July 15, 2016

Stephanie Howard
Bureau of Land Management
Vernal Field Office
170 South 500 East
Vernal, Utah 84078

Via Electronic Mail and Federal Express:

RE: Center for Biological Diversity EA Comments for the November 2016 Competitive Oil and Gas Lease Sale, Vernal Field Office

Dear Ms. Howard,

The Center for Biological Diversity, Utah Rivers Council, the Sierra Club, Friends of the Earth, Western Watersheds Project, Living Rivers & Colorado Riverkeeper, Utah Native Plant Society, and Great Old Broads for Wilderness write to submit the following comments on the proposed November 15, 2016 Competitive Oil and Gas Lease Sale, Vernal Field Office ("VFO"). The BLM Utah State Office is proposing to offer 28 parcels encompassing approximately 12,334.48 total acres for lease.

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

The Utah Rivers Council is a grassroots organization dedicated to the conservation and stewardship of Utah's rivers and sustainable clean water sources for Utah's people and wildlife. Founded in 1995, we work to protect Utah's rivers and clean water sources for today's citizens, future generations and healthy, sustainable natural ecosystems. We implement our mission through grassroots organizing, direct advocacy, research, education, community leadership and litigation.

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The Sierra Club is a national nonprofit organization with 64 chapters and over 635,000 members dedicated to exploring, enjoying, and protecting the wild places of the earth; to practicing and promoting the responsible use of the earth's ecosystems and resources; to educating and enlisting humanity to protect and restore the quality of the natural and human environment; and to using all lawful means to carry out these objectives. The Utah Chapter of the Sierra Club has approximately 4,100 members in the state of Utah, including members who live or recreate in areas that would be affected by this lease sale. Sierra Club members use the public lands in Utah, including the lands and waters that would be affected by actions under the lease sale, for quiet recreation, scientific research, aesthetic pursuits, and spiritual renewal. Within the lands managed by the Vernal Field Office Utah Chapter members take advantage of the extraordinary hunting opportunities on Diamond Mountain, spectacular backpacking and dispersed camping on lands adjacent to Dinosaur National Monument and world-class river running along the Green River. These areas would be threatened by increased oil and gas development that could result from the proposed lease sale.

Friends of the Earth is a 501(c)(3) organization with over 33,000 members and 496,000 activists nationwide. Friends of the Earth fights to create a more healthy and just world. Our current campaigns focus on promoting clean energy and solutions to climate change, ensuring the food we eat and products we use are safe and sustainable, and protecting marine ecosystems and the people who live and work near them. Our 4,375 members and activists in Utah are very concerned about the significant environmental and climate impacts fossil fuel development has on iconic places in Utah like the Green River and Canyon County. Those concerns are shared nationwide, with 30,730 members and activists sending letters to the Bureau of Land Management in Vernal, Utah, to oppose a commercial oil shale development project. During this Environmental Assessment comment period for the November 2016 oil and gas lease sale, 32,604 of our members and activists submitted comments.

Western Watersheds Project is a non-profit conservation group working to protect and conserve the public lands, wilderness, wildlife, and natural resources of the West through education, scientific study, public policy initiatives, and litigation. Western Watersheds Project staff and members use and enjoy the public lands, including the lands at issue here in the Vernal Field Office, and its cultural and natural resources. We have visited these areas in the past and intend to return in future as long as management activities continue to impinge on the resources we value.

Living Rivers/Colorado Riverkeeper empowers a movement to instill a new ethic of achieving ecological restoration, balanced with meeting human needs. From the Rocky Mountains through seven states and Mexico, the Colorado River is the artery of the desert southwest. Its canyons, ecology and heritage render an international treasure. However, ignorance, greed and complacency are robbing the Colorado of its ability to sustain life. We work to: restore inundated river canyons, wetlands and the delta; repeal antiquated laws which represent the river's death sentence; reduce water and energy use and their impacts on the river; and recruit constituents to aid in reviving the Colorado River.

Utah Native Plant Society ("UNPS") joins these comments for purpose of the issues raised herein regarding sensitive plant species. UNPS is a Utah non-profit corporation and

qualified IRS 501(c)(3) organization originally incorporated in 1978 and has eight local chapters around the state, and has about 400 members. We are dedicated to the appreciation, preservation, conservation and responsible use of the native plant and plant communities found in the state of Utah and the Intermountain West.

Great Old Broads for Wilderness ("Broads") is a national organization that engages and ignites the activism of elders to preserve and protect wilderness and wild lands. With 8,000 members and supporters, Broads got its start twenty-six years ago with a focus initially on protecting public lands in Utah. Today, we have 37 local chapters (called Broadbands), including three chapters in Utah in Moab, St. George, and the greater Salt Lake City area. Broads gives voice to the millions of older Americans who want to protect their public lands as Wilderness for this and future generations. We bring experience, commitment, and humor to the movement to protect the last wild places on Earth.

The exploration and development of these parcels likely involves highly controversial and severely harmful extraction methods, including horizontal drilling and hydraulic fracturing (or "fracking"). BLM has not taken any look at the impacts that are likely to result from such extraction methods. Furthermore, the extraction and burning of fossil fuels worsens the climate crisis; endangers water, air, wildlife, public health, and local communities; and further undermines the protection of our public lands. Because new fossil fuel leasing within the planning area will contribute to worsening the climate crisis, the vast majority of all *proven* fossil fuels must be kept in the ground to preserve any chance of averting catastrophic climate disruption. Opening up new areas to oil and gas exploration and unlocking new sources of greenhouse gas pollution would only fuel greater warming and contravenes BLM's mandate to manage the public lands "without permanent impairment of the productivity of the land and the quality of the environment."[1] Full compliance with the spirit and objectives of NEPA and other federal environmental laws and regulations requires BLM to avoid these dangers by ending all new leasing in the planning area and all other areas that it manages in order to limit the climate change effects of its actions; at a minimum, it should defer any such leasing until such time as it can conduct a comprehensive review of the climate consequences of its leasing activities, at the national and regional scale.

For the reasons set forth in this letter, we insist that BLM: (1) cease all new leasing of fossil fuels in the planning area, including oil and natural gas; (2) defer the proposed November 2016 Sale pending a programmatic review of all federal fossil fuel leasing which must consider "no leasing" and "no fracking" plan amendments; (3) at a minimum, defer leasing of parcels containing endangered, threatened, and sensitive species and habitat, including parcels adjacent to the Green River and its tributaries, parcels containing endangered plants, and parcels within greater sage-grouse and black-footed ferret habitat.

Should BLM proceed with the sale, BLM must: (1) initiate consultation with the Fish and Wildlife Service, as required by the Endangered Species Act ("ESA"); and (2) prepare a full EIS for the proposed lease sale in consideration of significant unexamined impacts from the

[1] *See* 43 U.S.C. §§ 1701(a)(7), 1702(c), 1712(c)(1), 1732(a) (emphasis added); *see also id*. § 1732(b) (directing Secretary to take any action to "prevent unnecessary or undue degradation" of the public lands).

consequences of leasing. Any such EIS must consider a full range of alternatives, including an alternative that bans new hydraulic fracturing and other unconventional well stimulation activities, and require strict controls on natural gas emissions and leakage.

I. ESA Listed and Sensitive Species

The EA reveals the presence of numerous threatened, endangered, and sensitive species and their critical habitat within the areas proposed for leasing, but fails to provide any meaningful information regarding potential effects. BLM must not only evaluate the indirect and cumulative effects on special status species under NEPA, it must also (a) consult (and/or confer in the case of black-footed ferrets) 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.

a. Duty to Consult

Congress enacted the ESA in 1973 to provide for the conservation of endangered and threatened fish, wildlife, plants and their natural habitats.[2] The ESA imposes substantive and procedural obligations on all federal agencies with regard to listed and proposed species and their critical habitats.[3] Under section 7 of the 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."[4]

The definition of agency "action" is broad and includes "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies," including programmatic actions.[5] Likewise, the "action area" includes "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action."[6]

The duties in ESA section 7 are only fulfilled by an agency's satisfaction of the consultation requirements that are set forth in the implementing regulations for section 7 of the ESA, and only after the agency lawfully complies with these requirements may an action that "may affect" a protected species go forward.[7] The action agency must initially prepare a biological assessment (BA) to "evaluate the potential effects of the proposed action" on listed species.[8] If the action agency concludes that the proposed action is "not likely to adversely affect" a listed species that occurs in the action area, the Service must concur in writing with this determination.[9] If the Service concurs in this determination, then formal consultation is not

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[2] *Id*. §§ 1531, 1532.
[3] *See id*. §§ 1536(a)(1), (a)(2) and (a)(4) and § 1538(a); 50 C.F.R. § 402.
[4] 16 U.S.C. § 1536(a)(2).
[5] 50 C.F.R. § 402.02.
[6] *Id*.
[7] *Pac. Rivers Council v. Thomas*, 30 F.3d 1050, 1055-57 (9th Cir. 1994).
[8] 50 C.F.R. § 402.12.
[9] *Id*. §§ 402.13(a) and 402.14(b).

required.[10] If the Service's concurrence in a "not likely to adversely affect" finding is inconsistent with the best available data, however, any such concurrence must be set aside.[11] If the action agency concludes that an action is "likely to adversely affect" listed species or critical habitat, it must enter into "formal consultation" with the Service.[12] The threshold for triggering the formal consultation requirement is "very low"; indeed, "any possible effect ... triggers formal consultation requirements."[13]

Formal consultation commences with the action agency's written request for consultation and concludes with the Service's issuance of a "biological opinion."[14] The biological opinion states the Service's opinion as to whether the effects of the action are "likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat."[15] When conducting formal consultation, the Service and the action agency must evaluate the "effects of the action," including all direct and indirect effects of the proposed action, plus the effects of actions that are interrelated or interdependent, added to all existing environmental conditions – that is, the "environmental baseline."[16] The environmental baseline includes the past and present impacts of all Federal, state, and private actions and other human activities in the action area…."[17] The effects of the action must be considered together with "cumulative effects," which are "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation."[18]

If the Service concludes in a biological opinion that jeopardy is likely to occur, it must prescribe "reasonable and prudent alternatives" to avoid jeopardy.[19] If the Service concludes that a project is not likely to jeopardize listed species, it must nevertheless provide an incidental take statement (ITS) with the biological opinion, specifying the amount or extent of take that is incidental to the action (but which would otherwise be prohibited under Section 9 of the ESA), "reasonable and prudent measures" (RPMs) necessary or appropriate to minimize such take, and the "terms and conditions" that must be complied with by the action agency to implement any reasonable and prudent measures.[20]

The ESA requires federal agencies to use the best scientific and commercial data available when consulting about whether federal actions will jeopardize listed species.[21] Accordingly, an action agency must "provide the Service with the best scientific and commercial

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[10] *Id*. § 402.13(a).
[11] *See id*. § 402.14(g)(8); 5 U.S.C. § 706(2).
[12] 50 C.F.R. §§ 402.12(k), 402.14(a).
[13] *See* Interagency Cooperation Under the Endangered Species Act, 51 Fed. Reg. 19,926 (June 3 1996).
[14] 50 C.F.R. § 402.02.
[15] *Id*. § 402.14(g)(4). To "jeopardize the continued existence of" means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." *Id*. § 402.02.
[16] *Id*. §§ 402.14 and 402.02.
[17] *Id*.
[18] *Id*.
[19] *Id*. § 402.14(h)(3).
[20] 16 U.S.C. § 1536(b)(4); 50 C.F.R. § 402.14(i).
[21] *See* 16 U.S.C. § 1536(a)(2).

data available or which can be obtained during the consultation for an adequate review of the effects that an action may have upon listed species of critical habitat."[22] Likewise, "[i]n formulating its biological opinion…the Service will use the best scientific and commercial data available."[23] However, if the action agency failed "to discuss information that would undercut the opinion's conclusions," the biological opinion is legally flawed, and the ITS will not insulate the agency from ESA Section 9 liability.[24]

Section 7(d) of the ESA provides that once a federal agency initiates consultation on an action under the ESA, the agency, as well as any applicant for a federal permit, "shall not make any irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures which would not violate subsection (a)(2) of this section."[25] The purpose of section 7(d) is to maintain the environmental status quo pending the completion of consultation. Section 7(d) prohibitions remain in effect throughout the consultation period and until the federal agency has satisfied its obligations under section 7(a)(2) that the action will not result in jeopardy to listed species or adverse modification of critical habitat.

The Fish and Wildlife Service's 2008 Biological Opinion for the BLM Vernal Field Office's Resource Management Plan considers at a field office-wide level the general impacts of oil and gas leasing on listed species within the planning area.[26] It explicitly conditions its findings of no jeopardy, however, on the requirement that "[a]ll site-specific projects designed under the proposed BLM Resource Management Plan would be subject to consultation requirements under Section 7 of the Endangered Species Act."[27]

b. BLM Sensitive Species Policy

Pursuant to Manual 6840, "[a]ll Federal candidate species, proposed species, and delisted species in the 5 years following delisting will be conserved as Bureau sensitive species."[28] The objective of Manual 6840 is "[t]o initiate <u>proactive</u> conservation measures that reduce or eliminate threats to Bureau sensitive species to minimize the likelihood of and need for listing of these species under the ESA."[29] Manual 6840 further states that it is the BLM's policy to promote the "conservation and to minimize the likelihood and need for listing" Bureau sensitive species.[30]

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[22] 50 C.F.R. § 402.14(d).
[23] *Id*. § 402.14(g)(8).
[24] *See Ctr. for Biological Diversity v. BLM*, 698 F.3d 1101, 1127-28 (9th Cir. 2012).
[25] 16 U.S.C. § 1536(d).
[26] U.S. Fish and Wildlife Service, Biological Opinion for the Vernal BLM Resource Management Plan 12-13 (2008) ("Vernal RMP BiOp").
[27] Vernal RMP BiOp at 41 (black-footed ferret); *see also* Vernal RMP BiOp at 58 (Ute ladies'-tresses), 68 (Uinta basin hookless cactus), 75 (clay reed-mustard), 84 (shrubby reed-mustard), 115 (bonytail, Colorado pikeminnow, humpback chub, and razorback sucker).
[28] United States Bureau of Land Management, Special Status Species Management Manual 6840 ("BLM Manual 6840") at § .01.
[29] *Id*. at § .02 (emphasis added).
[30] *Id*. at § .06.

Furthermore, pursuant to Manual 6840 it is the responsibility of State Directors to not only inventory BLM lands to determine the occurrence of BLM special status species, but also to determine "the condition of the populations and their habitats, and how discretionary BLM actions affect those species and their habitats."[31] The leasing of federal lands for oil and gas extraction is a discretionary BLM action that has the potential to adversely affect sensitive species including but not limited to the Graham's beardtongue (*Penstemon grahamii*), White River beardtongue (*Penstemon scariosus var. albifluvis*), golden eagle, and bald eagle.[32] Deferring an analysis of the potential effects of selling oil and gas leases to the APD stage is entirely inconsistent with the requirements of Manual 6840. If a lease is sold, the lessee acquires certain contractual rights constraining BLM authority. For example, according to 43 C.F.R. § 3101.1-2, once a lease is issued to its owner, that owner has the "right to use as much of the lease lands as is necessary to explore for, drill for, mine, extract, remove and dispose of the leased resource in the leasehold" subject to specific nondiscretionary statutes and lease stipulations. Therefore, once the lease is sold, it will be too late for BLM to ensure that sufficient protections will be in place to protect these species from the cumulative impacts of extraction-related activities.

Furthermore, pursuant to Manual 6840, Bureau sensitive species are considered BLM special status species, and Section 2 of the Manual provides specific measures that BLM is required to undertake in order to "conserve these species and their habitats."[33] To implement this section, BLM "shall... minimize or eliminate threats" affecting Bureau sensitive species, by determining their current threats and habitat needs, and ensuring that BLM activities "are carried out in a way that is consistent with its objectives for managing those species and their habitats at the appropriate spatial scale."[34] Due to the potential harms from habitat loss and fragmentation, the appropriate spatial scale for determining threats to Sprague's pipit from oil and gas development is the entire area subject to lease sales, rather than the piecemeal, limited APD-specific review that BLM is attempting to employ.

The need for a broader analysis to assess the threats to these species from the lease sale itself is further supported by Manual 6840's requirement that BLM work with partners and stakeholders to "develop species-specific or ecosystem-based conservation strategies," and in the absence of such strategies, to incorporate standard operating procedures and other conservation measures "to mitigate specific threats to Bureau sensitive species during the planning of activities and projects."[35] Postponing any analysis of impacts to sensitive plants and raptors until the later APD stage forecloses the implementation of standard procedures and conservation measures necessary to mitigate threats to these species during exploration or other actions that might take place prior to an APD being filed, since as noted above once a lease is issued, the owner has the "right to use as much of the lease lands as is necessary to explore for, drill for, mine, extract, remove and dispose of the leased resource in the leasehold."[36]

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[31] *Id.* at § .04.
[32] EA at 24 Table 3.4, 29-30 Table 3.10
[33] *Id.* at § .2 ("All federally designated candidate species, proposed species, and delisted species in the 5 years following their delisting shall be conserved as Bureau sensitive species.").
[34] *Id.* at § .2(C) (emphasis added).
[35] *Id.* (emphasis added).
[36] 43 C.F.R. § 3101.1-2.

Moreover, the development of species-specific and ecosystem-based conservation strategies implicitly necessitates a more holistic review of the cumulative impacts of the proposed lease sale, which cannot be accomplished through site-specific APD-stage analysis alone. Furthermore, piecemeal analyses of individual lease sales do not provide the appropriate perspective for examining the cumulative effects of hydraulic fracturing and climate change impacts at the regional and landscape scale and for making land management decisions.

Where activities have the potential to adversely impact species of concern, the general practice is to consider those impacts and address them "at the earliest possible time," in order to avoid delay and to ensure that impacts are avoided and opportunities for mitigation are not overlooked.[37] This is likewise true in the context of even more general environmental review, such as under NEPA.[38] Furthermore, it is general practice to evaluate the impacts of several related projects with cumulative impacts proposed or reasonably foreseeable in the same geographic region in a single, comprehensive, analysis.[39] Likewise, under the ESA an analysis of the effects of an action must consider actions that are interrelated or interdependent.[40] This obliges BLM to consider the effects of oil and gas extraction activities at the lease sale stage, since those activities are inherent in leasing land for such purposes. It is therefore evident that in order to effectuate the policy of protecting Bureau sensitive species set forth in Manual 6840,[41] and consistent with the established practice of early, comprehensive review of potential impacts to sensitive species, BLM must consider impacts to the Graham's and White River penstemon and other sensitive species at the lease sale stage, rather than waiting until the APD stage for project-specific review.

