] The

---

[67] **Exhibit 271,** Gucker, C.L. 2006. *Quercus havardii. In: Fire Effects Information System*, p. 6 [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: https://www.fs.fed.us/database/feis/plants/shrub/quehar/all.html [2019, December 31] [hereinafter Gucker 2006], Peterson and Boyd 1998, p. 5.

[68] Machenberg, 1984, pp. 6, 30-31, **Exhibit 272,** Kocurek, G., and K.G. Havholm. 1993. *Eolian Sequence Stratigraphy-A Conceptual Framework.* Chapter 16 In: Siliciclastic sequence stratigraphy (P. Weimer and H.W. Posamentier, eds.): AAPG Memoir 58, p. 393-409, pp. 394, 398-400, 402-404 [hereinafter Kocurek and Havholm 1993]; **Exhibit 273,** Pye, K. 2009. *Chapter 9: Management and Human Use of Sand Dune Environments.* In: Aeolian Sand and Sand Dunes. P. 329-367, p. 364 [hereinafter Pye 2009]; **Exhibit 273A,** Newton, B.T., and B. Allen. 2014. *Hydrologic Investigation at White Sands National Monument.* New Mexico Bureau of Geology and Mineral Resources. Open-file Report 559, pp. 1, 4, 28 [hereinafter Newton and Allen 2014].

[69] Machenberg, 1984, pp. 6, 24, 30-31.

[70] Machenberg, 1984, pp. 6, 24, 30-31, Stromberg et al. 1992, pp. 45-46, 51, 53, 54-56; Stromberg et al. 1993, pp. 311-112; Laity 2003, pp. 196-197, 208-209, 212, 218.

[71] Robinson 1958, p. 22.

[72] Machenberg 1984, p. 16; Gucker 2006, entire; **Exhibit 274,** University of California Riverside, Center for Conservation Biology. 2018. Proposed Protocol for Measuring Mesquite Health with Respect to Putative Facors Causing Declines in Stand Health in the Coachella Valley. Report Prepared for the Coachella Valley Conservation Commission [hereinafter University of California Riverside 2018].

[73] Machenberg, 1984, pp. 6, 19-21, 24, 29-31, 33; Kocurek and Havholm 1993, pp. 394, 401-402; **Exhibit 275,** Muhs, D., and V. Holliday. 2001. *Origin of Late Quaternary Dune Fields on the Southern High Plains of Texas and New Mexico*. GSA Bulletin 113 (1): 75-87, pp. 75-76 [hereinafter Muhs and Holliday 2001]; **Exhibit 276,** Laity, J. 2003. *Aeolian Destabilization Along the Mojave River, Mojave Desert, California: Linkages Among Flucial, Groundwater, and Aeolian Systems.* Physical Geology 24 (3): 196-221, pp. 196-197, 216-217 [hereinafter Laity 2003].

[74] Laity 2003, pp. 196, 209-211; **Exhibit 277,** Cambell, J.E., M.R. Sharifi, and P.W. Rundel. 2017. *Impact of Ground Water Depletion on the Mesquite Community at Edwards Air Force Base, Western Mojave Desert, California.* Aliso 35(2): 69-77, p. 77 [hereinafter Cambell et al. 2017].

[75] Laity 2003, pp. 196, 209-211; Cambell et al. 2017, pp. 69, 76-77.

Service concludes, "The consequences of shinnery oak death and degradation from groundwater pumping effects are significant because shinnery oak cannot be readily replaced."[76] Ultimately oil and gas activities as well as frac sand mining activities, lower the water table underlying a dune field which in turn depletes soil moisture; reduces the cohesiveness of sand grains; leaves dune plants susceptible to water stress, desiccation, and death; and causes wind erosion and deflation of the dune landforms. The Service predicts that over time, "there will likely be further stress to aquifers and groundwater levels due to changes in precipitation patterns and increasing summer temperatures."[77]

Effects of lowering the water table extend directly to the DSL, beyond impacts to its shinnery oak habitat. Female DSL prefer sandy soils with relatively high moisture content for nesting. DSL dig burrows into the base of sand dunes or within dune blowouts; construct nest chambers at the soil moisture horizon; and pack eggs with moist sand.[78] Evidently, the direct impacts to DSL due to groundwater depletion, surround reproduction behaviors and preferences for the species. Reproduction hinderances are particularly harmful for DSL existence moving forward and must be heavily considered, in depth, if an adequate NEPA and ESA consultation process is to occur. Again, leasees should be expected to disclose where it sources its water and frac sand in order to inform BLM of the multiple locations in which detrimental impacts to DSL habitat are occurring.

iv. Direct Mortality

Direct mortality to individual DSL can occur from vehicle strikes on roads, OHV strikes within DSL habitat, and heavy equipment use for construction of roads, pipelines, well pads, renewable energy infrastructure, and sand mining.[79] These direct mortality threats are included within the above comments, but an additional source is predation. Loggerhead shrikes are birds that prey upon DSL. These birds use fences, poles, trees, and utility wires as perches from which to hunt.[80] There are scientific hypotheses asserting that areas with more artificial perches stemming from oil and gas infrastructure, utility wires and poles, and fencing results in increased predation by bird species, particularly in habitats that were treeless and open prior to human interventions.[81] A study in New Mexico documented over 50 percent of loggerhead shrike hunts

---

[76] 2024 DSL SSA at 80–81 (citing Gucker 2006, entire; Peterson and Boyd 1998, pp. 1, 10.).
[77] 2024 DSL SSA at 81.
[78] **Exhibit 278,** Ryberg, W.A, M.T. Hill, D. Lay, and L.A. Fitzgerald. 2012. *Observations on the Nesting Ecology and Early Life History of the Dunes Sagebrush Lizard.* Western North American Naturalist 72(4): 582-585, pp. 583-584 [Ryberg et al. 2012].
[79] 2024 DSL SSA at 82.
[80] **Exhibit 278,** Ryberg, W.A, M.T. Hill, D. Lay, and L.A. Fitzgerald. 2012. *Observations on the Nesting Ecology and Early Life History of the Dunes Sagebrush Lizard.* Western North American Naturalist 72(4): 582-585; **Exhibit 279,** Rappole, J. 2000. Birds of the Southwest: Arizona, New Mexico, Southern California, and Southern Nevada, p. 163 [Rappole 2000]; Hathcock and Hill 2018, pp. 222-223.
[81] **Exhibit 280,** Dinkins, J.B., M.R. Conover, C.P. Kirol, J.L. Beck, and S.N. Frey. 2014. *Greater Sage-Grouse (Centrocercus urophasianus) Hen Survival: Effects of Raptors, Anthropogenic and Landscape Features, and Hen Behavior.* Canadian Journal of Zoology 92: 319-330, p. 320 [hereinafter Dinkins et al. 2014]; **Exhibit 281,** Lammers, W., and M. Collopy. 2007. *Effectiveness of Avian Predator Perch Deterrents on Electric Transmission Lines.* The Journal of Wildlife Management 71 (8):2752-2758, p. 2752 [hereinafter Lammers and Collopy 2007]; **Exhibit 282,** Prather, P., and T. Messmer. 2010. *Raptor and Corvid Response to Power Distribution Line Perch*

were initiated from a power line.[82] Ultimately, DSL habitats that had few to no perches, and thus notably less threats to the DSL from bird predation, can be transformed into habitats within increased predation up DSL, thus adding another compounding detriment to the species. BLM must take a hard look and what perch-like infrastructure will be included on parcels leased within DSL habitat.

v. When Taking Hard Look at DSL Impacts, BLM Must Include the Compounding Impacts of Climate Change as Well.

DSL are ectothermic, so ambient temperatures affect their physiological performance and daily activities.[83] Daily DSL activity declines as air and substrate temperatures increase due the necessity to thermoregulate for survival.[84] DSL do possess behavioral and physiological mechanisms to help them avoid extreme temperatures, which would normally limit effects on DSL.[85] Unfortunately, extreme events, including drought, impact shinnery oak habitat DSL depend on for these mitigating behaviors.[86] Climate change is likely altering the frequency and magnitude of these events, the effect of which is further exacerbated by anthropogenic changes to the landscape, especially oil and gas development. The oil and gas activities are further exacerbating the intensity of climate change and thus further contribute to the extinction of DSL, and many other flora and fauna. These ecosystems and their species, including the DSL, are inexorably linked to humanity's survival, well-being, and socio-economic success. The hydrocarbons extracted from these parcels by the oil and gas industry will be released into the atmosphere as greenhouse gases, either before or after combustion, thus further contributing to climate change and thus DSL diminishment into extinction. This socio-economic cost to society must be accounted for within a hard look analysis. BLM is already aware of cost accounting methodology for greenhouse gas emissions. A hard look by BLM, must include the cost to society for the GHG's emitted resulting from leasing these parcels. An omission of this accounting by BLM, would leave a glaring gap in NEPA and ESA analyses for an ever-growing contribution to the DSL's demise.

Deterrents in Utah. Journal of Wildlife Management 74 (4): 796-800, p. 796 [hereinafter Prather and Messmer 2010]; **Exhibit 283,** Slater, S., and J. Smith. 2010. *Effectiveness of Raptor Perch Deterrents on an Electrical Transmission Line in Southwestern Wyoming.* Journal of Wildlife Management 74 (5): 1080-1088, p. 1080 [hereinafter Slater and Smith 2010].

[82] **Exhibit 284,** Hathcock, C.D., and M.T. Hill. 2018. *Loggerhead shrike predation on dune-dwelling lizards and nesting success in southeastern New Mexico.* The Southwestern Naturalist 63: 220-224 [Hathcock and Hill 2018].

[83] Sartorius et al. 2002, p. 1996.

[84] Sartorius et al. 2002, p. 1975; **Exhibit 285,** Fitzgerald, L.A., Painter, C.W., T.J. Hibbitts, W.A. Ryberg, and N. Smolensky. 2011. *The Range and Distribution of Sceloporus arenicolus in Texas: Results of Surveys Conducted 8-15 June 2011: Final Report.* Texas A&M University, p. 4 [hereinafter Fitzgerald et al. 2011].

[85] **Exhibit 286,** Smolensky, N., and L. Fitzgerald. 2010. *Distance Sampling Underestimates Population Densities of Dune-Dwelling Lizards.* Journal of Herpetology 44 (3): 372-381, p. 374 [hereinafter Smolensky and Fitzgerald 2010]; **Exhibit 287,** Jacobson, C. 2016. *Thermal Ecology of the Dune Sagebrush Lizard.* Texas A & M University. Undergraduate Research Scholar Thesis. 13 pp, p. 3 [hereinafter Jacobson 2016]; **Exhibit 288,** Leavitt, D. 2019a. *Climatic conditions of the Mescalero-Monahans Shinnery Sands and how they relate to activity patterns of the Dunes Sagebrush Lizard.* Report prepared for Center of Excellence in Hazardous Materials Management, p. 1 [hereinafter Leavitt 2019a].

[86] 2024 DSL SSA 74.

Extreme cold and winter storms impact DSL. In order for DSL to be active they must hold a body temperature above 23°C (73°F).[87] Extreme cold weather snaps, sometimes accompanied by snow and hail, can reduce physiological activity resulting in DSL deaths. Ice storms can also result in destruction of shinnery oak. Dispersal and source-sink dynamics have traditionally allowed DSL to weather extreme winter storms.[88] Unfortunately, habitat fragmentation, by restricting patch size and dispersal ability, may create isolated populations vulnerable to sudden loss of habitat due to extreme winter storm events. The threats to DSL posed by extreme cold and winter storm events, will only grow as anthropogenic climate change continues to gain momentum and fragmentation of DSL habitat grows. A hard look on these negative influences must include the compounding effects of these exponential threats.

