CENTER *for* BIOLOGICAL DIVERSITY

FAX COVER SHEET

Date: November 13, 2017

To: Marci Todd—BLM

Fax #: 775-861-6711

# of Pages: 44 (including cover)

Please find attached our Protest Letter of the December 2017 Competitive Oil and Gas Lease Sale, Ely District.

Thank you.

Elise Ferguson, paralegal
Center for Biological Diversity
510-844-7106
eferguson@biologicaldiversity.org

CENTER for BIOLOGICAL DIVERSITY Because life is good.

November 13, 2017

Marci Todd
Acting State Director
Bureau of Land Management
1340 Financial Blvd
Reno, NV 89520

Via Facsimile and Overnight Mail: 775-861-6711

RE: Center for Biological Diversity, et al., Protest of the December 2017 Competitive Oil and Gas Lease Sale, Ely District - DOI-BLM-NV-L030-2017-0021-EA

Dear Ms. Todd:

The Center for Biological Diversity, WildLands Defense, and Basin and Range Watch hereby file this Protest of the Bureau of Land Management's ("BLM") planned December 12, 2017 Competitive Oil and Gas Lease Sale and Environmental Assessment DOI-BLM-NV-L030-2017-0021-EA, pursuant to 43 C.F.R. § 3120.1-3. We formally protest the inclusion of each of the 208 parcels, covering approximately 388,959 acres in the Ely District Office. The "specific serial numbers" of the parcels protested are:

NV-17-12-001	NV-17-12-020	NV-17-12-039
NV-17-12-002	NV-17-12-021	NV-17-12-040
NV-17-12-003	NV-17-12-022	NV-17-12-041
NV-17-12-004	NV-17-12-023	NV-17-12-042
NV-17-12-005	NV-17-12-024	NV-17-12-043
NV-17-12-006	NV-17-12-025	NV-17-12-044
NV-17-12-007	NV-17-12-026	NV-17-12-045
NV-17-12-008	NV-17-12-027	NV-17-12-046
NV-17-12-009	NV-17-12-028	NV-17-12-047
NV-17-12-010	NV-17-12-029	NV-17-12-048
NV-17-12-011	NV-17-12-030	NV-17-12-049
NV-17-12-012	NV-17-12-031	NV-17-12-050
NV-17-12-013	NV-17-12-032	NV-17-12-051
NV-17-12-014	NV-17-12-033	NV-17-12-052
NV-17-12-015	NV-17-12-034	NV-17-12-053
NV-17-12-016	NV-17-12-035	NV-17-12-054
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NV-17-12-398	NV-17-12-440	NV-17-12-448
NV-17-12-399	NV-17-12-441	
NV-17-12-400	NV-17-12-443	

PROTEST

I. Protesting Parties: Contact Information and Statement of Interests:

This Protest is filed on behalf of Protestors by their authorized representative:

Michael Saul
Senior Attorney
Center for Biological Diversity
1536 Wynkoop Street, Suite 421
Denver CO 80202
303-915-8308
msaul@biologicaldiversity.org

The Center for Biological Diversity 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 1.3 million members and on-line activists, including those living in Nevada who have visited these public lands in the Ely District management area 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.

WildLands Defense works to inspire and empower the preservation of wild lands and wildlife in the West. WildLands Defense's activists' and supporters' on-the-ground presence, extensive experience enforcing existing statutory and regulatory regimes, and the group's unparalleled conviction provide managers and policy-makers a clear and competent picture of the conditions of our public lands and wildlife communities on the ground as they exist, as well as lend decision-makers the sense of informed urgency as to the need for policy changes into the future.

Basin and Range Watch is a 501(c)(3) non-profit organization working to conserve the deserts of Nevada and California and to educate the public about the diversity of life, cultures, and history of the desert, as well as sustainable local renewable energy alternatives. The group works to conserve desert wildlands and species, protect groundwater resources, dark night skies, culturally important landscapes, and local ways of life. Basin and Range Watch is a group of desert advocates from diverse backgrounds united by their love of arid lands.