In sum, BLM has issued policies in Manual 6840 that require the agency to undertake actions to protect candidate species, much like the actions BLM is required to take in order to protect proposed and listed species. Delaying an analysis of impacts to the Graham's and White River penstemon and other sensitive species until the APD stage risks harm to an at-risk species that could otherwise be avoided. A failure to address the impacts to sensitive species at the lease sale stage violates BLM's own regulations set forth in Manual 6840, is entirely inconsistent with established practice and policies regarding species protection, and is therefore arbitrary and capricious agency action under the Administrative Procedures Act.

c. Black-Footed Ferret

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[37] *See, e.g.*, 50 C.F.R. §§ 402.14(a), (g)(8).

[38] *See* 40 C.F.R. § 1501.2 ("Agencies shall integrate the NEPA process with other planning at the earliest possible time to insure that planning and decisions reflect environmental values, to avoid delays later in the process, and to head off potential conflicts.").

[39] *See Kleppe v. Sierra Club*, 427 U.S. 390, 410 (1976) ("[W]hen several proposals for . . . actions that will have cumulative or synergistic environmental impact upon a region are pending concurrently before an agency, their environmental consequences must be considered together.").

[40] 50 C.F.R. §§ 402.14 and 402.02.

[41] *See* BLM Manual 6840 at .06 ("Bureau sensitive species will be managed consistent with species and habitat management objectives in land use and implementation plans to promote their conservation and to minimize the likelihood and need for listing under the ESA.").

According to the EA, parcels 094 and 103 contain habitat and/or potential occurrences of reintroduced black-footed ferrets.[42] The black-footed ferret, one of the most critically endangered mammals in North America, was reintroduced to the Coyote Basin in northeast Utah following near-extirpation in the wild.[43] The species was reintroduced to Utah as a nonessential, experimental population pursuant to a rule promulgated under Section 10(j) of the ESA.[44] Although nonessential experimental populations are not subject to the consultation requirement of ESA 7(a)(2), two provisions of ESA Section 7 still apply: (1) section 7(a)(1)—which requires all Federal agencies to use their authority to conserve listed species; and (2) section 7(a)(4)—which requires Federal agencies to confer with the Service on actions that are likely to jeopardize the continued existence of a proposed species throughout its range."[45] Under the requirements of Section 7(a)(1) and 7(a)(4), BLM must still ensure that it is using its authority to conserve the black-footed ferret, and must confer with the Fish and Wildlife Service to determine whether its actions will jeopardize the continued existence of the species.[46]

Importantly, the Section 10(j) rule for the Coyote Basin black-footed ferret reintroduction prohibits the "take" of black-footed ferrets under Section 9 of the ESA.[47] Allowing activities that harm federally-protected species, such as oil and gas drilling and associated ferret habitat destruction and mortality, opens up state and private actors to liability under section 9 of the ESA. Under section 9(a)(1)(B) of the ESA, it is illegal to engage in any activity that "takes" an endangered species.[48] The term "take" is defined in the "broadest possible manner to include every conceivable way" in which a person could harm or kill wildlife.[49] The term "take" is defined in the statute to include "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."[50]

The ESA's implementing regulations define "harm" to mean "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering."[51] The term "harass" is defined to mean "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering."[52]

Persons subject to the prohibition on take include individuals and corporations, as well as "any officer, employee, agent, department, or instrumentality of the Federal Government."[53] Further, "[t]he ESA prohibitions apply to actions by [governmental] agencies where their

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[42] EA at 30.
[43] U.S. Fish and Wildlife Service, Revised Black-Footed Ferret Recovery Plan ("Recovery Plan") at 20 (2013).
[44] U.S. Fish and Wildlife Service, Establishment of a Nonessential Experimental Population of Black-footed Ferrets in Northwestern Colorado and Northeastern Utah, 63 Fed. Reg. 52,824 (Oct. 1, 1998).
[45] 63 Fed. Reg. at 52,824.
[46] 63 Fed. Reg. at 58,835.
[47] 50 C.F.R. § 17.84(g).
[48] 16 U.S.C. § 1538(a)(1)(B).
[49] S. Rep. No. 93-307, 93d Cong., 1st Sess. 1, reprinted in 1973 USCAAN 2989, 2995.
[50] 16 U.S.C. § 1532(18).
[51] 50 C.F.R. § 17.3.
[52] *Id.*
[53] 16 U.S.C. § 1532(13).

regulatory programs approve actions by third parties that contribute to causing the take."[54] To the extent that exploration and development resulting from oil and gas leasing will foreseeably cause ESA "take" of ferrets, BLM may not authorize such leasing without a valid permit issued by the U.S. Fish and Wildlife Service.[55]

In Coyote Basin, the black-footed ferret is dependent for both habitat and forage on, in Coyote Basin, white-tailed prairie dog colonies. BLM, the Fish and Wildlife Service, and scientific research have all documented that oil and gas development can have serious adverse effects, including mortality, on both black-footed ferrets directly and the prairie dog colonies critical to their survival. The Vernal RMP EIS found that:

> The minerals development proposed in the Proposed RMP would have multiple short-term and long-term direct and indirect adverse impacts on white-tailed prairie dog and black-footed ferret populations in the VPA. For this analysis it was assumed that black-footed ferrets are completely dependent upon white-tailed prairie dog towns for survival in those areas where they have been reintroduced into the VPA. Therefore, the impacts of minerals development on white-tailed prairie dog populations would be similar to the impacts on black-footed ferret populations. Minerals development would likely lead to an increase in road densities, a reduction in habitat from the installation of mineral development infrastructure, and an increase in habitat fragmentation.[56]

Similarly, the Vernal RMP BiOp found, at a general plan-wide level, that:

> Although stipulations or conditions may be included in the terms of these mineral contracts, there are potential impacts associated with these various activities. . . . General direct and indirect impacts resulting from this program would include increased human presence and vehicle traffic in ferret habitat and surface disturbance. Specific negative impacts include decreased availability and use of suitable habitat; direct loss of habitat; and a decrease in prairie dog prey. As a result, black-footed ferret adults and offspring may experience a reduction in fitness. There is some potential for mortality if energy exploration or development activities result in the crushing of burrows. Increased vehicle traffic could also result in mortality from vehicle collisions.[57]

The best available scientific information regarding white-tailed prairie dogs (upon which black-footed ferrets in Coyote Basin rely exclusively for both burrows and prey base) demonstrates significant adverse impacts from oil and gas development:

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[54] *Strahan v. Coxe*, 127 F.3d 155 (1st Cir. 1997); *Animal Welfare Inst. v. Martin*, 623 F.3d 19 (1st Cir. 2010); *Defenders of Wildlife v. EPA*, 882 F.2d 1294 (8th Cir. 1988); *Loggerhead Turtle v. County Council of Volusia County*, 148 F.3d 1231 (11th Cir. 1998); *Seattle Audubon Soc'y v. Sutherland*, 2007 U.S. Dist. LEXIS 31880, 2007 WL 1300964 (W.D. Wash. May 2, 2007).
[55] 50 C.F.R. § 17.84(g)(2).
[56] Vernal RMP EIS at 4-459.
[57] Vernal RMP BiOp at 38.

> Petroleum development and agriculture are the most frequently cited as being of immediate conservation concern, and there is ample evidence to support this assertion (Seglund et al. 2004). Oil and gas development is currently occurring at unprecedented levels, with substantial expansion expected in the future, making it an ever increasing threat. In Wyoming, 77% of the white-tailed prairie-dog predicted range is being developed at some level for oil and gas, Colorado has 4,953 wells and Utah has 8,835 wells in the predicted distribution of white-tailed prairie dogs (Seglund et al. 2004). Even when petroleum activity does not directly eliminate active burrows, it has been shown to be detrimental to prairie dog populations.[58]

The 2004 Conservation Assessment for white-tailed prairie dogs similarly identified oil and gas development within prairie dog habitat as a limiting factor for the Coyote Basin population in Utah.[59] Neither the Vernal RMP EIS nor its accompanying BiOp provide sufficient site-specific development, colony and occurrence data to permit a reasoned evaluation of the extent and viability of remaining prairie dog and black-footed ferret habitat in Coyote Basin, or to evaluate the impact of proposed leases 094 and 103 on the remaining ferrets in the area.

The Coyote Basin reintroduction was the first black-footed ferret reintroduction program in 1999, and was designed in part to determine whether black-footed ferrets could be reestablished within white-tailed prairie dog colonies that have been affected by plague. Between 1999 and 2012, 424 ferrets were released, but the 2008-2012 population was estimated at only 7 adults.[60] Yet the EA provides no analysis or disclosure whatsoever of the effects of leasing parcels 094 and 103 on (a) the scientific integrity of the reintroduction experiment, (b) the survival of the remaining Coyote Basin population, or (c) the overall reintroduction and recovery effort for the species. BLM must carry out such an analysis under NEPA, and must also consult and/or confer with the Fish and Wildlife Service under ESA Section 7(a)(4) and the terms of the Vernal RMP Biological Opinion.

Appendix D to the EA discloses that BLM deferred 23 nominated parcels from this lease sale based on the presence of white-tailed prairie dog colonies.[61] We commend the BLM on the deferral of those parcels, but the EA provides no explanation or justification for why parcels 094 and 103 are still proposed for sale, despite the possible presence of not only white-tailed prairie dogs but also black-footed ferrets. Absent additional information regarding the location and condition of white-tailed prairie dog colonies, black-footed ferret occurrence and habitat use, and site-specific potential impacts of well pads, roads, and traffic on habitat, prey, and mortality, the inclusion of parcels 094 and 103 in the proposed lease sale is arbitrary and unjustified.

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[58] Douglas E. Kenaith, Species Assessment for White-Tailed Prairie Dog (*cynomus leucurus*) in Wyoming 26 (2004) (citing A.E. Seglund *et al.*, White-Tailed Prairie Dog Conservation Assessment (2004)).
[59] Seglund *et al*. at 46-47.
[60] Recovery Plan at 22 Table 2.
[61] EA at 125-131.

d. Endangered and threatened plants

EA Table 3.5 lists the five endangered or threatened plants inhabiting the proposed lease parcels:

Table 3.5, Threatened, Endangered, Proposed and Candidate Plants

Species	Status	Potential Occurrence and Habitat Type	Parcels
Hesperidanthus argillaceus	Threatened	Habitat includes steep slopes in soils between the	032, 038, 049,
(clay reed-mustard)		Uinta and Green River Formations in shadscale, sagebrush,andmixed-desertshrubplantcommunities at 4,900 to 5,600 feet elevation.	067
Hesperidanthus suffrutescens (shrubby reed-mustard)	Endan-gered	Habitat includes semi-barren slopes and hill tops of white shale from the Green River Formation. Soils and habitat may often include clast stones on the surface. Typical plant communities include: black sagebrush, shadscale, mixed-desert shrub, mountain-mahogany, and pinyon-juniper. From 5,100 to 7,000 feet elevation.	049, 067
Sclerocactus brevispinus	Threatened	Habitat includes clay badlands of cobbles and gravel	*038,049,067,
(Pariette cactus)		pavements from the Uinta Formation in mixed-desert shrub (saltbush) plant communities from 4,800 to 5,200 feet elevation.	105
Sclerocactus wetlandicus (Uinta Basin hookless cactus)	Threatened	Habitat includes river benches, slopes, and hills of fine textured xeric soils from the Duchesne River, Green River, Mancos, and Uinta Formations, generally overlain with large, round cobble. Associated plant communities include mixed-desert shrub and pinyon-juniper plant communities from 4,700 to 5,800 feet elevation.	*038,049,067, 105
Spiranthes diluvialis	Threatened	Habitat includes gravelly sand and sandy loam soils	All parcels
(Ute ladies'-tresses)		within wet places including wet meadows, margins of rivers, lakes, and streams, riparian sandbars, sub-irrigated springs and seeps, and irrigated fields. Typical plant communities include sedges, grasses, and forbs with little to no woody plant canopy. From 4,400 to 7,100 feet elevation.	that contain wetlands, riparian areas, or seasonably wet areas.
*Parcels contain habitat designated as Core Conservation Areas for the species that will require additional mitigation measures if developed (see USFWS 2014).			

The EA, and proposed stipulations, fail to adequately disclose or mitigate impacts to these five listed species from oil and gas leasing and development. BLM must take a hard look at impacts to listed plant species in an EIS, and must consult with the Fish and Wildlife Service under ESA Section 7(a)(2) to ensure its action will not cause jeopardy to these species or adverse modification of their critical habitat.

For the Uinta Basin Hookless cactus, found on parcels 38, 49, 67, and 105, the Fish and Wildlife Service's recent GasCo BiOp found the 300 foot buffer proposed for the lease sale[62] to be ineffective at minimizing impacts to the species:

> On a broader landscape scale, the section 7 consultation process has been less effective at minimizing impacts to *Sclerocactus wetlandicus* because: individual consultations are minimally effective at mitigating landscape-scale cumulative impacts, recent research indicates that a 300-foot buffer may not be sufficient to protect gene flow between individuals of the *Sclerocactus* species, and the scientific literature indicates that the impacts of roads and other surface disturbances can extend far beyond 300 feet. Through section 7 consultations, individual projects on a case-by-case basis – even large energy field development EISs – have not been likely to jeopardize the continued existence of *S. wetlandicus* because of commitments to mitigation measures. As a result, hundreds of energy development projects have been approved across the landscape of the Uinta Basin. As a result, habitat fragmentation, fugitive dust, invasive species, and hydrologic changes have increased across the landscape. In the foreseeable future these disturbances are likely to reach a level at which recovery of *S. wetlandicus* will be appreciably reduced.
>
> Recent research indicates that a 300-foot buffer between energy development and *Sclerocactus* plants may not be sufficient to protect pollinators and thus preserve gene flow between sub-populations. Connectivity between sub-populations is important because *Sclerocactus* species are out-crossing and require pollen from another plant's flower to produce viable seed (Tepedino et al., 201 0). Thus, maintaining pollinator habitat and pollinator populations is important for survival and recovery of *Sclerocactus* species. The commonest *Sclerocactus* flower visitors are Halictinae bees (a subfamily of bees that pollinate *Sclerocactus)* that can travel from 400 meters to 1,000 meters (Tepedino et al., 2010). These bees also use other native plants besides *Sclerocactus* species as food sources, and protecting overall native plant diversity is important to protect *Sclerocactus* pollinators (Tepedino et al., 2010). Finally, protecting bee nests is critical (Tepedino et al., 2010), but we do not currently have a reliable way to identify bee nests in the field. Although it does not appear the *S. wetlandicus* is pollinator-limited (Tepedino et al., 2010), we should strive to institute protections for *S. wetlandicus* pollinators before this becomes the case.

[62] Stipulation TE-12, EA 94-95

> The scientific literature continues to support the idea that effects from roads and other disturbances can extend far beyond 300 feet (see, for example, Walker and Everett, 1987; Myers-Smith and others 2006; Farmer, 1993). This research has been available for many years, even when we established the 300-foot buffer with federal land management agencies. These studies are not specific to the Uinta Basin, so we were conservative in our estimate of the minimum buffer needed to avoid jeopardizing survival and recovery of *Sclerocactus* species. At the time we thought that data from long-term population monitoring of *Sclerocactus* conducted by the BLM and three-year monitoring required for projects within 300-feet of plants would give us information specific to our species and ecosystem that we could use to refine buffers, if necessary. Unfortunately, inadequate study design (from the three-year monitoring) and incomplete results (from the long-term population monitoring) have not allowed us to draw any conclusions regarding what minimum buffer is sufficient to protect *Sclerocactus* species across their known ranges. Our previous knowledge of surface disturbance literature combined with new information regarding pollinators (from Tepedino et al., 2010) has made it imperative to implement more restrictive protective measures for *S. wetlandicus.*

Two other recent draft recovery plans for two small Pediocacti (*P. winkleri* and *P. despainii*) in Utah that have somewhat similar pollinators, and possibly some smaller-sized bees, indicate that a 300-foot buffer is grossly inadequate to conserve pollinators.[63] In those recovery plans, FWS recommends no surface occupancy or deferral of new leases, or, if NSO is not possible, "BLM should implement at minimum 400 m (1,312 ft) avoidance buffers, surface disturbance limits, and compensatory mitigation in areas where NSO is not possible."[64]

Similarly, in 2014, pollinator expert Dr. Vincent Tepedino reviewed the Conservation Agreement for the Graham's and White River beardtongues, and found a 300-foot buffer inadequate to conserve pollinators:

> [A] 300 ft buffer around plants is insufficient to avoid effecting larger, strong-flying pollinators such as species of Anthophora (Apidae) and Pseudomasaris (Masaridae). A minimum of a quarter mile (1300 ft) would still be insufficient but would be a much more reasonable compromise.
>
> The Sclerocacti have some even larger potential pollinators and so would need an even larger buffer. And all Sclerocacti species in Utah, common and uncommon, are in decline throughout the state for a variety reasons (drought and likely related increased beetle death, livestock grazing, invasive species, etc.).[65]

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[63] U.S. Fish and Wildlife Service, Draft Recovery Plan, Winkler cactus (*Pediocactus winkleri*) and San Rafael cactus (*Pediocactus despainii*) 85 (Dec. 2015), *available at* http://ecos.fws.gov/docs/recovery_plan/Pediocactus%20Recovery%20Plan%20Final%20DRAFT%20signed%20040520 16_1.pdf.
[64] *Id.* at 85.
[65] Dr. Vincent Tepedino, Public Submission, Comment on FWS-R6-ES-2013-0081-0030, Doc. No. FWS-R6-ES-2013-0081-0041 (June 20, 2014).

BLM must take a hard look at the effects of well pads, roads, and other ground disturbance on the Uinta Basin hookless cactus and other listed plant species, including effects on their pollinators and effects extending beyond the 300-foot buffer proposed in Stipulation TE-12. In addition, BLM must consult with the Fish and Wildlife Service, using best available scientific information, to determine whether the proposed action will jeopardize the continued existence of these species.

e. Graham's and White River beardtongues

Graham's and White River beardtongues, BLM sensitive species, are present on parcels 032, 121, and 122.[66] Oil and gas development in the Uinta Basin threatens these sensitive beardtongues.[67] As of July 2014, 27% and 13% of all known Graham's and White River beardtongue habitat, respectively, occurred on lands that already had been leased by BLM or the State of Utah for oil and gas development.[68] Given rapidly increasing oil and gas production in the region over the past two decades and current exploration occurring in beardtongue habitat, FWS expects oil and gas activity to pose an increasing threat.[69] Although the Fish and Wildlife Service withdrew these beardtongues from proposed ESA listing largely in reliance on a conservation agreement, the BLM still has a duty under its Manual and sensitive species policy to conserve the species.