On the other side of the coin, extreme heat and drought harms DSL populations as well. Granted, DSL is adapted to reside in a semiarid climate with a history of extreme heat and drought. But, over the last 20 years, southeastern New Mexico has frequently been in drought conditions, facing periods of severe drought.[89] In the 1920s and 1930s, shinnery oak ecosystems on average encountered drought 1 to 2 years in northern portions and 2 to 3 years in southern portions out of every 10 years.[90] In the past 20 years, moderate to exceptional drought has occurred every 1 to 2 years in the southern and northern shinnery oak ecosystems.[91] Drought is becoming more extreme in degree, and in some cases more frequent.

While no direct study has been conducted on drought impacts to DSL, the Service surmises that Drought could impact food resources, which would then impact DSL productivity. Relatedly, the marbled whiptail (*Aspidoscelis marmoratus*), another lizard species found in the Monahans Sandhills, showed decline in density during drought.[92] If drought restricts available food resources, it could negatively affect DSL recruitment and survival.

Shinnery oak can lose its leaves or not even leaf-out during periods of drought.[93] "Recent droughts have resulted in a lack of the typical spring green-up for shinnery oak, instead occurring later with the seasonal summer monsoons".[94] Green-up timing is critical to DSL, providing shelter for adults as they become active in the spring as well as food for invertebrates consumed by DSL. Drought impacts on shinnery oak hold broader consequences for duneland habitat as well. Shinnery oak clones can reach 50 ft in diameter, making large areas of duneland habitat vulnerable should an oak demise due to drought impacts.[95]

"Climate change is likely to increase the frequency and magnitude of drought in this region."[96] An increase in drought frequency and intensity is occurring throughout the range of

[87] Johnson et al. 2016, p. 3.
[88] 2024 DSL SSA at 74.
[89] U.S. Drought Monitor, https://droughtmonitor.unl.edu/.
[90] Peterson and Boyd 1998, p. 14.
[91] 2024 DSL SSA at 74–75.
[92] Fitzgerald et al. 2011, p. 30.
[93] Peterson and Boyd 1998, p. 9.
[94] 2024 DSL SSA at 75 (citing Johnson et al. 2016, p. 78.).
[95] Gucker 2006, p. 7.
[96] 2024 DSL SSA at 76.

the DSL.[97] Future climate change projections specify groundwater resources will be further depleted with more extreme drought and increasing summer temperatures.[98] Alterations to the landscape via oil and gas development will also exacerbate the impacts of climate change to DSL. Habitat fragmentation can increase air temperatures, increase solar radiation, and reduce the availability of microhabitats available to serve as thermal refugia.[99] Fragmentation also restricts natural source-sink dynamics that could buffer against extreme weather impacts through DSL dispersal behavior. Fragmentation lessons DSL capabilities to disperse and escape harsher micro-habitats harder hit by drought.[100] Given DSL reliance upon shinnery oaks and dunelands, growing drought will undoubtedly harm DSL in growing and compounding ways that BLM must address in its NEPA and ESA consultation processes.

c. BLM Must Take a Hard Look At Impacts of Oil and Gas Leasing and Development on the Endangered Southern DPS of the Lesser Prairie Chicken. BLM Should Defer Parcels Within, and Within 10 Miles of the Southern DPS.

The LPC population in New Mexico is a genetically unique and highly biologically significant population that evolved through specific adaptations to thrive in the Shinnery Oak Prairie ecoregion. Industrial development in New Mexico, particularly oil and gas development livestock grazing, have dramatically decreased the habitat available to the state's LPC population and drastically reduced the population's size— so much so that FWS has listed the Southern LPC DPS as endangered under the Endangered Species Act ("ESA"). Because this population is a habitat specialist population, and cannot easily adapt to new habitats, it is particularly vulnerable to habitat destruction and fragmentation.

BLM administers much of the LPC's remaining habitat. BLM therefore has the power to either help protect the remaining New Mexico LPC population, or to further threaten its survival by permitting leasing of federal lands in critical LPC habitat areas for oil and gas exploration and development. Any use of BLM lands inconsistent with the preservation of current LPC habitat will have a significant and negative impact on the LPC population. Parcels in the proposed oil and gas lease sales are located within or near the range of the endangered southern distinct population segment ("DPS") of the lesser prairie chicken (*Tympanuchus pallidicinctus*) ("LPC").

Leasing this land would create new and exacerbate existing threats to LPC survival, including increases in infrastructure and ensuing habitat fragmentation, noise pollution, and environmental hazards from the oil and gas drilling and extraction itself. The LPC New Mexico population stands on a precipice, and BLM's decision with respect to these federal lands will

---

[97] **Exhibit 289,** Kinniburgh, F., M. Simonton, and C. Allouch. 2015. *Come Heat and High Water: Climate Risk in the Southeastern U.S. and TX.* A Product of the Risky Business Project, p. 62 [hereinafter Kinniburgh et al. 2015].
[98] **Exhibit 290,** Nielsen-Gammon, J.W., J.L. Banner, B.I. Cook, D.M. Tremaine, C.I. Wong, R.E. Mace, H. Gao, Z.L. Yang, M.F. Gonzalez, R. Hoffpauir, T. Gooch, and K. Kloesel. 2020. *Unprecedented Drought Challenges for Texas Water Resources in a Changing Climate: What Do Researchers and Stakeholders Need to Know?* Earth's Future 8: e2020EF001552, pp. 5-7 [hereinafter Nielsen-Gammon et al. 2020]; **Exhibit 291,** Yoon, J.H., S.-Y. Wang, M.-H. Lo, and W.-Y. Wu. 2018. *Concurrent increases in wet and dry extremes projected in Texas and combined effects on groundwater.* Environmental Research Letters 13: 054002 [hereinafter Yoon et al. 2018].
[99] Jacobson 2016, pp. 3-4, 10.
[100] 2024 DSL SSA at 76.

likely determine the fate of this unique and genetically distinct population. BLM should choose *not* to lease *any* federal land for oil and gas development, and to preserve this unique and biologically significant population.

Given the serious threats already facing the LPC, and the fact that climate change will further exacerbate them, BLM should not open federal lands to lease for oil and gas development. Such activity will inflict significant harm on the LPC population and significantly decrease its ultimate chance of survival and recovery. While the existing threats facing the LPC and those predicted from climate change will be difficult to control, BLM does control the decisions about new land leases in critical habitat areas of the New Mexico LPC. BLM must use its power to avoid further harm to this fragile and genetically unique population.

BLM's past, current, and future decisions with respect to the leasing of LPC habitat will significantly and gravely impact the LPC. BLM's planning area includes 2.1 million acres of Federal surface land, and 3 million acres of BLM-managed mineral estate in New Mexico's Chaves, Eddy, and Lea Counties.[101] These counties are located in southeastern New Mexico and overlap considerably with critical LPC habitat. LPCs currently occupy seven counties within New Mexico—specifically, Eddy, Lea, Chaves, Leah, De Baca, Roosevelt, and Quay counties.[102]

Preserving remaining LPC habitat is critical because the LPC population already faces significant threats to its survival. This section outlines the EA's failure to take a hard look at the most significant threats to the LPC, making preservation by BLM of remaining LPC habitat and population even more crucial. BLM failed to take a hard look at the following threats to LPC that will arise from leasing parcels in and near occupied habitat for LPC, and unoccupied habitat that, critically, may in the future be necessary to ensure the newly-ESA-listed bird's survival and recovery. For these reasons, BLM should defer all parcels within or within 10 miles of the endangered Southern DPS.

BLM's imperative to take a hard look at impacts to habitat necessary for survival, recovery, and potential future introductions are made more important by the uniqueness and fragility of the New Mexico's LPC population, where survival and recovery of this population will almost certainly require not just stopping habitat loss, but also conservation, restoration, and reintroduction of birds into previously occupied habitat. Each population of the LPC is genetically unique, and this is particularly true of the LPC New Mexico population.[103] The LPC population in New Mexico resides in an ecoregion known as the Shinnery Oak Prairie, and members within this population exhibit especially unique genetic patterns.[104] In fact, numerous genetic studies comparing LPC populations of New Mexico to the nearest neighboring

---

[101] Bureau of Land Management, *Public Scoping Report for the Carlsbad Field Office Resource Management Plan Revision/Environmental Impact Statement*, 4 (May 2011).
[102] WildEarth Guardians et al., *supra*, at 55.
[103] **Exhibit 138,** Sara Oyler-McCance, *Rangewide Genetic Analysis of Lesser Prairie-Chicken Reveals Population Structure, Range Expansion, and Possible Introgression*, 17 Conservation Genetics 643 (2016).
[104] **Exhibit 139,** L. McDonald, *Range-Wide Population Size of the Lesser Prairie-Chicken*: *2012, 2013, 2014, 2015, and 2016*. Technical Report for the W. Ass'n of Fish and Wildlife Agencies (2016); Sara Oyler-McCance, *Rangewide Genetic Analysis of Lesser Prairie-Chicken Reveals Population Structure, Range Expansion, and Possible Introgression*, 17 Conservation Genetics 643 (2016), Exhibit 130.

population in Oklahoma have documented substantial genetic differences between these regions that suggest significant, if not complete, isolation by distance.[105] This isolation has resulted in a number of adaptations that make the population uniquely suited to the conditions of the Shinnery Oak Prairie. For example, studies document that this population invests more in survival and less in reproduction than do LPCs in more northerly regions.[106] The particular adaptations of the New Mexico LPC make this population highly biologically significant, and loss of this specific population of the LPC would mean substantial and irrevocable loss of intra-species biodiversity.

While the LPC has historically occupied habitat in east-central New Mexico, both its population and range and have decreased dramatically in the last two hundred years.[107] Prior to settlement and development, there were an estimated 125,000 LPC in the region.[108] However, since the 1800s, the overall occupied range of the LPC has decreased 92 percent—a figure which incorporates a 78 percent decrease in their range since 1963.[109] This decrease in LPC range is accompanied by a marked decrease in its population numbers. The latest LPC aerial survey indicates an estimated breeding population of about 38,000 birds in New Mexico.[110] There, the LPC currently occupies about 2 million acres, the majority of which are in eastern New Mexico.[111] However, LPCs are concentrated in patches within the few regions in New Mexico they still occupy, and only four of these patches exceed the 17,885-acre threshold necessary to maintain their populations over the long term.[112] What's more, only 26 percent of suitable habitat occupied by the LPC is considered large enough to support the populations.[113]