The mailing addresses for individual protestors are as follows:

Michael Saul
Senior Attorney
Center for Biological Diversity
1536 Wynkoop Street, Suite 421
Denver CO 80202
303-915-8308
msaul@biologicaldiversity.org

Patrick Donnelly
Nevada State Director
Center for Biological Diversity
PO Box 364414
North Las Vegas, NV 89156
702-483-0449
pdonnelly@biologicaldiversity.org

Katie Fite
Public Lands Director
WildLands Defense
PO Box 125
Boise, ID 83701
208-871-5738
katie@wildlandsdefense.org

Laura Cunningham
Executive Director
Basin and Range Watch
PO Box 70
Beatty, NV 89003
775-553-2806
bluerockiguana@gmail.com

II. Statement of Reasons as to Why the Proposed Lease Sale Is Unlawful:

BLM's Final Environmental Assessment ("EA") and proposed decision to lease the parcels listed above are substantively and procedurally flawed for numerous reasons, detailed below. We hereby incorporate by reference hereto our comments on the draft EA for the planned December 12, 2017 sale. The principal flaws in BLM's analysis and proposed action are as follows:

A. BLM has never, including under the 2008 Ely District Resource Management Plan, evaluated the site-specific impacts of large-scale oil and gas development, including hydrologic fracturing, on non-mineral resources within the Ely District, including surface and ground water, greater sage-grouse, springsnails, air quality, human health and safety, and seismicity.

B. BLM's EA and proposed FONSI, in violation of law, fail to comply with Section 7 of the Endangered Species Act, which requires that agencies insure that their actions will not jeopardize the continued existence of species listed under the Endangered Species Act. Despite the acknowledged presence of numerous listed species, BLM improperly attempts to postpone its consideration of oil and gas activities to the drilling stage. Additionally, BLM has failed to consult with the U.S. Fish and Wildlife Service.

C. BLM has both failed to consider the climate and greenhouse gas emission impacts of its oil and gas leasing decisions, and has arbitrarily rejected alternatives, including no leasing and no fracking alternatives, that would mitigate the adverse climate impacts of its actions.

A. BLM's EA Violates the National Environmental Policy Act ("NEPA") By Failing to Take a Hard Look at Foreseeable Indirect and Cumulative Impacts of the Proposed Action.

NEPA requires agencies to undertake thorough, site-specific environmental analysis at the earliest possible time and prior to any "irretrievable commitment of resources" so that the action can be shaped to account for environmental values. Pennaco Energy, Inc. v. United States DOI, 377 F.3d 1147, 1160 (10th Cir. 2004). Oil and gas leasing is an irretrievable commitment of resources. S. Utah Wilderness All. v. Norton, 457 F. Supp. 2d 1253, 1256 (D. Utah 2006). Thus, NEPA establishes "action-forcing" procedures that require agencies to take a "hard look," at "all foreseeable impacts of leasing" before leasing can proceed. Center for Biological Diversity v. United States DOI, 623 F.3d 633, 642 (9th Cir. 2010); N.M. ex rel. Richardson v. BLM, 565 F.3d 683, 717 (10th Cir. 2009). Chief among these procedures is the preparation of an environmental impact statement ("EIS"). Id. BLM, however, did not prepare an EIS.

In order to determine whether a project's impacts may be "significant," an agency may first prepare an Environmental Assessment ("EA"). 40 C.F.R. §§ 1501.4, 1508.9. If the EA reveals that "the agency's action may have a significant effect upon the . . . environment, an EIS must be prepared." Nat'l Parks & Conservation Ass'n v. Babbitt, 241 F.3d 722, 730 (9th Cir. 2001) (internal quotations omitted). If the agency determines that no significant impacts are possible, it must still *adequately* explain its decision by supplying a "convincing statement of reasons" why the action's effects are insignificant. Blue Mountains Biodiversity Project v. Blackwood, 161 F.3d 1208, 1212 (9th Cir. 1998) (emphasis added). However, BLM's EA and draft FONSI fail to provide any reasonable "convincing statement of reasons" for a finding of no

significant impact. BLM moreover failed to include any analyses for site-specific impacts. BLM claims:

