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Re: Comments on First Quarter 2022 Competitive Oil and Gas Lease Sales Proposed
in Bureau of Land Management's Colorado, Eastern States, Montana/Dakotas,
New Mexico, Nevada Utah, and Wyoming State Offices

Responsible Officials:

The Center for Biological Diversity (“the Center”), (other groups here), submit these scoping comments in response to the Bureau of Land Management’s (“BLM”) proposed first quarter 2022 competitive oil and gas lease sales (“lease sales”) and their respective proposed parcels,:

Montana State Office	DOI-BLM-MT-0000-2021-0006-EA
Nevada State Office	DOI-BLM-NV-B000-2021-0007-OTHER NEPA
Wyoming State Office	DOI-BLM-WY-0000-2021-0003-EA
New Mexico State Office	DOI-BLM-NM-0040-2021-0033-EA
New Mexico State Office	DOI-BLM-NM-P000-2021-0001-EA
Utah State Office	DOI-BLM-UT-0000-2021-0007-EA
Colorado State Office	DOI-BLM-CO-0000-2021-0005-OTHER NEPA
Eastern States State Office	DOI-BLM-Eastern States-J000-2021-0037-EA
Eastern States State Office	DOI-BLM-Eastern States-J000-2021-0036-DNA
Eastern States State Office	DOI-BLM-Eastern States-J000-2021-0038-DNA
Eastern States State Office	DOI-BLM-Eastern States-J000-2021-0035-DNA

For reasons explained below, BLM must defer all parcels proposed for lease pending completion of programmatic review of the federal fossil fuel programs and an analysis under NEPA, FLPMA, ESA and other laws 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. Louisiana v. Biden Does Not Require BLM to hold Lease Sales Or Issue Any Leases.

The Interior Department announced that it would proceed with the current lease sale process in response to a preliminary injunction order issued by the U.S. District Court for the Western District of Louisiana. Louisiana v. Biden, No. 2:21-cv-778-TAD-KK, 2021 WL 2446010 (W.D. La. June 15, 2021). That order enjoined implementation of a nationwide “Pause” on offshore and onshore oil and gas leasing contemplated by President Biden’s Executive Order 14008. Id. The Louisiana court, however, did not rule that BLM must hold lease sales every three months in every state office. Instead, while enjoining a nationwide “Pause” directed by the President, the Louisiana court distinguished lease sale postponements for NEPA or other environmental concerns.

The court stated that “[t]he agencies could cancel or suspend a lease sale due to problems with that specific lease [sale], but not as to eligible lands for no reason other than to do a comprehensive review pursuant to Executive Order 14008.” *Id.* at *14. The court added: “there is a huge difference between the discretion to stop or pause a lease sale because the land has become ineligible for a reason such as an environmental issue,” and halting lease sales “with no such issues and only as a result of Executive Order 14008.” *Id.* at *13. The Louisiana ruling found that the plaintiffs had shown a likelihood of success on the merits of the case because BLM’s postponement of some sales expressly relied on Executive Order 14008 or did not identify any NEPA concerns. *Id.* at *16; see also id. at *21 (“at least some of the onshore lease [sale]s were cancelled due to the Pause, without any other valid reason. Some were cancelled to do additional environmental analysis . . . but the Pause has obviously been implemented by Agency Defendants for some of the lease sales”).

The Louisiana court’s reasoning supports BLM’s continued authority to postpone lease sales to address NEPA and similar concerns tied to a given sale. As discussed elsewhere in these comments, there are numerous NEPA and other issues that require postponing leasing. The Louisiana order presents no obstacle to doing so.

A. As BLM Has Already Acknowledged, More NEPA Review Is Needed Prior To Offering These Leases for Sale.

Many or most of the parcels currently being scoped were originally slated to be auctioned in the March 2021 lease sales. BLM postponed those lease sales due to concerns that, in light of recent NEPA case law and other court decisions, the analyses for the March 2021 sales were inadequate. Those same concerns still apply and require additional analysis before offering any parcels for lease.

1. Colorado, Montana-Dakotas

A February 12, 2021 memorandum from Acting Deputy Solicitor Travis Annatoyn recommended postponing the first-quarter 2021 sales in Colorado and Montana-Dakotas. The memo found that “[e]ach sale raises serious questions as to NEPA compliance” and recommended that each sale be postponed. Specifically, the memorandum found that the greenhouse gas analyses for the Colorado and Montana-Dakota sales were “problematic” and “vulnerable to litigation” in light of court opinions like Columbia Riverkeeper v. U.S. Army Corps of Engineers, 2020 WL 6874871 (W.D. Wash. Nov. 23, 2020) and WildEarth Guardians v. Bernhardt, 2020 WL 6701317 (D.D.C. Nov. 13, 2020) (urging BLM to conduct a “robust analysis, using conservative estimates based on the best data, analyzed in an unrushed fashion, so that the analysis can effectively serve as a model for the other leases”). This recommendation was approved, and the lease sales were postponed.

To our knowledge, these concerns have not been resolved, and offering these parcels for lease would violate NEPA, just as it would have in March.

2. Utah

On February 4, 2021, the BLM Utah State Director deferred 8 of 9 parcels from the Utah March 2021 sale. The deferring memo noted that the 8 parcels “are within Greater Sage-grouse habitat and require additional analysis.” Subsequently, on February 11, 2021, the Utah State Director recommended postponing the March 2021 sale in its entirety because of legal concerns due to only having two alternatives in the NEPA analysis (leasing all or none of the proposed parcels) in light of Rocky Mountain Wild v. Bernhardt, 506 F.Supp.3d 1169 (D. Utah 2020).

To our knowledge, the concern about inadequate alternatives has not been resolved, and offering these parcels for lease would violate NEPA, just as it would have in March.

3. Wyoming

Prior to postponement of the March 2021 sale, BLM’s Wyoming state office recognized that “[c]oncerns raised in ongoing litigation, including WildEarth Guardians v. Zinke, 1:16-cv-01724 [(D.D.C.)] (climate change and greenhouse gas emissions), Western Watersheds Project vs. Zinke, 1:18-cv-00187-REB [(D. Idaho)] (BLM leasing policy IM 2018-034), and Montana Wildlife Federation vs. Bernhardt, 4:18-cv-00069-BMM [(D. Mont.)] (Greater Sage-grouse leasing prioritization)” needed to be “satisfactorily addressed in the Environmental Assessment and Protest Decision before any lease is issued.”

To our knowledge, none of these concerns has been resolved, and offering these parcels for lease would violate NEPA and FLPMA, just as it would have in March.

4. Eastern States

The BLM Eastern States State Director, with the BLM Deputy Director of Operations’ approval, postponed the March 2021 sale on February 11, 2021. The decision memorandum found that, after the court’s decision in WildEarth Guardians v. Bernhardt, 502 F.Supp.3d 237 (D.D.C. 2020), 13 of the 14 proposed parcels needed “additional air quality analysis, including greenhouse gas (GHG) analysis.”

To our knowledge, these concerns have not been resolved, and offering these parcels for lease would violate NEPA, just as it would have in March.

II. BLM must take a hard look at climate impacts of the entire first quarter leasing proposal, and avoid any new greenhouse gas pollution through oil and gas leasing.

The current lease sale process in this state is part of a national Interior Department decision to proceed with oil and gas leasing in light of the Louisiana litigation. On August 24, the Interior Department reported to the Louisiana court that BLM offices across the country had been directed “to finalize parcel lists for upcoming sales, in order to publicly post those parcel lists for NEPA scoping by August 31, 2021.” ECF No. 155 at 5, Louisiana v. Biden. As directed by the Department, notices of scoping in each state were posted on August 31. Also on

August 31, the Interior Department announced that it would proceed with offshore lease sale 257, which covers over 80 million acres in the Gulf of Mexico. The proposed lease sale in this state thus is plainly part of a larger national initiative 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 recreation and other uses of these lands and waters, the combined costs to taxpayers from issuing new leases before the Interior Department addresses royalty reform, and other relevant issues. NEPA's cumulative impacts requirement means 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. § 1508.7 (2019); see 46 C.F.R. §§ 46.30 (definition of reasonably foreseeable future actions), 46.115. 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 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).

Analyzing 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 environmental assessment (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, the Interior Department announced potential leasing covering nearly 1,200 square miles (more than 740,000 acres) onshore, and 125,000 square miles of the Gulf of Mexico. It would be arbitrary and capricious to assume that leasing on that scale will not be significant.

There is no remaining room in the carbon budget for new commitments of future greenhouse gas (GHG) pollution. Greenhouse gas pollution resulting from the lease sales and subsequent development, considered alongside existing federal fossil fuel development and potential development from leases previously 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.

BLM must therefore take a hard and comprehensive look at the cumulative climate change impacts of authorizing new leasing, together with committed emissions under lease, and immediately defer ANY sale of new leases, and/or APD approvals, pending demonstration of compatibility with U.S. and global climate goals and completion of the comprehensive review

and reconsideration of Federal oil and gas permitting and leasing practices called for by Executive Order 14008.¹ fuel program review. BLM must also consider a reasonable alternative of managed decline of GHG emissions from the already-leased federal fossil fuel estate.

A. BLM should defer new leasing pending demonstration of the compatibility of federal fossil fuel program greenhouse gas emissions with U.S. and global climate goals and completion of the EO 14008 federal fossil fuel program review.

BLM is responsible for the management of nearly 700 million acres of federal onshore subsurface minerals. The ultimate downstream GHG emissions from fossil fuel extraction of federally managed minerals by private leaseholders account for 23 percent of total U.S. GHG emissions and 27 percent of all energy-related GHG emissions. Further, federal fossil fuels already under lease contain up to 43 GtCO_{2e} of potential greenhouse gas pollution. Despite this, the federal fossil fuel programs—including the federal oil, gas, and coal programs under BLM’s purview—have never faced public and environmental review under NEPA or FLPMA to assess the impacts of their cumulative greenhouse gas pollution, their contribution to climate change impacts, or their compatibility or incompatibility with the U.S. climate goal of limiting warming to 1.5 degrees Celsius.

Now, pursuant to Section 208 of Executive Order 14008, BLM, in consultation with other federal agencies, will be required to undertake such a review. BLM must defer the lease sales and approval of new APDs pending completion of the Executive Order’s requirement for a “comprehensive review and reconsideration of federal oil and gas permitting and leasing practices.” Section 208 of the Executive Order reads:

To the extent consistent with applicable law, the Secretary of the Interior shall pause new oil and natural gas leases on public lands or in offshore waters pending completion of a comprehensive review and reconsideration of Federal oil and gas permitting and leasing practices in light of the Secretary of the Interior’s broad stewardship responsibilities over the public lands and in offshore waters, including potential climate and other impacts associated with oil and gas activities on public lands or in offshore waters.

Notably, while the Executive Order pauses new leases but not new drilling permits, BLM’s approval of new APDs and new wells is plagued by the same deficiencies that compel the pause on leasing: the cumulative climate impacts of federal fossil fuel programs have never faced a hard look analysis under NEPA. As such, the programs—and decisions therein approving new oil and gas wells and resultant GHG pollution—remain wholly untethered from the U.S. goal of limiting warming to 1.5 degrees Celsius.

B. BLM has a duty under FLPMA and NEPA to avoid catastrophic climate change in oil and gas leasing decisions.

¹ Executive Order 14008 of January 27, 2020, *Tackling the Climate Crisis at Home and Abroad*, Fed. Reg. Vol. 86, No. 19.

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

- Protect public land values including air and atmospheric, water resource, ecological, environmental, and scenic values, and to preserve and protect “certain public lands in their natural condition,” and “food and habitat for fish and wildlife”²;
- Account for “the long-term needs of future generations”³;
- Prevent “permanent impairment of the productivity of the land and quality of the environment”⁴; and
- “[T]ake any action necessary to prevent unnecessary or undue degradation of the lands.”⁵

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

The scientific community has made clear that the scale and speed of necessary action is greater than previously believed. There is little time left to avoid setting the world on a dangerous, potentially catastrophic, climate trajectory. Responding to the climate crisis will require both significant short-term global reductions in greenhouse gas emissions and net-zero global emissions by mid-century or before.⁶

EO 14008 also establishes national policy that places the climate crisis “at the center of U.S. foreign policy and national security.”⁷ It sets forth policy to “organize and deploy the *full capacity* of its agencies to combat the climate crisis to implement a Government-wide approach that reduces climate pollution in every sector of the economy.”⁸ EO 14008 prioritizes bolstering climate change resilience: “The United States will also move quickly to build resilience, both at home and abroad, against the impacts of climate change that are already manifest and will continue to intensify according to current trajectories.”⁹ This includes taking action to

² 43 U.S.C. §1701(a)(8).

³ 43 U.S.C. § 1702(c).

⁴ 43 U.S.C. § 1702(c).

⁵ 43 U.S.C. § 1732(b).

⁶ Executive Order (EO) 14008 (Jan. 27, 2021), § 101.

⁷ *Id.*

⁸ *Id.* § 201 (emphasis added).

⁹ *Id.* § 101.

“conserve[] our lands, waters, and biodiversity”¹⁰ and specifically to “achieve the goal of conserving at least 30 percent of our lands and waters by 2030” (the “30x30” goal or initiative).¹¹

These policies, in combination with FLPMA’s mandates and well-established facts relating to the climate emergency and its past, ongoing, and potential future harms, militate strongly to avoid catastrophic climate change in oil and gas leasing and permitting decisions. Additionally, NEPA requires BLM to consider ways to avoid, minimize, and mitigate impacts in accordance with the mitigation hierarchy.¹² Specifically, agencies must “include appropriate mitigation measures not already included in the proposed action or alternatives.”¹³ 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.¹⁴ This includes the robust use by BLM of conditions of approval to, in sequenced priority, avoid, mitigate, or compensate for climate, public lands, or community impacts.¹⁵

Under FLPMA, BLM is required to manage public lands on the basis of multiple use and sustained yield.¹⁶ This in turn requires consideration of “the present and future needs of the American people,” providing for “the long-term needs of future generations,” and ensuring the “harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment [considering] the relative values of the resources.”¹⁷ As the Supreme Court has explained:

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

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

In recognition of the environmental components of the multiple use mandate, courts have repeatedly held that development of public lands is not required but must instead be weighed against other possible uses, including conservation to protect environmental values. See, e.g., New Mexico ex rel. Richardson v. BLM, 565 F.3d 683, 710 (10th Cir. 2009) (“BLM’s obligation

¹⁰ *Id.* § 201.

¹¹ *Id.* § 206. *See also id.*, § 215 (establishing Civilian Climate Corps Initiative, which “shall aim to conserve and restore public lands and waters,” “protect biodiversity,” and “address the changing climate,” among other things).

¹² 40 C.F.R. §§ 1508.8, 1502.14, 1502.16, 1508.20.

¹³ *Id.* §§ 1502.14(f), 1502.16(h).

¹⁴ *See Bruce M. Pendery, BLM’s Retained Rights: How Requiring Environmental Protection Fulfills Oil and Gas Lease Obligations*, 40 *Env’tl. L.* 599 (2010).

¹⁵ *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).

¹⁶ 43 U.S.C. § 1732(a).

¹⁷ *Id.* § 1702(c).

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

Furthermore, FLPMA 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.”¹⁸ This substantive mandate requires that the agency not elevate the development of oil and gas resources above other critical resource values in the Lease Sale areas. To the contrary, FLPMA requires that where oil and gas development would threaten the quality of critical resources, that conservation of these resources should be the preeminent goal. The BLM must incorporate this mandate into the agency’s decision-making, consistent with resource values and concerns specific to the Lease Sale area’s resource values, as well with broader climate impact concerns.

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

C. BLM’s duty under NEPA requires it to sufficiently analyze all reasonable alternatives.

Incumbent on the BLM in any NEPA process is a robust analysis of alternatives to the proposed action. Consideration of reasonable alternatives is necessary to ensure that the agency has before it and takes into account all possible approaches to, and potential environmental impacts of, a particular project. NEPA’s alternatives requirement, therefore, ensures that the

¹⁸ 43 U.S.C. § 1701(a)(8).

“most intelligent, optimally beneficial decision will ultimately be made.” Calvert Cliffs’ Coordinating Comm., Inc. v. U.S. Atomic Energy Comm’n, 449 F.2d 1109, 1114 (D.C. Cir. 1971).

“[T]he heart” of an environmental analysis under NEPA is the analysis of alternatives to the proposed project, and agencies must evaluate all reasonable alternatives to a proposed action.” Colorado Environmental Coalition, 185 F.3d at 1174 (quoting 40 C.F.R. § 1502.14). An agency must gather “information sufficient to permit a reasoned choice of alternatives as far as environmental aspects are concerned.” Greater Yellowstone, 359 F.3d at 1277 (citing Colorado Environmental Coalition, 185 F.3d at 1174); see also Holy Cross Wilderness Fund v. Madigan, 960 F.2d 1515, 1528 (10th Cir. 1992).

The BLM must give detailed consideration to alternatives that address the likelihood that industry is only seeking the proposed leases in order to stockpile reserves and not actually produce oil and gas. We request the BLM give detailed consideration to the following alternative actions:

- An alternative that imposes a minimum bonus bid higher than \$2.00 per acre. Under 43 C.F.R. § 3120.1-2(c), BLM is prohibited from accepting a competitive oil and gas leasing bid that is less than \$2.00 per acre. However, there is nothing that prohibits the BLM from establishing a minimum bid that is higher than \$2.00 per acre. Here, we request the agency give detailed consideration to an alternative that requires a minimum bonus bid higher than \$2.00 per acre as a condition of selling the lease parcels. This will ensure that only serious industry interest in the proposed oil and gas leasing parcels and help to prevent companies from stockpiling federal oil and gas leases as a means to increase their assets and enhance their own financial bottomline.
- An alternative that defers offering the proposed lease parcels for sale until at least 50% of all leased federal oil and gas acres in each of the states for which a Q1 2022 sale is proposed are put into production. This could happen as a result of leases expiring before being put into production, by industry relinquishing leases that have not produced for many years, or by leases being put into production by companies. This alternative would help to incentivize industry to start producing and generating revenue or to give up their ownership of federal oil and gas leases. This alternative would be a reasonable measure for the BLM to impose as a means for protecting the public interest and maximizing revenue for the American public where leases have already been issued.

We also request that the BLM consider the following alternatives:

1. BLM Must Consider A No-Leasing Alternative.

In light of the overwhelming scientific consensus of dwindling U.S. and global carbon budgets and the catastrophic consequences of exceeding them, BLM must consider a “no leasing” alternative. BLM has broad discretion not to lease public lands for minerals development, and has the responsibility to use this discretion to safeguard environmental and

human health resources and values in light of climate change. See, e.g., *Udall v. Tallman*, 380 U.S. 1 (1965); *Rocky Mountain Oil & Gas Ass'n v. U.S. Forest Serv.* 157 F.Supp.2d 1142 (D. Mont. 2000). The BLM must consider a “no leasing” alternative in light of rapidly shrinking global carbon budgets.

Research that models emissions pathways for meeting 1.5° or 2°C targets shows that a rapid end to all fossil fuel extraction in the United States is necessary. Specifically, research indicates that *global* fossil fuel CO₂ emissions must *end entirely* by mid-century and likely as early as 2045 for a reasonable likelihood of limiting warming to 1.5° or 2°C.¹⁹ The United States must end fossil fuel CO₂ emissions even earlier: between 2025 and 2030 on average for a reasonable chance of staying below 1.5°C, and between 2040 and 2045 on average for a reasonable chance of staying below 2°C.²⁰ Ending U.S. fossil fuel CO₂ emissions between 2025 and 2030, consistent with the Paris climate targets, would require an immediate halt to new production and closing most existing oil and gas fields and coal mines before their reserves are fully extracted.

If new leasing ceases and existing non-producing leases are not renewed, 12% of oil production could be avoided in 2025 and 65% could be avoided by 2040 while 6% of natural gas production could be avoided in 2025 and 59% could be avoided by 2040.²¹ A comparison with other measures shows that “no leasing” could be a very significant part of U.S. efforts to address climate change. The 100 Mt CO₂ emissions savings that could result from no leasing in 2030 compares favorably with EPA standards for light- and medium-vehicles that are expected to yield 200 Mt in CO₂ savings in 2030, and with standards for heavy-duty vehicles that are expected to yield 70 Mt in CO₂ savings in the same year.

Also, importantly, avoided production through no new leasing and non-renewal of existing non-producing leases could help avoid further carbon lock-in in terms of investment in both fossil fuel-producing and fossil fuel-using infrastructure.²² Simply put, the timeframe to avoid catastrophic climate change is short, and the management of our federal minerals must fall into step with this reality.

2. An alternative that analyzes and applies best available methane reduction technologies as a stipulation attached to all parcels in the lease sale

The BLM should 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

¹⁹ Rogelj, Joeri et al., Energy system transformations for limiting end-of-century warming to below 1.5°C, 5 *Nature Climate Change* 519 (2015).

²⁰ See Climate Action Tracker, USA, <http://climateactiontracker.org/countries/usa> at Rating figure showing U.S. emissions versus year (last visited Oct. 30, 2019).

²¹ Peter Erickson and Michael Lazarus, *How Would Phasing Out U.S. Federal Leases for Fossil Fuel Extraction Affect CO₂ Emissions and 2°C Goals?*, Stockholm Environmental Institute (2016) at 16.

²² *Id.* at 30.

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 deliquification 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.

Id. at 5. In addition to reducing emissions, these “[m]ethane control technologies provide economic, health, safety, and environmental benefits for both operators and the public. These control technologies reduce not only greenhouse gas emissions, but also potentially explosive vapors, hazardous air pollutants, and volatile organic compounds (VOC), improving worker safety and limiting corporate liability.” *Id.* Accordingly, the BLM must rigorously explore and objectively evaluate an alternative that requires the implementation of these 10 technologies through stipulations that attach to all lease parcels.

3. An Alternative that Considers Adopting a Policy of Managed Decline of Fossil Fuel Production from the Entire Federal Mineral Estate

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

- Protect public land values including air and atmospheric, water resource, ecological, environmental, and scenic values, and to preserve and protect “certain public lands in their natural condition,” and “food and habitat for fish and wildlife” (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 mandates, given the climate emergency and its past, current, and projected future harms, render approval of new fossil fuel infrastructure or development on public lands unjustifiable in fact, law or policy, as articulated in President Biden’s January 27, 2021 Executive Order 14008 on “Tackling the Climate Crisis at Home and Abroad” (“EO 14008”). That order recognizes that taking action to address the climate crisis is “more necessary and urgent than ever”:

The scientific community has made clear that the scale and speed of necessary action is greater than previously believed. There is little time left to avoid setting the world on a dangerous, potentially catastrophic, climate trajectory. Responding to the climate crisis will require both significant short-term global reductions in greenhouse gas emissions and net-zero global emissions by mid-century or before.