---

[105] **Exhibit 140,** WildEarth Guardians et al., *Petition to List the LPC (Tympanuchus pallidicinctus) & Three Distinct Population Segments Under the U.S. Endangered Species Act & Emergency Listing Petition for the Shinnery Oak Prairie & Sand Sage Prairie Distinct Population Segments* 9 (Sept. 8, 2016).
[106] **Exhibit 141,** Patten et al., *Effects of Microhabitat and Microclimate Selection on Adult Survivorship of the Lesser Prairie-Chicken,* 69 Journal of Wildlife Mgmt. 1270 (2005). **Exhibit 142,** Grisham et al., *Nesting Ecology and Nest Survival of Lesser Prairie Chickens on the Southern High Plains of Texas*, 78 Journal of Wildlife Management 857 (2014).
[107] **Exhibit 143,** Michael Massey, *Long-Range Plan for the Management of Lesser Prairie Chickens in New Mexico*, Federal Aid in Wildlife Restoration Grant W-104-R41, Project 3.4, 47 (2001).
[108] J.A. Bailey et al., *Status of the Lesser Prairie Chicken in New Mexico*, 32 Prairie National 157 (2000).
[109] **Exhibit 144,** Taylor et. al., *Status, Ecology, and Management of the Lesser Prairie Chicken*, 77 USDA Forest Service Gen. Tech. Rep. 15 (1980a).
[110] *Aerial Survey Confirm Upward Trend in Lesser Prairie-Chicken Population* (07/08/2018), Gov't website https://www.wafwa.org/news/e_2104/Lesser_Prairie_Chicken_News_Releases/2018/7/Aerial_Surveys_Confirm_Upward_Trend_in_Lesser_Prairie-Chicken_Population.htm.
[111] **Exhibit 145,** Walter Van Pelt, *Lesser Prairie-Chicken Range-wide Conservation Plan Annual Progress Report* (2016).
[112] **Exhibit 146,** Kevin Johnson, *GIS Habitat Analysis for Lesser Prairie Chickens in Southeastern New Mexico*, 6 BMC Ecology 18 (2006).
[113] *Id.*

In order to survive and thrive, the LPC requires large tracts of relatively intact native grasslands.[114] According to the U.S. Fish and Wildlife Service ("FWS"), the LPC requires continuous areas of habitat that are at least 25,000 acres and connected to other large areas of habitat.[115] Without large enough tracts of land, and sufficient corridors connecting this land to other large tracts of land, the LPC population is likely to significantly decrease.[116] This is particularly true because LPC are habitat specialists, meaning that they are uniquely adapted to their specific environment.[117] As a result, the decline in LPC population size associated with habitat destruction and fragmentation is greater than the effect of acreage of habitat lost alone.[118]

As a result of its habitat-specific adaptations, it is far more difficult for the LPC to adapt to new environments. Unlike habitat generalist species, in which population decline due to habitat loss is mitigated by the species' ability to adapt to a new habitat, the LPC cannot generally make up for lost habitat by finding and adapting to new land. Thus, LPC populations decline in lockstep with habitat loss.

Having sizeable and reliable habitat is also critically important for the LPC because they regularly return to the same mating sites, called leks. LPC leks are typically short grassy areas or blowouts in flat sandy country.[119] In New Mexico, LPCs tend to select mating areas during spring, with greater cover of shrubs and overall density of vegetation.[120] The species typically has high fidelity to lek sites: males and females often return to the same lek sites year after year, underscoring the importance of consistent and suitable LPC habitat to the continued survival of the species.[121]

i. BLM Needs to Take a Hard Look at Impacts of Habitat Fragmentation

BLM is required to take a hard look at the impacts of habitat fragmentation on LPC. This includes habitat fragmentation that may result from the development oil and gas leasing with wells, powerlines, roads, and other infrastructure within both occupied habitat and habitat that is now unoccupied that may in the future be necessary for lesser prairie-chicken survival and recovery. BLM sidesteps analysis by claiming that leasing parcels are at least 10 miles away from estimated occupied habitat; the EA lacks monitoring or other data to demonstrate that

---

[114] *Natural Resources Conservation Services New Mexico Lesser Prairie Chicken Initiative* (last visited October 18, 2018), Gov't website. https://www.nrcs.usda.gov/wps/portal/nrcs/detail/nm/programs/financial/eqip/?cid=nrcs144p2_068635.
[115] WildEarth Guardians et al. at 20.
[116] **Exhibit 147,** Bender et al., *Habitat loss and Population Decline: A Meta-Analysis of the Patch Size Effect, 79* Ecology 517 (1998).
[117] *Id.*
[118] *Id.*
[119] **Exhibit 148,** Farrell Copelin, *Notes Regarding the History and Current Status of the Lesser Prairie Chicken in Oklahoma*, 37 Proc. Okla. Acad. Sci. 158 (1959).
[120] **Exhibit 149,** Lena Larsson et al., *Fine-Scale Selection of Habitat by the Lesser Prairie-Chicken*, 58 Southwest Nat. 135 (2013).
[121] **Exhibit 150,** D.A. Haukos et al., *Lesser Prairie Chicken Nest Site Selection and Vegetation Characteristics in Tebuthiuron Treated and Untreated and Untreated Sand Shinnery Oak in Texas.* 49 Great Basin Naturalist 624 (1989). Lesser Prairie-Chicken Interstate Working Group, *The Lesser Prairie-Chicken Range-Wide Conservation Plan* 14 (Oct. 2013).

parcels are or are not occupied by lesser prairie-chicken; it lacks such data to demonstrate that parcels are not sufficiently close to occupied habitat to ensure against habitat fragmentation impacts; it lacks analysis sufficient to ensure that habitat fragmentation resulting from development of leased parcels will not compromise unoccupied habitat within the Southern DPS that may be necessary for future reintroductions or to otherwise ensure for the lesser prairie-chicken survival and recovery.

Habitat fragmentation -- discontinuity in the spatial distribution of resources and conditions that affects occupancy, reproduction, or survival of a particular species -- poses the greatest threat to the survival of the LPC,[122] because it creates or exacerbates several significant threats to the LPC population.

According to FWS, "[t]he loss and fragmentation of even relatively small amounts of existing and suitable habitat can easily put the [LPC] on a path towards a 'death spiral' from which it cannot recover, as [FWS] has seen for similar prairie grouse species such as the now-extinct heath hen and endangered Attwater's prairie-chicken."[123] Habitat specialists like the lesser prairie chicken require larger habitat patch sizes to survive in the long term; decline in population size associated with habitat fragmentation will almost certainly be greater than the effect of acreage of habitat lost alone.[124]

Habitat fragmentation increases the probability of LPC population extirpations. Without effective channels of connection between suitable pockets of LPC habitat, isolated LPC population are prevented from inter-breeding.[125] Thus, habitat fragmentation leads to the biological impoverishment of resulting fragments of habitat.[126] The population as a whole will diminish in genetic diversity, ultimately lowering the species' ability to withstand natural disease or predation. In addition, habitat fragmentation can result in a population increase in harmful species, such as predators, in the space between suitable LPC habitats; these harmful species can then detrimentally affect the LPC in the remaining pockets of suitable habitat.[127]

The effects of habitat fragmentation, including a diminished genetic pool, a decrease in the number suitably sized habitat patches, and an increase in natural predation, extend beyond the isolated pockets of the population in habitat patches and produce long-term consequences for the entire species.

Relatedly, the LPC is considered an "umbrella species": a species that requires a sufficiently large and un-fragmented native habitat such that conservation of that species

---

[122] T.L. Fields, *Breeding season habitat use of Conservation Reserve Program (CRP) land by lesser prairie-chickens in west-central Kansas* (2004) (unpublished M.S. thesis, Colorado State University).
[123] (Defendant's Additional Filing in Support of their Opposed Motion to Amend the Judgment, Case No. 7:14-CV-00050-RAJ at 7; LPC Petition 53).
[124] Darren J. Bender, Thomas A. Contreras, and Lenore Fahrig, *Habitat loss and population decline: a meta-analysis of the patch size effect*, 79 Ecology. 517 (1998), Exhibit 138.
[125] **Exhibit 151,** L. Fahrig and G. Merriam, *Conservation of fragmented populations*, 8 Conserv. Biol. 50, 54 (1994).
[126] **Exhibit 152,** S. Harrison & E. Bruna, *Habitat fragmentation and large-scale conservation: What do we know for sure?* 22 Ecography 225, 229 (1999).
[127] D.S. Wilcove, C.H. McLellan, and A.P. Dobson, *Habitat fragmentation in the temperate zone*, in Conservation Biology: The Science of Scarcity and Diversity 237, 248 (M.E. Soulé, ed., 1986).

effectively provides for the conservation of several other sensitive species.[128] Protecting the LPC population by providing millions of hectares of contiguous prairie serves as both an effective way to promote LPC survival in the wild, and a way of protecting the whole ecosystem of the region. Conversely, loss of habitat suitable for the LPC will not only affect that species, but will produce far-reaching consequences for the region.[129]

Habitat fragmentation can be caused by human activities such as construction of roads and powerlines, energy development, cropland cultivation, and urban or rural sprawl.[130] Habitat fragmentation can result in both displacement of populations from preferred habitats, and significant stress to individuals that remain in close proximity. By failing to buttress its estimates of occupied and unoccupied habitat with actual lesser prairie-chicken location monitoring data, the EA charges forward with leasing parcels without understanding in fact where or how the bird's may be impacted.

For example, a decrease in large patches of un-fragmented habitats, and a commensurate increase in human infrastructure, leads to habitat fragmentation and a decline in LPC population much larger than might be apparent from only taking into account what we might normally consider physical barriers to movement.[131] Active leks are only found, in general, at least 3,000 to 5,000 meters away from anthropogenic features like roads, power lines, and oil and gas wells.[132] In general, the LPC avoids power lines, wells, and buildings; therefore, areas with comparatively greater human development have significant habitat fragmentation and lower survival and fecundity rates than less fragmented areas.[133]

Given the current, advanced, level of habitat loss and fragmentation in New Mexico, the further development of prairie for uses such as oil and gas development will severely threaten the future survival of the LPC. In New Mexico, only 26% of suitable habitat occurred in patches large enough to support lesser prairie chickens, whereas 74% of the "suitable" habitat (including most high-quality habitat) was in patches too small to support LPCs.[134] Only four habitat patches in New Mexico exceed the 17,885-acre threshold necessary to maintain lesser prairie chickens over the long term.[135]

ii. Habitat Fragmentation Due to Livestock Development

---

[128] **Exhibit 153,** C.L. Pruett, M.A. Patten, and D.H. Wolfe, *Avoidance behavior by prairie grouse: Implications for development of wind energy*, 23 Conserv. Biol. 1253, 1254 (2009).
[129] **Exhibit 154,** N.J. Silvy, M.J. Peterson, and R.R. Lopez, *The cause of the decline of the pinnated grouse: The Texas example*, 32 Wildl. Soc. Bull. 16, 20 (2004).
[130] B.A. Grisham, A.J. Godar, and C.P. Griffin, *Climate change*, 48 Stud. Avian Biol. 221, 227 (2016).
[131] **Exhibit 155,** S.D. Fuhlendorf, A.J. Woodward, D.M. Leslie Jr., and J.S. Shackford, *Multi-scale effects of habitat loss and fragmentation on lesser prairie-chicken populations of the US Southern Great Plains*, 17 Landscape Ecol. 617, 626 (2002).
[132] **Exhibit 156,** Anne M. Bartuszegive and Alex Daniels, *Impacts of energy development, anthropogenic structures, and land-use change on lesser prairie-chickens*, 48 Stud. Avian Biol. 205, 212 (2016).
[133] C.A. Hagen, *A demographic analysis of lesser prairie-chicken populations in southwestern Kansas: Survival, population viability, and habitat use*(2003) (unpublished Ph.D. dissertation, Kansas State University).
[134] K. Johnson, T.B. Neville, and P. Neville, *GIS habitat analysis for lesser prairie chickens in southeastern New Mexico*, 6 BMC Ecology (2006), at http://www.biomedcentral.com/1472-6785/6/18.
[135] *Id*.