> The sale of parcels and issuance of oil and gas leases is strictly an administrative action. The act of offering, selling, and issuing federal oil and gas leases does not produce impacts to water quality and surface water... The BLM cannot determine at the leasing stage whether or not a proposed parcel would actually be sold, or if it is sold and issued, whether or not the lease would be explored and developed. Consequently, the BLM cannot determine exactly where a well or wells may be drilled or what technologies that may be used to drill and produce wells, so the impacts listed below are general, rather than site-specific.[1]

BLM failed both of NEPA's "twin aims": not only did BLM fail to ensure that the agency takes a "hard look" at the environmental consequences of its proposed action, it also failed to make information on the environmental consequences available to the public, which may then offer its insight to assist the agency's decision-making through the comment process. See, e.g., Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 349 (1989). NEPA's procedural requirement is not merely a formality, but is there to allow the agencies and the public to understand the consequences of the proposed lease auction. Not only did BLM fail to provide an adequate environmental analysis of the foreseeable impacts of the proposed lease sale, but furthermore failed to provide the public adequate notice of either foreseeable environmental impacts, or the consequences of its newly-added "Additional Resource Protection Alternative".

BLM's deferral of site-specific analysis until the APD stage is unlawful under NEPA, its implementing regulations, and legal precedents. Courts have repeatedly rejected BLM's claim that it is not required to conduct any site-specific environmental review until after the parcels are leased and a proposal is submitted by industry. See, e.g., Center for Biological Diversity & Sierra Club v. BLM, 937 F. Supp. 2d 1140, 1158 (N.D. Cal. 2013) ("... BLM asserts the now-familiar argument that there is no controversy because any degradation of the local environment from fracking should be discussed, if ever, when there is a site-specific proposal. But the Ninth Circuit has specifically disapproved of this as a reason for holding off on preparing an EIS."); and Conner v. Burford, 848 F.2d 1441, 1450 (9th Cir. 1988) ("The government's inability to fully ascertain the precise extent of the effects of mineral leasing ... is not, however, a justification for failing to estimate what those effects might be before irrevocably committing to the activity.").

BLM is required under NEPA to perform and disclose an analysis of environmental impacts of the 208 parcels offered for lease *before* there are any "irreversible and irretrievable commitments of resources." Center for Biological Diversity, 937 F. Supp. 2d at 1152 (citing Conner v. Burford, 848 F.2d 1441, 1446 (9th Cir. 1988) ("Our circuit has held that an EIS must be prepared *before* any irreversible and irretrievable commitment of resources.") (emphasis added). "[N]on-NSO leases, even if subject to substantial government regulation, do constitute an 'irretrievable commitment of resources.' As a result, unless the lease reserves to the agencies an '*absolute right* to deny exploitation of those resources,' the sale of [] non-NSO leases ... constitutes the go or no-go point where NEPA analysis becomes necessary." Id at 1152. In other

[1] Final EA at 38-39.

words, the specific environmental effects of oil and gas leasing in the project area must be analyzed and disclosed now, at the leasing stage.

Rather than perform the environmental review as required, BLM tiers to the environmental impact statements (EISs) for the 2008 Ely Resource Management Plan,[2] and defers the site-specific analysis until after the parcels are leased.[3] This is unlawful. BLM is required to analyze all foreseeable human health and safety risks, and seismic risks, posed by unconventional extraction techniques before leasing. BLM's analyses on these issues are outdated and/or cursory at best. In a case called Center for Biological Diversity & Sierra Club v. BLM, 937 F. Supp. 2d 1140, 1152 (N.D. Cal. 2013), BLM also attempted to defer NEPA analysis of hydraulic fracturing (hereinafter referred to as "fracking") on the parcels at issue until it received a site-specific proposal, because the exact scope and extent of drilling that would involve fracking was unknown. The district court held BLM's "unreasonable lack of consideration of how fracking could impact development of the disputed parcels went on to unreasonably distort BLM's assessment," and explained:

> "[T]he basic thrust" of NEPA is to require that agencies consider the range of possible environmental effects before resources are committed and the effects are fully known. "Reasonable forecasting and speculation is thus implicit in NEPA, and we must reject any attempt by agencies to shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as 'crystal ball inquiry.'"