Id., Section 101. EO 14008 establishes national policy that places the climate crisis “at the center of U.S. foreign policy and national security.” *Id.* It sets forth policy to “organize and deploy the *full capacity* of its agencies to combat the climate crisis to implement a Government-wide approach that reduces climate pollution in every sector of the economy.” *Id.*, section 201 (emphasis added). EO 14008 prioritizes bolstering climate change resilience: “The United States will also move quickly to build resilience, both at home and abroad, against the impacts of climate change that are already manifest and will continue to intensify according to current trajectories.” *Id.*, section 101. This includes taking action to “conserve[] our lands, waters, and biodiversity” *id.*, section 201, and specifically to “achieve the goal of conserving at least 30 percent of our lands and waters by 2030” (the “30x30” goal or initiative). *Id.*, section 216. *See also id.*, section 215 (establishing Civilian Climate Corps Initiative, which “shall aim to conserve and restore public lands and waters,” “protect biodiversity,” and “address the changing climate,” among other things).

These policies, in combination with FLPMA’s mandates and well-established facts relating to the climate emergency and its past, ongoing, and potential future harms, militate strongly to avoid catastrophic climate change in oil and gas permitting decisions. 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. *See* Bruce. M Pendery, BLM’s Retained Rights: How Requiring Environmental Protection Fulfills Oil and Gas Lease Obligations, 40 *Envtl. L.* 599 (2010). This includes the robust use by BLM of conditions of approval to, in sequenced priority, avoid, mitigate, or compensate for climate, public lands, or community impacts. *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).

BLM should therefore consider an alternative of undertaking a rulemaking proceeding to impose, under its existing lease rights, a managed decline of production rates and greenhouse gas

pollution consistent with avoiding 1.5 Celsius warming. The U.S. has a moral obligation to lead the world transition from fossil fuel production to 100 percent clean energy. This owes to both its ample financial capability and dominant role in driving global climate change and associated harms. The U.S. is currently the world's largest oil and gas producer and third-largest coal producer.²³ The U.S. is also the world's largest historic emitter of greenhouse gas pollution, responsible for 25 percent of cumulative global CO₂ emissions since 1870, and is currently the world's second highest emitter on an annual and per capita basis.²⁴ The U.S. must lead the world in mobilizing its resources and technology to rapidly phase out fossil fuel extraction while investing in renewable energy technologies domestically and abroad, in addition to a just transition for affected workers and communities currently living on the front lines of the fossil fuel industry and its pollution.²⁵

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

Importantly, an overwhelming scientific consensus has definitively concluded that an immediate managed decline of fossil fuel production is necessary to limit global temperature rise to 1.5°C and avoid catastrophic damage throughout the country and the world.²⁶ Analysis has shown that already developed oil and gas fields and coal mines contain enough carbon to exceed a 1.5°C limit.²⁷ In addition, the United Nations 2020 *Production Gap Report* found that fossil fuel producers are planning to extract *more than double* the oil, gas, and coal by 2030 than is consistent with limiting warming to 1.5°C,²⁸ with U.S. oil and gas production poised to increase

²³ Oil Change International, *Drilling Toward Disaster* at 5.

²⁴ LeQuéré, Corinne et al., *Global Carbon Budget 2018*, 10 *Earth System Science Data* 2141 (2018) at Figure 5, 2167; Global Carbon Project, *Global Carbon Budget 2018* (Dec. 5, 2018), available at: https://www.globalcarbonproject.org/carbonbudget/18/files/GCP_CarbonBudget_2018.pdf at 19 (historical cumulative fossil CO₂ emissions by country).

²⁵ Piggot, Georgia et al., *Realizing a Just and Equitable Transition Away from Fossil Fuels*, Discussion brief, Stockholm Environment Institute (Jan. 2019), available at: <https://www.sei.org/publications/just-and-equitable-transition-fossil-fuels/>.

²⁶ Intergovernmental Panel on Climate Change, *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*, (V. Masson-Delmotte, et al. eds., 2018), <https://www.ipcc.ch/sr15/>.

²⁷ Oil Change International, *The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production* (September 2016), <http://priceofoil.org/2016/09/22/the-skys-limit-report/> at Table 3; Oil Change International, *Drilling Toward Disaster* at 5.

²⁸ SEI, IISD, ODI, E3G, and UNEP, *The Production Gap: The discrepancy between countries' planned fossil fuel production and global production levels consistent with limiting warming to 1.5°C or 2°C* (2020), <http://productiongap.org/> at 2, 4.

more than twice as much as any other country.²⁹ In fact, the U.S. fossil fuel industry is on track to account for 60% of the world's projected growth in oil and gas production by 2030, which would exhaust nearly half of the world's total allowance for oil and gas production by 2030 consistent with a 1.5°C limit.³⁰ Instead of increasing production, governments must make steep reductions of roughly 6% per year in fossil fuel production between 2020 and 2030 to limit warming to 1.5°C,³¹ including global declines of 8.5% per year for oil and 3.5% per year for gas.³² In short, to limit warming to 1.5°C, governments must immediately begin a managed decline that not only halts the approval of new fossil fuel production and infrastructure³³ *but also* phases out production in many existing fields and mines before their reserves are fully depleted.³⁴ As discussed above, the U.S. has a responsibility to lead a more rapid and aggressive managed decline on public lands and waters than what is required on average globally, consistent with a U.S. "fair share" based on the U.S. role as a dominant driver of the fossil-fuel driven climate crisis, high capacity for a just transition, and existing executive authority to undertake managed decline of on public lands and waters.³⁵

Thus, in accord with the Mineral Leasing Act, the Secretary of the Interior Department, acting through BLM, should set forth a declining rate of production over time that can, alongside transition measures, accommodate lease rights but provide for an orderly phase-out of onshore fossil fuel production consistent with declining rates of emissions necessary to limit temperature rise to 1.5°C. Declining rates of productions and greenhouse gas emissions should be exercised in existing leases on existing production and codified in Conditions of Approval for new permits to drill, as explained further below. The Mineral Leasing Act allows the Secretary of the Interior to "alter or modify from time to time the rate of prospecting and development and the quantity and rate of production under such plan." Likewise, nearly all BLM leases for onshore oil and gas contain a clause which states that "Lessor reserves the right to specify rates of development and production in the public interest." *See* U.S. Department of the Interior, Offer to Lease and Lease for Oil and Gas, Form 3100-11 (Oct. 2008).

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

²⁹ Ploy Achakulwisut & Peter Erickson, Trends in fossil fuel extraction: Implications for a shared effort to align global fossil fuel production with climate limits, Stockholm Environment Institute Working Paper (April 2021), www.sei.org/publications/trends-in-fossil-fuel-extraction/ at Figure 3.

³⁰ Oil Change International, *Drilling Toward Disaster* at 6.

³¹ SEI, IISD, ODI, E3G, and UNEP, The Production Gap: The discrepancy between countries' planned fossil fuel production and global production levels consistent with limiting warming to 1.5°C or 2°C (2020), <http://productiongap.org/> at 3, 4.

³² Sven Teske & Sarah Niklas, Fossil Fuel Exit Strategy: An orderly wind down of coal, oil and gas to meet the Paris Agreement (June 2021), <https://fossilfuel treaty.org/exit-strategy> at 6.

³³ Dan Tong et al., Committed emissions from existing energy infrastructure jeopardize 1.5 °C climate target, 572 *Nature* 373 (2019).

³⁴ Oil Change International, *Drilling Toward Disaster* at 11.

³⁵ Greg Muttitt & Sivan Kartha, Equity, climate justice and fossil fuel extraction: principles for a managed phase out, 20 *Climate Policy* 1024 (2020); U.S. Climate Action Network, The U.S. Climate Fair Share (2020), <https://usfairshare.org/background/>.

Year		Oil		Gas
2021	100%	969,261,207	100%	4,334,975,124
2022	90%	872,000,000	90%	3,901,000,000
2023	80%	775,000,000	80%	3,468,000,000
2024	70%	678,000,000	70%	3,034,000,000
2025	60%	582,000,000	60%	2,601,000,000
2026	50%	485,000,000	50%	2,167,000,000
2027	40%	388,000,000	40%	1,734,000,000
2028	30%	291,000,000	30%	1,300,000,000
2029	20%	194,000,000	20%	867,000,000
2030	17%	165,000,000	17%	737,000,000
2031	14%	136,000,000	14%	607,000,000
2032	11%	107,000,000	11%	477,000,000
2033	8%	78,000,000	8%	347,000,000
2034	5%	48,000,000	5%	217,000,000
2035	2.0%	19,000,000	2%	87,000,000

BLM should impose Conditions of Approval on permits to drill that subject any new production to consistency with a 14-year managed decline of federal oil and gas production onshore and offshore, starting from a 2020 production baseline and declining at a rate of 10 percent annually from 2021 to 2029 and 3 percent annually thereafter. Under this decline rate, annual greenhouse gas pollution from federal oil and gas production will be reduced by 83% by 2030 and 98% by 2035 (Table 1, Figure 1), meeting or exceeding reductions consistent with a 1.5°C limit.³⁶ Across its 14-year span, this rate of managed decline yields total federal oil and gas production of 5,787,261,207 bbl and 25,878,975,124 mcf, which is 7,782,395,691 bbl and 34,810,676,612 mcf less than under baseline 2020 production rates. Conditions of Approval for new permits should be in addition to BLM exercising declining rates of production in the context of existing permits to drill consistent with the decline rates shown in Table and Figure 1.

D. Leasing new fossil fuels for development would cause unnecessary and undue degradation that is prohibited under FLPMA

³⁶ The United Nations *Emissions Gap Report* estimated that limiting warming to 1.5°C requires countries to cut greenhouse gas emissions by at least 7.6% per year between 2020 and 2030 for a total emissions reduction of 55% by 2030 (see United Nations Environment Programme Emissions Gap Report 2019, UNEP, Nairobi (2019), <https://www.unenvironment.org/resources/emissions-gap-report-2019> at 37). However, the U.S. “fair share” of greenhouse gas emissions reductions for meeting a 1.5°C limit, based on equity principles of responsibility and capacity, has been estimated at 195% below 2005 levels by 2030, with at least 70% cuts in domestic emissions by 2030 and the remaining 125% achieved through financial and technological support for large-scale emissions reductions internationally (see U.S. Climate Action Network, *The U.S. Climate Fair Share* (2020), <https://usfairshare.org/backgrounder/>). Therefore, a managed decline in greenhouse gas pollution from federal oil and gas production that achieves 83% reductions by 2030 is consistent with the U.S. fair share for limiting warming to 1.5°C.

Because new commitments of fossil fuels for development are fundamentally incompatible with avoiding 1.5 Celsius of global warming, greenhouse gas pollution resulting from new commitments of federal fossil fuels to future development will cumulatively, given other regional, national, and international fossil fuel developments, push warming past the limit of 1.5 Celsius. These emissions and their resultant climate change impacts will cause unnecessary and undue degradation (UUD) to atmospheric conditions, wildlife, and other public lands values.

Pursuant to FLPMA, “[i]n managing the public lands,” the agency “shall, by regulation or otherwise, take any action necessary to prevent unnecessary or undue degradation of the lands.”³⁷ 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 agencies’ planning and management decisions, and should be considered in light of the overarching mandate, discussed previously, that the BLM employ “principles of multiple use and sustained yield.”³⁸; *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 BLM 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.”³⁹ 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, 124 S.Ct. 2373, 159 L.Ed.2d 137 (2004).

Here, the inquiry is whether the agency has taken sufficient measures to prevent degradation unnecessary to, or undue in proportion to, the development the proposed action permits. *See Theodore Roosevelt Conservation Partnership v. Salazar*, 661 F.3d 66, 76 (D.C. Cir. 2011). For example, methane waste and pollution may cause “undue” degradation, even if the activity causing the degradation is “necessary” according to BLM. Where methane waste and pollution is avoidable, even if in the process of avoiding such emissions lessees or operators incur reasonable economic costs that are consistent with conferred lease rights, it is “unnecessary” degradation. 43 U.S.C. § 1732(b).

Therefore, leasing and drilling activities may only go forward as long as unnecessary and undue environmental degradation does not occur. This is a *substantive* requirement, and one that the BLM must define and apply in the context of oil and gas development authorized through the individual lease sales. In other words, the BLM must define and apply the substantive UUD requirements in the context of the specific resource values at stake.

Further, these UUD requirements are distinct from requirements under NEPA. “A finding that there will not be significant impact [under NEPA] does not mean either that the project has been reviewed for unnecessary and undue degradation or that unnecessary or undue degradation will not occur.” *Ctr. for Biological Diversity*, 623 F.3d at 645 (quoting *Kendall's*

³⁷ 43 U.S.C. § 1732(b)

³⁸ 43 U.S.C. § 1732(a)

³⁹ *Id.* at § 1702(c).

Concerned Area Residents, 129 I.B.L.A. 130, 140 (1994)). In the instant case, BLM must specifically account for UUD in its NEPA analysis, which is distinct from its compliance under NEPA, and is also actionable on procedural grounds.

Because of the clear scientific consensus that continued development of oil and gas resources is incompatible with a livable climate, BLM must defer or cancel the lease sales to avoid catastrophic climate change and protect the public interest. Avoidance of GHG emissions to the greatest extent possible is required to satisfy BLM’s obligation to prevent unnecessary or undue degradation under FLPMA.⁴⁰ Given the catastrophic impacts of climate change on public lands, multiple uses, and future generations, avoiding UUD requires BLM to defer leasing to prevent any new commitments of resources that will result in additional greenhouse gas pollution from federal fossil fuels. Given the global nature of climate change, it is *never* necessary to have a net incremental increase in GHG emissions, because any emissions can be fully avoided.

FLPMA’s broad policy directives support this approach. For instance, FLPMA calls on BLM to manage public lands “in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air *and atmospheric*, water resource, and archaeological values.”⁴¹ It also directs BLM to receive “fair market value” for the use of public lands.⁴² “Fair market value” is not defined in FLPMA, but BLM’s economic valuation handbook and previous working groups convened by the Department of the Interior indicate that “economic, environmental, and social considerations [should be considered] in determining the value of federal lands—including option value.”⁴³ Because climate change, and thus all emissions of GHGs, create costs to be borne by society at large and by the BLM in adapting its lands to the changing climate, the “fair market value” of oil and gas extraction activities should take carbon costs into consideration.

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

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

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

⁴¹ 43 U.S.C. § 1701(a)(8) (emphasis added).

⁴² *Id.* § 1701(a)(9).

⁴³ *See* New York University School of Law; Institute for Policy Integrity, *Look Before You Lease; Reducing Fossil Fuel Dominance on Public Lands by Accounting for Option Value* at 4 (2020) (citing Jayni Foley Hein, *Federal Lands and Fossil Fuels: Maximizing Social Welfare in Federal Energy Leasing*, 42 HARV. ENVT’L L. REV. 1 at 39–40 (2018)).

BLM must also consider recent climate science, as well as the indirect and cumulative effects of greenhouse gas emissions that will result from the approval of the proposed leases and other past, present, and reasonably foreseeable federal and non-federal oil, gas, and coal leasing and production decisions. NEPA specifically requires BLM to consider existing, new, and revised climate science and policy, as well as quantify and discuss the significance of the direct, indirect, and cumulative greenhouse gases generated by its proposed action.⁴⁴ Court decisions clearly establish that NEPA mandates consideration and analysis of the indirect and cumulative climate impacts of BLM fossil fuel leasing decisions.⁴⁵

Climate change has been intensively studied and acknowledged at the global, national, and regional scales. Climate change is being fueled by the human-caused release of GHG, in particular carbon dioxide and methane. There is a near-linear relationship between cumulative anthropogenic CO₂ emissions and the global warming they cause, where each 1000 GtCO₂ of emissions causes a 0.45 degree Celsius increase in global surface temperature.⁴⁶ Carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are recognized as the key greenhouse gases contributing to climate change. In 2009, EPA found that these “six greenhouse gases taken in combination endanger both the public health and the public welfare of current and future generations.”⁴⁷ The D.C. Circuit has upheld this decision as supported by the vast body of scientific evidence on the subject.⁴⁸

⁴⁴ 40 C.F.R. §§ 1500.1 (requiring “high quality information” and “accurate scientific analysis”); 1502.16 (outlining what is required in an impacts analysis); 1508.7 (defining cumulative impacts); 1508.8 (defining direct and indirect impacts).

⁴⁵ *Citizens for a Healthy Community v. BLM*, No. 1:17-cv-2519 (D. Colo. March 27, 2019) (holding that “Defendants acted in an arbitrary and capricious manner and violated NEPA by not taking a hard look at the foreseeable indirect effects resulting from the combustion of oil and gas in the EIS and EA. Defendants must quantify and reanalyze the foreseeable indirect effects the emissions.”). *See also WildEarth Guardians v. Zinke*, No. CV 16-1724 (RC), 2019 WL 1273181 (D.D.C. Mar. 19, 2019) (invalidating nine BLM NEPA analyses in support of oil and gas lease sales because “BLM did not take a hard look at drilling-related and downstream [greenhouse gas] emissions from the leased parcels and, it failed to sufficiently compare those emissions to regional and national emissions.”); *San Juan Citizens All.*, 326 F. Supp. 3d at 1242–43 (collecting cases and requiring assessment of greenhouse gas emissions at the lease sale stage); *Western Org. of Res. Councils v. U.S. Bureau of Land Mgmt.*, CV 16-21-GF-BMM, 2018 WL 1475470 (D. Mont. Mar. 26, 2018) (requiring consideration of climate change at the RMP stage); *Sierra Club v. Fed. Energy Regulatory Comm’n*, 867 F.3d 1357, 1374 (D.C. Cir. 2017) (requiring quantification of indirect greenhouse gas emissions); *Nat’l Highway Traffic. Admin.*, 538 F.3d at 1215 (requiring assessment of the cumulative impacts of climate change).

⁴⁶ Intergovernmental Panel on Climate Change (IPCC), *2021: Summary for Policymakers*, In: *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the IPCC* at 36 [MassonDelmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J. B. R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)]. Cambridge University Press. In Press.

⁴⁷ EPA, *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*, 74 Fed. Reg. 66,496 (Dec. 15, 2009), available at: https://www.epa.gov/sites/production/files/2016-08/documents/federal_register-epa-hq-oar-2009-0171-dec.15-09.pdf.

⁴⁸ *See Coal. for Responsible Regulation, Inc. v. EPA.*, 684 F.3d 102, 120-22 (D.C. Cir. 2012).

In addition to complying with NEPA, BLM must ensure the climate change analysis for this proposed drilling complies with the Administrative Procedure Act, which provides that agency action can be set aside when it is deemed “arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law.”⁴⁹ An action is arbitrary and capricious “if the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.”⁵⁰

1. Climate science has conclusively established that GHG emissions from the production and combustion of fossil fuels are the predominant drivers of climate change and must be slowed to prevent climate catastrophe.

The Intergovernmental Panel on Climate Change (IPCC) is a Nobel Prize-winning scientific body within the United Nations that reviews and assesses the most recent scientific, technical, and socioeconomic information relevant to our understanding of climate change. In one of its more recent reports to policymakers in 2014, the IPCC provided a summary of our understanding of human-caused climate change.⁵¹ Among other things, the IPCC stated:

- Human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems.
- Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea level has risen.
- Anthropogenic greenhouse gas emissions have increased since the pre-industrial era, driven largely by economic and population growth, and are now higher than ever. This has led to atmospheric concentrations of carbon dioxide, methane, and nitrous oxide that are unprecedented in at least the last 800,000 years. Their effects, together with those of other anthropogenic drivers, have been detected throughout the climate system and are extremely likely to have been the dominant cause of the observed warming since the mid-20th century.
- In recent decades, changes in climate have caused impacts on natural and human systems on all continents and across the oceans. Impacts are due to observed climate change, irrespective of its cause, indicating the sensitivity of natural and human systems to changing climate.

⁴⁹ 5 U.S.C. § 706(2)(A).

⁵⁰ *Motor Vehicle Mfrs. Ass'n of U.S., Inc.*, 463 U.S. at 43.

⁵¹ IPCC, *Climate Change 2014 Synthesis Report, Summary for Policymakers*, available at: http://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf.

- Continued emission of greenhouse gases will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive, and irreversible impacts for people and ecosystems. Limiting climate change would require substantial and sustained reductions in greenhouse gas emissions which, together with adaptation, can limit climate change risks.
- Surface temperature is projected to rise over the 21st century under all assessed emission scenarios. It is very likely that heat waves will occur more often and last longer, and that extreme precipitation events will become more intense and frequent in many regions. The ocean will continue to warm and acidify, and global mean sea level will continue to rise.⁵²

In October 2018, IPCC expounded on its findings in a special report (hereinafter IPCC SP15”), noting that the differences between 1.5 degree Celsius warming and 2.0 degree Celsius warming are significant and that rapid transition away from fossil fuels is needed if we are to limit the impacts of climate change.⁵³ Specifically, the IPCC found:

- Human activities are estimated to have caused approximately 1.0 degree Celsius of global warming above pre-industrial levels, with a likely range of 0.8 degrees Celsius to 1.2 degrees Celsius. Global warming is likely to reach 1.5 degrees Celsius between 2030 and 2052 if it continues to increase at the current rate.
- Warming from anthropogenic emissions from the pre-industrial period to the present will persist for centuries to millennia and will continue to cause further long-term changes in the climate system, such as sea level rise, with associated impacts, but these emissions alone are unlikely to cause global warming of 1.5 degrees Celsius.
- Climate models project robust differences in regional climate characteristics between present-day and global warming of 1.5 degrees Celsius, and between 1.5 degrees Celsius and 2 degrees Celsius. These differences include increases in: mean temperature in most land and ocean regions, hot extremes in most inhabited regions, heavy precipitation in several regions, and the probability of drought and precipitation deficits in some regions.
- On land, impacts on biodiversity and ecosystems, including species loss and extinction, are projected to be lower at 1.5 degrees Celsius of global warming compared to 2 degrees Celsius. Limiting global warming to 1.5 degrees Celsius compared to 2 degrees Celsius is projected to lower the impacts on terrestrial, freshwater, and coastal ecosystems and to retain more of their services to humans.

⁵² *Id.* at 2–10.

⁵³ See IPCC SR 15, *Global Warming of 1.5 Degrees: Summary for Policy Makers* (Oct. 2018), available at: http://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf.

- Climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth are projected to increase with global warming of 1.5 degrees Celsius and increase further with 2 degrees Celsius.
- Pathways limiting global warming to 1.5 degrees Celsius with no or limited overshoot would require rapid and far-reaching transitions in energy, land, urban and infrastructure (including transport and buildings), and industrial systems. These systems transitions are unprecedented in terms of scale, but not necessarily in terms of speed, and imply deep emissions reductions in all sectors, a wide portfolio of mitigation options, and a significant upscaling of investments in those options.⁵⁴

In August 2021, IPCC issued the Sixth Assessment Report (AR6), updating earlier assessment reports with renewed urgency and specificity about the causes, effects, rates, extents, and severity of anthropogenic warming, and the correspondingly urgent need to rapidly curtail fossil fuel combustion to maintain favorable chances of avoiding 1.5 degrees Celsius warming.⁵⁵ Specifically, the IPCC found:

- It is unequivocal that human influence has warmed the atmosphere, ocean, and land. Human influence has warmed the climate at a rate that is unprecedented in at least the last 2,000 years. Widespread and rapid changes in the atmosphere, ocean, cryosphere, and biosphere have occurred.
- The scale of recent changes across the climate system as a whole and the present state of many aspects of the climate system are unprecedented over many centuries to many thousands of years.
- In 2019, concentrations of CO₂ in the atmosphere were higher than at any time in at least the last two million years.
- Every ton of CO₂ adds to global warming. With every additional increment of global warming, changes in extremes continue to become larger. Every additional 0.5 degrees Celsius of global warming causes clearly discernible increases in the intensity and frequency of hot extremes, heavy precipitation, and agricultural and ecological droughts.
- Human-induced climate change is already affecting many weather and climate extremes in every region across the globe. Evidence of observed changes in extremes such as heatwaves, heavy precipitation, droughts, and tropical cyclones, and, in particular, their attribution to human influence, has strengthened since the Fifth Assessment Report (AR5).
- Many changes in the climate system become larger in direct relation to increasing global warming. They include increases in the frequency and intensity of hot extremes, marine heatwaves, and heavy precipitation, agricultural and ecological

⁵⁴ *Id.* at SPM-4 to SPM-21.

⁵⁵ IPCC, 2021: *Summary for Policymakers*.

droughts in some regions, and proportion of intense tropical cyclones, as well as reductions in Arctic sea ice, snow cover, and permafrost.

- Continued global warming is projected to further intensify the global water cycle, including its variability, global monsoon precipitation, and the severity of wet and dry events.
- With further global warming, every region is projected to increasingly experience concurrent and multiple changes in climatic impact-drivers. Changes in several climatic impact-drivers would be more widespread at 2 degrees Celsius compared to 1.5 degrees Celsius global warming and even more widespread and/or pronounced for higher warming levels.
- The remaining global carbon budget, from the beginning of 2020, is 400 and 300 GtCO₂ for maintaining 67 percent and 83 percent likelihoods, respectively, of limiting global warming to 1.5 degrees Celsius.

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

- Water for people and nature in the Southwest has declined during droughts, due in part to human-caused climate change. Intensifying droughts and occasional large floods, combined with critical water demands from a growing population, deteriorating infrastructure, and groundwater depletion, suggest the need for flexible water management techniques that address changing risks over time, balancing declining supplies with greater demands.
- The integrity of Southwest forests and other ecosystems and their ability to provide natural habitat, clean water, and economic livelihoods have declined as a result of recent droughts and wildfire due in part to human-caused climate change. Greenhouse gas emissions reductions, fire management, and other actions can help reduce future vulnerabilities of ecosystems and human wellbeing.
- The ability of hydropower and fossil fuel electricity generation to meet growing energy use in the Southwest is decreasing as a result of drought and rising temperatures. Many renewable energy sources offer increased electricity reliability, lower water intensity of energy generation, reduced greenhouse gas emissions, and new economic opportunities.
- Food production in the Southwest is vulnerable to water shortages. Increased drought, heat waves, and reduction of winter chill hours can harm crops and livestock; exacerbate competition for water among agriculture, energy generation, and municipal uses; and increase future food insecurity.
- Heat-associated deaths and illnesses, vulnerabilities to chronic disease, and other health risks to people in the Southwest result from increases in extreme heat, poor air quality, and conditions that foster pathogen growth and spread. Improving public

health systems, community infrastructure, and personal health can reduce serious health risks under future climate change.⁵⁶

The California Department of Justice lists the probable impacts of climate change as:

- Sea level rise: The rise in sea level associated with climate change can be expected to impact 85 percent of the population who live and work in coastal areas and would put billion of dollars in property and infrastructure at risk.
- Losses to Sierra snowpack: Because the Sierra Nevada snowpack is the state's most important reservoir of water, this could have significant impacts to the state's already limited water supply.
- Forestry and higher risk of forest fires: As demonstrated by the recent record-setting and fire season,⁵⁷ climate change has already hit the state's forests. Climate change can be expected to continue to increase temperatures, make forests drier, and result in larger forest fires across the state.
- Damages to agriculture: Droughts have the potential to threaten California's \$39 billion dollar agriculture industry. This could have impacts on the food supply in California and the nation at large
- Public health impacts: Because climate change will result in more smog and hotter temperatures, sensitive populations are at greater risk of respiratory and heart disease and death.
- Habitat destruction and loss of ecosystems: California is home to the highest number of unique plant and animal species in the country. Climate change will most certainly have adverse effects on these species and their habitats.⁵⁸

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").⁵⁹ The Final Climate Guidance applies to all proposed federal agency

⁵⁶ See Patrick Gonzales et al., *Chapter 25: Southwest*, in *U.S. Global Change Research Program*, (2018) Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Vol. II (Reidmiller, D.R. et al., eds. 2018), available at: <https://nca2018.globalchange.gov/chapter/25/>.

⁵⁷ Andrew Freedman, *California Endures Record-Setting 'Kiln-Like' Heat as Fires Rage, Causing Injuries* (Sep. 6, 2020), available at: <https://www.washingtonpost.com/weather/2020/09/06/california-wildfires-heat-wave/> (accessed Aug. 29, 2021)

⁵⁸ Cal. DOJ, *Climate Change Impacts in California*, available at: <https://oag.ca.gov/environment/impact> (accessed Aug. 29, 2021).

⁵⁹ See 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), available at:

https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/nepa_final_ghg_guidance.pdf.

actions, “including land and resource management actions.”⁶⁰ 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.⁶¹

In reality, many of the impacts described above are already occurring, and often to a disproportionate degree in areas in which the proposed sales will occur. Portions of Colorado and Utah have already warmed more than 2 degrees Celsius, double the global average, making this area one of the largest 2°C hot spots in the continental US.⁶² With the region’s snowpack shrinking and melting earlier, the ground absorbs more heat. In addition, early snowmelt results in more water evaporation and less water availability for farmers later in the season. These impacts, situated as they are in a watershed that is critically important to the Western U.S., are already being felt far beyond the borders of these two states. The flow of the Colorado River, for example, has declined nearly 20% over the past century, half of which can be attributed to warming temperatures that decrease snowpack and cause the snowpack that does accumulate to melt earlier.⁶³

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

⁶⁰ *Id.* at 9.

⁶¹ *Id.* at 10–11.

⁶² Eilperin, Juliet, “2°C Beyond the Limit: This giant climate hot spot is robbing the West of its water,” *The Washington Post*, August 7, 2020 available at: https://www.washingtonpost.com/graphics/2020/national/climate-environment/climate-change-colorado-utah-hot-spot/?utm_campaign=wp_post_most&utm_medium=email&utm_source=newsletter&wpisrc=nl_most.

⁶³ *Id.* See also, P.C.D. Milly, K.A. Dunne, *Colorado River flow dwindles as warming-driven loss of reflective snow energizes evaporation*, *Science*, 367, (6483), 1252-1255, 13 March 2020; Udall, B. and J. Overpeck (2017), *The twenty-first century Colorado River hot drought and implications for the future*, *Water Resour. Res.*, 53, 2404– 2418, doi:10.1002/2016WR019638.

Meaningful consideration of greenhouse gas emissions is clearly within the scope of required NEPA review. *Nat'l Highway Traffic Safety Admin.*, 538 F.3d at 1217. As the Ninth Circuit has held, in the context of fuel economy standard rules:

The impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct. Any given rule setting a CAFE standard might have an “individually minor” effect on the environment, but these rules are “collectively significant actions taking place over a period of time”⁶⁴

The courts have ruled that federal agencies must consider indirect GHG emissions resulting from agency policy, regulatory, and leasing decisions. For example, agencies cannot ignore the indirect air quality and climate change impacts of decisions that would open up access to coal reserves.⁶⁵

Furthermore, BLM is required to assess recent science and include high quality information in its NEPA analyses. Thus, the BLM must consider several recent studies that have determined that existing fossil fuel reserves would push the world beyond warming of 1.5 degrees Celsius and 2 degrees Celsius above pre-industrial levels.⁶⁶

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

NEPA requires “reasonable forecasting,” which includes the consideration of “reasonably foreseeable future actions . . . even if they are not specific proposals.” *N. Plains Res. Council*,

⁶⁴ *Nat'l Highway Traffic Safety Admin.*, 538 F.3d at 1216 (quoting 40 C.F.R. § 1508.7).

⁶⁵ See *Mid States Coal. for Progress v. Surface Transp. Bd.*, 345 F.3d 520, 532, 550 (8th Cir. 2003); *High Country Conservation Advocates v. U.S. Forest Serv.*, 52 F.Supp. 3d 1174, 1197-98 (D. Colo. 2014); *Montana Environmental Information Center v. U.S. Office of Surface Mining*, 274 F. Supp. 3d 1074 (D. Mont. 2017), *amended in part, adhered to in part*, 2017 WL 5047901 (D. Mont. 2017).

⁶⁶ See Kelly Trout & Lorne Stockman, Oil Change International, *Drilling Toward Disaster: Why U.S Oil & Gas Expansion is Incompatible with Climate Limits* at 1, 6, 11 (Jan. 2019), available at: <http://priceofoil.org/content/uploads/2019/01/Drilling-Towards-Disaster-Web-v3.pdf>; SEI, IISD, ODI, E3G, and UNEP, *The Production Gap Report: 2020 Special Report* (2021), <http://productiongap.org/2020report>; Achakulwisut, Ploy and Peter Erickson, *Trends in fossil fuel extraction: Implications for a shared effort to align global fossil fuel production with climate limits*, Stockholm Environment Institute (April 2021), www.sei.org/publications/trends-in-fossil-fuel-extraction/.

Inc. v. Surface Transp. Bd., 668 F.3d 1067, 1079 (9th Cir. 2011) (citation omitted). That BLM cannot “accurately” calculate the total emissions expected from full development is not a rational basis for cutting off its analysis. “Because speculation is . . . implicit in NEPA,” agencies may not “shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as crystal ball inquiry.” *Id.* The D.C. Circuit has echoed this sentiment, rejecting the argument that it is “impossible to know exactly what quantity of greenhouse gases will be emitted” and countering that “agencies may sometimes need to make educated assumptions about an uncertain future” in order to comply with NEPA’s reasonable forecasting requirement. *Sierra Club v. Federal Energy Regulatory Comm’n*, 863 F.3d 1357, 1373-74 (D.C. Cir. 2017).

The CEQ’s Final Climate Guidance is dispositive on the issue of federal agency review of greenhouse gas emissions as foreseeable direct and indirect effects of the proposed action.⁶⁷ The CEQ guidance provides clear direction for BLM to conduct a lifecycle greenhouse gas analysis because the modeling and tools to conduct this type of analysis are readily available to the agency:

If the direct and indirect GHG emissions can be quantified based on available information, including reasonable projections and assumptions, agencies should consider and disclose the reasonably foreseeable direct and indirect emissions when analyzing the direct and indirect effects of the proposed action. Agencies should disclose the information and any assumptions used in the analysis and explain any uncertainties. To compare a project’s estimated direct and indirect emissions with GHG emissions from the no-action alternative, agencies should draw on existing, timely, objective, and authoritative analyses, such as those by the Energy Information Administration, the Federal Energy Management Program, or Office of Fossil Energy of the Department of Energy. In the absence of such analyses, agencies should use other available information.⁶⁸

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

The indirect effects of such an action that are reasonably foreseeable at the time would vary with the circumstances of the proposed action. For actions such as a Federal lease sale of coal for energy production, the impacts associated with the end-use of the fossil fuel being extracted would be the reasonably foreseeable combustion of that coal.⁶⁹

Although the 2016 CEQ guidance was “withdrawn for further consideration,”⁷⁰ the underlying requirement to consider climate change impacts under NEPA, including indirect and cumulative combustion impacts foreseeably resulting from fossil fuels leasing and drilling

⁶⁷ 81 Fed. Reg. 51,866 (Aug. 5, 2016).

⁶⁸ 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* at 16.

⁶⁹ *Id.*

⁷⁰ 82 Fed. Reg. 16,576 (Apr. 5, 2017).

decisions, has not changed.⁷¹ Further, President Biden on January 20, 2021 rescinded that Trump Executive Order, and directed CEQ to “review, revise, and update” its 2016 climate guidance.⁷² On February 19, 2021, CEQ effectively reinstated the 2016 GHG guidance:

CEQ will address in a separate notice its review of and any appropriate revisions and updates to the 2016 GHG Guidance. In the interim, agencies should consider all available tools and resources in assessing GHG emissions and climate change effects of their proposed actions, including, as appropriate and relevant, the 2016 GHG Guidance.⁷³

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

In both *Mid States Coalition* and *High Country*, the courts rejected the government’s rationale that increased emissions from combustion of coal was not reasonably foreseeable because the same amount of coal would be burned without opening up the areas at issue to new coal mining. Both courts found this argument “illogical at best” and noted that “increased availability of inexpensive coal will at the very least make coal a more attractive option to future entrants into the utilities market when compared with other potential fuel sources, such as nuclear power, solar power, or natural gas.” *See High Country*, 52 F. Supp. 3d at 1197 (quoting *Mid States Coalition*, 345 F.3d at 549). “On similar grounds, the development of new wells over

⁷¹ *See S. Fork Band*, 588 F.3d at 725; *Ctr. for Biological Diversity*, 538 F.3d at 1214-15; *Mid States Coalition for Progress*, 345 F.3d at 550; *WildEarth Guardians*, 104 F. Supp. 3d at 1230; *Dine Citizens Against Ruining Our Env’t*, 82 F. Supp. 3d at 1201; *High Country Conservation Advocates*, 52 F. Supp. 3d at 1174.

⁷² EO 13,99, 86 Fed. Reg. at 7040, Sec. 7, 86 Fed. Reg. at 7042.

⁷³ CEQ, *NEPA Guidance on Consideration of Greenhouse Gas Emissions*, 86 Fed. Reg. 10,252 (Feb. 19, 2021), available at: <https://www.govinfo.gov/content/pkg/FR-2021-02-19/pdf/2021-03355.pdf> (accessed Aug. 12, 2021).

the proposed areas for lease will increase the supply of [oil and natural gas]. At some point this additional supply will impact the demand for [oil and gas] relative to other fuel sources, and [these minerals] that otherwise would have been left in the ground will be burned. This reasonably foreseeable effect must be analyzed, even if the precise extent of the effect is less certain.” *Id.*; see also *WildEarth Guardians v. U.S. Office of Surface Mining, Reclamation & Enforcement*, 104 F. Supp. 3d 1208, 1229-30 (D. Colo. 2015) (coal combustion was indirect effect of agency’s approval of mining plan modifications that “increased the area of federal land on which mining has occurred” and “led to an increase in the amount of federal coal available for combustion”).⁷⁴

Even if it were true that potential emissions cannot reasonably be estimated, or estimated with a high degree of accuracy, it is possible for BLM to identify significant sources of greenhouse gas emissions, which would enable the identification of specific measures to reduce emissions and an understanding of the extent to which certain emissions are avoidable. The extreme urgency of the climate crisis requires BLM to pursue all means available to avoid and limit the climate change effects of its actions. As the most recent scientific information demonstrates, *any* additional, currently unaccounted for increase in GHG emissions from fossil fuel consumption is unwarranted and increases the likelihood of failing to limit warming to 1.5 degrees Celsius. Because the cumulative climate impacts of federal fossil fuel programs have never faced a hard look analysis under NEPA, no individual lease parcels can lawfully be dismissed as insignificant or de minimis. *Any* emissions source, no matter how small, is potentially significant, such that BLM should fully explore avoidance options for all sources.

The BLM must also consider a new study that was published in the journal *Nature* on February 19, 2020, analyzing pre-industrial ice cores to better quantify anthropogenic fossil methane emissions.⁷⁵ The results “indicate that anthropogenic fossil [methane] emissions are underestimated by about 38 to 58 teragrams CH₄ per year, or about 25 to 40 percent of recent estimates.”⁷⁶ This “highlights the human impact on the atmosphere and climate, [and] provides a firm target for inventories of the global [methane] budget.”⁷⁷ The BLM must consider what implications its leasing decisions will have against this backdrop of new information.

BLM must quantify the potential production volumes and corresponding lifecycle greenhouse gas emissions that will result from the proposed leases. Potential lifecycle greenhouse gas emissions for resultant oil and gas volumes were generated using a peer-

⁷⁴ See also, 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* at 14. For example, NEPA reviews for proposed resource extraction and development projects typically include the reasonably foreseeable effects of various phases in the process, such as clearing land for the project, building access roads, extraction, transport, refining, processing, using the resource, disassembly, disposal, and reclamation. Depending on the relationship between any of the phases, as well as the authority under which they may be carried out, agencies should use the analytical scope that best informs their decision-making.

⁷⁵ Benjamin Hmiel et. al, *Preindustrial ¹⁴CH₄ Indicates Greater Anthropogenic Fossil CH₄ Emissions*, *Nature*, 409, 409 (Feb. 19, 2020).

⁷⁶ *Id.*

⁷⁷ *Id.*

reviewed carbon calculator and lifecycle greenhouse gas emissions model developed by EcoShift consulting.⁷⁸ This model is not novel in its development or methodology. Numerous greenhouse gas calculation tools exist to develop lifecycle analyses, particularly for fossil fuel extraction, operations, transport and end-user emissions.⁷⁹ Indeed, the Department of Energy has historically utilized these types of lifecycle emissions analyses in NEPA reviews of oil and gas infrastructure projects.⁸⁰ Other federal agencies have begun to employ upstream, downstream,

⁷⁸ See Ecoshift Consulting, The potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels, Center for Biological Diversity and Friends of the Earth (2015), <http://www.ecoshiftconsulting.com/wp-content/uploads/Potential-Greenhouse-Gas-Emissions-U-S-Federal-Fossil-Fuels.pdf>.

⁷⁹ See Council on Environmental Quality, Revised draft guidance for greenhouse gas emissions and climate change impacts (2014), https://ceq.doe.gov/current_developments/GHG-accounting-tools.html.

⁸⁰ U.S. Department of Energy National Energy Technology Laboratory, Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States, DOE/NETL-2014/1649 (May 29, 2014) *available*

at <http://energy.gov/sites/prod/files/2014/05/f16/Life%20Cycle%20GHG%20Perspective%20Report.pdf>.

See also, U.S. Department of Energy National Renewable Energy Laboratory, Life Cycle Greenhouse Gas Emissions from Electricity Generation Fact Sheet, Pub No. NREL/FS-6A20-57817 (2013) *available*

at <http://www.nrel.gov/docs/fy13osti/57187.pdf>; U.S. Department of Energy National Energy Technology Laboratory Role of Alternative Energy Sources: Natural Gas Technology Assessment, Pub No.

DOE/NETL- 2012/1539 (NETL, 2012) *available at*

<https://www.netl.doe.gov/File%20Library/Research/Energy%20Analysis/Life%20Cycle%20Analysis/LCA-2012-1539.pdf>; U.S. Department of Energy National Energy Technology Laboratory, Life Cycle

Greenhouse Gas Inventory of Natural Gas Extraction, Delivery and Electricity Production, Pub No.

DOE/NETL-2011/1522 (NETL, 2011) *available at*

http://www.fossil.energy.gov/programs/gasregulation/authorizations/2013_applications/sierra_club_13-69_venture/exhibits_44_45.pdf; U.S. Department of Energy National Energy Technology Laboratory,

Life Cycle Analysis: Natural Gas Combined Cycle (NGCC) Power Plant, Pub No DOE/NETL-403-

110509 (Sep 10, 2012) (NETL, 2010) *available at* [https://www.netl.doe.gov/energy-](https://www.netl.doe.gov/energy-analyses/temp/FY13_LifeCycleAnalysisNaturalGasCombinedCycle(NGCC)PowerPlantFinal_060113.pdf)

[analyses/temp/FY13_LifeCycleAnalysisNaturalGasCombinedCycle\(NGCC\)PowerPlantFinal_060113.pdf](https://www.netl.doe.gov/energy-analyses/temp/FY13_LifeCycleAnalysisNaturalGasCombinedCycle(NGCC)PowerPlantFinal_060113.pdf)

and lifecycle greenhouse gas emissions analyses for NEPA review of energy-related projects.⁸¹ Courts have upheld the viability and usefulness of lifecycle analyses, and adoption of this trend is clearly reflected in the CEQ Guidance on Climate Change . 81 Fed. Reg. 51, 866 at 11 (Aug. 5, 2016) (“This guidance recommends that agencies quantify a proposed agency action’s projected direct and indirect GHG emissions. Agencies should be guided by the principle that the extent of the analysis should be commensurate with the quantity of projected GHG emissions and take into account available data and GHG quantification tools that are suitable for and commensurate with the proposed agency action”).⁸²

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

⁸¹ U.S. Bureau of Land Management, Final Supplemental Environmental Impact Statement for the Leasing and Underground Mining of the Greens Hollow Federal Coal Leas Tract, UTU-84102, 287 (Feb 2015) (BLM expressly acknowledged that “the burning of the coal is an indirect impact that is a reasonable progression of the mining activity” and quantified emissions from combustion without any disclaimer about other sources of coal. *Id* at 286. In that same EIS, BLM also acknowledged that truck traffic to haul coal would be extended as a result of the proposed lease approval, and this would generate additional emissions.) *See also*, U.S. Forest Service, Record of Decision and Final Environmental Impact Statement, Oil and Gas Leasing Analysis, Fishlake National Forest, 169 (Aug 2013) (Table 3.12-7: shows GHG emissions from transportation, offsite refining and end use; and total direct and indirect emissions. *See also id.*, Appendix E/SIR-2 (more detailed calculations of direct and indirect emissions.)) U.S. Army Corps of Engineers, Final Environmental Impact Statement: Alaska Stand Alone Gas Pipeline, Volume 2 Sec. 5.20-70–71 (Oct. 2012) The Corps, in a 2012 EIS for an intrastate natural gas pipeline in Alaska, estimated downstream emissions from combustion of the natural gas that would be transported, and also discussed the potential for natural gas to displace other, dirtier fuel sources such as coal and oil.) U.S. Department of State, Final Supplemental Environmental Impact Statement for the Keystone XL Project, § 4.14.3, Appendix U (Jan. 2014)(The Department of State, as lead agency on the Keystone XL Pipeline Review conducted a relatively comprehensive life-cycle greenhouse gas analysis for the proposed pipeline, alternatives, and baseline scenarios that could occur if the pipeline was not constructed.) U.S. Environmental Protection Agency Region X, Letter from Dennis McLerran, Regional Administrator, to Randel Perry, U.S. Army Corps of Engineers Seattle District, re Gateway Pacific Projects (Jan 22, 2013) *available at*

http://www.eisgatewaypacificwa.gov/sites/default/files/content/files/EPA_Reg10_McLerran.pdf#overlay-context=resources/project-library. (EPA submitted comments on the scope of impacts that should be evaluated in the coal terminal EIS that the Corps is preparing, in which it urged the Corps to conduct a lifecycle emissions analysis of GHG emissions from the coal that would be transported via the terminal.)