BLM needs to take a hard look at the how leasing parcels for oil and gas may impact lesser prairie-chicken cumulatively alongside livestock grazing, which also presents a critical risk to the LPC's survival. A habitat characterized by intermittent fire and heavy but infrequent bison grazing is most suitable for the LPC.[136] Human actions such as fire suppression and replacing bison with domestic cattle degrades the habitat for the LPC.[137] Because lesser prairie chickens are dependent on medium to tall grasses in a region of low rainfall, their habitat is very sensitive to overgrazing.[138] The shift from heavy but infrequent grazing by bison to heavy and constant grazing by domestic livestock has contributed to the spread of shrubs and trees, and has reduced the prevalence of native perennial grasses.[139] Therefore, the cultivation of livestock alters the natural composition of the grasslands, making the area increasingly unsuitable to support the LPC.

In New Mexico, livestock overgrazing is the second most important factor in determining cause of lek abandonment, accounting for 18.6% of the observed abandonment.[140] Heavy grazing diminishes the amount of *Andropogon*, a grass associated with good range condition and indicative of active leks. *Andropogon* decreases with grazing pressure, indicating that heavy livestock grazing is a primary contributor of lek abandonment in New Mexico.[141]

Additionally, the infrastructure needed for raising cattle poses a threat to the LPC. A collateral impact of livestock grazing is the proliferation of barbed-wire fences to divide pastures and mark changes in land ownership. Collision with fences was the second-highest cause of mortality for radio-collared lesser prairie chickens in Oklahoma and New Mexico, killing 86 of 322 birds, versus 91 mortalities from raptor predation.[142] In New Mexico, 26.5% of prairie chicken mortalities were the result of fence collisions. *Id.* Although marking fences to reduce grouse collision mortalities may be a way to combat this issue, it is only partially effective, reducing but not eliminating this source of mortality. Ultimately, fence removal is the biologically preferable option.[143]

iii. Habitat Fragmentation Due to Roads

---

[136] **Exhibit 157,** C.A. Hagen, B.K. Sandercock, J.C. Pitman, R.J. Robel, and R.D, *Spatial variation in lesser prairie-chicken demography: A sensitivity analysis of population dynamics and management alternatives*, 73 J. Wildl. Manage. 1325, 1330 (2009).
[137] *Id*.
[138] **Exhibit 158,** F. Hamerstrom & F. Hamerstrom, *Status and problems of North American grouse*, 73 Wilson Bull. 284, 290 (1961).
[139] M.A. Patten, D.H. Wolfe, E. Shochat, and S.K. Sherrod, *Effects of microhabitat and microclimate selection on adult survivorship of the lesser prairie-chicken*, 69 J. Wildl. Manage. 1270, 1277 (2005), Exhibit 133.
[140] **Exhibit 159,** J.L. Hunt & T.L. Best, *Investigation into the decline of populations of the lesser prairie chicken (Tympanuchus pallidicinctus) on lands administered by the Bureau of Land Management, Carlsbad Field Office, New Mexico*, Final Report to the Bureau of Land Management, Cooperative Agreement GDA010007 (2004).
[141] **Exhibit 160,** J.L. Hunt & T.L. Best, *Vegetative characteristics of active and abandoned leks of lesser prairie-chickens (Tympanuchus pallidicinctus) in southeastern New Mexico*, 55 Southw. Nat. 477, 481 (2010).
[142] **Exhibit 161,** D.H. Wolfe, M.A. Patten, E. Shochat, C.L. Pruett, and S.K. Sherrod, *Causes and patterns of mortality in lesser prairie-chickens Tympanuchus pallidicinctus and implications for management*, 13 Wildl. Biol. 95, 99 (2007).
[143] **Exhibit 162,** D.H. Wolfe, M.A. Patten, and S.K. Sherrod, *Reducing grouse collision mortality by marking fences (Oklahoma)*, 27 Ecol. Restor. 141, 142 (2009).

BLM also needs to take a hard and site-specific look at how roads associated with the development of the proposed, past, and potential future oil and gas lease parcels may impact lesser prairie-chicken.

Roads present a serious threat to LPC populations due to collision mortality. For example, in the highly fragmented habitat of western Oklahoma, collisions with fences, vehicles, or powerlines accounted for 42.4% of all lesser prairie chicken mortality, versus 14.3% of mortality in the less-fragmented habitats of New Mexico.[144] In LPC habitat in New Mexico, parcel size of private lands is currently ten times larger, and roads, fences and power lines are one-half to one-third as dense.[145] This habitat and survival benefit to the LPC population in New Mexico would be lost if this area was open to any further development.

Roads also cause the LPC to avoid otherwise suitable nearby habitat due to noise pollution from vehicles on the roadway, especially for the critical purpose of reproduction and rearing their young.[146] LPCs avoid habitats within 785 meters of roads.[147] LPC lek density increased with decreasing density of paved roads, and LPC preference for constructing leks increases as the potential nesting site's distance from highways also increases.[148] [149] Habitats with the greatest lek density had lower densities of paved roads and of unpaved roads, with paved roads having the stronger negative influence.[150] Likewise, lek abandonment has been shown to increase as a function of the miles of road within 1.6 km of the leks,[151] and nest success increases with distance from unimproved roads.[152]

In addition, roads are a conduit for the spread of invasive weeds along roadways and in adjacent habitats, which diminish the quality of LPC habitat[153]; disturbance of soils and vegetation during road construction provides ideal habitat for weed establishment, and construction equipment and subsequent vehicle use transports weed seeds into the road corridor.[154] Non-native invasive plants such as Bermuda grass, Old World bluestem, Russian

---

[144] **Exhibit 163,** Michael A. Patten et al, *Habitat fragmentation, rapid evolution and population persistence*, Evol. Ecol. Res. 7, 235 (2005).
[145] *Id.*
[146] **Exhibit 164,** Forman, R.T.T., and L.E. Alexander, *Roads and their major ecological effects*, Ann. Rev. Ecol. Syst. 29, 207 (1998).
[147] **Exhibit 165,** Robel, R. J. et al., *Effect of energy development and human activity on the use of sand sagebrush habitat by Lesser Prairie Chickens in southwestern Kansas*, Trans. N. Am. Wildl. Nat. Res. Conf. 69, 251 (2004).
[148] **Exhibit 166,** Timmer, J.M. et al., *Spatially explicit modeling of lesser prairie-chicken lek density in Texas*, J. Wildl. Manage. 78, 142 (2014).
[149] **Exhibit 167,** Jarnevich, C.S. and M.K. Laubhan, *Balancing energy development and conservation: A method utilizing species distribution models*, Envtl. Manage. 47, 926 (2011).
[150] **Exhibit 168,** Timmer, J.M., *Relationship of lesser prairie-chicken density to landscape characteristics in Texas*, MS Thesis, Texas Tech Univ., 131 (2012).
[151] Hunt, J.L. and T.L. Best, *Investigation into the decline of populations of the lesser prairie chicken (Tympanuchus pallidicinctus) on lands administered by the Bureau of Land Management, Carlsbad Field Office, New Mexico*, Final Report to the Bureau of Land Management, Cooperative Agreement GDA010007, 160 (2004), Exhibit 155.
[152] **Exhibit 169,** Pitman, J.C. et al., *Location and success of lesser prairie-chicken nests in relation to vegetation and human disturbance*, J. Wildl. Manage. 69, 1259 (2005).
[153] **Exhibit 170,** Gelbard, J.L. and J. Belnap, *Roads as conduits for exotic plant invasions in a semiarid landscape*, Conserv. Biol. 17, 420 (2003).
[154] *Id.*

olive, autumn olive, and osage orange are of no value to the lesser prairie chicken[155]: "[w]herever exotic bluestems have been established, they have been nearly impossible to eliminate and proven to be aggressive invaders that are likely to further diminish the habitat quality of remaining native grasslands."[156]

iv. Habitat Fragmentation Due to Power Lines

BLM also needs to take a hard and site-specific look at how power lines associated with the development of the proposed, past, and potential future oil and gas lease parcels may impact lesser prairie-chicken.

The LPC population is currently threatened by power lines. Overhead power and telephone lines are a significant source of collision mortality for lesser prairie chickens in Oklahoma and New Mexico.[157] Leading researchers recommend the burial of overhead lines in LPC habitat. [158]

LPCs also attempt to avoid power lines, further fragmenting populations and reducing the amount of habitat available for living and reproducing. LPC avoidance of power lines may serve as a movement barrier, further fragmenting habitats.[159] LPCs are rarely found within 0.4 km of power lines, even if the habitat was otherwise suitable for nesting.[160] LPCs avoid transmission lines for both nests and leks: few nest sites were located within 2 km of transmission lines,[161] and transmission lines have a negative relationship with lek density for lesser prairie chickens.[162] [163] Furthermore, the closer a lek is to a powerline, the more likely it is to be abandoned.[164] Placement of power lines near leks may negatively affect the breeding activities of males.[165]

Overhead electrical transmission lines emit electromagnetic fields that can negatively affect the behavior, reproductive success, growth and development, physiology, endocrinology, and oxidative stress of wild birds in ways that vary by species.[166] Although experiments involving LPCs have yet to be undertaken, there is a strong possibility that electromagnetic fields also negatively affect the LPC.

---

[155] **Exhibit 171,** Bidwell.T. et al., *Ecology and management of the lesser prairie-chicken in Oklahoma*, Stillwater, OK: Oklahoma State Cooperative Extension Service, 17 (2002).
[156] Rodgers, R.D, *A history of lesser prairie-chickens*, Stud. Avian Biol. 48, 15 (2016).
[157] Wolfe, D.H et al., *Causes and patterns of mortality in lesser prairie-chickens Tympanuchus pallidicinctus and implications for management*, Wildl. Biol. 13, 95 (2007), Exhibit 161.
[158] *Id.*
[159] **Exhibit 172,** Hagen, C. A. et al., *Impacts of anthropogenic features on habitat use by Lesser Prairie-Chickens*, Studies in Avian Biology (no. 39), University of California Press, Berkeley, CA, 63 (2011).
[160] Robel et al, *supra*, and Pitman et al, *supra*.
[161] Pruett et al, *supra*.
[162] **Exhibit 173,** Lautenbach, J.M., *Lesser prairie-chicken reproductive success, habitat selection, and response to trees*, M.S. Thesis, Kansas State Univ., 142 (2015).
[163] Timmer, *supra*.
[164] Hunt ann Best, *supra*.
[165] **Exhibit 174,** Hagen, C. A. et al. *Managing lesser prairie chicken populations and their habitats*, Wildl. Soc. Bull. 32, 69 (2004).
[166] **Exhibit 175,** Fernie, K.J., and S.J. Reynolds, *The effects of electromagnetic fields from power lines on avian reproductive biology and physiology: a review*, J. Toxicol. Environ. Health Part B 8, 127 (2005).