Center for Biological Diversity, 937 F. Supp. 2d at 1157 (citing City of Davis v. Coleman, 521 F.2d 661, 676 (9th Cir. 1975)).

As we have pointed out, and as the courts have made clear time and again, NEPA requires that "assessment of all 'reasonably foreseeable' impacts must occur at the earliest practicable point, and must take place before an 'irretrievable commitment of resources' is made." N.M. ex rel. Richardson v. BLM, 565 F.3d 683, 717-18 (10th Cir. 2009) (citing 42 U.S.C. § 4332(2)(C)(v)); compare with Center for Biological Diversity, 937 F. Supp. 2d at 1152 (N.D. Cal. 2013) ("Agencies are required to conduct this review at the 'earliest possible time' to allow for proper consideration of environmental values. . . A review should be prepared at a time when the decisionmakers 'retain a maximum range of options.'"). In Richardson, BLM argued there also that it was not required to conduct any site-specific environmental reviews until the issuance of an APD. The court looked to the Ninth and D.C. Circuits in concluding that "NEPA requires BLM to conduct site-specific analysis before the leasing stage." Richardson, 565 F.3d at 688. Richardson then offered a two-part test to determine whether NEPA has been satisfied: First we must ask whether the lease constitutes an "irretrievable commitment of resources." The Tenth Circuit, again citing to the Ninth and D.C. Circuits, concluded that issuing an oil and gas lease without an NSO stipulation constitutes such a commitment. Second, the agency must ask whether all "foreseeable impacts of leasing" have been taken into account before leasing can proceed. Id. Given the utter lack of any site-specific review of the present surface-occupancy-permitting parcels, for this lease sale, such impacts have not been taken into account.

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[2] *Id.* at 2.
[3] *Id.* at 5.

BLM must take a hard look at the specific parcels that it is offering for oil and gas leasing, and the foreseeable impacts to the resources on these parcels. BLM insists, however, on postponing any such analysis until it has already signed over drilling rights and is unable to preclude all surface disturbing activities to prevent critical environmental impacts that may arise after a proper NEPA analysis. This is a violation of NEPA.

As the time for NEPA analysis was triggered by the proposal for the sale of the lease, BLM had to analyze whether its decision to open up over 388,000 acres of land to development activities such as fracking might have significant environmental impact. Center for Biological Diversity & Sierra Club v. BLM, 937 F. Supp. 2d 1140, 1153 (N.D. Cal. 2013). If BLM finds based on the EA that the proposed actions will not significantly affect the environment, BLM can issue a finding of No Significant Impact ("FONSI") in lieu of the EIS. Id. However, BLM's Final EA does not support any reasonable finding that the environmental effects of its major action are insignificant.

In a case called Center for Biological Diversity v. National Highway Traffic Safety Admin., 538 F.3d 1172 (9th Cir. 2008) the court took similar issues with the BLM's failure to explain why it chose not to prepare an EIS:

> Nowhere does the EA provide a 'statement of reasons' for a finding of no significant impact, much less a 'convincing statement of reasons.' For example, the EA discusses the amount of CO[2] emissions expected from the Rule, but does not discuss the potential impact of such emissions on climate change. In the "Affected Environment" section of the EA, NHTSA states that "[i]ncreasing concentrations of greenhouse gases are likely to accelerate the rate of climate change." The agency notes that "[t]he transportation sector is a significant source of greenhouse gas (GHG) emissions, accounting for approximately 28 percent of all greenhouse gas emissions in the United States." From this, NHTSA jumps to the conclusion that "[c]oupled with the effects resulting from the 2003 light truck rule, the effects resulting from the agency's current action are expected to lessen the GHG impacts discussed above."

Id. at 1223 (internal citations omitted).

Similar to the National Highway Traffic Safety Admin case, the Final EA at issue here does not provide any clear or convincing statement of reasons for a finding of no significant impact. The EA discusses generally and vaguely the amount of surface disturbance that may result from leasing, the number of wells that might be drilled, the types of pollutants that may be emitted during development and production; but it does not discuss the potential impacts of any of these on the specific lands, waters, and species present within the areas proposed for leasing. BLM cannot simply jump to the conclusion that its stipulations and proposed mitigation measures will lessen the potential impacts to the level of insignificance.