The EA claims that the Graham's beardtongue would be subject to protections under a species-specific stipulation, UT-LN-90:

> For the parcels on federally managed surface, application of the appropriate species-specific lease notices and application of lease notices UT-LN-49 (Utah Sensitive Species) , UT-LN-51 (Special Status Plants: Not Federally Listed), UT-LN-89 (Horseshoe milkvetch [*Astragalus equisolensis*]), and UT-LN-90 (Graham beardtongue [*Penstemon grahamii*]) would be adequate for the leasing stage to disclose potential restrictions against future authorizations. Lease notices UT-LN-49 and UT-LN-51 may require modifications to the Surface Use Plan of Operations. Lease notices UT-LN-89 and UT-LN-90 outline specific mitigation measures and survey requirements for each specific BLM-Sensitive plant species they include.[70]

Review of the Preliminary Oil and Gas Lease Sale List (EA Appendix A), however, reveals that no such stipulation LN-90 exists, nor do any of the three proposed parcels containing sensitive

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[66] EA at 24.
[67] U.S. Fish and Wildlife Service, Threatened Species Status for Graham's Beardtongue (Penstemon grahamii) and White River Beardtongue (Penstemon scariosus var. albifluvis), proposed rule (Aug. 6, 2013), 78 Fed. Reg. 47,590; USFWS, Withdrawal of the proposed rules to list Graham's beardtongue (*Penstemon grahamii*) and White River beardtongue (*Penstemon scariosus var. albifluvis*) and designate critical habitat; proposed rules (Aug. 6, 2014), 79 Fed. Reg. 46,042, 46,077.
[68] 79 Fed. Reg. at 46,077.
[69] 79 Fed. Reg. at 46,077 ("substantial numbers of Graham's and White River beardtongue individuals (and their habitat) occur in areas that are leased for oil and gas development (Tables 5 and 6), and thus it is reasonable to conclude that the impacts of oil and gas activity will increase in the future as additional areas are developed.")
[70] EA at 39.

penstemons (including Conservation Area parcels 121 and 122) have a Graham's beardtongue stipulation attached.[71] The BLM cannot assume that impacts to the two sensitive beardtongues will be mitigated by a stipulation that does not exist.

Parcels 121 and 122 are within "conservation areas" under the Conservation Agreement.[72] The CA seeks "to identify, avoid, minimize, and mitigate potential threats to Graham's and White River beardtongues and their habitats, and to promote the species' long-term persistence, thereby preventing the need for listing either species." [73] To achieve this goal, the Conservation Agreement establishes the following objectives:

- Minimize and mitigate direct, indirect, and cumulative threats to both species.
- Establish conservation areas that protect occupied and unoccupied habitat.
- Promote stable or increasing populations within identified conservation areas and across the range of the two species.
- Investigate and demonstrate successful ecological restoration methods for transplanting and repopulating self-sustaining Graham's and White River beardtongue plant populations and community associates . . . and pollinators following surface disturbance. [74]

The EA fails to take a hard look at any of these four objectives. The management strategy for these conservation areas is set forth in twenty-nine "conservation actions" including the following:

- A maximum of 5% new surface disturbance for Graham's beardtongue and 2.5% new surface disturbance for White River beardtongue will be allowed per conservation unit from the date this Agreement is signed.
- Ground-disturbing activities will avoid Graham's and White River plants by 300 feet both inside and outside designated conservation areas. [75]

The EA makes cursory acknowledgment that Parcels 121 and 122 are within beardtongue "conservation areas,"[76] but does not apply the Agreement's management strategy. It does not minimize or mitigate the direct, indirect, and cumulative impacts to the species. Instead, it postpones any and all meaningful analysis to some unknown date and applies unenforceable Lease Notices to lease parcels that are found to contain either species' habitat.[77]

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[71] *See* EA at 78, 86.
[72] EA at 24; *see also* Conservation Agreement and Strategy for Graham's Beardtongue (*Penstemon grahamii*) and White River Beardtongue (*P. scariosus var. albifluvis*) (April 2014) ("Conservation Agreement"), *available at* https://www.fws.gov/mountain-prairie/species/plants/2utahbeardtongues/20140505ConservationAgreement.pdf.
[73] Conservation Agreement at 1.
[74] Conservation Agreement at 2.
[75] Conservation Agreement at 18; *see also id.* at 19-25.
[76] EA at 24.
[77] *See Sierra Club v. Peterson*, 717 F.2d 1409, 1413 (D.C. Cir. 1983) (federal agencies cannot "foreshorten[] [their] view of the impacts which could result from the act of *leasing*"); *New Mexico ex rel. Richardson v. BLM*, 565 F.3d 683, 717-19 (issuing leases without Non-Surface Occupancy stipulations constitutes an irretrievable commitment of resources).

BLM cannot assure that the leasing of additional land in proposed conservation areas will not violate the 5% or 2.5% maximum new surface disturbance threshold. Moreover, leasing these parcels is a direct violation of the Conservation Agreement's stated objective to "[p]romote stable or increasing populations within identified conservation areas and across the range of the two species." In proposing both species for listing under the ESA, FWS stated that "Graham's and White River beardtongues are particularly vulnerable to the effects of energy development because their ranges overlap almost entirely with oil shale and tar sands development areas, as well as ongoing traditional oil and gas drilling."[78]

The EA does not analyze the effects of herbivory on either penstemon. Federal and state monitoring surveys have shown that herbivory from wildlife and livestock is indisputably a substantial impact on these two species. A 2005 status report by Lewinsohn and Tepedino found that herbivory on *Penstemon grahamii* was so extreme at the Buck Canyon and Seep Ridge sites that few if any plants reproduced successfully from seed in either year of the study. Although it's impossible to determine who is doing the herbivory, the authors mention "large animal scat" and the presence of a watering trough for cattle 50m from the population. They also state that it's likely that cattle grazed within the site since there were no fences barring their entry.[79]

Tepedino expands further on the issue by stating that:

> "I believe that grazing could be a substantial threat to both Graham's and White River Penstemon. All Penstemons with which I have worked are very palatable and are sometimes grazed "without mercy" by mammals, both native and domesticated. For example, a study I was involved in with Jena Lewinsohn and Trent Toler in the Uintah Basin in 2004 and 2005, found that in 2005, 17% and 42% of the reproductive structures were removed (eaten to the ground) in two populations of White River Penstemon; removal rates were even higher in 2004. In addition, there were too few inflorescences of Graham's Penstemon in 2005 to conduct a study of its reproductive biology; they had been removed by grazers. Some of what we found was due to native ungulates, rabbits, etc., but cattle can also be grazing culprits. Allowing cattle grazing anytime before seeds have been matured and shed would be an invitation to additional heavy pressure on Penstemon reproductive success." (Tepedino, pers. comm.)

In addition, Red Butte Garden noted in their peer review comments on the 2013 proposed rule that sheep had significant impacts on these plants. They "were observed passing through a P. grahamii monitoring plot at Blue Knoll, and the browsing decimated the site. After grazing not a single flowering stalk remained within the plot, essentially wiping out all reproduction for

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[78] 78 Fed. Reg. at 47598; *see also id.* at 47600 ("The impacts of traditional oil and gas development on Graham's and White River beardtongues are expected to be high.").

[79] Lewinsohn, J., V. Tepedino, and T. Toler. 2005, status report on demography and pollinators for *Penstemon scariosus* var. *albifluvis* and *Penstemon grahamii* in Uintah County, Utah. Prepared for Ron Bolander, Bureau of Land Management, Utah State Office, Salt Lake City, UT by Red Butte Garden and Arboretum, Salt Lake City, UT.

that year". [80] Removing flowers also interferes with insect pollinators. Since these bees and wasps feed on pollen, herbivores directly compete with them for forage plants. Monitoring studies from 2004 – 2012 show that, depending on weather vagaries, fruiting and flowering could occur anywhere between April and mid-August. Herbivory effects would be most impactful during these times of reproductive effort.

Livestock is not the only source of herbivory on penstemons. Rabbits, squirrels, and other small grazers occur in the area, and deer have been directly observed eating *Penstemon grahamii*.[81] However, it is clear that herbivory levels needs to be reduced, and domestic sources of herbivory are easier to control. The number and intensity of the threats to these species are such that efforts need to be made to reduce impacts from all sources, including grazing. The BLM should consider whether the highest and best use of that land is not livestock or oil and gas but critical habitat for threatened species.

The Geocommunicator SiteMapper site contains information on the management designations for each grazing allotment (Improve, Maintain, or Custodial). The proposed critical habitat of *Penstemon scariosus* var. *albifluvis* is comprised of just three units, all of which contain at least one allotment in the "Improve" category. This implies that the area is not achieving even minimal land health standards and needs management attention. Similarly, all but one of the five units of *Penstemon grahamii* critical habitat have "Improve" allotments.

The Conservation Agreement also identified oil and gas exploration and development as a serious threat to Graham's and White River beardtongue habitat and long-term viability.[82] Moreover, road construction and maintenance, invasive weeds, off-road vehicles, habitat fragmentation, and climate change – all factors exacerbated by the leasing of parcels in these areas – also threaten both species' habitat and ability to survive in the long-term.[83] The EA does not discuss or analyze any of these issues, and thus fails either to take a hard look at impacts under NEPA or to meet BLM's conservation obligations under the Sensitive Species Policy and the Conservation Agreement.

f. Colorado River endangered fish

All proposed sale parcels have the potential to impact the four Colorado River endangered fish species (bonytail chub, Colorado pikeminnow, humpback chub, and razorback sucker) through water depletions resulting from oil and gas development.[84] Stipulation TE-03 requires consultation on and reporting of, but does not prohibit, such water depletions:

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[80] Red Butte Garden. 2013. Peer review comments in response to 50 CFR Part 17 [Docket No. FWS–R6–ES–2013–0081; 4500030113] RIN 1018–AY95 Endangered and Threatened Wildlife and Plants; Threatened Species Status for Graham's Beardtongue (Penstemon grahamii) and White River Beardtongue (Penstemon scariosus var. albifluvis). Submitted to Larry Crist, USFWS Field Supervisor, Utah. Comments at www.regulations.gov, accessed 6/24/14

[81] Fitts, R. 2013. Review of proposed rules to list *Penstemon grahamii* (Graham's Beardtongue) and *Penstemon scariosus* var. *albifluvis*. Utah Natural Heritage Program. Peer review comments at www.regulations.gov, accessed 6/24/14.

[82] *See* Conservation Agreement at 19.

[83] *Id*.

[84] EA at 29.

> Water depletions from *any* portion of the Upper Colorado River drainage basin above Lake Powell are considered to adversely affect or adversely modify the critical habitat of the four resident endangered fish species, and must be evaluated with regard to the criteria described in the Upper Colorado River Endangered Fish Recovery Program. Formal consultation with USFWS is required for all depletions. All depletion amounts must be reported to BLM.[85]

In the 2008 Vernal RMP BiOp, the Fish and Wildlife Service re-confirmed its long-standing opinion that all depletions from the Upper Colorado will jeopardize the continued existence of the four listed fish:

> Water depletions from the Upper Colorado River Basin are a major factor in the decline of the threatened and endangered Colorado River fish. The USFWS determined that any depletion will jeopardize their continued existence and will likely contribute to the destruction or adverse modification of their critical habitat (USDI, Fish and Wildlife Service, Region 6 Memorandum, dated July 8, 1997). However, the Recovery Program was established specifically to offset the negative effects of water depletions to the endangered fish populations, and to act as the Reasonable and Prudent Alternative for these depletions. Actual water depletions will be determined, and Section 7 consultation reinitiated on a project-specific basis. [86]

As specified in the Vernal RMP BiOp, BLM must initiate consultation on the proposed lease sale on a project-specific basis. Significant new information regarding progress under the Recovery Program and climate change effects on Green and Colorado River flows requires independent reevaluation of the effects of water depletions on the four endangered fish.

The Recovery Program's most recent Assessment of Sufficient Progress under the Upper Colorado River Endangered Fish Recovery Program indicates that Colorado pikeminnow are in decline and failing to meet recovery goals in the Green River Subbasin that will be affected by the proposed action:[87]

> Data from the third round (2011–2013) of population estimates for the Green River Subbasin are still being analyzed (thus no confidence intervals are shown for the 2011–2013 estimates in Figure 4). Preliminary results from this analysis indicate adults and sub-adults are in decline throughout the entire Green River Subbasin.[88]

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[85] Stipulation TE-03, EA at 90-91.

[86] Biological Opinion for BLM Resource Management Plan (RMP), Vernal Field Office (VFO), 113 (Oct. 23, 2008), *available at* http://www.blm.gov/style/medialib/blm/ut/vernal_fo/planning/rod_approved_rmp.Par.4719.File.dat/VernalBiologicalOpinion.pdf

[87] Fish and Wildlife Service, Final 2014-2015 Assessment of "Sufficient Progress" Under the Upper Colorado River Endangered Fish Recovery Program in the Upper Colorado River Basin 7-8(Oct. 7, 2015) ("Sufficient Progress Assessment"), *available at* http://www.coloradoriverrecovery.org/documents-publications/section-7-consultation/sufficientprogress/2015_Suff_Progress_Memo.pdf.

[88] Sufficient Progress Memo at 7.

> Another demographic requirement in the 2002 Recovery Goals is that recruitment of age-6, naturally-produced fish must equal or exceed mean annual adult mortality. Estimates of recruitment age fish have averaged 1,455 since 2001, but have varied widely (Figure 5). Recruitment exceeded annual adult mortality only during the 2006 – 2008 period.[89]

Pikeminnow within the Green River subbasin are also being adversely affected by mercury concentrations, which are exacerbated by water withdrawals:

> Although a good portion of the recovery factor criteria (USFWS 2002a) are being addressed, nonnative fish species continue to be problematic and researchers now speculate that mercury may pose a more significant threat to Colorado pikeminnow populations of the upper Colorado River basin than previously recognized. Osmundson and Lusk (2012) recently reported elevated mercury concentrations in Colorado pikeminnow muscle tissue; the highest concentrations were from the largest adults collected from the Green and Colorado river subbasins. Mercury exposure has been reported to impair reproduction in fish (Batchelar et al. 2013; J. Lusk, U.S. Fish and Wildlife Service, personal communication). Laboratory experiments have shown diminished reproduction and endocrine impairment in fish exposed to dietary methyl mercury at environmentally relevant concentrations, with documented effects on production of sex hormones, gonadal development, egg production, spawning behavior, and spawning success.[90]

Adverse effects from oil and gas development are not limited to the Green River water depletions addressed by the Upper Colorado Endangered Fish Recovery Program. BLM must also consider, and consult on, foreseeable water quality impacts from oil and gas development and the resulting wells, pipelines, pits, and soil disturbance. The Fish and Wildlife Service's recent Biological Opinion for the GasCo Energy Inc. Field Development Project EIS found that, in addition to water depletions, oil and gas development in the Uinta Basin has a significant potential for impacts to Colorado River endangered fish resulting from the highly foreseeable probability of spills and contamination:

> There is a greater potential for impacts from pollutants, if a pipeline, well pit, or other source were to inadvertently release contaminated fluids into waterways at points near the Green and White Rivers. Through direct or indirect discharge, these pollutants could reach the Green River and negatively impact water quality to the point of affecting native fish populations. Direct impacts will result from a discharge from a pipeline or well pit reaching the Green River in its original form or within a single·release event. Indirect effects occur when discharges are released to the .ground and are later released to the river after being carried by an erosion event or carried by rain or snowmelt runoff. As more well and pipeline

[89] *Id.* at 8.
[90] *Id*. at 10.

development occurs in the project area the chance of pollutants reaching the Green River increases, thus increasing the potential of harm to native fish populations.

Approximately 744 pipeline crossings (61.9 miles) of intermittent/ephemeral drainages that are tributary to the Green River will be required, though no wells, roads, or pipelines are proposed within the 100year floodplain for the Green River. In addition, no wells or pipelines are proposed within 1 00-year floodplains of Green River tributaries within 5 miles of the river.

While applicant-committed measures will reduce the chance for spills or leaks of contaminants, accidental releases can and do still occur. According to the National Response Center, there have been at least 219 spills and releases within Carbon, Duchesne, and Uintah Counties from January 1991 through August, 2011 due to oil and gas development and related activities affecting water, land and air.

Spill incidences reviewed in Utah include corrosion and leakage of surface and buried pipelines, broken well rods, valve and gasket failures, wellhead pressure buildups, shutoff alarm malfunctions, leakage of trace systems, loss of formation water to the surface during drilling, and vehicular related traffic accidents. Releases have included crude oil, natural gas, hydrochloric acid, condensate, salt water, ethylene glycol, and produced water in various quantities.

Releases of harmful agents into floodplain habitats could result in significant adverse impacts to the endangered fish and their designated critical habitat. One of the constituent elements of the designated critical habitat for the four Colorado River fish is contaminant-free water. Any release of contaminants into the floodplain will result in degradation of critical habitat and could result in take of individual fish, including downstream impacts to larvae and juveniles.[91]

In addition, neither the 2008 VFO RMP nor the Draft EA considered the impacts of climate change on these water resources, such as the decline in stream flows. This is a significant omission, as numerous climate change models show anthropogenic climate change is profoundly impacting the Colorado River in ways that are altering temperature[92], streamflow[93],

[91] U.S. Fish and Wildlife Service, Biological Opinion for the GasCo Energy Inc. Field Development Project EIS 26 (2011).

[92] Hoerling, M. P., et al. 2013. Evolving weather and climate conditions of the Southwest United States. Pages 74–100 in G. Garfin, A. Jardine, M. Black, R. Merideth, J. Overpeck, and A. Ray, editors. Assessment of climate change in the Southwest United States: a report prepared for the National Climate Assessment. Island Press, Washington, D.C., USA ("Hoerling, 2013")

[93] Hoerling, 2013; Hamlet, A., et al. 2005. Effects of temperature and precipitation variability on snowpack trends in the western United States. Journal of Climate 18: 4545-4561; Stewart, I. T., et al. 2004. Changes in snowmelt runoff timing in western North America under a 'Business as Usual' climate change scenario. Climatic Change 62: 217-232; Garfin, G., et al., 2014: Ch. 20: Southwest. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 462-486.

and the hydrologic cycle.[94] Changes observed to date include rising temperatures, earlier snowmelt and streamflow, decreasing snowpack, and declining runoff and streamflow.[95] Modeling studies project that these changes will only worsen, including continued declines in streamflow and intensification of drought.[96] Climate change is likely to have significant effects on the endangered fish species and the Colorado River ecosystem, and the effect of climate change on future flow regimes and water temperatures must be taken into account in the consultation process and considering the sufficiency of the existing Recovery Program.