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

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

BLM must engage in a robust examination of cumulative impacts of oil and gas production at the local, regional, and national, program-wide levels. BLM's analysis of cumulative impacts must include use of the Social Cost of Carbon (a protocol developed by EPA) in order to better quantify more of the potential costs of leasing and subsequent development.

NEPA requires that BLM engage in robust consideration of reasonable alternatives, through evaluation of both short- and long-term climate impacts, and by use of available tools or methods generally accepted in the scientific community to evaluate the impact of GHG emissions, including the social cost of greenhouse gases and global carbon budgets.

An agency must “consider every significant aspect of the environmental impact of a proposed action.” *Baltimore Gas & Elec. Co.*, 462 U.S. at 107. This includes the disclosure of direct, indirect, and cumulative impacts of its actions, including climate change impacts and emissions.⁸³ The need to evaluate such impacts is bolstered by the fact that “[t]he harms associated with climate change are serious and well recognized” and environmental changes caused by climate change “have already inflicted significant harms” to many resources around the globe. *Massachusetts v. EPA*, 549 U.S. 497, 521 (2007); *see also id.* at 525 (recognizing “the enormity of the potential consequences associated with manmade climate change”). Failing to perform such analysis undermines the agency’s decision-making process and the assumptions made.

NEPA requires federal agencies to prepare an EIS for any “major Federal actions significantly affecting the quality of the human environment.” *Montana Env'tl. Info. Ctr.*, 274 F. Supp. 3d at 1097 (citing 42 U.S.C. § 4332(C)). In preparing an EIS, all agencies must include a detailed statement on (1) the environmental impact of the proposed action, (2) any adverse environmental effects which cannot be avoided should the proposal be implemented, (3) alternatives to the proposed action, (4) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and (5) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.⁸⁴ Section 4332(C) of NEPA is an “action-forcing” provision intended as a directive to all agencies to assure consideration of the environmental impact of their actions in decisionmaking. *Kleppe v. Sierra Club*, 427 U.S. 390, 409 (1976). Furthermore, “an EIS must be prepared if substantial questions are raised as to whether a project may cause significant degradation of some human environmental factor . . . To trigger this requirement a plaintiff need not show that significant effects will in fact occur . . . raising substantial questions whether a project may have a significant effect is sufficient.” *Id.* (citing *Ocean Advocates v. U.S.*

⁸³ 40 C.F.R. § 1508.25(c).

⁸⁴ 42 U.S.C. § 4332(C).

Army Corps of Eng'rs, 402 F.3d 846, 864–65 (9th Cir. 2005)). When the court reviews an agency's decision to issue a Finding of No Significant Impact (FONSI), and thus not to prepare an EIS, “the arbitrary and capricious standard under the [Administrative Procedure Act] requires a court ‘to determine whether the agency has taken a ‘hard look’ at the consequences of its actions, based [its decision] on a consideration of the relevant factors,’ and provided a ‘convincing statement of reasons to explain why a project’s impacts are insignificant.’” *Id.* (citing *Barnes v. U.S. Dept. of Transp.*, 655 F.3d 1124, 1132 (9th Cir. 2011)). The Ninth Circuit held that in order for the court to uphold an agency's FONSI, the agency must consider the project's potential impact on climate change due to the downstream GHG emissions released as a result of the action. See *Ctr. for Biological Div.*, 538 F.3d at 1223.

The cumulative lifecycle emissions from the proposed leasing, in combination with other past federal fossil fuel leasing and production nationwide, should be put in the context of the global and U.S. carbon budgets. These emissions, individually and cumulatively, are significant in the scope of global, national, state, and local-level commitments to implementing rapid GHG emissions reductions. At a time when the U.S. must rapidly ratchet down GHG emissions to avoid the worst dangers of climate change, the BLM should not be committing to new fossil fuel leasing or development on our public lands that locks in carbon intensive oil production for years into the future.

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

The United States has committed to the climate change target of holding the long-term global average temperature “to well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 degrees Celsius above pre-industrial levels”⁷⁷ under the Paris Agreement.⁷⁸ The United States signed the Paris Agreement on April 22, 2016 as a legally binding instrument through executive agreement,⁷⁹ and the treaty entered into force on November 4, 2016. The Paris Agreement codifies the international consensus that climate change is an “urgent threat” of global concern.⁸⁰ The Agreement also requires a “well below 2°C” climate target because 2 degrees Celsius of warming is no longer considered a safe guardrail for avoiding catastrophic climate impacts and runaway climate change.⁸¹

Immediate and aggressive greenhouse gas emissions reductions are necessary to keep warming well below a 2 degrees Celsius rise above pre-industrial levels. The IPCC Fifth Assessment Report and other expert assessments have established global carbon budgets, or the total amount of carbon that can be burned while maintaining some probability of staying below a given temperature target. According to the IPCC, total cumulative anthropogenic emissions of CO₂ must remain below about 1,000 GtCO₂ from 2011 onward for a 66 percent probability of

limiting warming to 2 degrees Celsius above pre-industrial levels, and to 400 GtCO₂ from 2011 onward for a 66 percent probability of limiting warming to 1.5 degrees Celsius.⁸² These carbon budgets have been reduced to 850 GtCO₂ and 240 GtCO₂, respectively, from 2015 onward.⁸³ Most recently, an updated analysis of carbon budgets in the IPCC's Sixth Assessment Report estimates that the remaining global carbon budget from the beginning of 2020 is now only 400 and 300 GtCO₂ for maintaining 67 percent and 83 percent likelihoods, respectively, of limiting global warming to 1.5 degrees Celsius.⁸⁵

Published scientific studies have estimated the United States' portion of the global carbon budget by allocating the remaining global budget across countries based on factors including equity principles and economics. Estimates of the remaining U.S. carbon budget consistent with meeting a 1.5°C target are negative or near zero and very limited.⁸⁶ Therefore, whatever remaining carbon budget that the U.S. still has left, if any, is very small and rapidly being consumed.

The 2019 United Nations *Production Gap Report* used publicly available data to estimate the difference between fossil fuel volumes and emissions that countries are currently planning and what the IPCC estimates would be consistent with 1.5 degrees Celsius or 2 degrees Celsius pathways.⁸⁷ The analysis shows that countries' current plans and projections for fossil fuel production would lead, in 2030, to the emission of 39 billion tonnes (gigatonnes) of carbon dioxide (GtCO₂).⁸⁵ That is 13 GtCO₂, or 53 percent, more than would be consistent with a 2 degrees Celsius pathway (with an interquartile range of 11–15 GtCO₂) and 120 percent or 21 GtCO₂ (with a range of 18–23 GtCO₂) greater than fossil fuel production levels consistent with a 1.5 degrees Celsius pathway.⁸⁶ This gap grows wider by 2040, when production levels reach 110 percent (22 GtCO₂, with a range of 18–24) and 210 percent (28 GtCO₂, with a range of 27–31) higher than those consistent with the 2 degrees Celsius and 1.5 degrees Celsius pathways.⁸⁷ The subsequent 2020 *Production Gap Report* warned that **the world must decrease fossil fuel production by roughly 6% per year between 2020 and 2030 to limit warming to 1.5°C. Instead, fossil fuel producers are planning and projecting an average annual increase of 2%, which by 2030 would result in more than double the production consistent with the 1.5°C limit.**⁸⁸

According to a U.S.-focused analysis,¹⁰³ the United States alone has enough recoverable fossil fuels, split about evenly between federal and non-federal resources, that if extracted and burned, would exceed the global carbon budget for a 1.5 degrees Celsius limit, and would

⁸⁵ IPCC, 2021: *Summary for Policymakers* at Table SPM.2.

⁸⁶ 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>; Dooley, Kate et al., Ethical choices behind quantifications of fair contributions under the Paris Agreement, *Nature Climate Change* 11: 300-305 (2021), <https://www.nature.com/articles/s41558-021-01015-8>

⁸⁷ SEI, IISD, ODI, Climate Analytics, CICERO, and UNEP, *The Production Gap: The discrepancy between countries' planned fossil fuel production and global production levels consistent with limiting warming to 1.5°C or 2°C* (2019), <http://productiongap.org/>

⁸⁸ SEI, IISD, ODI, E3G, and UNEP, *The Production Gap Report: 2020 Special Report* (2021), <http://productiongap.org/2020report>

consume nearly the entire global budget for a 2 degrees Celsius limit.¹⁰⁴ Specifically, the analysis found:

Potential greenhouse gas emissions of federal fossil fuels (leased and unleased) if developed would release up to 492 GtCO₂e, representing 46 percent to 50 percent of potential emissions from all remaining U.S. fossil fuels.

Of that amount, up to 450 GtCO₂e have not yet been leased to private industry for extraction. Releasing those 450 GtCO₂e (the equivalent annual pollution of more than 118,000 coal-fired power plants) would be greater than any proposed U.S. share of global carbon limits that would keep emissions well below 2 degrees.

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

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

- The magnitude of climate change beyond the next few decades will depend primarily on the amount of greenhouse gases (especially carbon dioxide) emitted globally. Without major reductions in emissions, the increase in annual average global temperature relative to preindustrial times could reach 9 degrees Fahrenheit (5 degrees Celsius) or more by the end of this century. With significant reductions in emissions, the increase in annual average global temperature could be limited to 3.6 degrees Fahrenheit (2 degrees Celsius) or less.
- The global atmospheric carbon dioxide (CO₂) concentration has now passed 400 parts per million (ppm), a level that last occurred about 3 million years ago, when both global average temperature and sea level were significantly higher than today. Continued growth in CO₂ emissions over this century and beyond would lead to an atmospheric concentration not experienced in tens to hundreds of millions of years. There is broad consensus that the further and the faster the Earth's system is pushed toward warming, the greater the risk of unanticipated changes and impacts, some of which are potentially large and irreversible.¹⁰⁷

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

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

Scientific research has established that there is no room in the global carbon budget for new fossil fuel leasing or extraction if we are to avoid the worst dangers from climate change.

Instead, new fossil fuel production and infrastructure must be halted and as much existing production must be phased out to meet the Paris Agreement climate targets and avoid catastrophic climate damages.

The United States has committed to the climate change target of holding the long-term global average temperature “to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels” under the Paris Agreement.⁸⁹ The Paris Agreement established the 1.5 degree Celsius climate target given the evidence that 2 degrees of warming would lead to catastrophic climate harms.⁹⁰ Scientific research has estimated the global carbon budget—the remaining amount of carbon dioxide that can be emitted—for maintaining a likely chance of meeting the Paris climate targets, providing clear benchmarks for the United States and global climate action.⁹¹

Importantly, a 2016 global analysis found that the carbon emissions that would be released from burning the oil, gas, and coal in the world’s currently operating fields and mines would fully exhaust and exceed the carbon budget consistent with staying below 1.5 degrees Celsius.⁹² The reserves in currently operating oil and gas fields alone, even excluding coal mines, would likely lead to warming beyond 1.5 degrees.⁹³ An important conclusion of the analysis is that no new fossil fuel extraction or infrastructure should be built, and governments should grant no new leases or permits for extraction and infrastructure. Many of the world’s existing oil and gas fields and coal mines will need to be closed before their reserves are fully extracted in order

⁸⁹ United Nations Framework Convention on Climate Change, Conference of the Parties (Nov. 30-Dec. 11, 2015), Adoption of the Paris Agreement Art. 2, U.N. Doc. FCCC/CP/2015/L.9 (Dec. 12, 2015), available at: <http://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf> (“Paris Agreement”). The United States signed the Paris Agreement on April 22, 2016 as a legally binding instrument through executive agreement, and the treaty entered into force on November 4, 2016. Although the Trump Administration announced its intent to withdraw from the agreement, the United States at this time remains a party.

⁹⁰ EPCC, *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 (Oct. 6, 2018), available at: <http://www.ipcc.ch/report/sr15/>.

⁹¹ The 2018 IPCC Special Report on Global Warming of 1.5 degrees Celsius estimated the carbon budget for a 66 percent probability of limiting warming to 1.5 degrees at 420 GtCO₂ and 570 GtCO₂ from January 2018 onwards, depending on the temperature dataset used. At the current emissions rate of 42 GtCO₂ per year, this carbon budget would be expended in just 10 to 14 years. *See* IPCC, *Global Warming of 1.5°C*. Most recently, an updated analysis of carbon budgets in the IPCC’s Sixth Assessment Report estimates that the remaining global carbon budget from the beginning of 2020 is now only 400 and 300 GtCO₂ for maintaining 67 percent and 83percent likelihoods, respectively, of limiting global warming to 1.5 degrees Celsius.

⁹² Oil Change International, *The Sky’s Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production* at Table 3 (Sept. 2016), available at: <http://priceofoil.org/2016/09/22/the-skys-limit-report/>. According to this analysis, the CO₂ emissions from developed reserves in existing and under-construction global oil and gas fields and existing coal mines are estimated at 942 Gt CO₂, which vastly exceeds the 1.5 degrees Celsius-compatible carbon budget estimated in the 2018 IPCC Report on Global Warming of 1.5°C at 420 GtCO₂ to 570 GtCO₂.

⁹³ The CO₂ emissions from developed reserves in currently operating oil and gas fields alone are estimated at 517 Gt CO₂, which would likely exhaust the 1.5degrees Celsius-compatible carbon budget estimated in the 2018 IPCC Report on Global Warming of 1.5°C at 420 GtCO₂ to 570 GtCO₂.

to limit warming to 1.5 degrees.⁹⁴ In short, the analysis established that there is no room in the carbon budget for new fossil fuel extraction or infrastructure anywhere, including in the United States, and much existing fossil fuel production must be phased out to avoid catastrophic damages from climate change.⁹⁵

A 2019 analysis underscored that the United States must halt new fossil fuel extraction and rapidly phase out existing production to avoid jeopardizing our ability to meet the Paris climate targets and avoid the worst dangers of climate change.⁹⁶ The analysis showed that the U.S. oil and gas industry is on track to account for 60 percent of the world's projected growth in oil and gas production between now and 2030—the time period over which the IPCC concluded that global carbon dioxide emissions should be roughly halved to meet the 1.5 degrees Paris Agreement target.⁹⁷ Between 2018 and 2050, the United States is poised to unleash the world's largest burst of CO₂ emissions from new oil and gas development—primarily from shale and largely dependent on fracking—estimated at 120 billion metric tons of CO₂ which is equivalent to the lifetime CO₂ emissions of nearly 1,000 coal-fired power plants. Based on a 1.5 degrees IPCC pathway, U.S. production alone would exhaust nearly 50 percent of the world's total allowance for oil and gas by 2030 and exhaust more than 90 percent by 2050. Additionally, if U.S. coal production is to be phased out over a timeframe consistent with equitably meeting the Paris goals, at least 70 percent of U.S. coal reserves in already-producing mines must stay in the ground. In short, if not curtailed, U.S. fossil fuel expansion will impede the world's ability to meet the Paris climate targets and preserve a livable planet.

A recent study has concluded that in order to maintain just a 50% chance of limiting global temperature rise to 1.5°C, approximately 60% of global oil and gas must be left in the ground.⁹⁸ As a practical matter, this means that the U.S., along with most other oil producing regions, must reach peak production now or within the next decade, which would render many already operational and planned fossil fuel producing projects unviable.⁹⁹ In order to increase our odds of maintaining global temperature increase at 1.5°C (i.e. better than a 50/50 chance), even

⁹⁴ Oil Change International, *The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production* at 5 (Sept. 2016).

⁹⁵ This conclusion was reinforced by the IPCC Fifth Assessment Report which estimated that global fossil fuel reserves exceed the remaining carbon budget (from 2011 onward) for staying below 2 degrees Celsius (a target incompatible with the Paris Agreement) by 4 to 7 times, while fossil fuel resources exceed the carbon budget for 2 degrees by 31 to 50 times. See Bruckner, Thomas et al., *Energy Systems in Climate Change 2014: Mitigation of Climate Change*, Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press (2014), at Table 7.2.

⁹⁶ Oil Change International, *Drilling Toward Disaster: Why U.S. Oil and Gas Expansion Is Incompatible with Climate Limits* (January 2019), available at: <http://priceofoil.org/drilling-towards-disaster>.

⁹⁷ Intergovernmental Panel on Climate Change, *Global Warming of 1.5°C*, an IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (2018), available at: <http://www.ipcc.ch/report/sr15/> at SPM-15.

⁹⁸ Welsby, D., Price, J., Pye, S. *et al.* Unextractable fossil fuels in a 1.5 °C world. *Nature* **597**, 230–234 (2021). <https://doi.org/10.1038/s41586-021-03821-8>

⁹⁹ *Id.*

more existing reserves must remain undeveloped.¹⁰⁰ Given the large number of outstanding but undeveloped leases on federal lands, there is simply no room for expanded production.

A 2021 analysis similarly concluded that the largest increases by far in global oil and gas production between now and 2030 are projected to occur in the U.S.¹⁰¹ If U.S. fossil fuel expansion is not immediately halted, it will make it impossible to meet the 1.5°C limit and preserve a livable planet.

These analyses highlight that the United States has an urgent responsibility to lead in the transition from fossil fuel production to 100 percent clean energy, as a wealthy nation with ample financial resources and technical capabilities, and due to its dominant role in driving climate change and its associated harms. The U.S. is currently the world's largest oil and gas producer and third-largest coal producer.¹⁰² The U.S. is also the world's largest historic emitter of greenhouse gas pollution, responsible for 25 percent of cumulative global CO₂ emissions since 1870, and is currently the world's second highest emitter on an annual and per capita basis.¹⁰³ The U.S. must focus its resources and technology to rapidly phase out extraction while investing in a just transition for affected workers and communities currently living on the front lines of the fossil fuel industry and its pollution.¹⁰⁴

Research on the United States' carbon budget and the carbon emissions locked in U.S. fossil fuels similarly establishes that the U.S. must halt new fossil fuel production and rapidly phase out existing production to avoid the worst dangers of climate change. An analysis of U.S. fossil fuel resources demonstrates that the potential carbon emissions from already leased fossil fuel resources on U.S. federal lands would essentially exhaust the remaining U.S. carbon budget consistent with the 1.5 degrees Celsius target. This 2015 analysis estimated that recoverable fossil fuels from U.S. federal lands would release up to 349 to 492 GtCO₂eq of carbon emissions, if fully extracted and burned.¹⁰⁵ Of that amount, already leased fossil fuels would release 30 to 43 GtCO₂eq of emissions, while as yet unleased fossil fuels would emit 319 to 450 GtCO₂eq of emissions. Thus, carbon emissions from already leased fossil fuel resources on federal lands alone (30 to 43 GtCO₂eq) would essentially exhaust the U.S. carbon budget for a 1.5 degrees target if these leased fossil fuels are fully extracted and burned. The potential carbon emissions from unleased federal fossil fuel resources (319 to 450 GtCO₂eq) would exceed the U.S. carbon

¹⁰⁰ *Id.*

¹⁰¹ Achakulwisut, Ploy and Peter Erickson, Trends in fossil fuel extraction: Implications for a shared effort to align global fossil fuel production with climate limits, Stockholm Environment Institute (April 2021), www.sei.org/publications/trends-in-fossil-fuel-extraction/.

¹⁰² Oil Change International, *Drilling Toward Disaster* at 5.

¹⁰³ LeQuéré, Corinne et al., *Global Carbon Budget 2018*, 10 Earth System Science Data 2141 (2018) at Figure 5, 2167; Global Carbon Project, *Global Carbon Budget 2018* (Dec. 5, 2018), available at: https://www.globalcarbonproject.org/carbonbudget/18/files/GCP_CarbonBudget_2018.pdf at 19 (historical cumulative fossil CO₂ emissions by country).

¹⁰⁴ Piggot, Georgia et al., *Realizing a Just and Equitable Transition Away from Fossil Fuels*, Discussion brief, Stockholm Environment Institute (Jan. 2019), available at: <https://www.sei.org/publications/just-and-equitable-transition-fossil-fuels/>.

¹⁰⁵ Ecoshift Consulting, et al., *The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels*, prepared for Center for Biological Diversity & Friends of the Earth (2015).

budget for limiting warming to 1.5 degrees many times over.¹⁰⁶ This does not include the additional carbon emissions that will be emitted from fossil fuels extracted on non-federal lands, estimated up to 500 GtCO₂eq if fully extracted and burned.¹⁰⁷

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

- Federal crude oil already leased will continue producing for 34 years beyond the 1.5 degrees Celsius threshold and 19 years beyond the 2 degrees threshold; and
- Federal natural gas already leased will continue producing 23 years beyond the 1.5 degrees Celsius threshold and 8 years beyond the 2 degrees threshold.¹⁰⁸

In 2018, the U.S. Geological Survey and Department of the Interior estimated that carbon emissions released from extraction and end-use combustion of fossil fuels produced on federal lands alone—not including non-federal lands—accounted for approximately one quarter of total U.S. carbon emissions during 2005 to 2014.¹⁰⁹ This research further establishes that the United States must halt new fossil fuel projects and close existing fields and mines before their reserves are fully extracted to achieve the Paris climate targets and avoid the worst damages from climate change.

Such action is commensurate with findings in the International Energy Agency’s new report “Net Zero by 2050: A roadmap for the global energy system articulates a pathway for the global energy sector to reach net zero emission by 2050.”¹¹⁰ Even with reliance on unproven future emissions reduction technologies, it cites the incompatibility of new fossil fuel supply projects with the goal of limiting warming to 1.5 degrees Celsius:

Beyond projects already committed as of 2021, there are no new oil and gas fields approved for development in our pathway, and no new coal mines or mine extensions are required.¹¹¹

¹⁰⁶ EcoShift Consulting, et al., *The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels* at 4.

¹⁰⁷ *Id.* at 3 (“[T]he potential GHG emissions of federal fossil fuels (leased and unleased) are 349 to 492 Gt CO₂e, representing 46 percent to 50 percent of potential emissions from all remaining U.S. fossil fuels.”).

¹⁰⁸ DUSTIN MULVANEY, ET AL. OVER-LEASED: HOW PRODUCTION HORIZONS OF ALREADY LEASED FEDERAL FOSSIL FUELS OUTLAST GLOBAL CARBON BUDGETS (2016), https://1bps6437gg8c169i0y1drtgz-wpengine.netdna-ssl.com/wp-content/uploads/wpallimport/files/archive/Over_Leased_Report_EcoShift.pdf (hereinafter Over-Leased).