Power lines also increase predator habitat, which increases LPC mortality. Raptors and common ravens nest on transmission towers.[167] The increased predator presence along power lines can lead to LPC avoidance of these structures, and increased stress and risk of predation for LPCs that remain nearby.

v. Impacts to Lesser Prairie-Chicken from Climate Change

BLM also needs to take a hard look at the impacts of climate change on lesser prairie-chicken. The effects of climate change in the LPC's habitat are highly likely to exacerbate many existing challenges the species faces, particularly those related to its habitat. Climate change effects, including increased temperatures, drought, extreme weather events, vegetation changes, and the spread of parasites and disease, will likely further harm the LPC population by reducing its ability to nest, reproduce, obtain sufficient nourishment, and avoid deleterious predation.

a. Increased Temperatures

Increased summer temperatures and above-average winter temperatures, predicted as a result of climate change, will likely contribute to a decline in LPC nest survival rates.[168] Higher temperatures significantly contribute to lower daily brood survival.[169] LPC populations in New Mexico and Texas are more vulnerable to climate change than their counterparts in Kansas, as they face temperatures 7°C warmer than the latter.[170] Great Plains temperatures have already increased 1.5°F since the 1960s and 1970s baseline level.[171] Experts predict temperature increases of 2.5°F to 6°F above this baseline by 2050,[172] of 2.8°F to 3.5°F by 2060,[173] and of 5°F to 13.5°F above the baseline by 2090.[174] As a result of these temperature increases, LPC nest survival rates may fall below the level of viability for population persistence between 2050 and 2080.[175] Furthermore, the expected increase in temperature variability across the LPC habitat due

---

[167] **Exhibit 176,** Steenhof, K et al., *Nesting by raptors and common ravens on electrical transmission towers*, J. Wildl. Manage. 57, 271 (1993).
[168] *See* **Exhibit 177,** Cynthia P. Melcher, U.S. Geological Survey, Southern Great Plains Rapid Ecoregional Assessment—Pre-Assessment Report 170 (Timothy J. Assal et al. eds., 2015); *see also* **Exhibit 178,** Blake Grisham et al., *The Predicted Influence of Climate Change on Lesser Prairie-Chicken Reproductive Parameters*, (July 11, 2013), 8 PLOS ONE e68225.
[169] **Exhibit 179,** Fields et al., *Nest and Brood Survival of Lesser Prairie-Chickens in West Central Kansas*, 70 J. Wildlife Mgmt. 931, 935 (2009).
[170] *See* Grisham et al., *supra*, at 7.
[171] **Exhibit 180,** Thomas R. Karl, Global Climate Change Impacts in the U.S., 125 (Jerry M. Melillo et al., eds., 1st ed. 2009).
[172] *Id.* at 125.
[173] M. McLachlan, A. Bartuszevige, and D. Pool, *Evaluating the potential of the Conservation Reserve Program to offset projected impacts of climate change on the Lesser Prairie-Chicken (Tympanuchus pallidicinctus): a conservation effects assessment Project,* Playa Lakes Joint Venture, Lafayette, CO, USA (2010) at 17.
[174] Thomas R. Karl, Global Climate Change Impacts in the U.S., 125 (Jerry M. Melillo et al., eds., 1st ed. 2009), Exhibit 177.
[175] Grisham et al., *supra*, at 7.

to climate change may decrease survival of adult and juvenile chickens, in part through heat stress.[176]

1. **Drought**

In addition to increased and more variable temperatures, climate change will likely lead to increased drought in the southern Great Plains region, which will further harm the LPC's chances of survival.[177] LPCs in New Mexico and Texas are more vulnerable to climate change than their counterparts in Kansas because they receive 7% less relative humidity than do the latter.[178] Precipitation across the LPC habitat will likely decrease by 10% by 2060.[179] Such decreased precipitation will further contribute to lower rates of adult and juvenile LPC survival.[180] Moreover, population fluctuations resulting from prolonged periods of drought may further threaten the survival of fragmented LPC populations.[181]

b. Extreme Weather Events

Extreme weather events, exacerbated by climate change, are expected to further threaten the LPC's habitat and survival.[182] Weather events including tornadoes, hail storms, floods, heat waves, and cold waves will likely occur more frequently across the southern Great Plains due to climate change.[183] These events may temporarily reduce the quality of LPC habitat or even remove such habitat.[184] Extreme heat events, in addition to the trend of generally rising temperatures detailed above, are projected to increase throughout this century and increase mortality rates for both adult and juvenile LPCs.[185] Intense storms during the nesting season may lead to significant declines in reproduction and survival rates for local LPC populations.[186]

c. Vegetation Changes

---

[176] *See* **Exhibit 181,** Wolfe et al., *The Lesser Prairie-Chicken in the Mixed-Grass Prairie Ecoregion of Oklahoma, Kansas and Texas*, *in* 48 Studies in Avian Biology 299-314, 306 (David A. Haukos & Clint Boal 1 ed. 2016).
[177] *See* Wolfe et al., *supra*, at 306.
[178] *See* Grisham et al., *supra*, at 7.
[179] McLachlan et al., *supra*, at 7.
[180] *See* Wolfe et al., *supra*, at 306
[181] *See* **Exhibit 182,** Sean Kyle et al., Arizona Game and Fish Department, The Lesser Prairie-Chicken Range-wide Conservation Plan at 35 (William E. Van Pelt ed., 2013).
[182] *See* WildEarth Guardians et al. at 107, *supra*.
[183] *See* Blake Grisham et al., *Climate Change*, in Studies in Avian Biology 235 (David A. Haukos & Clint Boal 1 ed. 2016).
[184] *See* Sean Kyle et al., Arizona Game and Fish Department, The Lesser Prairie-Chicken Range-wide Conservation Plan at 36 (William E. Van Pelt ed., 2013), Exhibit 182.
[185] *See* Cynthia P. Melcher, U.S. Geological Survey, Southern Great Plains Rapid Ecoregional Assessment—Pre-Assessment Report 170 (Timothy J. Assal et al. eds., 2015 at 169, Exhibit 177; *see generally* David M. Anderson et al., U.S. Global Change Research Program, Global Climate Change Impacts in the U.S. (Thomas R. Karl et al. eds., 2009).
[186] *See* Sean Kyle et al., Arizona Game and Fish Department, The Lesser Prairie-Chicken Range-wide Conservation Plan 35 (William E. Van Pelt ed., 2013) at 35, Exhibit 182.

Climate change-induced changes in quantity and quality of vegetation across LPC habitat will likely contribute to a decline in the species' population over the next 60 years.[187]

Decreased shinnery oak distribution across the LPC habitat, which is expected to result from rising temperatures, increased drought, and other climatic effects, will reduce the amount of shrub cover and food supply available to the LPC.[188] This decreased shrub cover will also detrimentally affect the LPC's selection of nest sites and its adult survival rates.[189] By changing the structure and composition of plant communities, climate change will likely lead these communities to become less suitable for the LPC, a habitat specialist.[190] Drought-induced effects on vegetation composition and structures may in fact be the main mechanism of climate change related harm to the LPC population's viability.[191]

Climate change impacts on the geographical distribution of plants across the LPC habitat are also expected to reduce the quality and suitability of such habitat for the LPC.[192] Among the most serious scenarios predicted for vegetation change is a 100% loss of Great Plains grassland by 2030 in New Mexico, which would result in an extinction of the LPC in this region.[193]

As mentioned above, habitat fragmentation is a serious existing threat to the LPC. In habitats as fragmented as those of the LPC currently, climate change may lead to extinctions of the LPC by overwhelming small, local populations' ability to adapt, and reducing their genetic diversity.[194]

d. Parasites and Disease

Climate change may further threaten the LPC by leading to an increase in parasites including the West Nile Virus (hereinafter, WNV) across their habitat.[195] The WNV may decrease LPC hens' ability to nourish themselves, and the quality of their eggs, thus reducing rates of chick survival.[196] Climate change may exacerbate the transmission speed of the WNV

---

[187] *See* McLachlan, A. Bartuszevige, and D. Pool, *Evaluating the potential of the Conservation Reserve Program to offset projected impacts of climate change on the Lesser Prairie-Chicken (Tympanuchus pallidicinctus): a conservation effects assessment Project,* Playa Lakes Joint Venture, Lafayette, CO, USA (2010) at 29.
[188] *See* Cynthia P. Melcher, U.S. Geological Survey, Southern Great Plains Rapid Ecoregional Assessment—Pre-Assessment Report 170 (Timothy J. Assal et al. eds., 2015 at 170, Exhibit 177; *see also* William E. Van Pelt, ed., Western Ass'n on Fish & Wildlife Agencies, The Lesser Prairie-Chicken Range-wide Conservation Plan: Cheyenne, Wyo. (2013).
[189] *See* Wolfe et al., *supra*, at 306.
[190] *See* Sean Kyle et al., Arizona Game and Fish Department, The Lesser Prairie-Chicken Range-wide Conservation Plan 35 (William E. Van Pelt ed., 2013) at 35, Exhibit 182.
[191] Grisham et al., *supra*, at 231.
[192] *See* **Exhibit 183,** Camille Parmesan, *Ecological & Evolutionary Responses to Recent Climate Change*, 37 Annual Review of Ecology, Evolution & Systematics 637–669, 637 (2006).
[193] **Exhibit 184,** Patty Glick et al. eds., Nat'l Wildlife Fed'n, Scanning the Conservation Horizon: A Guide to Climate Change Vulnerability Assessment 100 (2011).
[194] *See* **Exhibit 185,** Alistair S. Jump & Josep Peñuelas, *Running to Stand Still: Adaptation & the Response of Plants to Rapid Climate Change*, 8 Ecology Letters 1010-1020, 1017 (2005).
[195] *See* WildEarth Guardians et al., *supra*, at 110.
[196] *See* Markus J. Peterson, *Macroparasitic, Microparasitic & Noninfectious Diseases of Lesser Prairie-Chickens*, *in* 48 Studies in Avian Biology 159-183, 176 (David A. Haukos & Clint Boal 1 ed. 2016).

through the LPC habitat by enabling increased mosquito speed and activity,[197] enhanced adult mosquito survival,[198] and faster development of the virus within mosquitoes.[199] Furthermore, since the increased drought resulting from climate change will likely lead to a higher concentration of LPCs around rarer, diminishing water sources, mosquitoes are predicted to benefit from an increase in their food supply - of LPC individuals around stagnant water.[200]

e. Noise Pollution

New oil and gas drilling would create new and significant noise pollution, posing a serious threat to nearby LPC populations. Drilling and its associated activities produce many noises not normally found in nature: the sounds of drilling, construction, and maintenance, along with the increase in extremely loud heavy-duty truck traffic necessary to transport people, drilling materials, and extracted oil and gas to and from drilling sites.[201] This noise pollution has been shown to be particularly disruptive to LPC leks and their successful reproduction.[202] In one study, researchers created recordings of sounds associated with oil and gas drilling and played them near leks in the wild, while observing other, unaffected lek sites as a control.[203] The study found a strong negative effect on both male and female attendance at the leks subjected to the noise, as compared to the control group.[204] Some of the leks subjected to the noises of oil and gas development showed a drop in female attendance of over 70 percent.[205]

These results have been supported by multiple other studies, including a study showing a statistically significant difference of 4 dB greater noise pollution at abandoned leks than active leks. [206] Sound disturbance at lek sites is likely to be "devastating to breeding efforts," and any further development of oil and gas drilling in current LPC habitat would pose a serious risk to the population's survival.[207]

---

[197] **Exhibit 186,** P. Mottram et al., *The Effect of Temperature on Eggs and Immature Stages of Culex Annulirostris Skuse (Diptera: Culicidae)*, 25 Australian J. Entomology 131-136 (1986).
[198] *See generally* **Exhibit 187,** Charles L. Bailey, *Winter Survival of Blood-fed and Non-blood-fed Culex pipiens*, 31 Am. J. Tropical Med. Hygiene 1054–1061 (1982).
[199] *See generally* **Exhibit 188,** David J. Dohm et al., *Effect of Envtl. Temperature on the Ability of Culex Pipiens (Diptera: Culicidae) to Transmit West Nile Virus*, 39 J. Med. Entomology 221-225 (2002).
[200] *See generally* **Exhibit 189,** Pamela Anderson et al., The Ctr. for Health & the Global Envt., Harvard Med. School, Climate Change Futures: Health, Ecological & Econ. Dimensions (Paul R. Epstein & Evan Mills eds., 2005).
[201] **Exhibit 190,** Francis, C.D., C.P. Ortega, and A. Cruz, *Noise pollution changes avian communities and species interactions,* (2009) at 1418.
[202] **Exhibit 191,** Blickley, J.L., D. Blackwood, and G.L. Patricelli, *Experimental Evidence for the Effects of Chronic Anthropogenic Noise on Abundance of Greater Sage-Grouse at Leks* (2012) at 467.
[203] *Id.*
[204] *Id.*
[205] *Id.*
[206] *See* J.L. Hunt & T.L. Best, *Investigation into the decline of populations of the lesser prairie chicken (Tympanuchus pallidicinctus) on lands administered by the Bureau of Land Management, Carlsbad Field Office, New Mexico*, Final Report to the Bureau of Land Management, Cooperative Agreement GDA010007 at 142 (2004), Exhibit 159.
[207] Smith, H., K. Johnson, and L. DeLay, *Survey of the lesser prairie chicken on Bureau of Land Management lands, Carlsbad Resource Area, NM. Unpubl. Rep. to the Bureau of Land Management. Albuquerque, NM: New Mexico Natural Heritage* (1998) at 6.6 Program at 6.

f. Environmental and Pollution Threats

New oil and gas drilling, and any new hydraulic fracturing, will also likely increase LPC exposure to hazardous chemicals, and may lead to very damaging changes to their habitat.