II. The EA Violates NEPA

a. The EA Improperly Fails to Take a Look at Greenhouse Gas Emissions from Oil and Gas Development and Combustion

BLM must take a hard look, pursuant to NEPA, at the mounting evidence proving that oil and gas operations are a major cause of climate change. The EA quantifies only greenhouse gas emissions from the drilling of a single exploratory well.[97] It arbitrarily and capriciously rejects any consideration of the foreseeable and intended downstream effects of oil and gas transport, distribution, processing, leakage, and, most importantly, combustion.[98] The EA argues, contrary to reason, CEQ guidance, BLM practice, and judicial precedent, that "[i]n a leasing EA there is no substantive difference between any possible alternative, including the no action alternative, when addressing GHG emissions and their potential to impact global climate."[99] It is clear, however, that under NEPA's requirement to analyze indirect impacts, the impacts of oil and gas leasing under NEPA include not only emissions from drilling operations, but the "downstream" emissions from the combustion (and leakage) of the oil and gas produced.[100]

Every step of the lifecycle process for development of oil and gas results in significant carbon emissions, including but not limited to:

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[94] *Id.*
[95] *Id.*
[96] Stewart, I. T., et al. 2004. Changes in snowmelt runoff timing in western North America under a 'Business as Usual' climate change scenario. Climatic Change 62: 217-232; Rauscher, S. A., et al. 2008. Future changes in snowmelt-driven runoff timing over the western US. Geophysical Research Letters 35: L16703, doi:10.1029/2008GL034424 ("Rauscher, 2008"); Dettinger, M., B. Udall, and A. Georgakakos. 2015. Western water and climate change. Ecological Applications 25: 2069-2093 ("Dettinger, 2015").
[97] EA 36-37.
[98] EA at 49-51.
[99] EA at 50.
[100] *See High Country Conservation Advocates v. United States Forest Serv*., 52 F. Supp. 3d 1174 (D. Colo. 2014); *Dine Citizens Against Ruining Our Env't v. United States Office of Surface Mining Reclamation & Enf't*, 82 F. Supp. 3d 1201 (D. Colo. 2015); *WildEarth Guardians v. United States Office of Surface Mining, Reclamation & Enf't*, 104 F. Supp. 3d 1208, 1230 (D. Colo. 2015); *Wildearth Guardians v. U.S. Office of Surface Mining, Reclamation & Enf't*, No. CV 14-103-BLG-SPW, 2015 WL 6442724 (D. Mont. Oct. 23, 2015) report and recommendation adopted in part, rejected in part sub nom. *Guardians v. U.S. Office of Surface Mining, Reclamation & Enf't*, No. CV 14-103-BLG-SPW, 2016 WL 259285 (D. Mont. Jan. 21, 2016); *see also* Council on Environmental Quality, Revised Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts 11 (Dec. 18, 2014), *available at* https://www.whitehouse.gov/administration/eop/ceq/initiatives/nepa/ghg-guidance ("emissions from activities that have a reasonably close causal relationship to the Federal action, such as those that may occur as a predicate for the agency action (often referred to as upstream emissions) and as a consequence of the agency action (often referred to as downstream emissions) should be accounted for in the NEPA analysis."

End-user oil and gas combustion emissions. The combustion of extracted oil and gas will add vast amounts of carbon dioxide to the atmosphere, further heating the climate and moving the Earth closer to catastrophic and irreversible climate change. Though much of the oil is used as gasoline to fuel the transportation sector, the produced oil may also be used in other types of products. The EIS should study all end-uses as contributors to climate change.

Combustion in the distribution of product. To the extent that distribution of raw and end-use products will rely on rail or trucks, the combustion of gasoline or diesel to transport these products will emit significant greenhouse gas emissions.

Emissions from Refineries and Production. Oil and gas must undergo intensive refinery and production processes before the product is ready for consumption. Refineries and their auxiliary activities constitute a significant source of emissions.

Vented emissions. Oil and gas wells may vent gas that flows to the surface at times where the gas cannot otherwise be captured and sold. Vented gas is a significant source of greenhouse gas emissions and can also pose a safety hazard.

Combustion during construction and extraction operations. Operators rely on both mobile and stationary sources of power to construct and run their sites. The engines of drilling or excavation equipment, pumps, trucks, conveyors, and other types of equipment burn large amounts of fuel to operate. Carbon dioxide, methane, and nitrous oxide (another potent greenhouse gas) are emitted from oxidized fuel during the combustion process. Engines emit greenhouse gases during all stages of oil and gas recovery, including drilling rig mobilization, site preparation and demobilization, completion rig mobilization and demobilization, well drilling, well completion (including fracking and other unconventional extraction techniques), and well production. Transportation of equipment and chemicals to and from the site is an integral part of the production process and contributes to greenhouse gas emissions. Gas flaring is another important source of greenhouse gas emissions. Significant sources of emissions in oil production include pneumatic devices, dehydrators and pumps, and compressors, and system upsets.[101]

Fugitive emissions. Potent greenhouse gases can leak as fugitive emissions at many different points in the production process, especially in the production of gas wells. Recent studies suggest that previous estimates significantly underestimate leakage rates.[102] New research shows methane leakage from some gas wells may be as high at 17.3 percent.[103] Moreover, new research has shown that unconventional gas wells are up

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[101] U.S. Environmental Protection Agency, National Gas STAR Program, Basic Information, Major Methane Emission Sources and Opportunities to Reduce Methane Emissions ("USEPA, Basic Information").

[102] Brandt, A. R. *et al., Methane leaks from North American natural gas systems, 343* Science 733 *(2014);* Miller, S. M. et al. Anthropogenic Emissions of Methane in the United States, Proc. Natl. Acad. Sci. Early Edition, DOI: 10.1073/pnas.1314392110 (2013) ("Miller 2013").

[103] Caulton, Dana R. et al., *Toward a Better Understanding and Quantification of Methane Emissions from Shale Gas Development*, 111 Proc. Natl. Acad. Sciences 17 (2014); Schneising, Oliver, et al., Remote Sensing of Fugitive Methane Emissions from Oil and Gas Production in North American Tight Geologic Formations, Earth's Future 2, doi:10.1002/2014EF000265 (2014); Allen, D. T. *et al., (2013), Measurements of Methane Emissions at Natural Gas Production Sites in the United States*, 110 *Proc*. Natl. Acad. Sci. 44 (2013) ("Allen 2013"); Zavala-Araizaa, Daniel et al., *Reconciling divergent estimates of oil and gas methane emissions*, 112 Proc. Natl. Acad. Sciences 51 (2015), available at *www.pnas.org/cgi/doi/10.1073/pnas.1522126112* (leakage rate 1.5% of production in Barnett shale or

> to 2.7 times more likely than a conventional well to have a cement or casing impairment, which can lead to methane leaks.[104] The intersection of new fractures with nearby abandoned wells can also result in methane migration to the surface.[105] Leakage can also occur during storage, processing, and distribution to customers.[106]

Natural gas emissions are generally about 84 percent methane.[107] Methane is a potent greenhouse gas that contributes substantially to global climate change. Its global warming potential is approximately 36 times that of carbon dioxide over a 100 year time frame and at least 87 times that of carbon dioxide over a 20 year time frame.[108] One of the IPCC Fifth Assessment Report's ("AR5") breakthrough insights is the discovery of a fundamental flaw in previous calculations of GWP: the climate effects of CO2 intrinsically includes carbon cycle feedbacks, but the GWPs of other greenhouse gases do not.[109] Thus, to compare "apples to apples," it is necessary to include these feedbacks in the estimates of all greenhouse gas emissions. Once climate-carbon feedbacks are incorporated for fossil fuel methane as well as for carbon dioxide, its warming potential over a 20-year time period is 87 times that of carbon dioxide.

The EA makes no reference to the role of methane in climate change or its global warming potential.[110] This is an egregious omission in light of a recently-published scientific study indicating that rates of methane and other volatile compound leakage in the Uinta basin are vastly higher than previously assumed.[111] The 2013 study from the Institute of Arctic and Alpine Research (INSTARR) found "total hydrocarbon/natural gas production loss rate of 8.4−15.9%."[112] An earlier airborne measurement of methane leakage from oil and gas fields in Uintah County found:

> Methane (CH_4) emissions from natural gas production are not well quantified and have the potential to offset the climate benefits of natural gas over other fossil fuels. We use atmospheric measurements in a mass balance approach to estimate CH_4 emissions of $55 \pm 15 \times 10^3$ kg h^{-1} from a natural gas and oil production field in Uintah County, Utah, on 1 day: 3 February 2012. This emission rate corresponds to 6.2%–11.7% (1σ) of average hourly natural gas production in Uintah County in the month of February. This study demonstrates the mass

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twice EPA's estimate); Vaidyanathan, G, *Bad news for the climate as methane leaks far surpass previous estimates*, E&E News (Dec. 8, 2015) (leakage rate in Barnett shale equal to annual emissions of 8,000 cars).

[104] Ingraffea, Anthony R, et al., *Assessment and Risk Analysis of Casing and Cement Impairment in Oil and Gas Wells in Pennsylvania, 2000 – 2012*, 111 Proc. Natl. Acad. Sciences 30 (2014).

[105] King, Pamela. *'Frack hits' provide pathways for methane migration study*, E&E News (Oct. 21, 2015).

[106] Howarth, R. W. A bridge to nowhere: methane emissions and the greenhouse gas footprint of natural gas, Energy Science and Engineering 2014; 2(2): 47–60, 49 ("Howarth 2014").

[107] Brown, Heather, Memorandum to Bruce Moore, USEPA/OAQPS/SPPD re Composition of Natural Gas for Use in the Oil and Natural Gas Sector Rulemaking at 3, July 28, 2011; Power, Thomas, The Local Impacts of Natural Gas Development in Valle Vidal, New Mexico, University of Montana (2005) ("Power").

[108] Intergovernmental Panel on Climate Change, Chapter 8: Anthropogenic and Natural Radiative Forcing in Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Table 8.7 (2013); Howarth, Robert, et al., Methane and the greenhouse-gas footprint of natural gas from shale formations, Climactic Change (Mar. 31, 2011) ("Howarth 2011"); Shindell, Drew, *Improved Attribution of Climate Forcing to Emissions*, 326 Science 716 (2009).

[109] *Id*. at 713.

[110] *See* EA at 36-37, 49-51.

[111] Helmig, D. *et al.*, Highly Elevated Atmospheric Levels of Volatile Organic Compounds in the Uintah basin, Utah, *Environ. Sci. Technol*. 2014, 4707-4715, dx.doi.org/10.1021/es405046r

[112] Helmig *et al.* at 4714; *see also* Karion, A., et al. Methane emissions estimate from airborne measurements over a western United States natural gas field. Geophys. Res. Lett. 2013, 40, 1-5.

> balance technique as a valuable tool for estimating emissions from oil and gas production regions and illustrates the need for further atmospheric measurements to determine the representativeness of our single-day estimate and to better assess inventories of CH_4 emissions.[113]

Oil and gas operations generally, and Uinta Basin operations in particular, release large amounts of methane. While the exact amount is not clear, EPA has estimated that "oil and gas systems are the largest human-made source of methane emissions and account for 37 percent of methane emissions in the United States and is expected to be one of the most rapidly growing sources of anthropogenic methane emissions in the coming decades."[114] That proportion is based on an estimated calculation of methane emissions, rather than measured actual emissions, which indicate that methane emissions may be much greater in volume than calculated.[115] The 2013 airborne measurement study indicates Uinta basin leakage rates of up to 12%.

Fracked wells leak an especially large amount of methane, with some evidence indicating that the leakage rate is so high that shale gas may be as bad for the climate as coal.[116] In fact, a research team associated with the National Oceanic and Atmospheric Administration recently reported that preliminary results from a field study in the Uinta Basin of Utah suggest that the field leaked methane at a rate of up to twelve percent of total production.[117]

Contrary to the EA's assertion that "[a] leasing EA by its nature does not include input data necessary to develop a reasonably accurate estimate of potential GHG emissions," the input data and tools exist and can readily be used to estimate the potential emissions from leasing. BLM itself has addressed end-use emissions in other NEPA decisions regarding coal[118] and oil and gas[119] leasing.

Indeed, all impacts of induced oil and gas production and climate change are indirect effects of any BLM lease sale.[120] Indirect impacts may include "growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems."[121]

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[113] Karion et al 2013.

[114] USEPA, Basic Information; *see also* Petron, Gabrielle, et al., *Hydrocarbon emissions characterization in the Colorado Front Range: A pilot study*, 117 Journal of Geophysical Research (2012).

[115] Miller, S. M. et al., *Anthropogenic Emissions of Methane in the United States*, Proc. Natl. Acad. Sci. Early Edition, DOI: 10.1073/pnas.1314392110 (2013).

[116] Howarth 2011; Brune, Michael, Statement of Sierra Club Executive Director Michael Brune Before the Committee on Oversight & Government Reform (May 31, 2012); Wang, Jinsheng, et al., Reducing the Greenhouse Gas Footprint of Shale (2011); Alvarez, Ramon et al., *Greater focus needed on methane leakage from natural gas infrastructure*, Proc. Nat'l. Acad. Sci. Early Edition (Feb 13, 2012) at 3; *see also* Howarth, Robert, et al., Venting and Leaking of Methane from Shale Gas Development: Response to Cathles et al., (2012); Hou, Deyi, et al., Shale gas can be a double-edged sword for climate change, Nature Climate Change at 386 (2012)

[117] *See* D. Helmig *et al.*, Highly Elevated Atmospheric Levels of Volatile Organic Compounds in the Uintah basin, Utah, *Environ. Sci. Technol*. 2014, 4707-4715, dx.doi.org/10.1021/es405046r; *see also* Brian Maffly, "Uinta basin gas leakage far worse than most believe," Salt Lake Tribune (Aug. 5,2013); Tollefson, Jeff, *Methane leaks erode green credentials of natural gas*, Nature News (Jan 2, 2013) .

[118] U.S. Bureau of Land Management, Final Supplemental Environmental Impact Statement for the Leasing and Underground Mining Of the Greens Hollow Federal Coal Lease Tract, UTU-84102, 287 (Feb. 2015).

[119] U.S. Bureau of Land Management, Previously Issued Oil and Gas Leases in the White River National Forest, Draft Environmental Impact Statement, BLM/CO/PL-16/002, 4.2-48, 4.2-59 (Nov. 2015).

[120] See 40 C.F.R. § 1508.8(a).

[121] *Id*.

BLM has an obligation to consider all reasonably foreseeable indirect effects of leasing including the fact that this lease sale will induce additional oil and natural gas production, transmission and end-user impacts that contribute to climate change. Failure to consider the significant impacts associated with oil and gas development and from climate change renders the EA deficient. Moreover, because the impacts are significant, they should be considered as part of an EIS.

The EA is deficient because it fails to consider critical indirect effects associated with this lease sale, including the environmental and climate change consequences of increasing oil and natural gas production to meet demand. New development to meet demand is fairly understood as indirectly caused by project development or more specifically, leasing, and thus the environmental and climate effects of that development must be considered in the EA. *Native Village of Point Hope v. Salazar*, 730 F. Supp. 2d 1009, 1017 (D. Alaska 2010) (requiring consideration of induced development of natural gas drilling in EIS for offshore oil and gas lease sale that caused the gas development); *see also Sierra Club v. Marsh*, 976 F.2d 763, 767 (1st Cir. 1992) (a future impact 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"); *Natural Res. Def. Council, Inc. v. Fed. Aviation Admin.*, 564 F.3d 549, 559-60 (2d Cir. 2009) (agency properly considered indirect and cumulative impacts of induced growth caused by construction of new airport); *City of Davis v. Coleman*, 521 F.2d 661, 674-77 (9th Cir. 1975) (environmental review for highway project needed to analyze impact of induced development despite uncertainty about pace and direction of development); *Border Power Plant Working Group v. Dept. of Energy*, 260 F. Supp. 2d 997, 1028-29 (S.D. Cal. 2003) (requiring consideration of environmental impacts, such as increased carbon dioxide and ammonia emissions, from additional electricity generation spurred by construction of energy transmission lines subject to federal approval).

BLM has acknowledged in the EA that "[T]hroughout the planning area, the BLM authorizes numerous types of activities and actions that result in GHG emissions, with the largest contributor being the combustion of fossil fuels for on-road and off-road vehicles, engines, and construction equipment. Additional activities that result in GHG emissions include...oil and gas and other mineral exploration and development." EA at 20. Thus, it is reasonably foreseeable, as opposed to speculative, that this lease sale will induce oil and natural gas production, transmission and ultimate end-user climate change impacts. The effects of this induced production must be considered in the EA, and in fact, necessitate a more robust review under an EIS. *See, e.g., N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1081-82 (9th Cir. 2011) (finding that NEPA review must consider induced coal production at mines, which was a reasonably foreseeable effect of a project to expand a railway line that would carry coal, especially where company proposing the railway line anticipated induced coal production in justifying its proposal); *Mid States Coal. for Progress v. Surface Transp. Bd.*, 345 F.3d 520, 549-50 (8th Cir. 2003) (environmental effects of increased coal consumption due to construction of a new rail line to reach coal mines was reasonably foreseeable and required evaluation under NEPA).

In addition to failing to consider indirect impacts of induced oil and gas development, transmission and end-user impacts of this lease sale, BLM's environmental review unlawfully fails to consider the cumulative environmental effects of this lease sale in conjunction with the

neighboring Crescent Point and Monument Butte energy project lease sales.[122] Cumulative impacts are those impacts on the environment resulting from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency . . . or person undertakes such other actions."[123] By all accounts, the impacts stemming from the oil and gas lease sale in Vernal discussed at length in these comments are cumulative with the impacts from development of the neighboring lease sales.[124] Indeed, under NEPA, BLM has an obligation to consider the effects of the neighboring lease sales as cumulative impacts of the Vernal lease sale.[125] The thousands of additional wells to be added to the Vernal area by the Monument Butte and Crescent Point development projects will contribute to the foreseeable cumulative impacts affecting resources within the area through (a) increased greenhouse gas emissions, (b) increased emissions of ozone precursors, particulate matter, and hazardous air pollutants; (c) depletions from the Green River watershed; (d) loss and fragmentation of habitat for greater sage-grouse, sensitive and listed plants, white-tailed prairie dogs, and migratory birds.

Using BLM's own lease parcel data and fossil fuel volumes from its EPCA Phase III oil and gas inventory, it is possible to estimate the total oil and gas volume of the proposed leases, resulting in an estimated oil volume of .509747 MMbbl and a gas volume of 35.223999 Bcf. Applying conservative estimates of the life-cycle emissions of oil and gas, this results in approximately 2,381,019 tons of CO_2 equivalent.[126] Even assuming a 20-year development cycle, this would result in annual emissions of 119,051 tons per year, vastly in excess of CEQ's recommend 25,000/ton year threshold for quantitative analysis.

It is important to note that these conservative estimates do not take into account the substantial evidence that Uinta basin methane emissions greatly exceed national averages.[127]

In summary, the EA's contention that greenhouse gas emissions are globally insignificant and/or impossible to estimate are inaccurate, contrary to NEPA, judicial decisions, CEQ guidance, and BLM practice, and do not provide a reasonable rationale for failing to address the comparative greenhouse gas emissions of leasing and no-leasing alternatives. The EIS must weigh the no-leasing and no-fracking alternatives' climate-change benefits against the impacts of allowing new leasing and fracking, and address the following:

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[122] *See* Monument Butte Oil and Gas Development Project DOI-BLM-UT-G010-2016-0065-EIS; Crescent Point Energy Utah Federal-Tribal Well Development Project DOI-BLM-UT-G010-2016-0010-EIS; *and* Maffly, Brian, "Uinta basin gas leakage far worse than most believe," Salt Lake Tribune (Aug. 5, 2013).

[123] 40 C.F.R. § 1508.7.

[124] *Thomas v. Peterson*, 753 F.2d 754, 759 (9th Cir. 1985) (reasoning that effects of proposed road and of timber sales that road was designed to facilitate were cumulative actions for which comprehensive analysis was required).