¹⁰⁹ Merrill, Matthew D. et al., *Federal Lands Greenhouse Gas Emissions and Sequestration in the United States—Estimates for 2005–14*, U.S. Geological Survey Scientific Investigations Report 2018–5131 (2018) at 8.

¹¹⁰ STÉPHANIE BOUCKAERT ET AL., INTERNATIONAL ENERGY AGENCY, NET ZERO BY 2050: A ROADMAP FOR THE GLOBAL ENERGY SECTOR (2021) (hereinafter IEA 2021), https://iea.blob.core.windows.net/assets/beceb956-0dcf-4d73-89fe-1310e3046d68/NetZeroBy2050-ARoadmapfortheGlobalEnergySector_CORR.pdf.

¹¹¹ *Id.* at 21.

“Net Zero by 2050” shows, like many earlier analyses and reports¹¹², that there is simply no room left in the global carbon budget for new federal fossil fuel leasing. Importantly, the pathway in “Net Zero by 2050” starts now.

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

III. BLM must take a hard look at the climate impacts to wildlife, including impacts resulting from the cumulative emissions of the federal fossil fuel programs

A. BLM Must Consider Impacts to Greater-Sage Grouse and Prioritize Leasing Outside Greater Sage-Grouse Habitat

BLM should defer all parcels that contain acreage designated as a Priority Habitat Management Area (PHMA), General Habitat Management Area (GHMA), or other habitat designations under the 2015 Greater Sage-Grouse Resource Management Plan Amendments (the 2015 Plans). Deferral is required for at least three reasons. First, a key component of the 2015 Plans requires BLM to prioritize new oil and gas leasing outside of PHMA and GHMA, in order to protect that habitat from future disturbance. In May 2020, BLM’s national policy addressing prioritization, Instruction Memorandum 2018-026, was struck down by a court. Montana Wildlife Federation v. Bernhardt, No. 18-cv-69-GF-BMM, 2020 WL 2615631 (D. Mont. May 22, 2020). BLM has not adopted new national guidance on the prioritization requirement, and has represented to the Montana court that the agency’s previous prioritization guidance (adopted in 2016) also is not in effect. As a result, there is currently no national guidance providing direction on how prioritization is to be applied. Complying with the prioritization requirement of the 2015 Plans must be a central consideration for any lease parcels in PHMA and/or GHMA, and BLM should defer all parcels containing PHMA and/or GHMA at least until new national guidance is issued. The Montana Wildlife Federation ruling demonstrates the need for a well-reasoned national directive that fully complies with the purpose and language of the 2015 Plans’ prioritization objective. If BLM state offices proceed with leasing in sage-grouse habitat using an ad hoc or state-by-state approach to prioritization, those decisions will inevitably fall short of what the 2015 Plans require.

Second, all parcels in sage-grouse habitat should be deferred in light of BLM’s ongoing consideration of revisions to the 2015 Plans. While Instruction Memorandum 2021-027 states that “BLM will not routinely defer leasing when waiting for an RMP amendment or revision,” it also recognizes that where “necessary terms and conditions under which leasing would be appropriate are not in conformance with the RMP, it will be necessary to amend the RMP before leasing is appropriate.” In such cases, “the affected lease parcels must be withdrawn or deferred

¹¹² SEI, IISD, ODI, E3G, and UNEP. 2020. *The Production Gap Report: 2020 Special Report*, available at: <http://productiongap.org/2020report>

from leasing until a plan amendment or revision can be completed at a later date.” BLM’s pending RMP revision process requires deferral of parcels in sage-grouse habitat because the terms and conditions of the 2015 Plans must be strengthened to ensure protection of the grouse and avoid the need for an Endangered Species Act listing. Sage-grouse populations have continued to decline under the 2015 Plans. See e.g., Angus Thuermer, Jr, Wyo sage grouse counts fall again, marking a 5-year trend, Wyo File (Sept. 14, 2021) (noting that “Wyoming’s 2021 count of male greater sage grouse declined 13% compared to 2020”).¹¹³ In addition, implementation and enforcement of the prioritization objective and other key components of the 2015 Plans have proven very challenging.

Maintaining and increasing sage-grouse populations will require amending the 2015 Plans to add new terms and conditions, such as closing PHMA and/or GHMA to new leasing, mineral withdrawals, expanded no surface occupancy buffers, and other measures. In the meantime, leasing in PHMA and GHMA must be deferred to avoid committing additional habitat to mineral development under terms that are inadequate to protect the sage-grouse.

Third, BLM must consider site-specific impacts to greater sage-grouse, including impacts to specific grouse populations. Prior to leasing, BLM must engage in full consideration of the indirect and cumulative effects to sage-grouse populations and habitat, and leasing absent such consideration would violate NEPA. In June 2021, a U.S. District Court struck down approximately 630 acres of BLM onshore oil and gas leases within sage-grouse habitats for comprehensive failures to consider alternatives to indiscriminate leasing of sage-grouse habitat, and for failure to take a hard look at the direct, indirect, and cumulative impacts of leasing within such habitat. In Western Watersheds Project v. Bernhardt, No. 1:18-cv-187 (D. Idaho June 9, 2021), the court found that, for a series of 2017 oil and gas leases, “BLM (1) failed to consider the reasonable alternative of deferring priority sage-grouse habitat; (2) failed to take a hard look at the direct and indirect impacts to greater sage-grouse; and (3) failed to take a hard look at the cumulative impacts on greater sage-grouse.” WWP v. Bernhardt, Mem. Dec. and Order on Partial Summary Judgment (Phase 2) at 51. Any additional leasing of sage-grouse habitat that does not fully address the legal failings found in both Montana Wildlife Federation and Western Watersheds Project would plainly violate both NEPA and FLPMA, and cannot go forward absent correction of those legal errors.

Under the requirements of the 2015 sage-grouse plan amendments, BLM must prioritize leasing outside of sage-grouse habitats. Given the continued nationwide decline of sage-grouse populations and BLM’s pattern of unexamined leasing decisions within its remaining habitat, BLM should comply by withdrawing all parcels containing PHMA and GHMA from the proposed sale. At a minimum, however, BLM must consider, under both NEPA and the 2015 ARMPA the site-specific impacts to individual populations of greater sage-grouse, including new post-2015 scientific information, prior to offering parcels for lease.

Existing NEPA documents, including the FEISs for the 2015 and 2019 GRSB Approved Resource Management Plan amendments, do not contain sufficient site-specific analysis to justify leasing of greater sage-grouse habitat. First, the 2015 GRSB ARMPA ROD clearly

¹¹³ Available at <https://www.wyofile.com/wyo-sage-grouse-counts-fall-again-marking-a-5-year-trend/>.

contemplates that leasing and resulting oil and gas exploration and development will have adverse effects on greater sage-grouse that cannot be fully mitigated by the lease stipulations, conditions of approvals, and other measures incorporated in the ARMPA.¹¹⁴ Those site-specific effects to particular GRSG subpopulations must be disclosed “before an irretrievable commitment of resources is made,” i.e., at the time of issuing an oil and gas lease that does not reserve the authority to preclude all drilling activities.¹¹⁵

Second, the 2015 GRSG ARMPAs and their accompanying FEISs clearly contemplate that there will be additional site-specific analysis of leasing proposals and their impact on GRSG habitat prior to lease issuance. The Northwest Colorado GRSG ARMPA explicitly requires that “[w]hen analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG.”¹¹⁶ The BLM’s Rocky Mountain RMPs, as amended by the 2015 GRSG ARMPA, further require that priority will be given to leasing and development of fluid mineral resources, outside of PHMA and GHMA. The Rocky Mountain Region RMPs are subject to the following measure for both priority and general habitat management areas:

Prioritization Objective—In addition to allocations that limit disturbance in PHMAs and GHMAs, the ARMPs and ARMPAs prioritize oil and gas leasing and development outside of identified PHMAs and GHMAs. This is to further limit future surface disturbance and encourage new development in areas that would not conflict with GRSG. This objective is intended to guide development to lower conflict areas and as such protect important habitat and reduce the time and cost associated with oil and gas leasing development by avoiding sensitive areas, reducing the complexity of environmental review and analysis of potential impacts on sensitive species, and decreasing the need for compensatory mitigation.¹¹⁷

The BLM is further subject to clear direction in the 2015 Sage-Grouse RMP amendments that its greater sage-grouse RMP plans and conservation strategy rely not solely on stipulations within designated habitats (stipulations acknowledged as insufficient, to result in a net conservation gain for general habitat, *see* 2015 RMPA ROD at 1-30 to 1-31) but also that, prior to leasing, it implemented a requirement prioritizing development outside of all sage-grouse habitats. BLM cannot “analyz[e] leasing and development of fluid mineral resources,” as required by, for example, CO Objective MR-I, by blindly leasing large areas of PHMA and GHMA without, as proposed here, any additional NEPA analysis.¹¹⁸

In addition, an apparent BLM policy of leasing virtually all nominated parcels within sage-grouse habitat is not only inconsistent with the RMPs and FLPMA’s consistency

¹¹⁴ *See* GRSG Northwest Colorado ARMPA 2015 at 4-89 to 4-96.

¹¹⁵ *New Mexico ex rel. Richardson v. BLM*, 565 F.3d 683, 718 (10th Cir. 2009).

¹¹⁶ GRSG Northwest Colorado ARMPA 2015 at 2-14.

¹¹⁷ GRSG Northwest Colorado ARMPA 2015 at 1-25.

¹¹⁸ *See* Northwest Colorado Greater Sage-Grouse Approved RMP Amendment at 2-14, Objective MR-I.

requirement, it also undermines a fundamental assumption of the RMP Amendment EISs – as well as the U.S. Fish and Wildlife Service’s determination that listing the greater sage-grouse under the Endangered Species Act was “not warranted.” That assumption is that the measures adopted in the RMP Amendments will result in oil and gas development tending to occur outside of greater sage-grouse habitat.

The BLM must to consider alternatives other than the leasing of parcels consisting of all nominated sage-grouse habitat. The unexamined leasing of PHMA and GHMA further undermines the assumption in the Fish and Wildlife Service’s “not warranted” finding for the greater sage-grouse that federal and state implementation of the “Wyoming Plan” for fluid minerals will continue the 2012-15 pattern of reduced drilling within core areas. If BLM is not actually going to give meaningful analysis of the effects of specific leasing decisions on sage-grouse habitat, it cannot rely on FEISs, such as the Northwest Colorado Sage Grouse RMP FEIS, that assume the effectiveness of that plan direction.

Third, BLM must address the fact that significant new information regarding oil and gas impacts on greater sage-grouse has become available since the 2015 ARMPA FEIS and was not considered in the 2019 RMP amendment FEIS. Recent peer-reviewed scientific publications have reviewed Greater Sage-Grouse population response to oil and gas management measures in Wyoming, and re-confirmed lek attendance by male sage-grouse declines approximately 2.5% per year in response to oil and gas development, and that attendance declines as development increases, even where well pad density is limited.¹¹⁹ In light of this information, BLM cannot continue to assume, against scientific evidence, that the management measures in the 2015 RMP amendments will be sufficient to stem sage-grouse population decline.

Holloran (2005) found that sage grouse avoided habitats within 3.1 miles of active oil and gas drilling operations, and within 2 miles of roads or wellpads during the production phase of oil and gas extraction.¹²⁰ How many acres of habitat within 5.3 miles of a lek, the habitat where nesting occurs, occur on the leases in question? How many acres of identified sage-grouse winter range occur on the leaseholds in question? The failure to consider the acreage of habitat lost due to abandonment of otherwise suitable habitats adjacent to roads and wellsites, and the failure to even quantify the amount of habitat critical to the life cycles of sage-grouse that occur on individual leases (much less evaluate the site-specific topography and how that might mitigate or exacerbate impacts of oil and gas development), constitute failures of NEPA’s hard look requirements.

More recent scientific study confirms the established finding that sage-grouse lek attendance is negatively related to oil and gas density, regardless of sagebrush cover and participation.¹²¹ Green et al. examined greater sage-grouse lek attendance, oil and gas well, and habitat and precipitation data from Wyoming over the period 1984 to 2008, and, consistent with

¹¹⁹ Green, Adam et al., Investigating Impacts of Oil and Gas Development on Greater Sage-Grouse, *Journal of Wildlife Management*, doi: 10.1002/jwmg.21179 (2016).

¹²⁰ Holloran, Matthew, Greater Sage-Grouse (*Centrocercus urophasianus*) Population Response to Natural Gas Field Development in Western Wyoming (2005).

¹²¹ Green, Adam et al., Investigating Impacts of Oil and Gas Development on Greater Sage-Grouse, *Journal of Wildlife Management*, doi: 10.1002/jwmg.21179 (2016).

numerous prior studies, that lek attendance declines are closely associated with the density of oil and gas development:

Oil and gas development correlates well with sage-grouse population declines from 1984 to 2008 in Wyoming, which is supported by other findings (Doherty et al. 2010b, Harju et al. 2010, Hess and Beck 2012, Taylor et al. 2013, Gregory and Beck 2014). As with other studies, we also found support for 4-year lag effects of oil and gas development on lek attendance (Walker et al. 2007, Doherty et al. 2010a, Harju et al. 2010, Gregory and Beck 2014). This result suggests that development likely affects recruitment into the breeding population rather than avoidance of wells by adult males or adult survival. Adult sage-grouse are highly philopatric to lek sites (Dalke et al. 1963, Wallestad and Schladweiler 1974, Emmons and Braun 1984, Dunn and Braun 1985, Connelly et al. 2011a), and males typically recruit to the breeding population in 2–3 years. We would expect a delayed response in lek attendance if development affects recruitment, either by reducing fecundity or avoidance of disturbance by nesting females, as adult males die and are not replaced by young males. On average, lek attendance was stable when no oil and gas development was present within 6,400m (Fig. 4). However, attendance declined as development increased.¹²²

This is a level of protection far greater than that provided by the BLM’s 2015 Sage-Grouse Plan Amendments. Importantly, Green et al. confirmed that declines in sage-grouse populations may continue even within Wyoming’s “core areas,” where density of wells is limited to approximately one pad per square mile.

As noted in one recent peer-reviewed study analyzing sage-grouse persistence under mitigation measures in Wyoming similar to those in the BLM sage-grouse plans:

Energy development has been shown to specifically impact male sage-grouse lek attendance, lek persistence, recruitment of yearling male and female grouse to leks, nest initiation and site selection, nest survival, chick survival, brood survival, summer survival of adult females, early brood-rearing habitat selection, adult female summer habitat selection, and adult female winter habitat selection¹²³.

Another study similarly found mitigation measures related to oil and gas development to be insufficient:

[M]itigation efforts within the study resulted in less avoidance of wells overall. However, sage-grouse still avoided areas of high density wells. No nests were

¹²² Green et al. at 9.

¹²³ Gamo, R. Scott & Beck, Jeffrey L., Effectiveness of Wyoming’s Sage-Grouse Core Areas: Influences on Energy Development and Male Lek Attendance, 59 *Environmental Management*, 189–203, doi: 10.1007/s00267-016-0789-9 (2017).

found in areas with greater than 4 wells per km² and most nests (62.82%) were located in areas with ≤ 1 well per km².¹²⁴

Other new scientific information has reaffirmed the harmful impacts of oil and gas development on greater sage-grouse. This research was summarized in a 2018 U.S. Geological Survey (USGS) publication as follows:

Before implementation of the State of Wyoming's Core Area¹²⁵ Strategy, lek attendance was correlated negatively with density of oil and gas wells (Green and others, 2017). Sage-grouse respond to development densities at multiple spatial scales surrounding leks with a 1- to 4-year time lag between oil and gas development and lek decline (Green and others, 2017). A possible explanation for a delayed response is that oil and gas development negatively affects sage-grouse recruitment into a breeding population (Green and others, 2017; but see Zabihi and others, 2017) rather than causing avoidance of an area or negatively affecting survival. Increasing density of oil and gas wells was correlated with decreasing lek attendance and effects on lek attendance were observed at a distance of 6.4 km from leks. Lek attendance was stable when no wells were present within 6.4 km of a lek and began declining after the addition of the first well. Allowable well densities that average one well pad per 640 acres within Core Areas may only be sufficient for limiting population declines to current rates but not for reversing the trend (Green and others, 2017). These analyses corroborated the findings of Gregory and Beck (2014) that suggested a maximum development density of one well pad within 2 km of leks to avoid measurable effects within 1 year and less than six well pads within 10 km of leks to avoid delayed effects. Other recent publications corroborated the negative relation between oil and gas development and sage-grouse populations or important life-history behaviors (Fedy and others, 2015a; Kirol and others, 2015a, b; Edmunds and others, 2017; Spence and others, 2017).¹²⁶

One study that has important implications for the BLM's leasing decision but was not incorporated in this lease sale's NEPA analysis is Smith et al. (2016), which found "use of winter habitats occurred over a longer period than current Core Area winter timing stipulations and a substantial amount of winter habitat outside of Core Areas was used by individuals that bred in Core Areas, particularly in smaller Core Areas."¹²⁷ Sage-grouse moved from their fall to winter

¹²⁴ Fedy et al., *The Influence of Mitigation on Sage-Grouse Habitat Selection within an Energy Development Field*, PLOS ONE 10(4) (2015),

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4383447/pdf/pone.0121603.pdf>

¹²⁵ Wyoming Core Areas roughly correlate to BLM's greater sage-grouse Priority Habitat Management Areas (PHMA).

¹²⁶ Hanser, S.E., et al., Greater sage-grouse science (2015–17)—Synthesis and potential management implications: U.S. Geological Survey Open-File Report 2018–1017, 46 p.,

<https://doi.org/10.3133/ofr20181017> (2018).

¹²⁷ See page 585 at Smith, K.T., et al, Does Wyoming's Core Area Policy Protect Winter Habitats for Greater Sage-Grouse? *Environmental Management* (2016) 58:585–596. DOI 10.1007/s00267-016-0745-8.

habitat earlier and moved from their winter to breeding habitat later than current seasonal restrictions.

B. BLM Must Consider Wildlife Impacts from Proposing Leasing in Nevada

1. The proposed Nevada lease sale parcels would, if offered, violate Section 7 of the Endangered Species Act because BLM has failed to ensure that issuance of the leases will not jeopardize the continued existence of the Railroad Valley Springfish.

Under Section 7 of the Endangered Species Act (ESA), federal agencies must “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 which is determined . . . to be critical.” 16 U.S.C. § 1536(a)(2). The duties in ESA Section 7 are only fulfilled by an agency’s satisfaction of the consultation requirements that are set forth in the ESA and its implementing regulations, and only after the agency lawfully complies with these requirements may an action that “may affect” a protected species go forward. *Pac. Rivers Council v. Thomas*, 30 F.3d 1050, 1055-57 (9th Cir. 1994).

Despite several comment letters, an administrative protest, and a sixty-day notice of intent to sue, BLM has, as of the date of this letter, failed to consult with the Fish and Wildlife Service regarding impacts to the Railroad Valley springfish and other listed species from oil and gas leasing in Railroad Valley.

Accordingly, for the proposed lease sale, BLM must not only evaluate the indirect and cumulative effects on special status species under NEPA, but it must also (a) consult with the Fish and Wildlife Service under Section 7 regarding the effects of oil and gas development and water use on listed species and critical habitat, and (b) evaluate the effects on sensitive species under its own sensitive species policy.

Although BLM did complete “programmatic” consultation with FWS on the Tonopah RMP in 1994, the resulting biological opinion was, of necessity, a high-level document which was never intended to provide site-specific analysis or guidance on the potential impacts of oil and gas leasing and development on the Railroad Valley springfish. Nor is the document current. Subsequent developments—most notably BLM’s failure to designate a Railroad Valley Area of Critical Environmental Concern (ACEC) and advances in oil and gas extraction technology—call into question the ongoing validity of the Tonopah RMP programmatic biological opinion. Federal and state authorities have long recognized the high value of groundwater-dependent ecosystems in Railroad Valley for native wildlife, including migratory birds and endemic species such as the Railroad Valley springfish. A sweeping 1934 executive order set aside 133,396 acres as the Railroad Valley Migratory Bird Refuge, noting “swampy areas” that were used by migratory birds for “nesting, resting, and feeding.” At the time, it was the third-largest federally designated wildlife sanctuary. Management of the refuge lands was subsequently transferred to BLM and the State of Nevada. Later, a series of executive actions in the 1960s changed the

area's designation to the Railroad Valley "Wildlife Management Area," and significantly reduced its size. Nevertheless, 14,720 acres in Railroad Valley retain the special designation. A 1990 "Habitat Management Plan" for the Railroad Valley Wildlife Management Area (WMA) emphasizes the protection and recovery of imperiled wildlife species including the Railroad Valley springfish.

The 1997 Tonopah RMP acknowledges the special status of the Railroad Valley WMA and commits BLM to "protect[ing], restor[ing], enhanc[ing]," and "expand[ing] habitat" for threatened and endangered species. Under the RMP, habitat for all federally listed threatened or endangered species must be "managed to maintain or increase populations of these species." Specific requirements include "protect[ing] the Railroad Valley springfish and its critical habitat" at springs in Railroad Valley. Importantly, the RMP expressly requires site-specific Section 7 consultation for all projects that may affect threatened or endangered species. The programmatic biological opinion accompanying the RMP relies for its "no jeopardy" conclusion on a number of specific future actions, including the designation of a Railroad Valley ACEC. However, ACEC designation was ultimately deferred by the final RMP and Record of Decision (ROD) and has yet to occur. Further, the biological opinion for the RMP did not consider the regional or site-specific environmental impacts of present-day oil and gas extraction methods, including hydraulic fracturing or "fracking," in Railroad Valley or elsewhere. BLM is now proposing to lease parcels in Railroad Valley in the First Quarter 2022 lease sale which lie within the same hydrographic basin as multiple springs within the Railroad Valley WMA and are designated as critical habitat for the Railroad Valley springfish. The potential impacts of fracking to these springs, including impacts to groundwater quality, groundwater quantity, and resulting changes to surface waters, clearly warrant consultation with FWS about the specific lease parcels and how fracking at those parcels may affect the Railroad Valley springfish.

To the extent that BLM relies on its programmatic consultations for the Tonopah RMP, that reliance is not proper for any of the listed species affected by BLM's action. The Tonopah RMP and biological opinion expressly require site-specific consultation with FWS, and BLM has an independent legal duty under the ESA to formally consult over the lease sale's potential adverse effects on listed species and consider the full scope of fracking and other drilling activities that could affect these species.

The law is clear that, in the context of oil and gas leasing, "agency action" under the ESA includes not just the legal transaction of lease issuance, but also all resulting post-leasing activities from exploration, through production, to abandonment:

[W]e hold that agency action in this case entails not only leasing but leasing and all post-leasing activities through production and abandonment. Thus, section 7 of the ESA on its face requires the FWS in this case to consider all phases of the agency action, which includes postleasing activities, in its biological opinion. Therefore the FWS was required to prepare, at the leasing stage, a comprehensive biological opinion assessing whether or not the agency action was likely to jeopardize the continued existence of protected species, based on "the best scientific and commercial data available."