In evaluating the significance of the impact of the proposed action, the agency must consider both the context of the action as well as the intensity. The several contexts in which the significance of an action must be analyzed includes: "society as a whole (human, national), the affected region, the affected interests, and the locality." 40 C.F.R. § 1508.27. For site-specific

actions, significance usually depends on the impact of the action on the locale, id., but in light of the recent Paris Agreement, it also depends on the impact on the world as a whole. Thus, to determine the significance of the action, BLM needed to look at not only the environmental impacts on the area to be leased, but also the analysis of the cumulative effects of oil and gas leasing on climate change.

Intensity is determined by scrutinizing the ten factors described in 40 C.F.R. § 1508.27:

(1) Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

(2) The degree to which the proposed action affects public health or safety.

(3) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

(4) The degree to which the effects on the quality of the human environment are likely to be highly controversial.

(5) The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

(6) The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

(7) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

(8) The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.

(9) The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.

(10) Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

The presence of any *one* of these factors may be sufficient to require an EIS. Id. Several of these factors are implicated in this lease sale. The ones we highlight here in this comment letter are discussed in greater detail below. For one, there is a clear "controversy" regarding the nature of the drilling to occur on the leases and the potential impacts drilling would impose on air, water, soil, and wildlife resources among other things. A proposal is highly controversial when "substantial questions are raised as to whether a project... may cause significant degradation" of a resource. Northwest Envtl. Def. Ctr. v. Bonneville Power Admin., 117 F.3d 1520, 1536 (9th Cir. 1997). A substantial dispute may concern the "size, nature, or effect" of the action. Blue Mts. Biodiversity Project v. Blackwood, 161 F.3d 1208, 1212 (9th Cir. 1998).

Furthermore, BLM's estimates regarding surface disturbance is based on historic information from RMPs which apparently do not take into account the recent sharp increase in leasing nominations and initial instances of fracking use in Nevada.[4] BLM should have considered in its EA the increased industry interest in Nevada oil and gas, and the potential for drilling levels to increase, should oil prices rise or well stimulation techniques change the production potential of Nevada hydrocarbon-bearing formations.

"[T]o prevail on a claim that the agency violated its statutory duty to prepare an EIS, a plaintiff need not show that significant effects will in fact occur. It is enough for the plaintiff to raise substantial questions whether a project may have a significant effect on the environment." Ctr. for Biological Diversity & Sierra Club v. BLM, 937 F. Supp. 2d 1140, 1154 (N.D. Cal. 2013). The significance of the impact of the proposed action depends on both the context of the action as well as the intensity. Id.

Numerous environmental harms may result from unconventional methods used by the industry to extract oil and gas, including hydraulic fracturing and horizontal drilling, as well as concerns relating to climate change. BLM has declined to look at these issues until it received an APD proposal from the industry. As we have already explained above, this is unlawful. The impact of fracking alone raises substantial questions on whether the proposed project may have significant effects on the environment.

BLM is required to prepare an Environmental Impact Statement ("EIS") or at least take a hard look at site-specific impacts in its EA before coming to a decision as to whether an EIS is needed. Simply deferring to existing RMPs for analysis does not adequately meet NEPA's hard look mandate. With the exception of last year's amendments for greater sage-grouse management, however, the current RMP, with which erstwhile resource protection stipulations are in accordance, is a decade old and does not reflect the best available currently available science or information on the impacts of widespread oil and gas development and fracking.

As we pointed out before, with the exception of the September 2015 Nevada and Northeastern California Greater Sage-Grouse Record of Decision and Approved Resource Management Plan Amendment ("2015 GRSG RMP") which covers only issues relating to greater sage-grouse, these RMPs have not been revised in decades and therefore do not address

[4] See BLM Nevada, 2015-2017 Expressions of Interest, *available at* https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/leasing/regional-lease-sales/nevada; See also DeLong, Jeff, "Fracking Hits Home in Nevada," *Reno Gazette-Journal* (April 15, 2014).

the emergence of new and significant information, including but not limited to that relating to the new and dangerous extraction methods of fracking and horizontal drilling, or the increased seismic risks from such extraction methods. Specifically, BLM's reliance on the brief and extremely general "Hydraulic Fracturing White Paper" (Appendix E) fails to consider or analyze any of the site-specific impacts to springs, surface waters, shallow aquifers, or hydrologic and geological conditions specific to the lands and waters of the Ely District.