[125] 40 C.F.R. §§ 1508.7, 1508.8.

[126] Oil and gas volume estimates were generated in a geographic information system by clipping technically recoverable oil and gas volumes in the Bureau of Land Management's EPCA Phase III spatial data with lease parcel boundaries provided by Bureau of Land Management. Potential lifecycle greenhouse gas emissions for resultant oil and gas volumes were generated using a carbon calculator and lifecycle greenhouse gas emissions models developed by EcoShift consulting. Methods for those models are described in the report available at this hyperlink: http://www.ecoshiftconsulting.com/wp-content/uploads/Potential-Greenhouse-Gas-Emissions-U-S-Federal-Fossil-Fuels.pdf.

[127] *See* D. Helmig *et al.*, Highly Elevated Atmospheric Levels of Volatile Organic Compounds in the Uintah basin, Utah, *Environ. Sci. Technol*. 2014, 4707-4715, dx.doi.org/10.1021/es405046r; *see also* Brian Maffly, "Uinta basin gas leakage far worse than most believe," Salt Lake Tribune (Aug. 5,2013); Tollefson, Jeff, *Methane leaks erode green credentials of natural gas*, Nature News (Jan 2, 2013).

1. *Sources of Greenhouse Gases*

In performing a full analysis of climate impacts, BLM must consider all potential sources of greenhouse gas emissions (e.g. greenhouse gas emissions generated by transporting large amounts of water for fracking). BLM should also perform a full analysis of all gas emissions that contribute to climate change, including methane and carbon dioxide. The EIS should calculate the amount of greenhouse gas emissions that will result on an annual basis from (1) each of the fossil fuels that can be developed within the planning area, (2) each of the well stimulation or other extraction methods that can be used, including, but not limited to, fracking, acidization, acid fracking, and gravel packing, and (3) cumulative greenhouse gas emissions expected over the long term (expressed in global warming potential of each greenhouse pollutant as well as CO_2 equivalent), including emissions throughout the entire fossil fuel lifecycle discussed above.

2. *Effects of Climate Change*

In addition to quantifying the total emissions that would likely result from the lease sale, an EIS should consider the environmental effects of these emissions, resulting from climate disruption's ecological and social effects of climate disruption.[128] Release of greenhouse gases (from extraction, leakage, and downstream combustion) is not merely a reasonably foreseeable consequence of fracking extraction, it is the necessary and intended consequence. CEQ and the courts have repeatedly cautioned federal agencies that they cannot ignore either climate change generally, or the combustion impacts of fossil fuel extraction in particular.[129]

Under the Paris Agreement, discussed above in Section I subsection "A", nearly 200 governments, including the United States, agreed to the commitments enumerated in the Paris Agreement to "strengthen the global response to the threat of climate change."[130] The Paris Agreement codified the international consensus that the climate crisis is an urgent threat to human societies and the planet, with the parties recognizing that:

> Climate change represents an *urgent and potentially irreversible threat to human societies and the planet* and thus requires the widest possible cooperation by all countries, and their participation in an effective and appropriate international response, with a view to accelerating the reduction of global greenhouse gas emissions.[131]

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[128] *See* Council on Environmental Quality, Revised Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts 11 (Dec. 18, 2014), *available at* *https://www.whitehouse.gov/administration/eop/ceq/initiatives/nepa/ghg-guidance* (instructing agencies to consider indirect and connected actions, including "downstream" emissions). Although the CEQ guidance is still in draft form and not binding, it is arbitrary for agencies to ignore its reasoning without explanation.

[129] *See* 40 C.F.R. §§ 1508.7, 1508.8; *Center for Biological Diversity v. Nat'l Highway Transp. Safety Admin.*, 538 F.3d 1172, 1217 (9th Cir. 2008); *Utahns for Better Transp. v. U.S. Dep't of Transp.*, 305 F.3d 1152, 1176 (10th Cir. 2002); *Dine Citizens Against Ruining Our Env't v. U.S. Office of Surface Mining*, 82 F.Supp.3d 1201, 1212-14 (D. Colo. 2015).

[130] United Nations Framework Convention on Climate Change, Adoption of the Paris Agreement, Proposal by the President, Draft decision ("Paris Agreement"), Art. 2(1).

[131] Paris Agreement, Decision, Recitals (emphasis added).

Numerous authoritative scientific assessments have established that climate change is causing grave harms to human society and natural systems, and these threats are becoming increasingly dangerous. The Intergovernmental Panel on Climate Change (IPCC), in its 2014 Fifth Assessment Report, stated that: "Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased" and that "[r]ecent climate changes have had widespread impacts on human and natural systems."[132]

The 2014 Third National Climate Assessment, prepared by a panel of non-governmental experts and reviewed by the National Academy of Sciences and multiple federal agencies similarly stated: "That the planet has warmed is 'unequivocal,' and is corroborated though multiple lines of evidence, as is the conclusion that the causes are very likely human in origin"[133] and "[i]impacts related to climate change are already evident in many regions and are expected to become increasingly disruptive across the nation throughout this century and beyond."[134] The United States National Research Council similarly concluded that "[c]limate change is occurring, is caused largely by human activities, and poses significant risks for—and in many cases is already affecting—a broad range of human and natural systems."[135]

The IPCC and National Climate Assessment further decisively recognize the dominant role of fossil fuels in driving climate change:

> While scientists continue to refine projections of the future, observations unequivocally show that climate is changing and that the warming of the past 50 years is primarily due to human-induced emissions of heat-trapping gases. These emissions come mainly from burning coal, oil, and gas, with additional contributions from forest clearing and some agricultural practices.[136]
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> CO_2 emissions from fossil fuel combustion and industrial processes contributed about 78% to the total GHG emission increase between 1970 and 2010, with a contribution of similar percentage over the 2000–2010 period (*high confidence*).[137]

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[132] Intergovernmental Panel on Climate Change, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change ("IPCC AR5 Synthesis Report") at 2.

[133] Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014: Climate Change Impacts in the United States: The Third National Climate Assessment (U.S. Global Change Research Program). doi:10.7930/J0Z31WJ2 ("Third National Climate Assessment") at 61 (quoting IPCC, 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor, and H. L. Miller, Eds., Cambridge University Press, 1-18.).

[134] Third National Climate Assessment at 10.

[135] National Research Council, Advancing the Science of Climate Change (2010), available at www.nap.edu. ("Advancing the Science of Climate Change") at 2.

[136] Third National Climate Assessment at 2.

[137] IPCC AR5 Synthesis Report at 46.

These impacts from the extraction and combustion of fossil fuels are harming the United States in myriad ways, with the impacts certain to worsen over the coming decades absent deep reductions in domestic and global GHG emissions. EPA recognized these threats in its 2009 Final Endangerment Finding under Clean Air Act Section 202(a), concluding that greenhouse gases from fossil fuel combustion endanger public health and welfare: "the body of scientific evidence compellingly supports [the] finding" that "greenhouse gases in the atmosphere may reasonably be anticipated both to endanger public health and to endanger public welfare."[138] In finding that climate change endangers public health and welfare, EPA has acknowledged the overwhelming evidence of the documented and projected effects of climate change upon the nation:

Effects on air quality: "The evidence concerning adverse air quality impacts provides strong and clear support for an endangerment finding. Increases in ambient ozone are expected to occur over broad areas of the country, and they are expected to increase serious adverse health effects in large population areas that are and may continue to be in nonattainment. The evaluation of the potential risks associated with increases in ozone in attainment areas also supports such a finding."[139]

Effects on health from increased temperatures: "The impact on mortality and morbidity associated with increases in average temperatures, which increase the likelihood of heat waves, also provides support for a public health endangerment finding."[140]

Increased chance of extreme weather events: "The evidence concerning how human induced climate change may alter extreme weather events also clearly supports a finding of endangerment, given the serious adverse impacts that can result from such events and the increase in risk, even if small, of the occurrence and intensity of events such as hurricanes and floods. Additionally, public health is expected to be adversely affected by an increase in the severity of coastal storm events due to rising sea levels."[141]

Impacts to water resources: "Water resources across large areas of the country are at serious risk from climate change, with effects on water supplies, water quality, and adverse effects from extreme events such as floods and droughts. Even areas of the country where an increase in water flow is projected could face water resource problems from the supply and water quality problems associated with temperature increases and precipitation variability, as well as the increased risk of serious adverse effects from extreme events, such as floods and drought. The severity of risks and impacts is likely to increase over time with accumulating greenhouse gas concentrations and associated temperature increases."[142]

Impacts from sea level rise: "The most serious potential adverse effects are the increased risk of storm surge and flooding in coastal areas from sea level rise and more intense storms.

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[138] Final Endangerment Finding, 74 Fed. Reg. at 66,497.
[139] *Id.*
[140] *Id.*
[141] *Id.* at 66,497-98.
[142] *Id.* at 66,498.

Observed sea level rise is already increasing the risk of storm surge and flooding in some coastal areas. The conclusion in the assessment literature that there is the potential for hurricanes to become more intense (and even some evidence that Atlantic hurricanes have already become more intense) reinforces the judgment that coastal communities are now endangered by human-induced climate change, and may face substantially greater risk in the future. Even if there is a low probability of raising the destructive power of hurricanes, this threat is enough to support a finding that coastal communities are endangered by greenhouse gas air pollution. In addition, coastal areas face other adverse impacts from sea level rise such as land loss due to inundation, erosion, wetland submergence, and habitat loss. The increased risk associated with these adverse impacts also endangers public welfare, with an increasing risk of greater adverse impacts in the future."[143]

Impacts to energy, infrastructure, and settlements: "Changes in extreme weather events threaten energy, transportation, and water resource infrastructure. Vulnerabilities of industry, infrastructure, and settlements to climate change are generally greater in high-risk locations, particularly coastal and riverine areas, and areas whose economies are closely linked with climate-sensitive resources. Climate change will likely interact with and possibly exacerbate ongoing environmental change and environmental pressures in settlements, particularly in Alaska where indigenous communities are facing major environmental and cultural impacts on their historic lifestyles."[144]

Impacts to wildlife: "Over the 21st century, changes in climate will cause some species to shift north and to higher elevations and fundamentally rearrange U.S. ecosystems. Differential capacities for range shifts and constraints from development, habitat fragmentation, invasive species, and broken ecological connections will likely alter ecosystem structure, function, and services, leading to predominantly negative consequences for biodiversity and the provision of ecosystem goods and services."[145]

In addition to these acknowledged impacts on public health and welfare more generally, climate change is causing and will continue to cause serious impacts on natural resources that the Department of Interior is specifically charged with safeguarding.[146]

Impacts to Public Lands: Climate change is causing and will continue to cause specific impacts to public lands ecosystem services. Although public lands provide a variety of difficult-to-quantify public benefits, one recent Forest Service attempt at quantification estimates the public land ecosystem services at risk from climate change at between $14.5 and $36.1 billion annually.[147] In addition to the general loss of ecosystem services, irreplaceable species and aesthetic and recreational treasures are at risk of permanent destruction. High temperatures are

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[143] *Id.*
[144] *Id.*
[145] *Id.*; *see also* Third National Climate Assessment at 195-219.
[146] *See* Federal Land Policy and Management Act of 1976, 43 U.S.C. §§ 1701(a)(8), 1712(c)(1); Multiple-Use Sustained Yield Act of 1960, 16 U.S.C. § 528; National Environmental Policy Act of 1969, 42 U.S.C. §§ 4331-4332.
[147] Esposito, Valerie et al., Climate Change and Ecosystem Services: The Contribution and Impacts on Federal Public Lands in the United States, USDA Forest Service Proceedings RMRS-P-64 at 155-164 (2011).

causing loss of glaciers in Glacier National Park; the Park's glaciers are expected to disappear entirely by 2030, with ensuing warming of stream temperatures and adverse effects to aquatic ecosystems.[148] With effects of warming more pronounced at higher latitudes, tundra ecosystems on Alaska public lands face serious declines, with potentially serious additional climate feedbacks from melting permafrost.[149] In Florida, the Everglades face severe ecosystem disruption from already-occurring saltwater incursion.[150] Sea level rise will further damage freshwater ecosystems and the endangered species that rely on them.

Impacts to Biodiversity and Ecosystems: Across the United States ecosystems and biodiversity, including those on public lands, are directly under siege from climate change—leading to the loss of iconic species and landscapes, negative effects on food chains, disrupted migrations, and the degradation of whole ecosystems.[151] Specifically, scientific evidence shows that climate change is already causing changes in distribution, phenology, physiology, genetics, species interactions, ecosystem services, demographic rates, and population viability: many animals and plants are moving poleward and upward in elevation, shifting their timing of breeding and migration, and experiencing population declines and extirpations.[152] Because climate change is occurring at an unprecedented pace with multiple synergistic impacts, climate change is predicted to result in catastrophic species losses during this century. For example, the IPCC concluded that 20% to 30% of plant and animal species will face an increased risk of extinction if global average temperature rise exceeds 1.5°C to 2.5°C relative to 1980-1999, with an increased risk of extinction for up to 70% of species worldwide if global average temperature exceeds 3.5°C relative to 1980-1999.[153]

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[148] U.S. Environmental Protection Agency, Climate Change and Public Lands (1999).

[149] *See* National Climate Assessment at 48; Collins, M. et al., Long-term Climate Change: Projections, Commitments and Irreversibility, Ch 12 at 1096-7 in *Climate Change 2013: The Physical Science Basis, Contribution of Working Group 1 to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (2013); MacDougall, A. H., et al., Significant contribution to climate warming from the permafrost carbon feedback, 5 Nature Geoscience 719-721 (2012), doi:10.1038/ngeo1573.

[150] *See* National Climate Assessment at 592; Foti, R., Met al., Signs of critical transition in the Everglades wetlands in response to climate and anthropogenic changes, 110 Proceedings of the National Academy of Sciences6296-6300, (2013), doi:10.1073/pnas.1302558110.

[151] National Climate Assessment at 13.

[152] *See* Parmesan, C. and G. Yohe, A globally coherent fingerprint of climate change impacts across natural systems, 421 Nature 37–42 (2003); Root, T. et al., Fingerprints of global warming on wild animals and plants, 421 Nature 57–60 (2003); Chen, I. et al., Rapid range shifts of species associated with high levels of climate warming, 333 Science 1024–1026 (2011).

[153] Intergovernmental Panel on Climate Change, Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor, and H. L. Miller, Eds., Cambridge University Press (2007). Other studies have predicted similarly severe losses: 15%-37% of the world's plants and animals committed to extinction by 2050 under a mid-level emissions scenario, s*ee* Thomas et al., Extinction risk from climate change, 427 Nature 145–8 (2004)); the potential extinction of 10% to 14% of species by 2100 if climate change continues unabated, *see* Maclean, I. M. D. and R. J. Wilson, Recent ecological responses to climate change support predictions of high extinction risk, 108 Proceedings of the National Academy of Sciences of the United States of America 12337-12342 (2011); and the loss of more than half of the present climatic range for 58% of plants and 35% of animals by the 2080s under the current emissions pathway, in a sample of 48,786 species, *see* Warren, R. J. et al., Increasing Impacts of Climate Change Upon Ecosystems with Increasing Global Mean Temperature Rise, 106 Climatic Change 141–77 (2011).

In sum, climate change, driven primarily by the combustion of fossil fuels, poses a severe and immediate threat to the health, welfare, ecosystems and economy of the United States. These impacts are felt across the nation, including upon the public lands the Secretary of the Interior is charged with safeguarding. A rapid and deep reduction of emissions generated from fossil fuels is essential if such threats are to be minimized and their impacts mitigated.

Although cost-benefit analysis is not necessarily the ideal or exclusive method for assessing contributions to an adverse effect as enormous, uncertain, and potentially catastrophic as climate change, BLM does have tools available to provide one approximation of external costs and has previously performed a "social cost of carbon" analysis in prior environmental reviews.[154] Its own internal memo identifies one available analytical tool: "For federal agencies the authoritative estimates of [social cost of carbon] are provided by the 2013 technical report of the Interagency Working Group on Social Cost of Carbon, which was convened by the Council of Economic Advisers and the Office of Management and Budget."[155] As explained in that report:

> The purpose of the "social cost of carbon" (SCC) estimates presented here is to allow agencies to incorporate the social benefits of reducing carbon dioxide (CO_2) emissions into cost-benefit analyses of regulatory actions that impact cumulative global emissions. The SCC is an estimate of the monetized damages associated with an incremental increase in carbon emissions in a given year. It is intended to include (but is not limited to) changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services due to climate change.[156]

Further, other analytical tools exist to evaluate the cost of methane emissions.[157] EPA has peer reviewed and employed such a tool in its "Regulatory Impact Analysis of the Proposed Emission Standards for New and Modified Sources in the Oil and Natural Gas Sector."[158]

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[154] *See High Country Conserv'n Advocates v. United States Forest Serv.*, 2014 U.S. Dist. Lexis 87820 (D. Colo. 2014) (invalidating environmental assessment ["EA"] for improperly omitting social cost of carbon analysis, where BLM had included it in preliminary analysis); Taylor, P. "BLM crafting guidance on social cost of carbon -- internal memo," Greenwire, April 15, 2015, available at http://www.eenews.net/greenwire/stories/1060016810/; BLM Internal Memo from Assistant Director of Resources and Planning Ed Roberson ("Roberson Internal Memo"), April 2015, available at http://www.eenews.net/assets/2015/04/15/document_gw_01.pdf (noting "some BLM field offices have included estimates of the [social cost of carbon] in project-level NEPA documents") (accessed July 29, 2015); *see also* Council on Environmental Quality, Revised Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts, p. 18, available at www.whitehouse.gov/administration/eop/ceq/initiatives/nepa/ghg-guidance (accessed Jul 29, 2015) (quantitative analysis required if GHGs > 25k tons/yr).

[155] BLM, Roberson Internal Memo.

[156] *See* Interagency Working Group on Social Cost of Carbon, United States Government, Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis - Under Executive Order 12866, May 2013, available at https://www.whitehouse.gov/sites/default/files/omb/inforeg/social_cost_of_carbon_for_ria_2013_update.pdf (accessed July 29, 2015).

[157] *See* Marten A.L., Kopits K.A., Griffiths C.W., Newbold S.C., Wolverton A. 2014, online publication (2015, print publication). "Incremental CH4 and N2O mitigation benefits consistent with the US Government's SC-CO2 estimates," Climate Policy 15(2):272-298, abstract available at http://www.tandfonline.com/doi/abs/10.1080/14693062.2014.912981.