Conner v. Burford, 848 F.2d 1441, 1453 (9th Cir. 1988).

In the past, and with respect to these specific parcels, BLM has refused to consult at the lease stage, and proposed to defer consultation to the drilling (APD) stage. This is precisely the sort of incremental step consultation decisively rejected as inconsistent with the ESA in *Conner*. The refusal to consult at the lease stage further precludes reliance on the earlier Tonopah RMP and any related plan-level consultation, because that plan-level consultation does not include site-specific evaluations for individual activities. Under *Conner*, the individual activity in question is clearly the issuance of a lease, and consultation must occur prior to lease issuance if the resulting activities may affect listed species or critical habitat.

As discussed further below, a deep carbonate aquifer that underlies the majority of the Great Basin flows underneath the proposed lease parcels, generally trending from northeast to southwest. These groundwater reservoirs are the most vital resources in the Great Basin desert, supporting the vast majority of Nevada's robust biodiversity, and frequently harboring species protected or proposed for protection under the Endangered Species Act.

In light of the critical importance of groundwater and surface water resources, it is incumbent upon the BLM to include a rigorous analysis of potential impacts to these resources, and the cascading effects such impacts would have on the region's wildlife and biodiversity. BLM should not attempt to minimize the potential impacts, or delay any actual analysis until the APD phase. As noted, this is an unlawful circumvention of the ESA's consultation requirements. Impacts to the quality and quantity of groundwater, and thus to the surface expression of those waters, are reasonably foreseeable and must be analyzed.

2. The Tonopah RMP and the Federal Land Policy and Management Act (FLPMA) require BLM to protect, restore, and enhance habitat for the threatened Railroad Valley springfish.

In addition to requiring site-specific Section 7 consultation for all federal actions affecting threatened and endangered species, the Tonopah RMP requires BLM to "protect, restore, enhance, and expand habitat of species identified as threatened, endangered, or Nevada BLM Sensitive Species under the Endangered Species Act." "Habitat for all Federally listed threatened or endangered species or Nevada BLM Sensitive Species" must be "managed to maintain or increase current populations of these species." Specifically, with respect to the Railroad Valley springfish, BLM must "[c]ontinue to protect the Railroad Valley springfish and its critical habitat" on BLM public lands. BLM may not authorize any land uses "incompatible" with the Railroad Valley Wildlife Management Area's "values."

Without detailed information on how the Railroad Valley springfish and other species of concern will be affected, BLM cannot ensure compliance with the RMP. Specifically, BLM cannot take appropriate action at the leasing stage to protect, restore, or enhance habitat for listed and sensitive species; it cannot ensure that habitat for these species is being managed to maintain

or increase populations; and it cannot ensure consistency with the RMP's specific requirements that the Railroad Valley springfish continue to be protected, and that land uses incompatible with the Railroad Valley WMA's values not be authorized.

3. BLM must adequately disclose and analyze the proposed lease sale's reasonably foreseeable impacts on groundwater and surface water resources.

The proposed lease parcels are situated within a vast and complex hydrographic region. As noted, deep carbonate aquifer underlies the proposed lease parcels. This aquifer, which transmits groundwater across distances exceeding 200 miles, is largely comprised of "fossil water," which accumulated underground during the Pleistocene and continues to flow and discharge to this day. Above the carbonate aquifer are basin-fill or alluvial aquifers, which move precipitation from the region's numerous mountain ranges to the valley floors. As groundwater flow meets resistant layers of rock, both systems give rise to surface expressions of groundwater, generally in the form of springs and wetlands. These surface water expressions are the most vital resources in the desert, supporting the vast majority of Nevada's robust biodiversity, and frequently harboring species protected or proposed for protection under the ESA. Nevada's most precious resource is its groundwater. Abundant relative to the aridity of the climate, Nevada's groundwater supports domestic use by hundreds of thousands of Nevadans, the majority of Nevada's agricultural output, and almost the entirety of Nevada's biodiversity. As a result of the critical importance of this resource, any federal action which may cause impacts to groundwater quantity must include a rigorous analysis of the possibility of those impacts, and the potential effects should impacts to groundwater quantity occur.

As detailed in the Center's August 19, 2020 comments on these parcels, the volumes of water needed to successfully fracture rock to open up oil and gas resources vary widely: statewide median quantities utilized fall between 76,818 gallons (0.23 acre-feet) per well to 5,259,965 gallons (15.9 acre-feet) per well. Without citations, the BLM's own fracking "white paper" puts forward ranges of 25,000 to 500,000 gallons for shallow vertical wells, and 800,000 to 10 million (2.4 to 30.3 acre-feet) for deep tight sand gas horizontal or directionally drilled wells.

Given the variability in both estimates of water consumption per well and in the number of anticipated wells, there is great uncertainty in attempting to evaluate the impacts of the proposed lease sale on quantities of water. However, this does not relieve BLM from their legal obligation to evaluate such impacts. Under NEPA, agencies must include information on uncertain impacts if such information is essential to a reasoned choice among alternatives, and the overall costs of obtaining it are not exorbitant. These requirements are particularly important for impacts which have catastrophic consequences, even if their probability of occurrence is low. The potential impacts to water quantity clearly meet this threshold. If hundreds or thousands of wells were developed—something that is not outside the realm of possibility should oil prices go back above \$100 per barrel—and if those wells each required the high-end estimate of 10,000,000 gallons (30.3 acre-feet) to fracture, total water withdrawals for fractured wells from this lease sale could reach into the billions of gallons (tens of thousands of acre-feet).

Withdrawals on the level of tens of thousands of acre-feet have the potential to radically alter the hydrologic regime in the areas where such withdrawals are made. If the withdrawals are made from shallow alluvial aquifers, adjacent springs, wetlands, and other water features may dry up. If the withdrawals are made from the deeper regional aquifer, effects may be far reaching and drying could occur tens of miles away. Additionally, due to connections between local and regional aquifers, intensive pumping of alluvial aquifers may eventually impact regional aquifers.

A robust analysis of impacts to groundwater is important because BLM cannot rely on the state of Nevada to safeguard groundwater resources. First, the state's concept of "perennial yield" allows for the unmitigated destruction of all unallocated surface water resources. Perennial yield is notably not defined in statute, but a working definition is "the maximum amount of groundwater that can be salvaged each year over the long term without depleting the groundwater reservoir[,] . . . usually limited to the maximum amount of natural discharge." What this functionally means is that the state of Nevada makes available for appropriation an amount of water equivalent to that which is discharged within a basin through surface discharge and evapotranspiration through phreatophytic vegetation. As such, if a basin is fully appropriated and all of those water rights are being exercised, the long-term effect will be to cease all surface discharge and eliminate all phreatophytes. This will have catastrophic and existential consequences to a variety of species.

Nevada state water law therefore does nothing to protect wildlife and other natural values present on public land—indeed, the law is structured to encourage full development of water resources, so it can be argued that Nevada state water law is actively detrimental to public land water-dependent resources. As such, BLM cannot rely on Nevada's water law as an indicator of the potential for groundwater impacts and overappropriation. An independent analysis must be made by BLM of any groundwater withdrawals associated with development of these leases, to examine the impacts of such withdrawals and how they may affect the environment. As has been outlined here, there is the distinct possibility of impacts to quantity of groundwater, and therefore amount of surface discharge, due to pumping for fracking either via overappropriation or localized drawdown. As discussed elsewhere in this letter and in Dr. Myers' report, dozens of endemic, endangered, or threatened species rely on water features potentially affected by pumping. Thus there are significant ramifications from neglecting to analyze impacts to water quantity or offering any protections whatsoever to water features. BLM must also consider impacts to groundwater quality from oil and gas development. Studies have reported many instances around the country of groundwater contamination due to surface spills of oil and gas wastewater, including fracking flowback. As Dr. Myers states, fracking and other unconventional techniques pose inherent risks to groundwater due to releases below the surface, and these risks must be properly evaluated. Once groundwater is contaminated, it is very difficult, if not impossible, to restore the original quality of the water.

Groundwater contamination can occur in a number of ways, and the contamination may persist for many years. Poorly constructed or abandoned wells are recognized as one of the most likely ways by which contaminants may reach groundwater. Faulty well construction, cementing, or casing, as well as the injection of fracking waste underground, can all lead to leaks. Older wells that may not have been designed to withstand the stresses of hydraulic fracturing but which

are reused for this purpose are especially vulnerable. As the Center noted in its August 2020 comments, improper well construction and surface spills are cited as a confirmed or potential cause of groundwater contamination in numerous incidents at locations across the U.S. including but not limited to Colorado, Wyoming, Pennsylvania, Ohio, West Virginia, and Texas..

Dr. Myers additionally notes that fluids and hydrocarbons may contaminate groundwater by migrating through newly created or natural fractures. Many unconventional techniques intentionally fracture the formation to increase the flow of gas or oil. New cracks and fissures can allow the additives or naturally occurring elements such as natural gas to migrate to groundwater. Fluids can also migrate through pre-existing and natural faults and fractures that may become pathways once the fracking or other method has been used.

BLM must consider long-term studies on the potential for fluid migration through newly created subsurface pathways. Fluid migration is of particular concern when oil and gas operations are close to drinking water supplies or waters that support special-status species such as the Railroad Valley springs.

Surface water contamination may also occur from storm runoff, chemical and waste transport, chemical storage leaks, and breaches in pit liners. The spilling or leaking of fracking fluids, flowback, or produced water is a serious problem. Harmful chemicals present in these fluids can include volatile organic compounds (VOCs), such as benzene, toluene, xylenes, and acetone. As much as 25 percent of fracking chemicals are carcinogens, and flowback can even be radioactive. Contaminated surface water can thus result in many adverse effects to wildlife, agriculture, and human health and safety. It may make waters unsafe for drinking, fishing, swimming and other activities, and it may be infeasible to restore the original water quality once surface water is contaminated. Based on the hydrogeology of the Railroad Valley region, springs in the Duckwater Valley and near Locke's Ranch are at particular risk of contamination. BLM's proposed lease stipulations are inadequate to protect against these impacts. Although we commend BLM's acknowledgment of its authority to consider and add lease stipulations at the leasing stage, the particular stipulations relied upon here would do little to protect water resources and the wildlife which depend on them. Contamination of an aquifer due to fracking would affect the entire aquifer, potentially causing impacts to water sources miles away. CSU or NSO "buffers" do little to actually protect groundwater resources. The stipulations also offer extensive discretion to BLM to accommodate developers in the form of exceptions, modifications, and waivers.

IV. BLM Must Consult with U.S. Fish and Wildlife Service and National Marine Fisheries Service Pursuant to Section 7 of the Endangered Species Act

Congress enacted the ESA in 1973 to provide "a program for the conservation of . . . endangered species and threatened species." 16 U.S.C. § 1531(b). Section 2(c) of the ESA establishes that it is "the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act." 16 U.S.C. § 1531(c)(1). The ESA defines "conservation" to mean "the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary." 16 U.S.C. § 1532(3). Similarly, Section 7(a)(1) of the ESA

directs that all federal agencies “utilize their authorities in furtherance of the purposes by carrying out programs for the conservation of endangered species and threatened” of the ESA. 16 U.S.C. § 1536(a)(1).

For every discretionary action, Section 7(a)(2) of the ESA requires each federal agency, in consultation with FWS, to “insure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any threatened or endangered species, or result in the destruction or adverse modification of the critical habitat of such species.” 16 U.S.C. § 1536(a)(2). During consultation both the action agency and FWS must use the best scientific data available. *Id.* The Supreme Court has unequivocally stated that the Act’s “language, history, and structure” made clear “beyond a 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.”¹²⁸ Simply put, “the plain intent of Congress in enacting this statute was to halt and reverse the trend toward species extinction, *whatever the cost.*”¹²⁹

To determine if consultations are required, the action agency must first determine if its action “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.”¹³⁰ 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.”¹³¹

At this first step of the assessment, an agency must determine if its actions “may affect” listed species. The courts have explained 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 the threshold.¹³² Only a scientific finding of “no effect” is sufficient to avoid the consultation process altogether.¹³³ If 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 so, then the agency must engage in “formal consultation” with FWS, or receive concurrence from the Services that its actions are “not likely to adversely affect” listed species. 50 C.F.R. § 402.14.

¹²⁸ *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 174 (1978).

¹²⁹ *Id.* (emphasis added).

¹³⁰ 50 C.F.R. § 402.02

¹³¹ 50 C.F.R. § 402.02.

¹³² *Karuk Tribe of Cal. v. U.S. Forest Serv.*, 681 F.3d 1006, 1027 (9th Cir. 2012).

¹³³ *American Fuel & Petrochemical Manufacturers, et al. v. EPA*, 937 F. 3d 559 (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.).

To complete formal consultation, FWS 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. If FWS concludes in the biological opinion that the proposed action will jeopardize the continued existence of a listed species, or will result in the destruction or adverse modification of critical habitat, FWS must outline “reasonable and prudent alternatives” to the proposed action that FWS believes would not jeopardize listed species or result in the destruction or adverse modification of critical habitat. 16 U.S.C. § 1536(b)(3)(A).

If the biological opinion concludes that the proposed action is not likely to jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of critical habitat, FWS must provide an “incidental take statement” (“ITS”) along with the biological opinion, specifying the amount or extent of such incidental taking on the species, any “reasonable and prudent measures” that FWS considers necessary or appropriate to minimize such impact, and setting forth the “terms and conditions” that must be complied with by the agency to implement those measures. 16 U.S.C. § 1536(b)(4); 50 C.F.R. § 402.14(i).

Here, BLM’s proposed oil and gas leasing clearly represents a discretionary agency action subject to the consultation requirements of the ESA.

Because of the programmatic nature of BLM’s resumption of leasing, BLM must initiate programmatic consultation with FWS at the earliest possible time. This programmatic consultation must address two critical types of harms that occur to listed species: (1) landscape level impacts that occur to listed species that are found within the action area of the existing footprint of possible and existing fossil fuel leasing and (2) geographically remote impacts to listed species from climate change exacerbated by the cumulative emissions of the federal fossil fuel programs.

BLM’s proposed leasing also marks the resumption of leasing following a pause of oil and gas leasing program pursuant to Executive Order 14008. Because the direct, indirect, and cumulative effects of this resumption of leasing will cross the very low “may affect” threshold for hundreds of species listed under the ESA, BLM must consult with the U.S. Fish and Wildlife Service and National Marine Fisheries Service (collectively “the Services”) to ensure that the resumption of federal oil and gas leasing, in addition to the 1st quarter 2022 lease sales and including climate impacts from its indirect and cumulative greenhouse gas pollution, will not jeopardize listed species or adversely modify their critical habitat.¹³⁴

Because fossil fuel extraction from public lands and waters represents 25% of all U.S. emissions, and therefore represent a globally significant percentage of all emissions, the impacts to climate-threatened listed species and their habitats is appreciable, significant, and must be assessed under the ESA’s consultation framework. This is also true of the onshore oil and gas leasing by itself, and the 1st quarter 2022 lease sales, whose associated oil and gas volumes

¹³⁴ *Karuk Tribe of California v. U.S. Forest Service*, 681 F.3d 1006 (2012); *American Fuel & Petrochemical Manufacturers, et al. v. EPA*, 937 F. 3d 559 (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.).

contain upwards of 246 million tons of potential greenhouse gas pollution. This analysis of these impacts would be consistent with President Biden’s Executive Order 13990, which states that all federal agencies “must be guided by the best science and be protected by processes that ensure the integrity of Federal decision-making

V. BLM Must Take a Hard Look at Air Quality and Health Impacts

A. Air Quality Impacts

The BLM must take a hard look at the air quality impacts from oil and gas development in the areas of the lease sales. Much of air pollution from oil and gas development and operations, which is specifically discussed below also degrades visibility. Section 169A of the Clean Air Act (“CAA”), 42, U.S.C. § 7401 *et seq.* (1970) sets forth a national goal for visibility, which is the “prevention of any future, and the remedying of any existing, impairment of visibility in Class I areas which impairment results from manmade air pollution.” Congress adopted the visibility provisions in the CAA to protect visibility in “areas of great scenic importance.” H.R. Rep. No. 294, 95th Cong. 1st Sess. at 205 (1977). In promulgating its Regional Haze Regulations, 64 Fed. Reg. 35,714 (July 1, 1999), the U.S. Environmental Protection Agency (“EPA”) provided:

Regional haze is visibility impairment that is produced by a multitude of sources and activities which emit fine particles and their precursors and which are located across a broad geographic area. Twenty years ago, when initially adopting the visibility protection provisions of the CAA, Congress specifically recognized that the “visibility problem is caused primarily by emission into the atmosphere of SO₂, oxides of nitrogen, and particulate matter, especially fine particulate matter, from inadequate[ly] controlled sources.” H.R. Rep. No. 95-294 at 204 (1977). The fine particulate matter (PM) (e.g., sulfates, nitrates, organic carbon, elemental carbon, and soil dust) that impairs visibility by scattering and absorbing light can cause serious health effects and mortality in humans, and contribute to environmental effects such as acid deposition and eutrophication.

The visibility protection program under sections 169A, 169B, and 110(a)(2)(J) of the CAA is designed to protect Class I areas from impairment due to manmade air pollution. The current regulatory program addresses visibility impairment in these areas that is “reasonably attributable” to a specific source or small group of sources, such as, here, air pollution resulting from oil and gas development. *See* 64 Fed. Reg. 35,714.

Moreover, EPA finds the visibility protection provisions of the CAA to be quite broad. Although EPA is addressing visibility protection in phases, the national visibility goal in section 169A calls for addressing visibility impairment generally, including regional haze. *See e.g., State of Maine v. Thomas*, 874 F.2d 883, 885 (1st Cir. 1989) (“EPA’s mandate to control the vexing problem of regional haze emanates directly from the CAA, which ‘declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in Class I areas which impairment results from manmade air pollution.’”) (citation omitted).

In addition to impacts from development from the lease sales, cumulative air quality impacts from sources in and around the proposed development areas may result in serious impairments to air quality standards.

The current status of air quality in an area is a fundamental consideration for analysis in the BLM's NEPA analysis. Background monitored concentrations of all pollutants should be reviewed. Given increasing development in some areas, there may be higher concentrations that should be reflected.

Any BLM leasing analysis must also comply with the recent federal court decision in *Rocky Mountain Wild v. Haaland*, 2021 WL 4438032 (D. Colo. Sept. 28, 2021). Specifically:

- BLM must analyze and disclose all direct, indirect, and cumulative air quality impacts, and must rely on up-to-date and accurate air quality information. *See id.* at *2-4. BLM must also analyze and disclose impacts to air quality in the Uinta Basin, which is designated as nonattainment of the ozone NAAQS. *See id.* at 4 (BLM's air quality analysis violated NEPA because it "makes no mention of these expected [air quality NAAQS] exceedances, much less explains why the BLM deemed them to be insignificant").
- BLM must analyze and disclose all direct, indirect, and cumulative impacts to resource values identified after the agency's respective RMPs and prior leasing analyses were completed. *See id.* *5-6. New information that post-dates these RMPs includes, for example, the San Rafael Reef Wilderness, the data and information collected for the San Rafael Desert and Moab MLPs, updated air quality NAAQS (including the Uinta Basin nonattainment designation), the Dingell Act land exchange provisions (including the expansion of Goblin Valley State Park), and new listing decisions under the ESA. *See id.* at *6 ("the BLM cannot evaluate potential impacts . . . until it first becomes aware that those characteristics exist."); *id.* ("the discovery of new information about lands that were previously approved for development requires the BLM to specifically consider whether that new information justifies a change in management objectives.").

B. Human Health Impacts of Oil and Gas Production

The BLM must also include an analysis of reasonably foreseeable direct, indirect, and cumulative human health impacts resulting from oil and gas leasing and development in the planning areas. 40 C.F.R. § 1506.6. 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 its requisite evaluation of significance mandates that agencies consider the degree to which their proposed actions affect public health or safety. 40 C.F.R § 1508.27(b)(2). 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). The broad array of effects agencies must consider reflects a socio-ecological model of health that takes environmental,

social, and structural determinants into account. “Effects includes 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. § 1508.8. 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.¹³⁵ Senator Henry Jackson, the key author of NEPA, expressed this intent by stating: “When we speak of the environment, basically, we are talking about the relationship between man and these physical and biological and social forces that impact upon him. A public policy for the environment basically is not a public policy for those things out there. It is a policy for people.”¹³⁶

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. 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).

There are several notable scientific papers BLM should consider in the context of adverse health risks and impacts associated with oil and gas drilling and fracking. A 2014 review identified 15 different components of unconventional oil and gas development, everything from trucks and tanks to chemicals and venting, which can present a chemical, physical and/or safety hazard.¹³⁷ And multiple peer-reviewed scientific papers have identified adverse health effects and risks arising from exposure to unconventional oil and gas drilling, even within a large radius

¹³⁵ 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 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).

¹³⁶ *Id.*

¹³⁷ John L. Adgate et al., Potential Public Health Hazards, Exposures and Health Effects from Unconventional Natural Gas Development, 48 ENVIRONMENTAL SCIENCE & TECHNOLOGY 8307 (Feb. 24, 2014).

of residences—potentially up to ten miles.¹³⁸ One such study found that babies whose mothers lived in close proximity to multiple oil and gas wells were 30% more likely to be born with heart defects than babies born to mothers who did not live close to oil and gas wells.¹³⁹

Moreover, the use of stipulations do not eliminate BLM’s obligation to take a hard look at health effects at the leasing stage, as NEPA requires. Nor are they likely sufficient to protect people and communities in the lease sale areas against health and safety risks and adverse effects. Health experts surveyed in one study agreed that oil and gas setbacks of over 1000 feet were likely inadequate to protect public health, and additional setbacks were necessary to protect young children and elderly people,¹⁴⁰ and others 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 0.5 miles of unconventional oil and gas drilling sites.¹⁴¹ Indeed, 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. For example, a 2016 study and Health Impact Assessment 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

¹³⁸ See, e.g., 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) (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); 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); 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 (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 in light of the heightened health risks of residing within ½ mile or less of unconventional oil and gas drilling sites).

¹³⁹ 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).

¹⁴⁰ See Celia Lewis *et al.*, *Setback Distances for Unconventional Oil and Gas Development: Delphi Study Results*. 13 PLoS One e0202462 (Aug. 16, 2018).

¹⁴¹ See Webb *et al.*, *supra* Note 155.

severity/magnitude of health effects.¹⁴² And for many health impacts, including those related to social determinants of health and cumulative exposures and risks, the study found that setbacks of *any* distance were unlikely to minimize risks or mitigate effects *at all*.¹⁴³

As discussed above, emissions from oil and gas development are not limited to combustion, rather they occur throughout the chain of production—with some of the greatest emissions occurring at the point of extraction. These impacts are a consequence of various stages of oil and gas development—from the drilling and fracking of oil and gas wells, to air quality impacts and the release of hazardous emissions. The BLM must sufficiently address and analyze these impacts in its NEPA analysis.