Spills and emissions from oil and gas well pads, from the trucks that transport drilled oil and gas, and from trucks transporting fluids and compounds necessary for drilling are routine.[208] Researchers have documented LPC deaths in other areas "from sludge pits and poisonous gases" attributed to oil and gas drilling.[209]

No new hydraulic fracturing should happen in the BLM lands up for leasing until the impact of fracking on the LPC has been further studied. While there is no research yet on the direct impact of hydraulic fracturing on the LPC, southeastern New Mexico is increasingly viewed as a prime area for hydraulic fracturing.[210] However, multiple studies have found environmental impacts of fracking on the environment, from increased erosion, to chemical spills, to polluting the water supply.[211] [212] Until there is further research done, considering all the threats already facing the LPC, there should be no further disruption of the LPC's ecosystem with potentially hazardous activities.

d. BLM Must Properly Analyze Federal or State Law and Policy.

There are several federal and state government laws and policies that set GHG emission reduction targets or commitments, which authorization of the proposed leases will likely threaten. On the federal side, President Biden announced a goal to achieve net-zero emissions by 2050,[213] as well as a target to reduce GHG emissions by 50-52% by 2030, compared to 2005 levels.[214] In addition, the United States is a signatory to the 2015 Paris Agreement, committing to a goal of limiting global temperature increase well below 2 C, pursuing efforts to limit the increase to 1.5 C, and committing to reaching global peaking of GHGs as soon as possible.

On the state side, for example, both Colorado and New Mexico have statutes and executive orders setting emission reduction goals. In Colorado, HB19-1261 requires the state to reduce GHG emissions by at least 26 percent in 2025, at least 50 percent by 2030, and at least 90 percent by 2050, relative to 2005 pollution levels. In New Mexico, Executive Order 2019-003

---

[208] **Exhibit 192,** Clancy, S.A., F. Worrall, R.J. Davies, J.G. Gluyas. *The potential for spills and leaks of contaminated liquids from shale gas developments.* 626 Sci. of the Total Env't. 1463, 1464 (June 1, 2018).
[209] Massey, M. *Long-range plan for the management of lesser prairie-chickens in New Mexico, 2002-2006. New Mexico Department of Game and Fish, Federal Aid in Wildlife Restoration* (2001) at 16, Exhibit 143.
[210] **Exhibit 193,** Tsvetana Paraskova, USA Today, *Is southeastern New Mexico the new sweet spot for shale?* (2017), available at https://www.usatoday.com/story/money/energy/2017/11/22/southeastern-new-mexico-new-sweet-spot-shale/882239001/.
[211] **Exhibit 194,** Williams, H.F.L., D.L. Havens, K.E. Banks, and D.J. Wachal *Field-based monitoring of sediment runoff from natural gas well sites in Denton County, Texas, USA,* (2008).
[212] **Exhibit 195,** Burton, G.A., K.J. Nadelhoffer, and K. Presley, *Hydraulic fracturing in the state of Michigan: Environment/ecology technical report. University of Michigan*. (2013).
[213] Executive Order 13990 (January 20, 2021).
[214] Executive Order 14008 (January 27, 2021).

declares the state's support of the 2015 Paris Agreement goals and orders the state to achieve statewide reduction of GHG emissions of at least 45% by 2030, relative to 2005 levels.

BLM must discuss and evaluate how the proposed lease sales and their estimated GHG emissions may threaten violation of these federal and state laws and policies.

U.S. Bureau of Land Management
New Mexico State Office
Attn: Catherine Brewster
301 Dinosaur Trail
Santa Fe, NM 87508

Via Eplanning (*Exhibits sent via FedEx*)

Re: Scoping for the New Mexico Q1 2026 Oil and Gas Lease Parcel Sales (DOI-BLM-NM-F010-2025-0033-EA & DOI-BLM-NM-P020-2025-1005-EA)

Appendix D Exhibit List

Exhibit 138, Sara Oyler-McCance, *Rangewide Genetic Analysis of Lesser Prairie-Chicken Reveals Population Structure, Range Expansion, and Possible Introgression*, 17 Conservation Genetics 643 (2016).

Exhibit 139, L. McDonald, *Range-Wide Population Size of the Lesser Prairie-Chicken*: *2012, 2013, 2014, 2015, and 2016*. Technical Report for the W. Ass'n of Fish and Wildlife Agencies (2016).

Exhibit 140, WildEarth Guardians et al., *Petition to List the LPC (Tympanuchus pallidicinctus) & Three Distinct Population Segments Under the U.S. Endangered Species Act & Emergency Listing Petition for the Shinnery Oak Prairie & Sand Sage Prairie Distinct Population Segments* 9 (Sept. 8, 2016).

Exhibit 141 Patten et al., *Effects of Microhabitat and Microclimate Selection on Adult Survivorship of the Lesser Prairie-Chicken,* 69 Journal of Wildlife Mgmt. 1270 (2005).

Exhibit 142, Grisham et al., *Nesting Ecology and Nest Survival of Lesser Prairie Chickens on the Southern High Plains of Texas*, 78 Journal of Wildlife Management 857 (2014).

Exhibit 143, Michael Massey, *Long-Range Plan for the Management of Lesser Prairie Chickens in New Mexico*, Federal Aid in Wildlife Restoration Grant W-104-R41, Project 3.4, 47 (2001).

Exhibit 144, Taylor et. al., *Status, Ecology, and Management of the Lesser Prairie Chicken*, 77 USDA Forest Service Gen. Tech. Rep. 15 (1980a).

Exhibit 145, Walter Van Pelt, *Lesser Prairie-Chicken Range-wide Conservation Plan Annual Progress Report* (2016).

Exhibit 146, Kristine Johnson, *GIS Habitat Analysis for Lesser Prairie Chickens in Southeastern New Mexico*, 6 BMC Ecology 18 (2006).

Exhibit 147, Bender et al., *Habitat loss and Population Decline: A Meta-Analysis of the Patch Size Effect, 79* Ecology 517 (1998).

Exhibit 148, Farrell Copelin, *Notes Regarding the History and Current Status of the Lesser Prairie Chicken in Oklahoma*, 37 Proc. Okla. Acad. Sci. 158 (1959).

Exhibit 149, Lena Larsson et al., *Fine-Scale Selection of Habitat by the Lesser Prairie-Chicken*, 58 Southwest Nat. 135 (2013).

Exhibit 150, D.A. Haukos et al., *Lesser Prairie Chicken Nest Site Selection and Vegetation Characteristics in Tebuthiuron Treated and Untreated and Untreated Sand Shinnery Oak in Texas.* 49 Great Basin Naturalist 624 (1989). Lesser Prairie-Chicken Interstate Working Group, *The Lesser Prairie-Chicken Range-Wide Conservation Plan* 14 (Oct. 2013).

Exhibit 151, L. Fahrig and G. Merriam, *Conservation of fragmented populations*, 8 Conserv. Biol. 50, 54 (1994).

Exhibit 152, S. Harrison & E. Bruna, *Habitat fragmentation and large-scale conservation: What do we know for sure?* 22 Ecography 225, 229 (1999).

Exhibit 153, C.L. Pruett, M.A. Patten, and D.H. Wolfe, *Avoidance behavior by prairie grouse: Implications for development of wind energy*, 23 Conserv. Biol. 1253, 1254 (2009).

Exhibit 154, N.J. Silvy, M.J. Peterson, and R.R. Lopez, *The cause of the decline of the pinnated grouse: The Texas example*, 32 Wildl. Soc. Bull. 16, 20 (2004).

Exhibit 155, S.D. Fuhlendorf, A.J. Woodward, D.M. Leslie Jr., and J.S. Shackford, *Multi-scale effects of habitat loss and fragmentation on lesser prairie-chicken populations of the US Southern Great Plains*, 17 Landscape Ecol. 617, 626 (2002).

Exhibit 156, Anne M. Bartuszegive and Alex Daniels, *Impacts of energy development, anthropogenic structures, and land-use change on lesser prairie-chickens*, 48 Stud. Avian Biol. 205, 212 (2016).

Exhibit 157, C.A. Hagen, B.K. Sandercock, J.C. Pitman, R.J. Robel, and R.D, *Spatial variation in lesser prairie-chicken demography: A sensitivity analysis of population dynamics and management alternatives*, 73 J. Wildl. Manage. 1325, 1330 (2009).

Exhibit 158, F. Hamerstrom & F. Hamerstrom, *Status and problems of North American grouse*, 73 Wilson Bull. 284, 290 (1961).

Exhibit 159, J.L. Hunt & T.L. Best, *Investigation into the decline of populations of the lesser prairie chicken (Tympanuchus pallidicinctus) on lands administered by the Bureau of Land Management, Carlsbad Field Office, New Mexico*, Final Report to the Bureau of Land Management, Cooperative Agreement GDA010007 (2004).

Exhibit 160, J.L. Hunt & T.L. Best, *Vegetative characteristics of active and abandoned leks of lesser prairie-chickens (Tympanuchus pallidicinctus) in southeastern New Mexico*, 55 Southw. Nat. 477, 481 (2010).

Exhibit 161, D.H. Wolfe, M.A. Patten, E. Shochat, C.L. Pruett, and S.K. Sherrod, *Causes and patterns of mortality in lesser prairie-chickens Tympanuchus pallidicinctus and implications for management*, 13 Wildl. Biol. 95, 99 (2007).

Exhibit 162, D.H. Wolfe, M.A. Patten, E. Shochat, C.L. Pruett, and S.K. Sherrod, *Causes and patterns of mortality in lesser prairie-chickens Tympanuchus pallidicinctus and implications for management*, 13 Wildl. Biol. 95, 99 (2007).

Exhibit 163, Michael A. Patten et al, *Habitat fragmentation, rapid evolution and population persistence*, Evol. Ecol. Res. 7, 235 (2005).

Exhibit 164, Forman, R.T.T., and L.E. Alexander, *Roads and their major ecological effects*, Ann. Rev. Ecol. Syst. 29, 207 (1998).

Exhibit 165, Robel, R. J. et al., *Effect of energy development and human activity on the use of sand sagebrush habitat by Lesser Prairie Chickens in southwestern Kansas*, Trans. N. Am. Wildl. Nat. Res. Conf. 69, 251 (2004).