Leasing and development of oil and gas wells could exact extraordinary financial costs to communities and future generations, setting aside the immeasurable loss of irreplaceable, natural values that can never be recovered. BLM must provide an accounting of these potential costs in an EIS.

b. BLM Failed to Include any Analysis of Impacts to Water Quality or Water Resources

The EA omits any mention of water resources from its analysis of Affected Environment (Chapter 3) and Environmental Effects (Chapter 4),[159] despite the fact that the action area encompasses numerous streams, reservoirs, rivers and tributaries, some of which include critical habitat for endangered fish, as well as impaired waters. For example, Parcel UT-1116-009 intersects Ninemile Creek; Parcel UT-1116-067 intersects Willow Creek; Parcels UT-1116-094 and -103 intersect Green River; and Parcel UT-1116-142 overlaps the Steinaker Reservoir.[160] Even BLM states in the draft EA that there are four parcels "near or adjacent to Steinaker Reservoir: 069, 070, 071, and 142." Yet BLM does not discuss at all, any of the foreseeable consequences that oil and gas development would have on the water resources present in the areas to be leased. An EA may be set aside if it fails to address "certain crucial factors, consideration of which is essential to a truly informed decision whether or not to prepare an EIS." *In Def. of Animals, Dreamcatcher Wild Horse & Burro Sanctuary v. U.S. Dep't of Interior*, 751 F.3d 1054, 1072 (9th Cir. 2014); *see also W. Watersheds Project v. Rosenkrance*, 736 F. Supp. 2d 1276, 1278 (D. Idaho 2010) (Set aside the EA because it failed to address whether the wilderness values of action area would be impaired by the BLM's decision to allow grazing on this allotment, and by the cumulative effects of this decision and other grazing permitted.); *and Found. for N. Am. Wild Sheep v. United States Dep't of Agric.*, 681 F.2d 1172, 1178 (9th Cir. 1982) (Held that the Service's determination that no EIS was required was "plainly unreasonable" because "[t]he EA at issue here failed to address certain crucial factors, consideration of which was essential to a truly informed decision whether or not to prepare an EIS.").

Oil and gas operations, including hydraulic fracturing and other unconventional stimulation methods, are significant threats to water resources. Analysis of these threats are crucial because some of the water resources in or adjacent to the parcels at issue contain critical habitat for the Colorado River fish (bonytail, humpback chub, Colorado pikeminnow, and razorback sucker), listed as endangered under the Endangered Species Act, or have watersheds that are tributary to designated habitat. As discussed above, oil and gas development in these areas has the potential to jeopardize the continued existence of the endangered Colorado River fish, or result in the destruction or adverse modification of the critical habitat of such species.

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[158] *See* USEPA, Social Cost of Carbon, *available at* http://www3.epa.gov/climatechange/EPAactivities/economics/scc.html (noting application of social cost of methane supported by peer review); USEPA, Regulatory Impact Analysis of the Proposed Emission Standards for New and Modified Sources in the Oil and Natural Gas Sector, Ch. 4, available at http://www3.epa.gov/airquality/oilandgas/pdfs/og_prop_ria_081815.pdf.

[159] See EA.

[160] *See* Center for Biological Diversity Map of Waters.

It is clear that the unconventional oil and gas extraction methods, such as fracking, pose serious threats to water resources.[161] Across the U.S., in states where fracking or other types of unconventional oil and gas recovery has occurred, surface water and groundwater have been contaminated. Recent studies have concluded that water contamination attributed to unconventional oil and gas activity has occurred in several states, including Colorado,[162] Wyoming,[163] Texas,[164] Pennsylvania,[165] Ohio,[166] and West Virginia.[167] The likelihood that this sale would result in fracking raises several issues that BLM must address:

- Where will the water come from and what are the impacts of extracting it?
- What chemicals will be used in the drilling and fracking process?
- How will BLM ensure the collection and disclosure of that information?
- What limitations will BLM place on the chemicals used in order to protect public health and the environment?
- What measures will BLM require to ensure adequate monitoring of water impacts, both during and after drilling?
- What baseline data is available to ensure that monitoring of impacts can be carried out effectively? How will BLM collect baseline data that is not currently available?
- Much of the fracking fluid return to the surface as toxic waste. Where will the discharge go?
- Is there the potential for subsurface migration of fracking fluids, or the potential for those fluids to escape into the groundwater by way of a faulty casing?
- What kinds of treatment will be required?

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[161] U.S. Government Accountability Office, Unconventional Oil and Gas Development – Key Environmental and Public Health Requirements (2012); U.S. Government Accountability Office, Oil and Gas – Information on Shale Resources, Development, and Environmental and Public Health Risks (2012).

[162] Trowbridge, A., *Colorado Floods Spur Fracking Concerns*, CBS News, Sept. 17, 2013, *available at* http://www.cbsnews.com/8301-201_162-57603336/colorado-floods-spur-fracking-concerns/ ("Trowbridge 2013") (accessed July 30, 2015).

[163] U.S. Environmental Protection Agency, Draft Investigation of Ground Water Contamination near Pavillion, Wyoming (2011) ("USEPA Draft Pavillion Investigation"); DiGiulio, Dominic C. et al. Impact to Underground Sources of Drinking Water and Domestic Wells from Production Well Stimulation and Completion Practices in the Pavillion, Wyoming, Field, Environ. Sci. Technol., 2016, 50 (8), pp. 4524–4536, abstract available at http://pubs.acs.org/doi/abs/10.1021/acs.est.5b04970.

[164] Fontenot, Brian et al., An evaluation of water quality in private drinking water wells near natural gas extraction sites in the Barnett Shale Formation, Environ. Sco. Technol., DOI: 10.1021/es4011724 (published online July 25, 2013) ("Fontenot 2013").

[165] Jackson, Robert et al., Increased Stray Gas Abundance in a Subset of Drinking Water Wells near Marcellus Shale Gas Extraction, Proc. Natl. Acad. of Sciences Early Edition, doi: 10.1073/pnas.1221635110/-/DCSupplemental (2013) ("Jackson 2013").

[166] Ohio Department of Natural Resources, Report on the Investigation of the Natural Gas Invasion of Aquifers in Bainbridge Township of Geauga County, Ohio (Sep. 2008) ("ODNR 2008").

[167] Begos, K., *Four States Confirm Water Pollution*, Associated Press (January 5, 2014), *available at* http://www.usatoday.com/story/money/business/2014/01/05/some-states-confirm-water-pollution-from-drilling/4328859/ (accessed July 29, 2015); *see also* U.S. EPA, Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources, External Review Draft (June 2015) ("EPA 2015"), *available at* http://ofmpub.epa.gov/eims/eimscomm.getfile?p_download_id=523539 (accessed July 30, 2015).

- What is the potential footprint and impact of the necessary treatment facilities?

BLM's analysis of potential impacts to water must take account of all significant and foreseeable impacts to water that may arise from the sale, including the following issues.

1. BLM Must Look at Foreseeable Surface Water Contamination

Surface waters can be contaminated in many ways from unconventional well stimulation. In addition to storm water runoff, surface water contamination may also occur from chemical and waste transport, chemical storage leaks, and breaches in pit liners.[168]

Oil and gas operations require land clearance for access roads, pipelines, well pads, drilling equipment, chemical storage, and waste disposal pits. As a result, new oil and gas development will cause short-term disturbance as well as long-term disturbance within the areas for lease. While undisturbed land can retain greater amounts of water through plants and pervious soil, land that has been disturbed or developed may be unable to retain as much water, thereby increasing the volume of runoff. The area of land that is able to retain water will be significantly decreased if unconventional oil and gas extraction methods are permitted to expand. Water from precipitation and snowmelt can serve as an avenue through which contaminants travel from an operation site to sensitive areas, including population centers. Contaminated water runoff may seep into residential areas, polluting streets, sidewalks, soil, and vegetation in urban areas, adversely affecting human health. Thus, not only do these oil and gas activities create pollution, they create greater conduits for storm water runoff to carry those pollutants from the operation site, into areas in which significant harm can be caused.

Rapid runoff, even without contaminants, can harm the environment by changing water flow patterns and causing erosion, habitat loss, and flooding. Greater runoff volumes may also increase the amount of sediment that is carried to lakes and streams, affecting the turbidity and chemical content of surface waters. Because a National Pollutant Discharge Elimination System permit is not required for oil and gas operations,[169] it is particularly important that the impact of runoff is considered as part of the NEPA process.

Disposal of wastes from oil and gas operations, as well as the spilling or leaking of fracking fluids, flowback, or produced water, can lead to contamination of water resources. Harmful chemicals present in these fluids can include volatile organic compounds ("VOCs"), such as benzene, toluene, xylenes, and acetone.[170] As much as 25 percent of fracking chemicals are carcinogens,[171] and flowback can even be radioactive.[172] As described below, contaminated surface water can result in many adverse effects to wildlife, agriculture, and human health and

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[168] Vengosh, Avner et al., A Critical Review of the Risks to Water Resources from Unconventional Shale Gas Development and Hydraulic Fracturing in the United States, Environ. Sci. Technol., DOI: 10.1021/es405118y (2014) ("Vengosh 2014").
[169] 33 U.S.C. § 1342(l)(2).
[170] U.S. Environmental Protection Agency, Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources (Nov. 2011) ("EPA Plan to Study Fracking Impacts").
[171] Colborn 2011.
[172] EPA Plan to Study Fracking Impacts; White, Ivan E., Consideration of radiation in hazardous waste produced from horizontal hydrofracking, National Council on Radiation Protection (2012).

safety. It may make waters unsafe for drinking, fishing, swimming and other activities, and may be infeasible to restore the original water quality once surface water is contaminated. Such significant impacts must be thoughtfully considered in an EIS.

Potential sources of contamination include leaching from landfills that receive drilling and fracking solid wastes; spreading of drilling and fracking wastes over large areas of land; wastewaters discharged from treatment facilities without advanced "total dissolved solids" removal processes, or inadequate capacity to remove radioactive material removal; and breaches in underground injection disposal wells.[173]

Massive volumes of chemicals and wastewater used or produced in oil and gas operations have the potential to contaminate local watersheds. Between 2,600 to 18,000 gallons of chemicals are injected per hydraulically fracked well depending on the number of chemicals injected.[174] This waste can reach fresh water aquifers and drinking water.

Produced waters that fracking operations force to the surface from deep underground can contain high levels of total dissolved solids, salts, metals, and naturally occurring radioactive materials.[175] If spilled, the effects of produced water or brine can be more severe and longer-lasting than oil spills, because salts do not biodegrade or break down over time.[176] The only way to deal with them is to remove them.[177] The accumulation of long-lived isotopes of radium has been observed in the sediments and soils of produced-water spill sites.[178] Due to its relatively long half-life, radium contamination can remain in the soil for thousands of years.[179] Given the massive volumes of chemicals and wastewater produced, their potentially harmful constituents, and their persistence in the environment, the potential for severe environmental harm is real and must be evaluated in an EIS.

Furthermore, fluids must be transported to and/or from the well, which presents opportunities for spills.[180] Unconventional well stimulation relies on numerous trucks to transport chemicals to the site as well as collect and carry disposal fluid from the site to processing facilities. A U.S. Government Accountability Office (GAO) study found that up to

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[173] EPA 2015, 8-20, 8-36, 8-48, 8-65, 8-70; USGS, Indication of Unconventional Oil and Gas Wastewaters Found in Local Surface Waters, available at http://toxics.usgs.gov/highlights/2016-05-09-uog_wastes_in_streams.html.
[174] EPA 2015 at ES-12.
[175] Brittingham, Margaret C. et al., Ecological Risks of Shale Oil and Gas Development to Wildlife, Aquatic Resources and their Habitats, Environ. Sci. Technol. 2014, 48, 11034-11047, p. 11039; Lauer, Nancy E. Brine Spills Associated with Unconventional Oil Development in North Dakota. Environmental Science & Technology Article ASAP, DOI: 10.1021/acs.est.5b06349 (April 27, 2016), available at http://pubs.acs.org/doi/abs/10.1021/acs.est.5b06349 (finding contaminants such as ammonium, selenium, and lead at produced-water spill sites in North Dakota, and contamination in violation of national water quality regulations
[176] *Id*. at G (observing contamination from produced water "is remarkably persistent in the environment" and "elevated levels of salts and trace elements…can be preserved in spill sites for at least months to years"); King, Pamela, *Limited study supports findings on bigger brine spill risks*, E&E News (Nov. 4, 2015) ("King 2015")
[177] *Id*.
[178] Lauer 2016 at G.
[179] *Id*.
[180] Warco, Kathy, *Fracking truck runs off road; contents spill*, Observer Reporter (Oct 21, 2010).

1,365 truck loads can be required just for the drilling and fracturing of a single well pad,[181] while the New York Department of Conservation estimated the number of "heavy truck" trips to be about 3,950 per horizontal well (including unloaded and loaded trucks).[182] Accidents during transit may cause leaks and spills that result in the transported chemicals and fluids reaching surface waters. Chemicals and waste transported by pipeline can also leak or spill. There are also multiple reports of shippers dumping waste uncontained into the environment.[183]

The EIS should evaluate how often accidents can be expected to occur, and the effect of chemical and fluid spills on resources present in the action area. Such analysis should also include identification of the particular harms faced by communities near oil and gas fields. The EIS must include specific mitigation measures and alternatives based on a cumulative impacts assessment, and the particular vulnerabilities of environmental justice communities in both urban and rural settings.

Thousands of gallons of chemicals can be potentially stored on-site and used during hydraulic fracturing and other unconventional well stimulation activities.[184] These chemicals can be susceptible to accidental spills and leaks. Natural occurrences such as storms and earthquakes may cause accidents, as can negligent operator practices. Some sites may also use on-site wastewater treatment facilities. Improper use or maintenance of the processing equipment used for these facilities may result in discharges of contaminants. Other causes of spills include equipment failure (most commonly, blowout preventer failure, corrosion and failed valves) and failure of container integrity.[185]

Substantial concerns have been raised regarding potential human health impacts from oil and gas development within the Uinta Basin and in the Vernal Field Office area in particular.[186] The EIS should examine and quantify the risks to human health and the environment associated with on-site chemical and wastewater storage, including risks from natural events and negligent operator practices. Again, such analysis must also include an analysis of potential impacts faced by environmental justice communities in both rural and urban settings.

2. BLM Must Look at Foreseeable Water Depletion

The EA acknowledges that water used in drilling operations on the proposed leases will deplete the Colorado River System:

> It is estimated that approximately 3 acre-feet of water would be needed for the drilling and completion of one well. For the purposes of this document it is

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[181] U.S. Government Accountability Office, Oil and Gas: Information on Shale Resources, Development, and Environmental and Public Health Risks, GAO 12-732 (2012) at 33.
[182] NYDEC SGEIS at Ch. 6 Potential Environmental Impacts (2015) at 6-306 –*available at* http://www.dec.ny.gov/docs/materials_minerals_pdf/fsgeis2015.pdf.
[183] Kusnetz, Nicholas, *North Dakota's Oil Boom Brings Damage Along with Prosperity* at 4, ProPublica (June 7, 2012) ("Kusnetz North Dakota"); E&E News, *Ohio man pleads not guilty to brine dumping* (Feb. 15, 2013).
[184] EPA 2015 at ES-10.
[185] EPA 2015 at ES-11.
[186] Paul Solotaroff, "What's Killing the Babies of Vernal, Utah?" Rolling Stone (July 2, 2015).

assumed that the water would be obtained from a fresh water source that would be depleting to the Colorado River System.[187]

The EA, however, despite perfunctory acknowledgment that hydraulic fracturing "could potentially be implemented if development were to occur,"[188] discloses no information whatsoever regarding the potential fracking techniques that could be employed in the Uinta Basin, the water demands of those techniques, or the sources of water. This is a highly significant omission, because the water demands of fracking and/or horizontal drilling have the potential to greatly exceed water demands for simple drilling and completion. Although the EA provides no detail whatsoever regarding specific fracking techniques and water usage in the Uinta Basin, Halliburton boasts of the use of "production enhancement" on more than 500 wells in the Basin.[189]

Some fracking techniques require the use of tremendous amounts of freshwater. Typically between 2 and 5.6 million gallons of water are required to frack each well.[190] These volumes far exceed the amounts used in conventional natural gas development.[191] One recent study reviews water volumes used in fracking nationwide from 2011-2014, and finds in the Uinta Basin of northeast Utah, hydraulic fracturing water use volumes of between 1001 and 10,000 m^3 (0.811 to 8.107 acre-feet) per well.[192]

Water used in large quantities may lead to several kinds of harmful environmental impacts. The extraction of water for fracking can, for example, lower the water table, negatively affect biodiversity, harm local ecosystems, and reduce water available to communities.[193]

Withdrawal of large quantities of freshwater from streams and other surface waters will undoubtedly have serious environmental impacts.[194] Withdrawing water from streams will decrease the supply for downstream users, such as farmers or municipalities. Reductions in stream flows may also lead to downstream water quality problems by diminishing the water bodies' capacity for dilution and degradation.

The Vernal RMP EIS acknowledges significant adverse effects from oil and gas development on water, through both depletion and contamination:

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[187] EA at 10.
[188] EA at 10.
[189] Halliburton, "Uinta Basin," http://www.halliburton.com/en-US/ps/solutions/unconventional-resources/coalbed-methane/coalbed-methane-plays/the-uinta-basin.page?node-id=hgjyd47x (last visited July 13, 2016).
[190] U.S. Government Accountability Office 2012 at 17.
[191] *See* Clark, Corrie E. et al., Life Cycle Water Consumption for Shale Gas and Conventional Natural Gas, Environ. Sci. Technol., 2013, 47 (20), pp 11829–11836, abstract *available at* http://pubs.acs.org/doi/abs/10.1021/es4013855.
[192] Tanya Gallegos *et al.*, Hydraulic fracturing water use variability in the United States and potential environmental implications, Water Resources Research 51:7 (July 2015) 5839-5845 & Figure 1.
[193] International Energy Agency, Golden Rules for the Golden Age of Gas at 31-32 (2012).
[194] *See* Entrekin, Sally et al., *Rapid Expansion of Natural Gas Development Poses a Threat to Surface Waters*, 9 Front Ecol. Environ. 9, 503 (2011); EPA 2015 at 4-16.

> The minerals development proposed in the Proposed RMP would have long-term and short-term, direct and indirect adverse impacts on bonytail, Colorado pikeminnow, humpback chub, razorback sucker, roundtail chub, flannelmouth sucker, bluehead sucker and Colorado River cutthroat trout. The Soils and Water uality Section (Section 4.17.2) concludes that although stipulations would mitigate the negative impacts of minerals development on water quality, the mineral development outlined for the Proposed RMP and each alternative would result in indirect, long-term adverse impacts to water quality through soil erosion, sedimentation, and the potential for petroleum discharges into surface water and would therefore adversely impact these fisheries. It is also currently unknown how minerals development would increase surface disturbances in selenium and boron-rich soils, which could indirectly increase these contaminants in waters supporting these fisheries.
>
> The greatest impact to the Colorado River fishes would be that most of the new energy and mineral development would occur in the southern part of the VPA, in the proximity of the Green and White Rivers or their tributaries. Oil and gas development would change clean water discharge patterns into the rivers. Any new depletion from the Green River, particularly in a critical habitat reach would constitute a substantial impact.[195]

Despite acknowledging the significance of these impacts, BLM fails to include any analysis of them in the EA or the RMP EIS. BLM must consider not only the immediate water depletions demanded by drilling and completion, but the potential water demands of fracking and/or other production enhancement techniques, and their consequences for water volume and flow with the Green River and effects on endangered fish and their critical habitat. The EIS must analyze where water will be sourced, how much, and the effects on water sources under different alternatives. Moreover, all of these effects must be analyzed in the context of increasing water scarcity in the planning area due to climate change, drought, and increasing population growth.