The implementation of methane waste mitigation technologies, as discussed above, can not only help spur economic benefit, but can also allay some of the harmful health effects of oil and gas development by reducing emissions of NOX, VOCs and other criteria pollutants. Aside from the direct health impacts of NOX and VOCs,¹⁴⁴ these emissions can also result in significant increases in ground-level ozone (i.e., ozone precursors), and, consequently, can have a dramatic impact on human health.¹⁴⁵ For example, ozone has been shown to decrease lung function – particularly in adolescents and young adults—as well as increase the risk of death from respiratory causes.¹⁴⁶

The EPA is currently proposing standards to reduce air pollution from oil and natural gas

¹⁴² See, e.g., 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) (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).

¹⁴³ *Id.*

¹⁴⁴ See, e.g., Colorado Department of Public Health and Environment, *2010 Air Quality Data Report* (2010).

¹⁴⁵ See, e.g., GAO Report, *Oil and Gas: Information on Shale Resources, Development, and Environmental and Public Health Risks* (Sept. 2012); GAO Report, *Unconventional Oil and Gas Development: Key Environmental and Public Health Requirements* (Sept. 2012); Earthworks, *Natural Gas Flowback: How the Texas Natural Gas Boom Affects Health and Safety* (April 2012); Green River Alliance, *Healthy Air Questionnaire Final Report: Clean Air and Healthy Communities* (2011); Lisa McKenzie, Ph.D., et. al., *Human health and risk assessment of air emissions from development of unconventional natural gas resources* (Feb. 2012); Lisa McKenzie, Ph.D., Testimony on: *Federal Regulation: Economic, job, and energy security implications of federal hydraulic fracturing regulation*, May 2, 2012; Earthworks, *Gas Patch Roulette: How Shale Gas Development Risks Public Health in Pennsylvania*, October 2012.

¹⁴⁶ See Ira B. Tager, et. al., *Chronic Exposure to Ambient Ozone and Lung Function in Young Adults*, EPIDEMIOLOGY, Vol. 16, No. 6 (Nov. 2005); Michael Jarrett, Ph.D., et. al., *Long-Term Ozone Exposure and Mortality*, THE NEW ENGLAND JOURNAL OF MEDICINE, 360: 1085-95 (2009).

drilling operations. According to the EPA, the oil and gas industry is “the largest industrial source of emissions of volatile organic compounds (VOCs), a group of chemicals that contribute to the formation of ground-level ozone (smog).”¹⁴⁷ Moreover, “[e]xposure to ozone is linked to a wide range of health effects, including aggravated asthma, increased emergency room visits and hospital admissions, and premature death.”¹⁴⁸ The oil and natural gas industry is also “a significant source of emission of methane,” as well as an emitter of “air toxics such as benzene, ethylbenzene, and n-hexane,” which are “pollutants known, or suspected of causing cancer and other serious health effects.”¹⁴⁹ The EPA reports that the oil and gas industry:

emits 2.2 million tons of VOCs, 130,000 tons of air toxics, and 16 million tons of greenhouse gases (methane) each year (40% of all methane emission in the U.S.). The industry is one of the largest sources of VOCs and sulfur dioxide emissions in the United States.¹⁵⁰

The rapid development of high volume/horizontal drilling in conjunction with hydraulic fracturing has driven expansion of new sources resulting in increased emissions—a change that requires consideration by the BLM.

Many of the impacts to human health have already been documented in communities subject to industrial scale oil and gas development. For example, in Garfield County, Colorado, residents have experienced health effects they believe to be caused from oil and gas development. “Community concerns range from mild complaints such as dizziness, nausea, respiratory problems, and eye and skin irritation to more severe concerns including cancer.”¹⁵¹ Additionally, the community has “environmental concerns related to noise, odors, dust, and ‘toxic’ chemicals in water and air.”¹⁵² After a thorough review of ambient air data across Garfield County, ATSDR determined that, “considering both theoretical cancer risks as well as non-cancer health effects and the uncertainties associated with the available data, it is concluded that the exposures to air pollution in Garfield County pose an indeterminate public health hazard for current exposures.”¹⁵³ ATSDR further provided that “estimated theoretical cancer risks and non-cancer hazards for benzene [in the community], which is within the oil and gas development area, appear significantly higher than those in typical urban and rural area, causing some potential concern,” and later concluded that “[t]hese elevated levels are an indicator of the increased potential for health effects related to benzene exposure . . . in the oil and gas

¹⁴⁷ EPA, *Oil and Natural Gas Pollution Standards: Basic Information, Emissions from the Oil & Natural Gas Industry* (2011), available at: <http://www.epa.gov/airquality/oilandgas/basic.html>; see also Cally Carswell, *Cracking the ozone code – Utah’s gas fields*, HIGH COUNTRY NEWS, Sept. 4, 2012.

¹⁴⁸ See *id.*, EPA, *Pollution Standards*.

¹⁴⁹ *Id.*

¹⁵⁰ Letter from American Lung Association, American Public Health Association, American Thoracic Society, Asthma and Allergy Foundation of America, and Trust for America’s Health to Lisa Jackson, Administrator, U.S. Environmental Protection Agency (Nov. 30, 2011), at 4.

¹⁵¹ U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry (“ATSDR”), *Health Consultation: Garfield County, Public Health Implications of Ambient Air Exposures to Volatile Organic Compounds as Measured in Rural, Urban, and Oil & Gas Development Areas* (2008), at 1.

¹⁵² *Id.*

¹⁵³ *Id.*

development area.¹⁵⁴

Unfortunately, impacts to human health are not limited only to gas emissions, but can result from exposure to chemicals necessary for gas extraction—namely, the hundreds of chemicals used in hydraulic fracturing.¹⁵⁵ Indeed, “[b]etween 2005 and 2009, the 14 oil and gas service companies [analyzed by Congress] used more than 2,500 hydraulic fracturing products containing 750 chemicals and other components. Overall, these companies used 780 million gallons of hydraulic fracturing products – not including water added at the well site – between 2005 and 2009.”¹⁵⁶ Chemical components include BTEX compounds—benzene, toluene, xylene, and ethylbenzene—which are hazardous air pollutants and known human carcinogens. As the BLM proceeds with approval of the lease sales, they must consider the human health impacts associated with these extractive practices.

Leading doctors and scientists studying these issues recognize the unknown risks inherent to fracking. “We don’t know the chemicals that are involved, really; we sort of generally know,” Vikas Kapil, chief medical officer at National Center for Environmental Health, part of the U.S. Centers for Disease Control and Prevention, said at a conference on hydraulic fracturing.¹⁵⁷ “We don’t have a great handle on the toxicology of fracking chemicals.”¹⁵⁸ Christopher Portier, director of the CDC’s National Center for Environmental Health and Agency for Toxic Substances and Disease Registry further provided that “additional studies should examine whether wastewater from wells can harm people or the animals and vegetables they eat.”¹⁵⁹ “We do not have enough information to say with certainty whether shale gas drilling poses a threat to public health.”¹⁶⁰

Indeed, a new study demonstrates that animals, especially livestock, are sensitive to the contaminants released into the environment by drilling and by its cumulative impacts.¹⁶¹ Because animals often are exposed continually to air, soil, and groundwater and have more frequent reproductive cycles, animals can be used to monitor potential impacts to human health—they are fracking’s “canary in the coalmine.” The study evaluated all available fracking-

¹⁵⁴ *Id.*

¹⁵⁵ See Theo Colborn, et. al., *Comments to the Bureau of Land Management, Uncompahgre Field Office, THE ENDOCRINE DISRUPTION EXCHANGE*, April 20, 2012; Theo Colborn, et. al., *Natural Gas Operations from a Public Health Perspective, HUMAN AND ECOLOGICAL RISK ASSESSMENT*, 17: 1039-1056 (2011).

¹⁵⁶ UNITED STATES HOUSE OF REPRESENTATIVES, COMMITTEE ON ENERGY AND COMMERCE, *Chemicals Used in Hydraulic Fracturing* (April 2011).

¹⁵⁷ Alex Wayne, *Fracking Moratorium Urged by U.S. Doctors Until Health Studies Conducted*, BLOOMBERG NEWS, January 9, 2012, available at: <http://www.bloomberg.com/news/2012-01-09/fracking-moratorium-urged-by-u-s-doctors-until-health-studies-conducted.html>.

¹⁵⁸ *Id.*

¹⁵⁹ Alex Wayne and Katarzyna Klimasinska, *Health Effects of Fracking for Natural Gas Need Study, Says CDC Scientist*, BLOOMBERG NEWS, January 4, 2012, available at: <http://www.bloomberg.com/news/2012-01-04/health-effects-of-fracking-for-natural-gas-need-study-says-cdc-scientist.html>.

¹⁶⁰ *Id.*

¹⁶¹ Michelle Bamberger and Robert E. Oswald, *Impacts of Gas Drilling on Human and Animal Health*, NEW SOLUTIONS, VOL. 22(1) 51-77 (2012).

related reports on sick or dying animals. Although secrecy surrounds the fracking industry, “a few ‘natural experiments’ have provided powerful evidence that fracking can harm animals.”¹⁶² For example:

Two cases involving beef cattle farms inadvertently provided control and experimental groups. In one case, a creek into which wastewater was allegedly dumped was the source of water for 60 head, with the remaining 36 head in the herd kept in other pastures without access to the creek. Of the 60 head that were exposed to the creek water, 21 died and 16 failed to produce calves the following spring. Of the 36 that were not exposed, no health problems were observed, and only one cow failed to breed. At another farm, 140 head were exposed when the liner of a wastewater impoundment was allegedly slit, as reported by the farmer, and the fluid drained into the pasture and the pond used as a source of water for the cows. Of those 140 head exposed to the wastewater, approximately 70 died and there was a high incidence of stillborn and stunted calves. The remainder of the herd (60 head) was held in another pasture and did not have access to the wastewater; they showed no health or growth problems. These cases approach the design of a controlled experiment, and strongly implicate wastewater exposure in the death, failure to breed, and reduced growth rate of cattle.¹⁶³

The health problems and uncertainties that proliferate in communities where oil and gas development takes place warrants the further collection of data and research, as contemplated under NEPA, before such development can be made possible through the authorization of development through the lease sales. NEPA requires a hard look at these impacts.

As referenced above, ozone has long been recognized to cause adverse health effects. Exposure to ozone can cause or exacerbate respiratory health problems—including shortness of breath, asthma, chest pain and coughing—can decrease lung function, and can even lead to long-term lung damage. *See also* EPA’s National Ambient Air Quality Standards for Particulates and Ozone, 62 FR 38,856 (July 18, 1997). Short-term exposure to ozone causes multiple negative respiratory effects, from inflammation of airways to more serious respiratory effects that can lead to use of medication, absences from school and work, hospital admission, emergency room visits, and chronic obstructive pulmonary disease (“COPD”). According to a recent report by the National Research Council (“NRC”), short-term exposure to current levels of ozone in many areas is likely to contribute to premature deaths.¹⁶⁴ As described in more detail below, even ozone concentrations as low as 60 ppb can be harmful to human health. Long-term exposure to elevated levels of ozone results in numerous negative harmful effects, such as permanent lung damage and abnormal lung development in children. Long-term exposure may also increase risk

¹⁶² See Peter Montague, *Why Fracking and Other Disasters Are So Hard to Stop*, HUFFINGTON POST, Jan. 20, 2012, available at: http://www.huffingtonpost.com/peter-montague/why-fracking-and-other-di_b_1218889.html (last visited Jan. 23, 2012).

¹⁶³ See Bamberger at 60.

¹⁶⁴ National Research Council, *Link Between Ozone Air Pollution and Premature Death Confirmed*, (April 2008), available at: <http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=12198>.

of death from respiratory problems. Short- and long-term exposure to elevated levels of ozone can also harm people's hearts and cardiovascular systems. *See* 79 Fed. Reg. 75234-311.

According to the US Department of Agriculture, ground-level ozone causes more damage to plants than all other air pollutants combined. Exposure to elevated ozone typically results in suppressed photosynthesis, accelerated senescence, decreased growth and lower yields.¹⁶⁵ Research demonstrates that ground-level ozone is already decreasing crop yields.¹⁶⁶

On October 26, 2015, EPA published a final rule to revise the NAAQS for ozone to 70 parts per billion (ppb) from the current 75 ppb. National Ambient Air Quality Standards for Ozone, 80 Fed. Reg. 65292 (Oct. 26, 2015). This decision was driven by significant recent scientific evidence that the standard of 75 ppb was not adequately protecting public health. *Id.* at 136. In fact, recent studies have documented decreased lung functioning and airway inflammation in young, healthy adults at ozone concentrations as low as 60 ppb. *Id.* at 146.

Additionally, climate change is likely to worsen ozone pollution, offsetting the improvements in air quality and public health that would be expected from reductions in emissions of ozone precursors. As described by the EPA in its recent ozone rulemaking:

In addition to being affected by changing emissions, future O₃ concentrations may also be affected by climate change. Modeling studies in the EPA's Interim Assessment (U.S. EPA, 2009a) that are cited in support of the 2009 Endangerment Finding under CAA section 202(a) (74 FR 66496, Dec. 15, 2009) as well as a recent assessment of potential climate change impacts (Fann et al., 2015) project that climate change may lead to future increases in summer O₃ concentrations across the contiguous U.S. While the projected impact is not uniform, climate change has the potential to increase average summertime O₃ concentrations by as much as 1-5 ppb by 2030, if greenhouse gas emissions are not mitigated. Increases in temperature are expected to be the principal factor in driving any O₃ increases, although increases in stagnation frequency may also contribute (Jacob and Winner, 2009). If unchecked, climate change has the potential to offset some of the improvements in O₃ air quality, and therefore some of the improvements in public health, that are expected from reductions in emissions of O₃ precursors.

80 Fed. Reg. 65292, 65300 (October 26, 2015). For example, climate change impacts include an increase in the area burned by wildfires, which, in turn are sources of O₃ precursors. *Id.* at 65371.

¹⁶⁵ Booker, FL, R Muntifering, M McGrath, KO Burkey, D Decoteau, EL Fiscus, W Manning, S Krupa, A Chappelka, DA Grantz. *The ozone component of global change: Potential effects on agricultural and horticultural plant yield, product quality and interactions with invasive species*. *Journal of Integrative Plant Biology* (2009) 51:337-351.

¹⁶⁶ Sally Wilkinson, Gina Mills, Rosemary Illidge and William J. Davies, *How is ozone pollution reducing our food supply?* *Journal of Experimental Botany*, Vol. 63, No. 2, pp. 527-536, 2012.

Here, BLM must consider the science supporting EPA’s revision of the NAAQS, as well as the impacts of climate change on ozone levels, in its preparation of the EA for the lease sales.

Hydraulic fracturing (“fracking”) operations are particularly harmful, emitting especially large amounts of air pollution, including air toxic air pollutants. Permitting fracking and other well stimulation techniques will greatly increase the release of harmful air emissions. BLM must analyze air quality impacts from new development in conjunction with the existing air quality landscape. BLM must analyze increased emissions from foreseeable oil and gas development for the lease sales in order to prevent further degradation of local air quality, respiratory illnesses, premature deaths, hospital visits, as well as missed school and work days.

The BLM must take the necessary steps to analyze the impacts of all foreseeable future air emissions from induced oil and gas development and operations in conjunction with this lease sales, and cumulatively with future oil and gas projects.

BLM also must identify mitigation measures for controlling air pollution emissions, 40 C.F.R. § 1508.25, and consider all reasonable alternatives. Ctr. for Biological Diversity v. Nat’l Highway Traffic Safety Admin., 538 F.3d 1172, 1217 (9th Cir. 2008) (citing 40 C.F.R. § 1502.14(a)).

Also critical to the BLM’s analysis of air quality impacts is the relationship to human health. Logically, adherence to NAAQS would have a positive relationship to human health, however, the agency cannot rely on these standards or other indicators such as the Air Quality Index (“AQI”) or National Air Toxics Assessment (“NATA”) and assume that this alone would satisfy the BLM’s hard look NEPA obligations.

Research indicates a strong correlation between oil and gas development and increased ozone concentrations—especially in the summer when warm, stagnant conditions yield an increase in O₃ from oil and gas emissions.¹⁶⁷ Additionally, oil and gas production in the mountain west has recently been linked to *winter* ozone levels that greatly exceed the NAAQS.¹⁶⁸

As the Endocrine Disruption Exchange has noted:

In addition to the land and water contamination issues, at each stage of production and delivery tons of toxic volatile compounds, including benzene, toluene, ethylbenzene, xylene, etc., and fugitive natural gas (methane), escape and mix with nitrogen oxides from the exhaust of diesel-driven, mobile and stationary equipment to produce ground-level ozone. Ozone combined with particulate matter less than

¹⁶⁷ Marco A Rodriguez, et al., *Regional Impacts of Oil and Gas Development on Ozone Formation in the Western United States*, JOURNAL OF AIR & WASTE MANAGEMENT ASSOCIATION (Sept. 2009).

¹⁶⁸ See Gail Tonnesen and Richard Payton, EPA Region 8. *Winter Ozone Formation: Results from the Wyoming Upper Green River Basin Studies and Plans for the 2012, Uintah Basin Study* (seminar abstract) (Jan. 2012), available at: <http://www.esrl.noaa.gov/csd/seminars/2012/TonnesenPayton.html> (citing, *inter alia*, Schnell, et. al., *Rapid photochemical production ozone at high concentrations in a rural site during winter*, 2 Nature Geosci. 120-122 (2009)).

2.5 microns produces smog (haze). Gas field produced ozone has created a serious air pollution problem similar to that found in large urban areas, and can spread up to 200 miles beyond the immediate region where gas is being produced. Ozone not only causes irreversible damage to the lungs, it is equally damaging to conifers, aspen, forage, alfalfa, and other crops commonly grown in the West. Adding to this is the dust created by fleets of diesel-driven water trucks working around the clock hauling the constantly accumulating condensate water from well pads to central evaporation pits.¹⁶⁹

Increases in ground-level ozone not only impact regional haze and visibility, but can also result in dramatic impacts to human health. According to the EPA:

Breathing ground-level ozone can result in a number of health effects that are observed in broad segments of the population. Some of these effects include:

- Induction of respiratory symptoms
- Decrements in lung function
- Inflammation of airways

Respiratory symptoms can include:

- Coughing
- Throat irritation
- Pain, burning, or discomfort in the chest when taking a deep breath
- Chest tightness, wheezing, or shortness of breath

In addition to these effects, evidence from observational studies strongly indicates that higher daily ozone concentrations are associated with increased asthma attacks, increased hospital admissions, increased daily mortality, and other markers of morbidity. The consistency and coherence of the evidence for effects upon asthmatics suggests that ozone can make asthma symptoms worse and can increase sensitivity to asthma triggers.¹⁷⁰

¹⁶⁹ The Endocrine Disruption Exchange. Undated. *Chemicals In Natural Gas Operations: Health Effects Spreadsheet and Summary*, available at: <http://www.endocrinedisruption.com/chemicals.multistate.php>.

¹⁷⁰ EPA, *Health Effects of Ozone in the General Population*, available at: <http://www.epa.gov/apti/ozonehealth/population.html>.

Oil and gas development is one of the largest sources of VOCs, ozone, and sulfur dioxide emissions in the United States. The relationship between air quality and human health must be analyzed in the agency’s NEPA analysis. “The agency must examine the relevant data and articulate a satisfactory explanation for its action including a ‘rational connection between the facts found and the choice made.’” Motor Vehicle Mfrs., 463 U.S. at 43 (1983).

C. Climate Change Impacts on Health and Environmental Justice

In addition to the well-documented impacts and risks of proximity to oil and gas production, described above, BLM must take a hard look at the impacts of climate change on human health, communities, and environmental justice issues. Because continuation of unsustainable fossil-fuel production and consumption carries with it known risks and likely outcomes in terms of worsening climate change impacts, such impacts are “reasonably foreseeable for purposes of NEPA, and must be analyzed. 40 C.F.R. § 1506.6.

The EPA recently issued a report on climate change impacts on four vulnerable populations groups. The report examined impacts to four socially vulnerable populations: defined based on income, educational attainment, race and ethnicity, and age. Of these groups, racial or ethnic minorities are the most likely to live in areas which will suffer the highest levels of climate change impacts under a scenario with 2° C of global warming or 50 cm of of global sea level rise.¹⁷¹ For example, Black and African American individuals are 40% more likely than non-Black and African Americans to currently live in areas with the highest projected increases in mortality rates due to climate-driven changes in extreme temperatures.¹⁷² Likewise, American Indian and Alaska Native individuals are 48% more likely than non-American Indian and non-Alaska Native individuals to currently live in areas where the highest percentage of land is projected to be inundated due to sea level rise.¹⁷³

More specific climate impacts that are already occurring likewise have both economic and human health costs. In particular, and of particular relevance to many of the lease sale areas at issue here, increasing wildfire frequency and severity are already occurring and can be expected to grow worse as the impacts of climate change grow more acute. Multiple studies have found that climate change has already led to an increase in wildfire season length, wildfire frequency, and burned area. The wildfire season has lengthened in many areas due to factors including warmer springs, longer summer dry seasons, and drier soils and vegetation.¹⁷⁴ Recent studies on the impacts of wildfire smoke have concluded—not surprisingly—that such events have both social and economic costs. For example, a recent study found that increasing concentrations of fine particulate matter (PM2.5) due to wildfire smoke could be directly correlated to premature

¹⁷¹ U.S. Environmental Protection Agency, *Climate Change and Social Vulnerability in the United States, a Focus on Six Impacts*, September 2021.

¹⁷² *Id.* at 6.

¹⁷³ *Id.*

¹⁷⁴ USGCRP (U.S. Global Change Research Program). 2018. Impacts, risks, and adaptation in the United States: Fourth National Climate Assessment, volume II. Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.). <https://nca2018.globalchange.gov/downloads>. doi:10.7930/NCA4.2018.

childhood death in low and middle-income countries.¹⁷⁵ Similarly, even short-term exposure to wildfire related PM 2.5 has been associated with an increased risk of mortality.¹⁷⁶ Similarly, long-term exposure to outdoor air pollution, which can include wildfire smoke pollution, as well as air pollution caused by oil and gas development, increases the risk of cardiovascular disease, including stroke and coronary heart disease, even at concentrations lower than current pollutant limit values.¹⁷⁷ Also unsurprisingly, wildfire smoke has also been demonstrated to account for substantial economic costs related to health.¹⁷⁸

In the face of these and a myriad of additional health and societal impacts, medical and health professionals have called for urgent action to halt the worst impacts of climate change while there is still time.¹⁷⁹ This call-to-action notes not only the health impacts caused by *any* global temperature increase, but also impacts to crop yield potential (i.e. the ability to feed the world population) and ecosystem health.¹⁸⁰ These medical professionals recognize that the climate crisis represents an overall environmental crisis which must be addressed in a way that places equitable considerations foremost.¹⁸¹ It is past time that our government (and BLM) do the same.