Exhibit 166, Timmer, J.M. et al., *Spatially explicit modeling of lesser prairie-chicken lek density in Texas*, J. Wildl. Manage. 78, 142 (2014).

Exhibit 167, Jarnevich, C.S. and M.K. Laubhan, *Balancing energy development and conservation: A method utilizing species distribution models*, Envtl. Manage. 47, 926 (2011).

Exhibit 168, Timmer, J.M., *Relationship of lesser prairie-chicken density to landscape characteristics in Texas*, MS Thesis, Texas Tech Univ., 131 (2012).

Exhibit 169, Pitman, J.C. et al., *Location and success of lesser prairie-chicken nests in relation to vegetation and human disturbance*, J. Wildl. Manage. 69, 1259 (2005).

Exhibit 170, Gelbard, J.L. and J. Belnap, *Roads as conduits for exotic plant invasions in a semiarid landscape*, Conserv. Biol. 17, 420 (2003).

Exhibit 171, Bidwell.T. et al., *Ecology and management of the lesser prairie-chicken in Oklahoma*, Stillwater, OK: Oklahoma State Cooperative Extension Service, 17 (2002).

Exhibit 172, Hagen, C. A. et al., *Impacts of anthropogenic features on habitat use by Lesser Prairie-Chickens*, Studies in Avian Biology (no. 39), University of California Press, Berkeley, CA, 63 (2011).

Exhibit 173, Lautenbach, J.M., *Lesser prairie-chicken reproductive success, habitat selection, and response to trees*, M.S. Thesis, Kansas State Univ., 142 (2015).

Exhibit 174, Hagen, C. A. et al. *Managing lesser prairie chicken populations and their habitats*, Wildl. Soc. Bull. 32, 69 (2004).

Exhibit 175, Fernie, K.J., and S.J. Reynolds, *The effects of electromagnetic fields from power lines on avian reproductive biology and physiology: a review*, J. Toxicol. Environ. Health Part B 8, 127 (2005).

Exhibit 176, Steenhof, K et al., *Nesting by raptors and common ravens on electrical transmission towers*, J. Wildl. Manage. 57, 271 (1993).

Exhibit 177, Cynthia P. Melcher, U.S. Geological Survey, Southern Great Plains Rapid Ecoregional Assessment—Pre-Assessment Report 170 (Timothy J. Assal et al. eds., 2015).

Exhibit 178, Blake Grisham et al., *The Predicted Influence of Climate Change on Lesser Prairie-Chicken Reproductive Parameters*, (July 11, 2013), 8 PLOS ONE e68225.

Exhibit 179, Fields et al., *Nest and Brood Survival of Lesser Prairie-Chickens in West Central Kansas*, 70 J. Wildlife Mgmt. 931, 935 (2009).

Exhibit 180, Thomas R. Karl, Global Climate Change Impacts in the U.S., 125 (Jerry M. Melillo et al., eds., 1st ed. 2009).

Exhibit 181, Wolfe et al., *The Lesser Prairie-Chicken in the Mixed-Grass Prairie Ecoregion of Oklahoma, Kansas and Texas*, *in* 48 Studies in Avian Biology 299-314, 306 (David A. Haukos & Clint Boal 1 ed. 2016).

Exhibit 182, Sean Kyle et al., Arizona Game and Fish Department, The Lesser Prairie-Chicken Range-wide Conservation Plan at 35 (William E. Van Pelt ed., 2013).

Exhibit 183, Camille Parmesan, *Ecological & Evolutionary Responses to Recent Climate Change*, 37 Annual Review of Ecology, Evolution & Systematics 637–669, 637 (2006).

Exhibit 184, Patty Glick et al. eds., Nat'l Wildlife Fed'n, Scanning the Conservation Horizon: A Guide to Climate Change Vulnerability Assessment 100 (2011).

Exhibit 185, Alistair S. Jump & Josep Peñuelas, *Running to Stand Still: Adaptation & the Response of Plants to Rapid Climate Change*, 8 Ecology Letters 1010-1020, 1017 (2005).

Exhibit 186, P. Mottram et al., *The Effect of Temperature on Eggs and Immature Stages of Culex Annulirostris Skuse (Diptera: Culicidae)*, 25 Australian J. Entomology 131-136 (1986).

Exhibit 187, Charles L. Bailey, *Winter Survival of Blood-fed and Non-blood-fed Culex pipiens*, 31 Am. J. Tropical Med. Hygiene 1054–1061 (1982).

Exhibit 188, David J. Dohm et al., *Effect of Envtl. Temperature on the Ability of Culex Pipiens (Diptera: Culicidae) to Transmit West Nile Virus*, 39 J. Med. Entomology 221-225 (2002).

Exhibit 189, Pamela Anderson et al., The Ctr. for Health & the Global Envt., Harvard Med. School, Climate Change Futures: Health, Ecological & Econ. Dimensions (Paul R. Epstein & Evan Mills eds., 2005).

Exhibit 190, Francis, C.D., C.P. Ortega, and A. Cruz, *Noise pollution changes avian communities and species interactions,* (2009) at 1418.

Exhibit 191, Blickley, J.L., D. Blackwood, and G.L. Patricelli, *Experimental Evidence for the Effects of Chronic Anthropogenic Noise on Abundance of Greater Sage-Grouse at Leks* (2012) at 467.

Exhibit 192, Clancy, S.A., F. Worrall, R.J. Davies, J.G. Gluyas. *The potential for spills and leaks of contaminated liquids from shale gas developments.* 626 Sci. of the Total Env't. 1463, 1464 (June 1, 2018).

Exhibit 193, Tsvetana Paraskova, USA Today, *Is southeastern New Mexico the new sweet spot for shale?* (2017), available at https://www.usatoday.com/story/money/energy/2017/11/22/southeastern-new-mexico-new-sweet-spot-shale/882239001/.

Exhibit 194, Williams, H.F.L., D.L. Havens, K.E. Banks, and D.J. Wachal *Field-based monitoring of sediment runoff from natural gas well sites in Denton County, Texas, USA,* (2008).

Exhibit 195, Burton, G.A., K.J. Nadelhoffer, and K. Presley, *Hydraulic fracturing in the state of Michigan: Environment/ecology technical report. University of Michigan*. (2013).

Exhibit 223, U.S. Fish and Wildlife Services, *Species Status Assessment for the Dunes Sagebrush Lizard*, 51 (April 2024) (Version 1.3) (hereafter "2024 DSL SSA"); Chan et al. 2009, p. 136; Chan et al. 2020, p. 6.

Exhibit 224. Chan, L., C. Painter, M. Hill, T. Hibbitts, D. Leavitt, W. Ryberg, D. Walkup, and L. Fitzgerald. 2020. *Phylogeographic structure of the dunes sagebrush lizard, an endemic habitat specialist.* PLoS One 15(9): e0238194.

Exhibit 225, Henle, K., K. Davies, M. Kleyer, C. Margules, and J. Settele. 2004. *Predictors of Species Sensitivity to Fragmentation.* Biodiversity and Conservation 13.

Exhibit 226, Devictor, V., R. Julliard, and F. Jiguet. 2008. *Distribution of Specialist and Generalist Species along Spatial Gradients of Habitat Disturbance and Fragmentation.*

Exhibit 227, Walkup, D.K., D.J. Leavitt, and L.A. Fitzgerald. 2017. *Effects of Habitat Fragmentation on Population Structure of Dune-Dwelling Lizards.* Ecosphere 8 (3).

Exhibit 228, Machenberg, M. 1984. *Geology of Monahans Sandhills State Park, Texas.* Guidebook 21. University of Texas at Austin. Bureau of Economic Geology.

Exhibit 229, Degenhardt, W.G., C.W. Painter, and A.H. Price. 1996. *Amphibians and Reptiles of New Mexico.* University of New Mexico Press. Albuquerque.

Exhibit 230, Snell, H.L., L.W. Gorum, L.J.S. Pierce, and K.W. Ward. 1997. *Results from the fifth year (1995) research on the effect of shinnery oak removal on populations of sand dune lizards, Sceloporus arenicolus, in New Mexico.* Final Report to New Mexico Department of Game and Fish. Contract #80-516.6-01.

Exhibit 231, Fitzgerald, L., C. Painter, D. Sias, and H. Snell. 1997. *The Range, Distribution and Habitat of Sceloporus arenicolus in New Mexico*. Final Report submitted to New Mexico Department of Game and Fish (Contract #80-516.6-01).

Exhibit 232, Peterson, R., and C.S. Boyd. 1998. *Ecology and management of sand shinnery communities: a literature review.* Gen. Tech. Rep. RMRS-GTR-16. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Exhibit 233, Painter, C., D. Sias, L. Fitzgerald, L. Pierce, and H. Snell. 1999. *Management Plan for the Sand Dune Lizard Sceloporus arenicolus in New Mexico.*

Exhibit 234, Sartorius, S.S., J.P.S. do Amaral, R.D. Durtsche, C.M. Deen, and W.I. Luterschmidt. 2002. *Thermoregulatory accuracy, precision, and effectiveness in two sand-dwelling lizards under mild environmental conditions.* Canadian Journal of Zoology 80:1966-1976, pp. 1972-1975

Exhibit 235, Painter, C., D. Sias, L. Fitzgerald, L. Pierce, and H. Snell. 1999. *Management Plan for the Sand Dune Lizard Sceloporus arenicolus in New Mexico*.

Exhibit 236, Dhillion, S.S., and M.H. Mills. 2009. The Sand Shinnery Oak (Quercus havardii) Communities of the Llano Estacado: History, Structure, Ecology, and Restoration in: R.A.Anderson, J.S. Fralish, and J.M. Baskin, eds. *Savannas, Barrens, and Rock Outcrop Plant Communities of North America*. 1999.

Exhibit 237, Leavitt, D.J., and M.R. Acre. 2014. *Sceloporus arenicolus (Dunes Sagebrush Lizard). Activity Patterns and Foraging Mode.* Herpetological Review 45(4). 699-700.

Exhibit 238, Hibbitts, T., and T. Hibbitts. 2015. *Texas Lizards: A Field Guide.* University of Texas Press.

Exhibit 239, Henle 2004, p. 239; Devictor et al. 2008, p. 511; Hibbitts, T.J., W.A. Ryberg, C.S. Adams, A.M. Fields, D. Lay, and M.E. Young. 2013. *Microhabitat Selection by a Habitat Specialist and a Generalist in both Fragmented and Unfragmented Landscapes.* Herpetological Conservation and Biology 8(1).

Exhibit 240, Leavitt, D., and L. Fitzgerald. 2013. *Disassembly of a Dune-dwelling Lizard Community due to Landscape Fragmentation.* Ecosphere 4(8).

Exhibit 241, Hokit, D.G., and L.C. Branch. 2003. *Habitat Patch Size Affects Demographics of the Florida Scrub Lizard (Sceloporus woodi).* Journal of Herpetology 37 (2): 257-265.

Exhibit 242, Chan, L., L. Fitzgerald, and K. Zamudio. 2009. *The Scale of Genetic Differentiation in the Dunes Sagebrush-Lizard, an Endemic Habitat Specialist.* Conservation Genetics 10:131-142.

Exhibit 243, Ryberg, W., M. Hill, C. Painter, and L. Fitzgerald. 2013. *Landscape Pattern Determines Neighborhood Size and Structure within a Lizard Population.* PLOS ONE: 8(2).