As BLM has not provided any environmental review of the parcels at issue or any site-specific analysis of the potential environmental impacts from the proposed action. As noted in the Center for Biological Diversity's comments on BLM's draft EA, BLM failed to take a hard look at the foreseeable impacts from the lease sale, oil and gas development, and the use of hydraulic fracking technologies. In particular, BLM failed to take a hard look at the potential impacts of the proposed action on water resources, greater sage-grouse, springsnails, air quality, human health and safety, and seismicity.

1. BLM does not Consider Potential Impacts to Water Resources in Proposed Sale Area

The Environmental Analysis inadequately analyzes potential impacts to water resources and the plant and wildlife communities that rely on them. In the Environmental Assessment, BLM acknowledges the vast and complex hydrogic system of which the parcels proposed for leasing are a part.[5] In a jarring omission, however, the EA does not provide any detail on the surface manifestations of this system – the springs and creeks which are essential for nearly all life in the desert. It provides no disclosure or analysis of the location of surficial water features in relation to the parcels proposed for leasing, nor does it detail the resources, including threatened and endangered and BLM sensitive species, which rely on those water features and could potentially be impacted by adjacent oil and gas development.

The main emphasis of our protest regarding water resources is out lined in our comment letter on the draft EA, pages 8-19, which is incorporated herein.

BLM failed to address our comments regarding the impacts of hydraulic fracturing on ground and surface water resources in the Final EA. Rather than lawfully disclosing and analyzing these impacts, BLM simply reiterated a set of existing guidelines on fracking, including the much ballyhooed Nevada state regulations.[6] Similarly, BLM failed to respond to our comments on the consumption of groundwater used in fracking. Instead of disclosing and analyzing these impacts, BLM states that it is relying on the appropriation system employed by the Nevada Division of Water Resources. Again, describing a groundwater management system does not suffice for an environmental analysis. Additionally, the Nevada system of awarding water rights does not protect environmental resources, and indeed encourages the drying up of natural surficial features in deference to development. It cannot be relied upon by BLM to protect the environment.

[5] Final EA, at 31-38.
[6] Final EA at 40.

BLM failed to provide a water resources stipulation in the Final EA, and none exists in the 2008 RMP upon which the EA is tiered. Other comparable recent oil and gas lease sale EAs in Nevada have incorporated a water resources stipulation, which ostensibly serves to provide some protections for water resources, including setbacks or NSO provisions, and other restrictions.[7] BLM Nevada staff, upon repeated inquiry, failed to provide a reason for the lack of a water resources stipulation. There are no protections at all for water resources provided in the Final EA, and no conditions or stipulations attached to the leases preventing the degradation of water resources. Thus there is a high likelihood of significant impact upon development.

Accordingly, BLM failed to respond to our comments and address the potential impacts of hydraulic fracturing to water resources.

In addition to protecting its own public lands resources, it is incumbent upon BLM not to impact the water rights of others. The proposed action could cause conflict with numerous private water rights holders. Additionally, Parcel Group F is adjacent to Great Basin National Park, which holds federal reserved water rights on at least some waters within the Park.

Hydrologist Tom Myers, Ph.D., has prepared a technical memorandum analyzing the Final EA and its deficiencies in disclosing and analyzing potential impacts to water resources. It is attached to this protest as Attachment A. This memorandum describes how hydraulic fracturing could impact both the shallow and regional aquifers, and reflects the best available science which must be considered by BLM before proceeding with the lease sale.