3. BLM Must Look at Foreseeable Impacts to Aquatic Life and Habitat

When streams and other surface waters are depleted, the habitat for countless plants and animals will be harmed, and the depletion places tremendous pressure on species that depend on having a constant and ample stream of water. The increased risk of toxic spills and leaks discussed above could also harm aquatic species that inhabit areas downstream from spill sites. A pair of studies that compared water quality downstream from a wastewater injection site in West Virginia to that of upstream areas found (1) downstream sites had elevated levels of endocrine-disrupting chemicals at levels known to adversely affect aquatic organisms; and (2) microbial communities in downstream sediments had lower diversity and shifts in community composition, altering microbial activity and potentially impacting nutrient cycling.[196]

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[195] Vernal RMP EIS at 4-459 to -460.

[196] Akob, D.M., et al., 2016, Wastewater disposal from unconventional oil and gas development degrades stream quality at a West Virginia injection facility: Environmental Science and Technology, doi:10.1021/acs.est.6b00428 (Advanced Web release); Kassotis, C.D., et al., 2016, Endocrine disrupting activities of surface water associated with a West Virginia oil and gas Industry wastewater disposal site: Science of the Total

Important physical habitats such as banks, pools, runs, and glides (low gradient river sections) are important yet susceptible to disturbance with changing stream flows. Altering the volume of water can also change the water's temperature and oxygen content, harming some species that require a certain level of oxygenated water. Decreasing the volume of streamflow and stream channels by diverting water to fracking would have a negative impact on the environment.

The physical equipment itself that is designed to intake and divert water may also pose a threat to Colorado River endangered fishes. If not properly designed, such equipment and intake points may be a risk to wildlife.

c. The Finding of No Significant Impact is Not Supported by Any Reasoned Explanations, and is Hence Arbitrary and Capricious.

The foreseeable impacts to water resources in the planning area, as well as the endangered species and their critical habitat are significant enough to warrant the preparation of an EIS. However, BLM's decision not to look at any of these glaring issues resulted instead in a "Finding of No Significant Impact" ("FONSI") and in the consequent decision not to prepare an EIS. In deciding so, BLM ignores both the high degree of uncertainty and substantial controversy regarding the effects that the proposed action will have on the quality of the environment, especially in regards to the water resources in the areas to be leased. BLM's finding appears to be based solely upon its refusal to look at any site-specific impacts.[197] In essence, BLM concludes that there are no significant impacts because BLM will not analyze any of those impacts. That is not a proper basis for a FONSI, and BLM provides no other reasoned explanation or basis for the conclusion that none of the foreseeable environmental consequences of the proposed action are significant. In fact, BLM's finding is contrary to the growing body of scientific evidence, discussed above, showing the likely impacts of water contamination and depletion on not only endangered species but human health and safety as well.

Courts, including the Tenth Circuit, have repeatedly rejected BLM's claim that it does not have to perform site-specific NEPA analyses, or address mitigation measures, until an APD is received. As BLM acknowledges in its Draft EA, BLM is required to perform and disclose an analysis of environmental impacts *prior* to the irretrievable commitment of resources. N.M. ex rel. Richardson v. BLM, 565 F.3d 683, 716 (10th Cir. 2009) (Assessment of a given environmental impact must occur as soon as that impact is "reasonably foreseeable," citing 40 C.F.R. § 1502.22, and must take place before an "irretrievable commitment of resources" occurs, citing 42 U.S.C. § 4332(2)(C)(v)); See also Pennaco Energy, Inc. v. United States DOI, 377 F.3d 1147, 1160 (10th Cir. 2004) (Agencies are required to satisfy NEPA before committing themselves irretrievably to a given course of action, so that the action can be shaped to account for environmental values.). The point of irretrievable and irreversible commitment occurs at the

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Environment, v. 557–558, p. 901910, doi:10.1016/j.scitotenv.2016.03.113. The two studies are summarized at: http://toxics.usgs.gov/highlights/2016-05-09-uog_wastes_in_streams.html.

[197] *See, e.g.*, Draft EA, Appendix C. Interdisciplinary Checklist at 117.

point of lease issuance. S. Utah Wilderness All. v. Norton, 457 F. Supp. 2d 1253, 1256 (D. Utah 2006). Therefore, BLM's deferral of site-specific analysis until the APD stage is unlawful under NEPA, its implementing regulations, and legal precedents. BLM is therefore required to thoroughly analyze the impacts of the proposed lease sale at this time – which requires the agency to prepare an EIS.

Furthermore, BLM's finding of no significant impacts relies on outdated information and fails to take into account new and significant information regarding the effects of climate change on the Upper Colorado River Basin. For example, BLM's only mention of water resources is the generalized and unsubstantiated conclusion that surface waters are present in the areas to be leased "but not affected to a degree that detailed analysis is required." In light of "existing knowledge regarding resource values on the subject parcels," which is based upon highly generalized information contained in the VFO RMP from 2008, BLM concludes that "significant impacts beyond those already addressed in the VFO RMP [2008] are not anticipated to occur as a result of leasing the proposed parcels." However, neither the 2008 VFO RMP nor the Draft EA considered the impacts of climate change on these water resources, such as the decline in stream flows. This is a significant omission, as numerous climate change models show anthropogenic climate change is profoundly impacting the Colorado River in ways that are altering temperature[198], streamflow[199], and the hydrologic cycle.[200] Changes observed to date include rising temperatures, earlier snowmelt and streamflow, decreasing snowpack, and declining runoff and streamflow.[201] Modeling studies project that these changes will only worsen, including continued declines in streamflow and intensification of drought.[202] Climate change is likely to have significant effects on the endangered fish species and the Colorado River ecosystem.

1. Rising temperatures

The Colorado River basin has warmed significantly during the past century, with average increases in surface temperature of 1.6°F (0.9°C) over the Southwest during 1901-2010.[203] The greatest warming has occurred in spring and summer, and in daytime high temperatures and

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[198] Hoerling, M. P., et al. 2013. Evolving weather and climate conditions of the Southwest United States. Pages 74–100 in G. Garfin, A. Jardine, M. Black, R. Merideth, J. Overpeck, and A. Ray, editors. Assessment of climate change in the Southwest United States: a report prepared for the National Climate Assessment. Island Press, Washington, D.C., USA ("Hoerling, 2013")

[199] Hoerling, 2013; Hamlet, A., et al. 2005. Effects of temperature and precipitation variability on snowpack trends in the western United States. Journal of Climate 18: 4545-4561; Stewart, I. T., et al. 2004. Changes in snowmelt runoff timing in western North America under a 'Business as Usual' climate change scenario. Climatic Change 62: 217-232; Garfin, G., et al., 2014: Ch. 20: Southwest. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 462-486.

[200] *Id*.

[201] *Id*.

[202] Stewart, I. T., et al. 2004. Changes in snowmelt runoff timing in western North America under a 'Business as Usual' climate change scenario. Climatic Change 62: 217-232; Rauscher, S. A., et al. 2008. Future changes in snowmelt-driven runoff timing over the western US. Geophysical Research Letters 35: L16703, doi:10.1029/2008GL034424 ("Rauscher, 2008"); Dettinger, M., B. Udall, and A. Georgakakos. 2015. Western water and climate change. Ecological Applications 25: 2069-2093 ("Dettinger, 2015").

[203] Hoerling, 2013.

nighttime low temperatures.[204] Surface temperatures in the Southwest are projected to increase steeply in this century by an average of 4.5 to 7.9° F depending on the emissions scenario, with an average of 2.5 to 3°F of warming projected for 2021-2050 alone.[205] As explained below, warming temperatures are having significant effects on streamflow, drought severity, and the hydrologic cycle in the Southwest.[206]

2. Earlier snowmelt and streamflow

In much of the Colorado River basin, snowmelt, snowmelt runoff, and streamflow timing have trended earlier since the mid-1950s, in parallel with warming temperatures.[207] The Colorado River basin's spring pulse from 1978-2004 shifted to two weeks earlier compared to flows before 1978.[208] Although there are both natural and human influences on these hydrologic trends, studies indicate that anthropogenic greenhouse gases began to impact snow-fed streamflow timing during 1950-1999.[209] Modeling studies have projected that snowmelt, spring runoff, and streamflow timing will continue to shift earlier across much of the Southwest.[210]

3. Decreasing snowpack

The Colorado River receives most of its water from winter snowpack from the Rocky Mountains, where 15% of the total basin areas generates 85% of the river flow.[211] Across much of the Colorado River basin, the spring snowpack is decreasing and more winter precipitation is falling as rain instead of snow.[212] Approximately half of the observed decline in snowpack in the western United States during 1950-1999 has been attributed to the effects of anthropogenic greenhouse gases, ozone and aerosols.[213] Modeling studies project a continued reduction of Southwest mountain snowpack during February through May during this century, largely due to the effects of rising temperatures.[214]

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[204] Bonfils, C., et al. 2008. Detection and attribution of temperature changes in the mountainous western United States. Journal of Climate 21: 6404–6424 ("Bonfils, 2013"); Hoerling et al. 2013.
[205] Cayan, D. et al. 2013. Future climate: projected average. Pages 101–125 in G. Garfin, A. Jardine, R. Merideth, M. Black, and S. LeRoy, editors. Assessment of climate change in the southwest United States: a report prepared for the National Climate Assessment. A report by the Southwest Climate Alliance. Island Press, Washington, D.C., USA ("Cayan et al. 2013").
[206] Barnett, T. P., et al. 2008. Human-induced changes in the hydrology of the western United States. Science 319: 1080–1083 ("Barnett et al. 2008"); Woodhouse, C. A., et al. 2016. Increasing influence of air temperature on upper Colorado River streamflow. Geophys. Res. Lett. 43, doi:10.1002/2015GL067613 ("Woodhouse et al. 2016").
[207] Hamlet et al. 2005; Stewart et al. 2005; Barnett et al. 2008; Hoerling et al. 2013; Garfin et al. 2014.
[208] Ray, A.J., Barsugli, et al. 2008. Climate change in Colorado: a synthesis to support water resources management and adaptation. Report for the Colorado Water Conservation Board. University of Colorado, Boulder ("Ray et al. 2008").
[209] Barnett et al. 2008; Hidalgo, H. G., et al. 2009 Detection and attribution of streamflow timing changes to climate change in the western United States. Journal of Climate 22: 3838-3855 ("Hidalgo et al. 2009"); Hoerling et al. 2013
[210] Stewart et al. 2004; Rauscher et al. 2008; Dettinger et al. 2015.
[211] Dettinger, et al. 2015. Western water and climate change. Ecological Applications 25: 2069-2093 ("Dettinger et al. 2015").
[212] Hamlet et al. 2005; Pierce, D. W., et al. 2008. Attribution of declining western U.S. snowpack to human effects. Journal of Climate 21: 6425-6444 ("Pierce et al. 2008"); Das et al. 2009
[213] Pierce et al. 2008
[214] Cayan et al. 2013; Dettinger et al. 2015.

4. *Declining Runoff and Streamflow*

Annual runoff in the Colorado River basin appears to be declining (USBR 2011), with significant consequences for reduced streamflow. During 2001–2010, warm temperatures and dry conditions reduced average naturalized flows in the Colorado River (measured at Lee's Ferry) to the second-lowest-flow decade since 1901, to12.6 million acre-feet per year compared to the 1901–2000 average of 15.0 million acre-feet per year.[215]

Modeling studies project that runoff and streamflow will continue to decrease substantially in the Colorado River basin during this century.[216] Barnett and Pierce (2009) concluded that anthropogenic climate change is likely to reduce runoff in the Colorado River basin by 10-30% by 2050. Projected reductions in runoff range from 6-7 percent[217] to 45 percent[218] depending on the models and methods used in each study.[219] In the short term, Hoerling and Eischeid (2007) predict streamflow to decrease by 25% during 2006-2030, and by 45% during 2035-2060.

Importantly, numerous studies show that warming temperatures alone will cause runoff and streamflow declines in the Colorado River basin. For example, in a recent review, Vano et al. (2014) estimated that future streamflow in the Colorado River basin will be reduced by 5% to 35% due to rising temperature alone. When precipitation change is considered, a 5% decrease in precipitation would further reduce streamflow by 10% to 15%.[220]

Warming temperatures will play an increasingly important role in causing runoff to decline in the Colorado River basin, and must be factored into streamflow forecasts.[221] An empirical study of the influence of precipitation, temperature, and soil moisture on upper Colorado River basin streamflow over the past century found that warmer temperatures have already resulted in flows less than expected based on precipitation levels.[222] The study was "the first to examine the instrumental historical record to see if a temperature effect could be

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[215] Hoerling et al. 2013.

[216] Ray, A.J., et al. 2008. Climate change in Colorado: a synthesis to support water resources management and adaptation. Report for the Colorado Water Conservation Board ("Ray, et al 2008"); Das et al. 2011; US Bureau of Reclamation and Colorado River Basin Water Supply and Demand Study Team. 2011. Colorado River basin Water Supply and Demand Study: Technical Report B – Water Supply Assessment. Interim Report No. 1 ("USBR 2011"); Cayan et al. 2013; Georgakakos, A., et al. 2014. Water resources. Pages 69–112 in J. M. Melillo, T. C. Richmond, and G. W. Yohe, editors. Climate change impacts in the United States: the third National Climate Assessment. U.S. Global Change Research Program, Washington, D.C., USA ("Georgakakos et al. 2014"); Dettinger et al. 2015

[217] Christensen, N.S. and D.P. Lettenmaier. 2007. A multimodel ensemble approach to assessment of climate change impacts on the hydrology and water resources of the Colorado River basin. Hydrology and Earth System Sciences 11: 417-1434 ("Christensen and Lettenmaier 2007").

[218] Hoerling, M. and J. Eischeid. 2007. Past peak water in the Southwest. Southwest Hydrology 35: 18–19 ("Hoerling and Eischeid 2007").

[219] see Barnett, T.P. and D.W. Pierce. 2008. When will Lake Mead go dry? Water Resources Research 44: W03201 ("Barnett and Pierce 2009") at Table 2.

[220] Vano, J. A., et al. 2014. Understanding uncertainties in future Colorado River streamflow. Bulletin of the American Meteorological Society 95: 59-78 ("Vano et al. 2014").

[221] Woodhouse et al. 2016

[222] Woodhouse et al. 2016

detected."[223] Consistent with past research, the study found that cool season precipitation explains most of the variability in annual streamflow. However, temperature was highly influential in determining streamflow under certain conditions. The study concluded that "[s]ince 1988, a marked increase in the frequency of warm years with lower flows than expected, given precipitation, suggests continued warming temperatures will be an increasingly important influence in reducing future UCRB water supplies." The researchers warned that "streamflow forecasts run the risk of overprediction if warming spring and early summer temperatures are not adequately considered."

5. Increasing Drought Severity

Historically, droughts in the Colorado River basin were primarily driven by precipitation deficits. However, studies indicate that rising temperatures have begun to play a more important role in driving droughts.[224] Importantly, rising temperature superimposed on natural drought variability is expected to exacerbate the impacts of droughts.[225] Modeling studies project that droughts in the Southwest will intensify due to longer periods of dry weather and more extreme heat, leading to higher evapotranspiration and moisture loss.[226] In the Colorado River basin, future droughts are projected to be substantially hotter, and drought is projected to become more frequent, intense, and longer lasting than in the historical record.[227]

6. Reduced reservoir levels and unsustainable demand for water

Reservoirs in the Colorado River basin are highly vulnerable to climate change, particularly because the amount of storage in reservoirs is sensitive to runoff changes.[228] Even small decreases in runoff have caused average reservoir levels to markedly decrease.[229] Christensen et al. (2004) predicted that climate change impacts on the hydrology of the Colorado River system would result in water demand (deliveries and evaporation) exceeding reservoir inflows (which would also be decreased), resulting in a degraded system. Likewise, Barnett and Pierce (2008) projected that a 10% reduction in runoff would result in requested water deliveries surpassing sustainable deliveries by 2040, while a 20% reduction in runoff would cause unsustainable water demands by 2025. A greater demand than supply makes the system more prone to long-term sustained droughts, as reservoirs will not have sufficient time to be naturally replenished and more water will be extracted from a dwindling supply than is sustainable.[230]

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[223] Colorado River flows reduced by warmer spring temperatures, Science Daily (March 9, 2016), available at https://www.sciencedaily.com/releases/2016/03/160309125412.htm
[224] Hoerling et al. 2013, Vano et al. 2014
[225] Seager, R., et al. 2012. Projections of declining surface-water availability for the southwestern United States. Nature Climate Change doi:10.1038/NCLIMATE1787; Cook et al. 2015
[226] Seager, R., et al. 2007. Model projections of an imminent transition to a more arid climate in southwestern North America. Science 316: 1181-1184; Cayan et al. 2010; Trenberth, K.E., et al. 2013. Global warming and changes in drought. Nature Climate Change 4: 17-22.
[227] Garfin et al. 2014.
[228] Barnett and Pierce 2008.
[229] Christensen et al. 2004. The effects of climate change on the hydrology and water resources of the Colorado River basin. Climatic change 62: 337-363.
[230] Christensen and Lettenmaier 2007.

Reservoirs would spend additional time in a depleted state, weakening the system's buffering ability in years where there is low precipitation.[231]

In sum, the best available scientific data indicates that climate change is resulting in higher temperatures in the Colorado River Basin, reduced snowpack, reduced runoff, and increased drought, *which have already reduced* and will continue to reduce stream flows in the Basin. BLM must consider this new information regarding current and future Green and Colorado River flows both in its NEPA anlaysis and in consultation with the Fish and Wildlife Service regarding effects to listed fish.

III. BLM Must Address Environmental Justice and Public Health Impacts

Executive Order 12898 requires that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States."[232] Despite substantial questions regarding air pollution from Uinta Basin drilling and its public health effects on communities in northeast Utah, [233] BLM in the EA declines to address public health and environmental justice, stating:

> As defined in EO 12898, minority, low income populations and disadvantaged groups may be present within the counties involved in this lease sale. However, all citizens can file an expression of interest or participate in the bidding process (43 CFR §3120.3-2). The stipulations and notices applied to the subject parcels do not place an undue burden on these groups. Leasing the nominated parcels would not cause any disproportionately high and adverse human health or environmental effects on minority populations, low-income populations, or Native American Tribes because the minerals are federal and or the surface is private or BLM.[234]

The BLM's stated reasons for declining to address the public health and environmental impacts of oil and gas development on minority and low-income populations in northeast Utah are wholly arbitrary. The fact that anyone can submit an expression of interest or bid on an oil and gas lease does not in any way obviate the fact that the negative health consequences of oil and gas development and resulting air pollution are borne largely by those who do not have the capital to invest in oil and gas leases, and who do not share in the economic benefits the industry brings to its investors. Furthermore, the assertion that leasing would not cause disproportionate impacts "because the minerals are federal and or the surface is private or BLM" ignores two basic but critical facts. First, air pollution does not remain conveniently within land ownership

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[231] Barnett and Pierce 2009

[232] Executive Order 12,898, 59 Fed. Reg. No. 32 (Feb. 11, 1994).