Exhibit 244, Young, M.E., W.A. Ryberg, L.A. Fitzgerald, and T.J. Hibbitts. 2018. *Fragmentation alters home range and movements of the Dunes Sagebrush Lizard.* Canadian Journal of Zoology 96: 905-912.

Exhibit 245, Ryberg, W., M. Hill, C. Painter, and L. Fitzgerald. 2015. *Linking irreplaceable landforms in a self-organizing landscape to sensitivity of population vital Rates for an Ecological Specialist.* Conservation Biology 29 (3): 888-898.

Exhibit 246, Johnson, K., M. Horner, E. Muldavin, P. Neville, T. Neville, and J. Smith. 2016. *Dunes sagebrush lizard habitat map and models, New Mexico.* Natural Heritage New Mexico Publ. No. 15-387. Natural Heritage New Mexico, University of New Mexico, Albuquerque, NM.

Exhibit 247, Sias, D.S., and H.L. Snell. 1998. *The Sand Dune Lizard Sceloporus arenicolus and Oil and Gas Development in Southeastern New Mexico.* Final Report of field studies 1995-1997. Report to New Mexico Department of Game and Fish

Exhibit 248, Hibbitts, T., L. Fitzgerald, D. Walkup, and W. Ryberg. 2017. *Why Didn't the Lizard Cross the Road? Dunes Sagebrush Lizards Exhibit Road-avoidance Behavior.* Wildlife Research 44 (3): 194-199.

Exhibit 249, Delgado-Garcia, J.D., J.R. Arevalo, and J.M. Fernandez-Palacios. 2007. *Road Edge Effect on the Abundance of the Lizard Gallotia galloti (Sauria: Lacertidae) in two Canary Islands Forests.* Biodiversity and Conservation 16: 2949-2963.

Exhibit 250, Goncalves, L., D. Alvares, F. Teixeira, G. Schuck, I. Coelho, I. Esperandio, J. Anza, J. Beduschi, V. Bastazini, and A. Kindel. 2018. Reptile Road-kills in Southern Brazil: Composition, Hot Moments and Hotspots. Science of the Total Environment 615: 1438-1445.

Exhibit 251, Van Pelt, W.E., S. Kyle, J. Pitman, D. Klute, G. Beauprez, D. Schoeling, and A. Janus. 2013. *The Lesser Prairie-chicken Range-wide Conservation Plan.* 373 pp.

Exhibit 252, Romano, A., D. Leavitt, C. Schalk, D. Dittmer, and L. Fitzgerald. 2014. *Vertebrate by-catch of Pipeline Trenches in the Mescalero-Monahans Shinnery Sands of Southeastern New Mexico.* p.95.

Exhibit 253, Mossa, J., and L.A. James. 2013. *Changing Fluvial Systems.* Physical Geography 34(4-5): 267-272.

Exhibit 254, Benson, M.E., and Wilson, A.B., 2015, *Frac sand in the United States—A geological and industry overview: U.S. Geological Survey Open-File Report 2015–1107*, 78 p, pp. 1-50.

Exhibit 255, Engel, M., F. Boesl, and H. Bruckner. 2018. Migration of Barchan Dunes in Qatar-Controls of the Shamal, Telconnections, Sea-Level Changes and Human Impact. Geosciences 8 (240): 1-16.

Exhibit 257, Mace, R. 2019. *Frac Sand Facilities and their Potential Effects on the Groundwater Resources of the Monahans-Mescalero Sand Ecosystem Permian Basin, Texas. A Report for the TX Comptroller of Public Accounts Contract* CMD No. 19-6754CS.

Exhibit 258, Brenneman, K.A., R.A. James, E.A. Gross, and D.C. Dorman. 2000. *Olfactory Neuron Loss in Adult Male CD Rats Following Subchronic Inhalation Exposure to Hydrogen Sulfide.* Toxicologic Pathology 28 (2): 326-333.

Exhibit 259, Lusk, J., and E. Kraft. 2010. *Hydrogen Sulfide Monitoring Near Oil and Gas Production Facilities in Southeastern New Mexico and Potential Effects of Hydrogen Sulfide to Migratory Birds and other Wildlife. U.S. Fish and Wildlife Service Environmental Contaminants Program* Project ID: FFS 2F41-200220006.1. 92 pp.

Exhibit 260, Al-Hashem, M.A., P.F. Brain, and S.A. Omar. 2007. *Effects of Oil Pollution at Kuwait's great Al-Burgan Oil Field on Polycyclic Aromatic Hydrocarbon Concentrations in the Tissues of the Desert Lizard Acanthodactylus scutellatus and their Ant Prey.* Ecotoxicology 16: 551-555.

Exhibit 261, Al-Hashem, M.A. 2011. *Evidence of Hepatotoxicity in the Sand Lizard Acnthodactylus scutellatus from Kuwait's Greater Al-Burgan Oil Field.* Ecotoxicology and Environmental Safety 74: 1391-1395.

Exhibit 262, Esler, D., B. Ballachey, C. Matkin, D. Cushing, R. Kaler, J. Bodkin, D. Monson, G. Esslinger, K. Kloecker. 2018. *Timelines and mechanisms of wildlife population recovery following the Exxon Valdez oil spill.* Deep Sea Research Part II: Topical Studies in Oceanography 147: 36-42.

Exhibit 263, Rosell-Mele, A., N. Moraleda-Cibrian, M. Cartro-Sabate, F. Colomer-Venturay, P. Mayor, M. Orta-Martinez. 2018. *Oil Pollution in Soils and Sediments from the Northern Peruvian Amazon.* Science of the Total Environment 610-611:1010-1019.

Exhibit 264, Emmerich, W. 1985. *Tebuthiron – Environmental Concerns.* Rangelands 7 (1):14-16.

Exhibit 265, Shafer, G. 1956. *Ground-water Resources of the Crane Sandhills, Crane County, Texas.* Bulletin 5604. Texas Board of Water Engineers.

Exhibit 266, Garza, S. and J. Wesselman. 1959. *Geology and Ground-water Resources of Winkler County, Texas.* Bulletin 5916. Texas Board of Water Engineers. 221 pp.

Exhibit 267, White, D.E. 1971. *Water Resources of Ward County, TX.* Report 125. Texas Water Development Board. 124 pp.

Exhibit 268, Jones, I.C. 2008. *Investigating Recharge in Arid Alluvial Basin Aquifers: The Pecos River Valley Aquifer, TX.* Gulf Coast Association of Geological Societies Transactions 58: 489-500.

Exhibit 269, Mace 2019, p. 12; Rainwater, K. 2020. *Sand Mining Water Use in West Texas.* Environmental Consultant Report.

Exhibit 270, Ashworth, J. 1990. *Evaluation of Ground-Water Resources in Parts of Loving, Pecos, Reeves, Ward, and Winkler Counties, TX.* Texas Water Development Board Report 317.

Exhibit 271, Scanlon, B., S. Ikonnikova, Q. Yang, and R. Reedy. 2020. *Will Water Issues Constrain Oil and Gas Production in the United States.* Environ. Sci. Technol.54: 3510-3519.

Exhibit 271, Gucker, C.L. 2006. *Quercus havardii. In: Fire Effects Information System*, p. 6 [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: https://www.fs.fed.us/database/feis/plants/shrub/quehar/all.html

Exhibit 272, Machenberg, 1984, pp. 6, 30-31, Kocurek, G., and K.G. Havholm. 1993. *Eolian Sequence Stratigraphy-A Conceptual Framework.* Chapter 16 In: Siliciclastic sequence stratigraphy (P. Weimer and H.W. Posamentier, eds.): AAPG Memoir 58, p. 393-409.

Exhibit 273, Pye, K. 2009. *Chapter 9: Management and Human Use of Sand Dune Environments.* In: Aeolian Sand and Sand Dunes. P. 329-367, p. 364 [hereinafter Pye 2009]; Newton, B.T., and B. Allen. 2014. *Hydrologic Investigation at White Sands National Monument.* New Mexico Bureau of Geology and Mineral Resources. Open-file Report 559.

Exhibit 274, University of California Riverside, Center for Conservation Biology. 2018. Proposed Protocol for Measuring Mesquite Health with Respect to Putative Facors Causing Declines in Stand Health in the Coachella Valley. Report Prepared for the Coachella Valley Conservation Commission.

Exhibit 275, Muhs, D., and V. Holliday. 2001. *Origin of Late Quaternary Dune Fields on the Southern High Plains of Texas and New Mexico*. GSA Bulletin 113 (1): 75-87.

Exhibit 276, Laity, J. 2003. *Aeolian Destabilization Along the Mojave River, Mojave Desert, California: Linkages Among Flucial, Groundwater, and Aeolian Systems.* Physical Geology 24 (3): 196-221.

Exhibit 277, Cambell, J.E., M.R. Sharifi, and P.W. Rundel. 2017. *Impact of Ground Water Depletion on the Mesquite Community at Edwards Air Force Base, Western Mojave Desert, California.* Aliso 35(2): 69-77

Exhibit 278, Ryberg, W.A, M.T. Hill, D. Lay, and L.A. Fitzgerald. 2012. *Observations on the Nesting Ecology and Early Life History of the Dunes Sagebrush Lizard.* Western North American Naturalist 72(4).

Exhibit 279, Rappole, J. 2000. Birds of the Southwest: Arizona, New Mexico, Southern California, and Southern Nevada, p. 163.

Exhibit 280, Dinkins, J.B., M.R. Conover, C.P. Kirol, J.L. Beck, and S.N. Frey. 2014. *Greater Sage-Grouse (Centrocercus urophasianus) Hen Survival: Effects of Raptors, Anthropogenic and Landscape Features, and Hen Behavior.* Canadian Journal of Zoology 92: 319-330.

Exhibit 281, Lammers, W., and M. Collopy. 2007. *Effectiveness of Avian Predator Perch Deterrents on Electric Transmission Lines.* The Journal of Wildlife Management 71 (8):2752-2758.

Exhibit 282, Prather, P., and T. Messmer. 2010. *Raptor and Corvid Response to Power Distribution Line Perch Deterrents in Utah.* Journal of Wildlife Management 74 (4): 796-800.

Exhibit 283, Slater, S., and J. Smith. 2010. *Effectiveness of Raptor Perch Deterrents on an Electrical Transmission Line in Southwestern Wyoming.* Journal of Wildlife Management 74 (5): 1080-1088.

Exhibit 284, Hathcock, C.D., and M.T. Hill. 2018. *Loggerhead shrike predation on dune-dwelling lizards and nesting success in southeastern New Mexico.* The Southwestern Naturalist 63: 220-224.

Exhibit 285, Fitzgerald, L.A., Painter, C.W., T.J. Hibbitts, W.A. Ryberg, and N. Smolensky. 2011. *The Range and Distribution of Sceloporus arenicolus in Texas: Results of Surveys Conducted 8-15 June 2011: Final Report.* Texas A&M University, p. 4.

Exhibit 286, Smolensky, N., and L. Fitzgerald. 2010. *Distance Sampling Underestimates Population Densities of Dune-Dwelling Lizards.* Journal of Herpetology 44 (3): 372-381.

Exhibit 287, Jacobson, C. 2016. *Thermal Ecology of the Dune Sagebrush Lizard.* Texas A & M University. Undergraduate Research Scholar Thesis. 13 pp.

Exhibit 288, Leavitt, D. 2019a. *Climatic conditions of the Mescalero-Monahans Shinnery Sands and how they relate to activity patterns of the Dunes Sagebrush Lizard.* Report prepared for Center of Excellence in Hazardous Materials Management.