VI. BLM Must Take a Hard Look At Impacts To Water Resources 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).

Groundwater is a critical resource that supplies many communities, particularly rural ones, with drinking water. Protecting 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

¹⁷⁵ *Tao Xue, Guannan Geng, Jiajianghui Li, et. al.* Associations between exposure to landscape fire smoke and child mortality in low-income and middle-income countries: a matched case-control study, *Lancet Planet Health* 2021; 5:e588–98.

¹⁷⁶ *Gongbo Chen, Yuming Guo, Xu Yue, Shilu Tong, et. al.* Mortality risk attributable to wildfire-related PM2.5 pollution: a global time series study in 749 locations, *Lancet Planet Health* 2021; 5: e579-87.

¹⁷⁷ *Kathrin Wolf, Barbara Hoffmann, Zorana J Andersen,* Long-term exposure to low-level ambient air pollution and incidence of stroke and coronary heart disease: a pooled analysis of six European cohorts within the ELAPSE project, *Lancet Planet Health* 2021; 5: e620-32.

¹⁷⁸ *Nicolas Borchers-Arriagada, David M J S Bowman, Owen, et. al.* Smoke health costs and the calculus for wildfires fuel management: a modelling study, *Lancet Planet Health* 2021; 5: e608-19.

¹⁷⁹ Editorial, *New England Journal of Medicine*, September 5, 2021 (Editorial published simultaneously in numerous international medical journals, signed by 19 editor-in-chiefs of global medical journals).

¹⁸⁰ *Id.*

¹⁸¹ *Id.*

changes in climate and water use.”¹⁸² 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.¹⁸³ 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.¹⁸⁴

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.¹⁸⁵ For example, a report studying a sample of existing oil and gas well records in Montana confirms industry admissions that well casing and cementing practices do not always protect underground sources of drinking water.¹⁸⁶ 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.¹⁸⁷

¹⁸² 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). Available at www.epa.gov/hfstudy.

¹⁸³ See, e.g., Gayathri Vaidyanathan, Fracking Can Contaminate Drinking Water, at 8, *Sci. Am.* (Apr. 4, 2016); 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, Env'tl. Sci. & Tech.* 4524, 4532 (Mar. 29, 2016); EPA 2016 Report.

¹⁸⁴ See BLM, Regulatory Impact Analysis for the Final Rule to Rescind the 2015 Hydraulic Fracturing Rule, at 44–45 (Dec. 2017).¹⁸⁴ State regulations are similarly inadequate to ensure protection of groundwater.

¹⁸⁵ 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>.

¹⁸⁶ Dominic DiGiulio, Examination of Selected Production Files in Southcentral Montana to Support Assessment of the March 2018 BLM Lease Sale (December 22, 2017). Available at https://eplanning.blm.gov/public_projects/nepa/87551/136880/167234/Earthjustice_Protest_1-12-2018.pdf. (Exhibit D to David Katz and Jack and Bonnie Martinell’s protest of the March 13, 2018 BLM Montana-Dakotas oil and gas lease sales).

¹⁸⁷ 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, Env'tl. Sci. & Tech.* 4524, 4532 (Mar. 29, 2016). Available at <https://pubs.acs.org/doi/10.1021/acs.est.5b04970>.

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 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.*

A. Groundwater Impacts

The oil and gas development authorized through the lease sales could result in significant potential to contaminate groundwater resources in the lease sale areas. Such contamination may result during the following processes: (1) the state of chemical mixing due to spills, leaks, and transportation accidents; (2) during the fracking process due to well malfunctions, migration of fracking fluids or fluids from the fractured formation to aquifers, and mobilization of subsurface materials to aquifers; (3) during flowback due to releases, leakage of on-site storage, and spills from pits (caused by improper construction, maintenance, or closure); and (4) during wastewater disposal due to discharges of wastewater into groundwater, incomplete treatment, and transportation accidents.¹⁸⁸ Fracking chemicals and wastewater may also contaminate groundwater supplies as a result of illegal dumping.¹⁸⁹ As discussed above, not all chemical used in fracking have been fully disclosed, but many of those that have been disclosed or discovered are toxic, hazardous, or harmful to human health or welfare. Despite a general lack of adequate oversight of fracking operations, various instances of water pollution from fracking operations have been documented.¹⁹⁰

Groundwater contamination is among the most serious and consequential impacts of the oil and gas drilling industry, especially where hydraulic fracturing (“fracking”) is anticipated. Accordingly, evidence of groundwater contamination from oil and gas operations must be fully analyzed by the BLM.

¹⁸⁸ See U.S. Environmental Protection Agency, *Draft Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources* (Feb. 2011).

¹⁸⁹ Nicholas Kusnetz, *North Dakota’s Oil Boom Brings Damage Along with Prosperity*, PROPUBLICA, July 7, 2012, available at: <http://www.propublica.org/article/the-other-fracking-north-dakotas-oil-boom-brings-damage-along-with-prosperi#>.

¹⁹⁰ See, e.g., *id.* (reporting on lack of oversight); Western Organization of Resource Councils, *Gone for Good: Fracking and Water Loss in the West* (2013) at 17-18, 31 (noting lack of state oversight).

BLM must also consider the potential fracking impacts to groundwater from existing models. For example,¹⁹¹:

Fracking can release fluids and contaminants from the shale either by changing the shale and overburden hydrogeology or simply by the injected fluid forcing other fluids out of the shale. The complexities of contaminant transport from hydraulically fractured shale to near- surface aquifers render estimates uncertain, but a range of interpretative simulations suggest that transport times could be decreased from geologic time scales to as few as tens of years. Preferential flow through natural fractures fracking-induced fractures could further decrease the travel times to as little as just a few years.

Research indicates that contaminated water from fracking has the potential to migrate into and contaminate presumably separate groundwater aquifers.¹⁹²:

This study shows that some areas of elevated salinity with type D composition in NE PA were present prior to shale-gas development and most likely are unrelated to the most recent shale gas drilling; however, the coincidence of elevated salinity in shallow groundwater with a geochemical signature similar to produced water from the Marcellus Formation suggests that these areas could be at greater risk of contamination from shale gas development because of a preexisting network of cross- formational pathways that has enhanced hydraulic connectivity to deeper geological formations.

BLM has consistently asserted that there are no documented linkages between hydraulic fracturing and water wells. This overlooks the studies that link the two, and BLM must recognize these and analyze these risks and impacts. In addition to the studies cited in Citizen Groups' comments, BLM should consider the following:

Methane concentrations were detected generally in 51 of 60 drinking-water wells (85%) across the region, regardless of gas industry operations, but concentrations were substantially higher closer to natural-gas wells. Methane concentrations were 17-times higher on average in shallow wells from active drilling and extraction areas than in wells from non-active areas.

Although dissolved methane in drinking water is not currently classified as a health hazard for ingestion, it is an asphyxiant in enclosed spaces and an explosion and fire hazard.

¹⁹¹ T. Myers, *Potential Contaminant Pathways from Hydraulically Fractured Shale to Aquifers*, GROUND WATER (April 17, 2012).

¹⁹² N.R. Warner, *Geochemical evidence for possible natural migration of Marcellus Formation brine to shallow aquifers in Pennsylvania*, PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, vol. 109, iss. 30. (July 9, 2012).

More research is also needed on the mechanism of methane contamination, the potential health consequences of methane, and establishment of baseline methane data in other locations.¹⁹³

In addition, the EPA has determined that such contamination does, in fact, occur.¹⁹⁴

The presence of synthetic compounds such as glycol ethers, along with enrichments in K, Cl, pH, and the assortment of other organic components is explained as the result of direct mixing of hydraulic fracturing fluids with ground water in the Pavillion gas field.

During the fracturing process, fractures can be produced, allowing migration of native brine, fracturing fluid, and hydrocarbons from the oil or gas well to a nearby water well. When this happens, the water well can be permanently damaged and a new well must be drilled or an alternative source of drinking water found. *Id.* at IV-22.

In 1982, Kaiser Gas Co. drilled a gas well on the property of Mr. James Parsons. The well was fractured using a typical fracturing fluid or gel. The residual fracturing fluid migrated into Mr. Parson's water well (which was drilled to a depth of 416 feet), according to an analysis by the West Virginia Environmental Health Services Lab of well water samples taken from the property. Dark and light gelatinous material (fracturing fluid) was found, along with white fibers. (The gas well is located less than 1,000 feet from the water well.) The chief of the laboratory advised that the water well was contaminated and unfit for domestic use, and that an alternative source of domestic water had to be found. *Id.* at IV-22.¹⁹⁵

Moreover, one of the most significant risks of water resources contamination results from pit impoundments. At a minimum, the BLM should include alternatives that contain stipulations and COAs to protect the environment from pit impoundments. These protections include adequate livestock fencing around the pit, wildlife netting above the pit, increased requirements for liner integrity, requirements for leak detection systems, and a prohibition of siting pits within 50 feet of groundwater, among others.

However, in many cases, closed-loop drilling systems are preferable. In all alternatives, BLM should require that *all* parcels include the following analysis:

¹⁹³ S.G. Osborn, *et al.*, *Methane contamination of drinking water accompanying gas-well drilling and hydraulic fracturing*, PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, vol. 108, iss. 20. (May 17, 2011).

¹⁹⁴ *see also*, U.S. EPA, Draft Report, *Investigation of ground water contamination near Pavillion, Wyoming* (December 2011).

¹⁹⁵ U.S. EPA, Report to Congress, *Management of wastes from the exploration, development, and production of crude oil, natural gas and geothermal energy*. Vol. 1. (December 1987).

- BLM should consider total surface disturbance as a key factor in determining whether or not pits should be allowed.
- As part of the APD process, BLM should require applicants to submit carbon emissions estimates under pit and closed loop scenarios. These estimates should include emissions associated with pit construction, fluid waste trucking requirements, and solid waste trucking requirements.
- All other impacts being equal, BLM should place emphasis on the least-polluting method of development.
- Should a pit be allowed, BLM should require that solid waste collected after evaporation report only to hazardous waste treatment centers or repositories, not municipal landfills.

BLM should make all these analyses publicly available on a per-well basis. This information should be posted online where it is easy to navigate by affected stakeholders. The public should be allowed to comment on the APDs and BLM should allow for legal protests to APDs.

Other fluid waste management issues include:

- Water consumption: through stipulations and COAs, BLM should require process and flowback water recycling to the maximum extent practicable to reduce freshwater consumption and reduce carbon emissions associated with trucking of fluid waste to injection wells. BLM should require operators to disclose freshwater requirements on a per-well basis, and the data should be publicly available.
- Given the amount of toxins associated with fracking flowback and process water,¹⁹⁶ BLM should require full disclosure of all chemicals contained in pits or in tanks destined for injection wells. This may require additional mandates for water testing on a periodic basis. The testing data should be publicly available online on a per-well basis.
- Naturally occurring radioactive fluids should be assessed and quantified when first encountered, before more fluids are produced. If the projected amounts of radioactive materials would cause management problems and violations of radiation control laws, the drilling operation should cease until the problem is corrected.
- Airborne gasses originating from storage tanks or pit impoundments should be monitored periodically, and data should be made available to the public. If air emissions associated with fluid waste exceed air quality control laws, the operation should cease until the problem is corrected.

¹⁹⁶ See Earthworks, Oil & Gas Accountability Project, *The Pit Rule – Good Questions and Honest Answers*, Available at: http://www.earthworksaction.org/files/publications/FS_NM-PitRule-GoodQuestions-webres.pdf.

The bulk of pit contamination is associated with seeps into shallow groundwater – of the sort that can readily flow into drinking water wells – or as spills and runoff. Similar incidents are occurring across the country.¹⁹⁷ For example, in Pennsylvania, state authorities were forced to quarantine cattle after a pit leaked into their field, leaking into a smelly pool that killed the grass.¹⁹⁸ In Colorado, leaky pits with torn liners spilled more than 6,000 barrels of waste.¹⁹⁹ And in Ohio, compromised pit liners and pit wall failures have sent pollution spilling out into the environment.²⁰⁰

Here, in preparing its NEPA analyses, BLM must address the direct, indirect, and cumulative impacts to groundwater, 40 C.F.R. § 1508.25(c), giving particular scrutiny to the potential for contamination of groundwater supplies.

B. Surface Water Impacts

Likewise, the BLM must quantify and address the risk of potentially catastrophic spills and blowouts at well sites, which could impact and degrade surface waters. This is a serious concern because such major spills are not uncommon in natural gas drilling. For instance, a major well blowout in Pennsylvania recently sent thousands of gallons of contaminated fluid coursing into a stream feeding the Susquehanna River.²⁰¹ In February of 2013, a major spill occurred in Windsor, Colorado where at least 84,000 gallons of water contaminated with oil and chemicals used in hydraulic fracturing spilled from a broken wellhead and into a field.²⁰² The BLM has failed to demonstrate that such incidents could not occur on BLM leases.

Other data confirms the risk to surface waters from fracking and fracking-related activities.²⁰³

Gas well development of any type creates surface disturbances as a result of land clearing, infrastructure development, and release of contaminants produced from deep groundwater (e.g., brines). However, the use of hydraulic fracturing poses additional environmental threats due to water withdrawals and contamination from fracking fluid chemicals. *Id.* at 504.

¹⁹⁷ See, e.g., Natural Resources Defense Council, *Petition for Rulemaking to Regulate Oil and Gas Waste* (Sept. 8, 2010) (collecting these incidents) [hereinafter “NRDC Petition”].

¹⁹⁸ Nicolas Kusnetz, *A Fracking First in Pennsylvania: Cattle Quarantine*, PRO PUBLICA (July 2, 2010), available at: <http://www.propublica.org/article/a-fracking-first-in-pennsylvania-cattle-quarantine>.

¹⁹⁹ See Colorado Oil and Gas Conservation Commission, Inspection/Incident Inquiry, Spill Reports Doc. Nos. 1630424, 1630436, 1630427, 1630428, 1630429, 1630430.

²⁰⁰ See NRDC Petition at 20.

²⁰¹ Associated Press, *Crews Stop Flow of Drilling Fluid from PA Well* (Apr. 22, 2011).

²⁰² See Finley.

²⁰³ See, e.g., Sally Entekin, et al., *Rapid expansion of natural gas development poses a threat to surface waters*, FRONTIERS IN ECOLOGY, vol. 9, iss. 9. (October 2011) at 503.

Elevated sediment runoff into streams, reductions in stream flow, contamination of streams from accidental spills, and inadequate treatment practices for recovered wastewaters are realistic threats. *Id.* at 510.

C. Antidegradation

Moreover, Section 303 of the Clean Water Act (“CWA”), 33 U.S.C. § 1313, requires each State to institute comprehensive standards establishing water quality goals for all intrastate waters, and requires that such standards “consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses.” 33 U.S.C. § 1313(c)(2)(A). A 1987 amendment to the CWA makes clear that section 303 also contains an “antidegradation policy”—that is, a policy requiring that state standards be sufficient to maintain existing beneficial uses of navigable waters, preventing their further degradation. 33 U.S.C. § 1313 (d)(4)(B); *see also PUD No. 1 of Jefferson County v. Washington Dept. of Ecology*, 511 U.S. 700, 705 (1994). Accordingly, EPA’s regulations implementing the CWA require that state water quality standards include “a statewide antidegradation policy” to ensure that “[e]xisting instream water uses and the level of water quality necessary to protect [those] uses [are] maintained and protected.” 40 C.F.R. § 131.12(a)(1). At a minimum, state water quality standards must satisfy these conditions. The CWA also allows States to impose more stringent water quality controls. *See* 33 U.S.C. §§ 1311(b)(1)(C), 1370; *see also* 40 CFR § 131.4(a) (“As recognized by section 510 of the Clean Water Act [33 U.S.C. § 1370], States may develop water quality standards more stringent than required by this regulation”). BLM also holds independent authority to protect water quality above and beyond what the CWA may require or authorize. 43 U.S.C. §§ 1701(a)(8), 1702(c), 1732(b).

The water quality standards that Congress required the States to develop must include three elements: (1) first, each water body must be given a “designated use,” such as recreation or the protection of aquatic life; (2) second, the standards must specify for each body of water the amounts of various pollutants or pollutant parameters that may be present without impairing the designated use; and (3) third, each state must adopt an **antidegradation review policy** which will allow the State to assess activities that may lower the water quality of the water body. *See American Wildlands v. Browner*, 260 F.3d 1192, 1194 (10th Cir. 2001) (citing 33 U.S.C. § 1313(c)(2)(A) and 40 C.F.R. §§ 130.3, 130.10(d)(4), 131.6, 131.10, 131.11).

In its NEPA analysis, the BLM must address whether the development of oil and gas resources will affect any high-quality waters or whether it will degrade any existing uses. The BLM may not evade their NEPA duty to consider these impacts by asserting that other agencies may issue discharge permits. 40 C.F.R. §§ 1502.14(f), 1502.16(h). “A non-NEPA document – let alone one prepared and adopted by a state government – cannot satisfy a federal agency’s obligations under NEPA.” *South Fork Band Council of Western Shoshone of Nevada v. U.S. Department of Interior*, 588 F.3d 718, 726 (9th Cir. 2009) (citing *Klamath-Siskiyou Wildlands Center v. BLM*, 387 F.3d 989, 998 (9th Cir. 2004)) (BLM’s argument that it need not consider impacts because a facility operated under a state permit issued pursuant to the Clean Air Act is “without merit”); *Southern Or. Citizens Against Toxic Sprays, Inc. v. Clark*, 720 F.2d 1475 (9th Cir. 1983) (another agency’s consideration of environmental impacts does not relieve BLM of its duty to consider effects; “BLM must assess independently [the impacts]”); *see also Calvert Cliffs’*

Coordinating Comm., Inc. v. U. S. Atomic Energy Comm'n, 449 F.2d 1109, 1123 (D.C. Cir. 1971) (“Certification by another agency that its own environmental standards are satisfied involves an entirely different kind of judgment.”).

1. Water Quality Standards

Pursuant to CWA section 303(d)(1), 33 U.S.C. § 1313(d)(1), each state is further required to identify those waters that do not meet water quality standards—called the “303(d)(1) list.” For impaired waters identified in the § 303(d)(1) list, the states must establish a total maximum daily load (“TMDL”) for pollutants identified by the EPA. A TMDL specifies the maximum amount of pollutant that can be discharged or loaded into the waters from all combined sources, so as to comply with the subject water quality standards.

CWA section 1323(a) requires federal agencies to comply with state and local water-quality requirements “in the same manner, and to the same extent as any nongovernmental entity.” Congress intended this section to ensure that federal agencies were required to “meet all [water pollution] control requirements as if they were private citizens.” S. REP. NO. 92-414 (1971), *as reprinted in* 1972 U.S.C.C.A.N. 3668, 3734. This provision applies to activities resulting in either “discharge or runoff of pollutants.” 33 U.S.C. § 1323(a).

Accordingly, any activity undertaken by the BLM in this area—including the approval of drilling of public lands for oil and gas, as contemplated by the lease sales here—may degrade potential “outstanding waters.” Not only is the BLM mandated to follow antidegradation and water quality standards under the CWA and state law, but they must also take a NEPA “hard look” at any impacts that may be related to these water quality standards as well.

2. Water Quantity

In addition to impacts on water quality, oil and gas development processes, and particularly fracking, may result in significant impacts on water quantity. To frack a single well one time requires 2-8 million gallons.²⁰⁴ Annually, the EPA estimates that 70-140 billion gallons of water are used to frack wells in the United States—enough to supply drinking water to 40-80 cities of 50,000.²⁰⁵ This massive use of water is of particular concern in states in the interior West, which includes many of the lease sales, where water supplies are scarce and already stretched.²⁰⁶ Indeed, as the Department of Energy has recognized, “[a]vailable surface water supplies have not increased in 20 years, and groundwater tables and supplies are dropping at an alarming rate.”²⁰⁷ Because of the chemicals that are added to fracking water, the water may not be reused.²⁰⁸ Removing water for fracking can stress existing water supplies by lower water tables and dewatering aquifers, decreasing stream flows, and reducing water in surface

²⁰⁴ J. David Hughes, *Will Natural Gas Fuel America in the 21st Century?*, May 2011, at 23.

²⁰⁵ See EPA Draft Plan at 20.

²⁰⁶ See WORC, *Gone for Good*, at 7-8 (noting water scarcity in west and significant water demands of fracking).

²⁰⁷ U.S. Dep’t of Energy, *Energy Demands on Water Resources: Report to Congress on the Interdependency of Energy and Water*, Dec. 2012, at 12.

²⁰⁸ See EPA Draft Plan at 20.

reservoirs.²⁰⁹ This can result in changes to water quality, and it can also alter the hydrology of water systems, and it can increase concentrations of pollutants in the water.

There is also potential for the reductions in water quantity to impact aquatic and riverine species and habitat by affecting water flows and natural river processes: this, in turn, could lead to fish declines, changes to riparian plant communities, and alterations to sediment.²¹⁰ Water resources in many of the lease sale areas are already stressed or over-allocated, and oil and gas development has already led to unpermitted and illegal water withdrawals.²¹¹

Here, in its NEPA analysis the BLM must closely assess the direct, indirect, and cumulative impacts of oil and gas development on water supplies. 40 C.F.R. §§ 1508.7, 1508.8. This analysis must consider the potential sources of water that would be used for oil and gas development, and the impacts of these water withdrawals on water availability for drinking, agriculture, and wildlife. The analysis must further address the impacts to water quantity at different annual, seasonal, monthly, and daily time scales because the impacts of such water withdrawals could be more acute during times, months, and seasons of scarcity. For example, increased withdrawal and irretrievable contamination of waters will be particularly harmful during times—like the present—when much of the state is experiencing drought conditions.²¹²

VII. Conclusion

For the aforementioned reasons, prior to any decision to resume leasing of federal public lands for fluid mineral development, the Bureau of Land Management 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 that nationwide policy on resources including global climate, environmental justice, wildlife habitat, air quality, and surface and groundwater quality. As laid forth in numerous judicial decisions, BLM's current plan- and lease-level NEPA compliance cannot possibly support a decision to lawfully resume leasing, and therefore all new leasing must be deferred until such time as comprehensive environmental review, including the cumulative impacts of past, ongoing, and reasonably foreseeable fossil fuel development can be considered. 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 1.5C and mitigating the worst effects of global climate change.

²⁰⁹ *Id.*

²¹⁰ Nat'l Parks Conservation Ass'n, *National Parks and Hydraulic Fracturing: Balancing Energy Needs, Nature, and America's National Heritage* (2013) at 23.

²¹¹ See WORC, *Gone for Good* at 21.

²¹² See WORC, *Gone for Good* at 8.

Sincerely,

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