[233] *See Siddika N, Balogun HA, Amegah AK, Jaakkola JJ. Prenatal ambient air pollution exposure and the risk of stillbirth: systematic review and meta-analysis of the empirical evidence. Occup Environ Med. 2016 May 24. pii: oemed-2015-103086. doi: 10.1136/oemed-2015-103086*; *see also* Annie Knox, "At Vernal forum, questions about air pollution, pregnancies, research," Salt Lake Tribune (April 19, 2015); Solotaroff, "What's Killing the Babies of Vernal, Utah?"

[234] EA, App. C at 109.

boundaries. Ozone, particulates, and hazardous air pollutants from oil and gas development travel and affect disadvantaged communities not directly located on the leasehold. Second, these same pollutants also have occupational health impacts on industry employees and contractors who do not live, but work, on the leasehold.

IV. BLM Must End All New Fossil Fuel Leasing and Hydraulic Fracturing

Climate change is a problem of global proportions resulting from the cumulative greenhouse gas emissions of countless individual sources. A comprehensive look at the impacts of fossil fuel extraction, and especially fracking, across the planning area affected by the leases in an updated RMP is absolutely necessary. BLM has *never* thoroughly considered the cumulative climate change impacts of *all* potential fossil fuel extraction and fracking (1) within the planning area, (2) across the state, and (3) across all public lands. Proceeding with new leasing proposals *ad hoc* in the absence of a comprehensive plan that addresses climate change and fracking is premature and risks irreversible damage before the agency and public have had the opportunity to weigh the full costs of oil and gas and other fossil fuel extraction and consider necessary limits on such activities. Therefore BLM must cease all new leasing at least until the issue is adequately analyzed in a programmatic review of all U.S. fossil fuel leasing,[235] or at least within amended RMPs.

A. BLM Must Limit Greenhouse Gas Emissions By Keeping Federal Fossil Fuels In the Ground

Expansion of fossil fuel production will substantially increase the volume of greenhouse gases emitted into the atmosphere and jeopardize the environment and the health and well being of future generations. BLM's mandate to ensure "harmonious and coordinated management of the various resources *without permanent impairment of the productivity of the land and the quality of the environment*" requires BLM to limit the climate change effects of its actions.[236] Keeping all unleased fossil fuels in the ground and banning fracking and other unconventional well stimulation methods would lock away millions of tons of greenhouse gas pollution and limit the destructive effects of these practices.

A ban on new fossil fuel leasing and fracking is necessary to meet the U.S.'s greenhouse gas reduction commitments. On December 12, 2015, 197 nation-state and supra-national organization parties meeting in Paris at the 2015 United Nations Framework Convention on Climate Change Conference of the Parties consented to an agreement (Paris Agreement) committing its parties to take action so as to avoid dangerous climate change. [237] As the United

[235] *See* Center for Biological Diversity, Petition for a Moratorium on the Leasing of Federal Public Land Fossil Fuels Under the Mineral Leasing Act, Before the United States Department of the Interior, July 12, 2016.
[236] *See* 43 U.S.C. §§ 1701(a)(7), 1702(c), 1712(c)(1), 1732(a) (emphasis added); *see also id*. § 1732(b) (directing Secretary to take any action to "prevent unnecessary or undue degradation" of the public lands).
[237] United Nations Framework Convention on Climate Change, Adoption of the Paris Agreement, Proposal by the President, Draft decision -/CP.2, Art. 2. (2015)

States signed the treaty on April 22, 2016[238] as a legally binding instrument through executive agreement,[239] the Paris Agreement commits the United States to critical goals—both binding and aspirational—that mandate bold action on the United States' domestic policy to rapidly reduce greenhouse gas emissions.[240]

The United States and other parties to the Paris Agreement recognized "the need for an effective and progressive response to the urgent threat of climate change on the basis of the best available scientific knowledge."[241] The Paris Agreement articulates the practical steps necessary to obtain its goals: parties including the United States have to "reach global peaking of greenhouse gas emissions *as soon as possible* . . . and to *undertake rapid reductions* thereafter in accordance *with best available science*,"[242] imperatively commanding that developed countries specifically "should continue taking the lead by undertaking economy-wide absolute emission reduction targets"[243] and that such actions reflect the "highest possible ambition."[244]

The Paris Agreement codifies the international consensus that climate change is an "urgent threat" of global concern,[245] and commits all signatories to achieving a set of global goals. Importantly, the Paris Agreement commits all signatories to an articulated target to hold 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"[246] (emphasis added).

In light of the severe threats posed by even limited global warming, the Paris Agreement established the international goal of limiting global warming to 1.5°C above pre-industrial levels in order to "prevent dangerous anthropogenic interference with the climate system," as set forth in the UNFCCC, a treaty which the United States has ratified and to which it is bound.[247] The Paris consensus on a 1.5°C warming goal reflects the findings of the IPCC and numerous scientific studies that indicate that 2°C warming would exceed thresholds for severe, extremely

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[238] For purposes of this Petition, the term "treaty" refers to its international law definition, whereby a treaty is "an international law agreement concluded between states in written form and governed by international law" pursuant to article 2(a) of the Vienna Convention on the Law of Treaties, 1155 U.N.T.S. 331, 8 I.L.M. 679 (Jan. 27, 1980).
[239] *See* United Nations Treaty Collection, Chapter XXVII, 7.d Paris Agreement, List of Signatories; U.S. Department of State, Background Briefing on the Paris Climate Agreement, (Dec. 12, 2015), http://www. state.gov/ r/pa/prs/ps/2015/12/250592.htm.
[240] Although not every provision in the Paris Agreement is legally binding or enforceable, the U.S. and all parties are committed to perform the treaty commitments in good faith under the international legal principle of *pacta sunt servanda* ("agreements must be kept"). Vienna Convention on the Law of Treaties, Art. 26.
[241] *Id.*, Recitals.
[242] *Id.*, Art. 4(1).
[243] *Id.*, Art. 4(4).
[244] *Id*, Art. 4(3).
[245] *Id.*, Recitals.
[246] *Id.*, Art. 2.
[247] *See* United Nations Framework Convention on Climate Change, Cancun Agreement (2011) *available at* http://cancun.unfccc.int/ (last visited Jan 7, 2015); United Nations Framework Convention on Climate Change, Copenhagen Accord (2009) *available at* http://unfccc.int/meetings/copenhagen_dec_2009/items/5262.php (last accessed Jan 7, 2015). The United States Senate ratified the UNFCC on October 7, 1992. *See* U.S. Congress, Ratification of Treaty Document titled The United Nations Framework Convention on Climate Change, adopted May 9, 1992, https://www.congress.gov/treaty-document/102nd-congress/38.

dangerous, and potentially irreversible impacts.[248] Those impacts include increased global food and water insecurity, the inundation of coastal regions and small island nations by sea level rise and increasing storm surge, complete loss of Arctic summer sea ice, irreversible melting of the Greenland ice sheet, increased extinction risk for at least 20-30% of species on Earth, dieback of the Amazon rainforest, and "rapid and terminal" declines of coral reefs worldwide.[249] As scientists noted, the impacts associated with 2°C temperature rise have been "revised upwards, sufficiently so that 2°C now more appropriately represents the threshold between 'dangerous' and 'extremely dangerous' climate change."[250] Consequently, a target of 1.5 ºC or less temperature rise is now seen as essential to avoid dangerous climate change and has largely supplanted the 2°C target that had been the focus of most climate literature until recently.

Immediate and aggressive greenhouse gas emissions reductions are necessary to keep warming below a 1.5º or 2°C rise above pre-industrial levels. Put simply, there is only a finite amount of CO_2 that can be released into the atmosphere without rendering the goal of meeting the 1.5°C target virtually impossible. A slightly larger amount could be burned before meeting a 2°C target became an impossibility. Globally, fossil fuel reserves, if all were extracted and burned, would release enough CO_2 to exceed this limit several times over.[251]

The question of what amount of fossil fuels can be extracted and burned without negating a realistic chance of meeting a 1.5 or 2°C target is relatively easy to answer, even if the answer is framed in probabilities and ranges. The IPCC Fifth Assessment Report and other expert assessments have established global carbon budgets, or the total amount of remaining carbon that can be burned while maintaining some probability of staying below a given temperature target. According to the IPCC, total cumulative anthropogenic emissions of CO_2 must remain below about 1,000 gigatonnes ($GtCO_2$) from 2011 onward for a 66% probability of limiting warming to 2°C above pre-industrial levels.[252] Given more than 100 $GtCO_2$ have been emitted since 2011,[253]

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[248] *See* Paris Agreement, Art. 2(1)(a); U); United Nations Framework Convention on Climate Change, Subsidiary Body for Scientific and Technical Advice, Report on the structured expert dialogue on the 2013-15 review, No. FCCC/SB/2015/INF.1 at 15-16 (June 2015);IPCC AR5 Synthesis Report at 65 & Box 2.4.

[249] *See* Jones, C. et al, Committed Terrestrial Ecosystem Changes due to Climate Change, 2 Nature Geoscience 484, 484–487 (2009); Smith, J. B. *et al.*, Assessing Dangerous Climate Change Through an Update of the Intergovernmental Panel on Climate Change (IPCC) 'Reasons for Concern', 106 Proceedings of the National Academy of Sciences of the United States of America 4133, 4133–37 (2009); Veron, J. E. N. *et al.*, The Coral Reef Crisis: The Critical Importance of <350 ppm CO2, 58 Marine Pollution Bulletin 1428, 1428–36, (2009); ; Warren, R. J. *et al.*, Increasing Impacts of Climate Change Upon Ecosystems with Increasing Global Mean Temperature Rise, 106 Climatic Change 141–77 (2011); Hare, W. W. *et al.*, Climate Hotspots: Key Vulnerable Regions, Climate Change and Limits to Warming, 11 Regional Environmental Change 1, 1–13 (2011); ; Frieler, K. M. *et al.*, Limiting Global Warming to 2ºC is Unlikely to Save Most Coral Reefs, Nature Climate Change, Published Online (2013) doi: 10.1038/NCLIMATE1674; ; M. Schaeffer *et al.*, Adequacy and Feasibility of the 1.5°C Long-Term Global Limit, Climate Analytics (2013).

[250] Anderson, K. et al., Beyond 'Dangerous' Climate Change: Emission Scenarios for a New World, 369 Philosophical Transactions, Series A, Mathematical, Physical, and Engineering Sciences 20, 20–44 (2011).

[251] Cimons, Marlene, Keep it in the Ground, Sierra Club, 350.org, Greenpeace (2016)

[252] IPCC, 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change; Summary for Policymakers at 27; IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change at 64 & Table 2.2 [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)] at 63-64 & Table 2.2 ("IPCC AR5 Synthesis Report").

the remaining portion of the budget under this scenario is well below 900 $GtCO_2$. To have an 80% probability of staying below the 2°C target, the budget from 2000 is 890 $GtCO_2$, with less than 430 $GtCO_2$ remaining.[254]

To have even a 50% probability of achieving the Paris Agreement goal of limiting warming to 1.5°C above pre-industrial levels equates to a carbon budget of 550-600 $GtCO_2$ from 2011 onward, [255] of which more than 100 $GtCO_2$ has already been emitted. To achieve a 66% probability of limiting warming to 1.5°C requires adherence to a more stringent carbon budget of only 400 $GtCO_2$ from 2011 onward, [256] of which less than 300 $GtCO_2$ remained at the start of 2015. An 80% probability budget for 1.5°C would have far less that 300 $GtCO_2$ remaining. Given that global CO_2 emissions in 2014 alone totaled 36 $GtCO_2$,[257] humanity is rapidly consuming the remaining burnable carbon budget needed to have even a 50/50 chance of meeting the 1.5°C temperature goal.[258]

According to a recent report by EcoShift Consulting commissioned by the Center and Friends of the Earth, unleased (and thus currently unburnable) federal fossil fuels represent a significant source of potential greenhouse gas emissions:

- Potential GHG emissions of federal fossil fuels (leased and unleased) if developed would release up to 492 gigatons (Gt) (one gigaton equals 1 billion tons) of carbon dioxide equivalent pollution (CO2e); representing 46 percent to 50 percent of potential emissions from all remaining U.S. fossil fuels.
- Of that amount, up to 450 Gt CO2e have not yet been leased to private industry for extraction;

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[253] From 2012-2014, 107 GtCO2 was emitted (*see* Annual Global Carbon Emissions at http://co2now.org/Current-CO2/CO2-Now/global-carbon-emissions.html).

[254] Carbon Tracker Initiative, Unburnable Carbon – Are the world's financial markets carrying a carbon bubble? (2011) *available at* http://www.carbontracker.org/wp-content/uploads/2014/09/Unburnable-Carbon-Full-rev2-1.pdf; Meinshausen, M. *et al.*, Greenhouse gas emission targets for limiting global warming to 2 degrees Celsius, 458 Nature 1158, 1159 (2009).

[255] IPCC AR5 Synthesis Report at 64 & Table 2.2.

[256] *Id*.

[257] *See* CO2Now.org, Annual Global Carbon Emissions, https://www.co2.earth/global-co2-emissions? (accessed Apr 29, 2016).

[258] In addition to limits on the *amount* of fossil fuels that can be utilized, emissions pathways compatible with a 1.5 or 2°C target also have a significant temporal element. Leading studies make clear that to reach a reasonable likelihood of stopping warming at 1.5° or even 2°C, global CO2 emissions must be phased out by mid-century and likely as early as 2040-2045. *See, e.g.* Rogelj, Joeri *et al.*, Energy system transformations for limiting end-of-century warming to below 1.5°C, 5 Nature Climate Change 519, 522 (2015). United States focused studies indicate that we must phase out fossil fuel CO2 emissions even earlier—between 2025 and 2040—for a reasonable chance of staying below 2ºC. *See, e.g.* Climate Action Tracker, http://climateactiontracker.org/countries/usa. Issuing new legal entitlements to explore for and extract federal fossil fuels for decades to come is wholly incompatible with such a transition.

- Releasing those 450 Gt CO2e (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 below scientifically advised levels.[259]

Fracking has also opened up vast reserves that otherwise would not be available, increasing the potential greenhouse gas emissions that can be released into the atmosphere. BLM must consider a ban on this practice and a ban on new leasing to prevent the worst effects of climate change.

B. BLM Must Consider A Ban on New Oil and Gas Leasing and Fracking in a Programmatic Review and Halt All New Leasing and Fracking in the Meantime.

Development of unleased oil and gas resources will fuel climate disruption and undercut the needed transition to a clean energy economy. As BLM has not yet had a chance to consider no-leasing and no-fracking alternatives as part of any of its RMP planning processes or a comprehensive review of its federal oil and gas leasing program, BLM should suspend new leasing until it properly considers this alternative in updated RMPs or a programmatic EIS for the entire leasing program. BLM demonstrably has tools available to consider the climate consequences of its leasing programs, and alternatives available to mitigate those consequences, at either a regional or national scale.[260]

BLM would be remiss to continue leasing when it has never stepped back and taken a hard look at this problem at the programmatic scale. Before allowing more oil and gas extraction in the planning area, BLM must: (1) comprehensively analyze the total greenhouse gas emissions which result from past, present, and potential future fossil fuel leasing and all other activities across all BLM lands and within the various planning areas at issue here, (2) consider their cumulative significance in the context of global climate change, carbon budgets, and other greenhouse gas pollution sources outside BLM lands and the planning area, and (3) formulate measures that avoid or limit their climate change effects. By continuing leasing and allowing new fracking in the absence of any overall plan addressing climate change BLM is effectively burying its head in the sand.

A programmatic review and moratorium on new leasing would be consistent with the Secretary of Interior's recent order to conduct a comprehensive, programmatic EIS (PEIS) on its coal leasing program, in light of the need to take into account the program's impacts on climate change, among other issues, and "the lack of any recent analysis of the Federal coal program as a whole."[261] Specifically, the Secretary directed that the PEIS "should examine how best to assess

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[259] EcoShift Consulting et al., The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels (Aug. 2015), available at http://www.ecoshiftconsulting.com/wp-content/uploads/Potential-Greenhouse-Gas-Emissions-U-S-Federal-Fossil-Fuels.pdf

[260] *See, e.g.,* U.S. Bureau of Land Management Montana, North Dakota and South Dakota, Climate Change Supplementary Information Report (updated Oct. 2010) (conducting GHG inventory for BLM leasing in Montana, North Dakota and South Dakota); BLM, Proposed Rule: Waste Prevention, Production Subject to Royalties, and Resource Conservation, 81 Fed. Reg. 6615 (Feb. 8, 2016) (proposing BLM-wide rule for prevention of methane waste).

[261] *See* Secretary of Interior, Order No. 3338, § 4 (Jan. 15, 2016)

the climate impacts of continued Federal coal production and combustion and how to address those impacts in the management of the program to meet both the Nation's energy needs and its climate goals, as well as how best to protect the public lands from climate change impacts."[262]

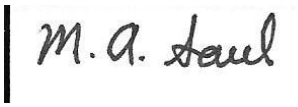
The Secretary also ordered a moratorium on new coal leasing while such a review is being conducted. The Secretary reasoned:

> Lease sales and lease modifications result in lease terms of 20 years and for so long thereafter as coal is produced in commercial quantities. Continuing to conduct lease sales or approve lease modifications during this programmatic review risks locking in for decades the future development of large quantities of coal under current rates and terms that the PEIS may ultimately determine to be less than optimal. This risk is why, during the previous two programmatic reviews, the Department halted most lease sales with limited exceptions…. Considering these factors and given the extensive recoverable reserves of Federal coal currently under lease, I have decided that a similar policy is warranted here. A pause on leasing, with limited exceptions, will allow future leasing decisions to benefit from the recommendations that result from the PEIS while minimizing any economic hardship during that review.[263]

The Secretary's reasoning is also apt here. A programmatic review assessing the climate change effects of public fossil fuels is long overdue. And there is no shortage of oil and gas that would preclude a moratorium while such a review is conducted, as evidenced by very low natural oil and gas prices. More importantly, BLM should not "risk[] locking in for decades the future development of large quantities of [fossil fuels] under current…terms that a [programmatic review] may ultimately determine to be less than optimal."[264] BLM should cancel the sale and halt all new leasing and fracking until a programmatic review is completed.

Conclusion

Oil and gas development not only fuels the climate crisis but entails significant public health risks and harms to the environment. Accordingly, the EIS should thoroughly analyze the alternative of no new fossil fuel leasing, and no fracking or other unconventional well stimulation methods within the VFO planning area. Thank you for your consideration of these comments. We look forward to reviewing a legally adequate EIS for this proposed oil and gas leasing action.



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[262] *Id*. § 4(c).
[263] *Id*. § 5.
[264] *Id*.

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