2. BLM Has Failed to Take a Hard Look at Impacts to Greater Sage-Grouse Populations and Habitat in the EA

In another galling omission, BLM fails to provide any disclosure or analysis whatsoever of the impacts of the proposed action on the greater sage-grouse in the Final EA. Rather, the document simply attaches a number of stipulations from the RMP and 2015 Plan Amendments. In what appears to be a pattern, BLM is substituting a reiteration of current management regimes for an analysis of the impacts of the proposed action. We commented on this in our comment letter on the draft EA, pages 27-29. By continuing to insist on providing absolutely no analysis of the impacts to the sage-grouse from the proposed action, BLM has unlawfully failed to adequately respond to our comments regarding sage-grouse.

a. BLM's Revised Environmental Assessment Does Not Adequately Consider and Mitigate Impacts to Greater Sage-Grouse

The greater sage-grouse is a BLM sensitive species. In September 2015, all BLM resource management plans for Nevada and Northeastern California, including Ely District, were amended as part of an effort to secure adequate regulatory mechanisms to prevent the

[7] Bureau of Land Management, Battle Mountain District Oil and Gas September 2017 Lease Sale Final Environmental Assessment, DOI-BLM-NV-B020-2017-0002-EA.

listing of the greater sage-grouse under the Endangered Species Act.[8] Because oil and gas development and associated infrastructure has numerous well-documented adverse effects on GRSG survival, breeding, and behavior, these plan amendments prescribe management measures for BLM-permitted activities, including oil and gas leasing, within various categories (Sagebrush Focal Areas ("SFAs"), Priority Habitat Management Areas ("PHMAs"), General Habitat Management Areas ("GHMAs") and Other Habitat Management Areas ("OHMAs")) of sage-grouse habitat,[9] and prescribed stipulations for all new fluid mineral leases within those designated habitats.[10]

Given the significance of the potential impacts that oil and gas development could have on the species, proper investigation here is crucial. BLM is required under NEPA to collect data particular to the region affected by the leases, and analyze how the leasing might affect the sage-grouse habitat and resources by the lease sale.[11]

The Final EA's lack of any analysis on sage-grouse is also troubling because the BLM's approach to mitigating the effects of oil and gas development on GRSG is to attach stipulations to the leases. However, these stipulations are not absolute. Of the eight GRSG stipulations in the Final EA, six can have exceptions, four can be modified, and four can be waived entirely.[12] As a result, these stipulations might or not actually be applied in the way they are described in the REA, and thus the mitigation that BLM suggests will occur might or might not actually take place.

This is not a hypothetical concern. A 2017 General Accountability Office report (GAO Report) found serious inconsistencies in BLM practice regarding exceptions to stipulations.[13] "The extent to which BLM approves requests for exceptions to environmentally related lease and permit requirements is unknown because BLM does not have comprehensive or consistent data on these requests. Additionally, BLM's processes for considering exception requests and documenting its decisions vary across its field offices."[14] Furthermore, the GAO Report found that the public is unlikely to have an opportunity to provide input to the BLM's decisions whether to grant exceptions. "BLM consistently involved the public when developing lease requirements and to some extent when developing permit requirements. However, BLM generally did not involve the public when considering an operator's request for an exception to a lease or permit requirement."[15] In fact, the public might not even be able to find out whether an exception was granted because "BLM does not currently require field offices to make the results

[8] See BLM, Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (Sept. 2015) ("NV/NE CA ARMPA").
[9] NV/NE CA RMPA at 2-29 to 2-30.
[10] NV/NE CA RMPA Appendix G.
[11] See Center. for Biological Diversity, 937 F. Supp. 2d at 1159 (Preparation of an EIS "is mandated where uncertainty may be resolved by further collection of data, or where collection of such data may prevent speculation on potential effects.").
[12] Final EA at 121-125.
[13] The GAO Report appears to include exceptions, modifications, and waivers of lease stipulations in the single term "exception." *See* GAO. (2017) Oil and Gas Development: Improved Collection and Use of Data Could Enhance BLM's Ability to Assess and Mitigate Environmental Impacts.
[14] GAO (2017) at 11.
[15] *Id.* at 17.

of its exception decisions available to the public. Without access to this information, the public may not be able to provide substantive input into BLM's future land use planning processes."[16]

b. The Proposed Lease Sale Does not Comply with the 2015 Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (Sage-Grouse ARMPA)

The Proposed Action does not comply with the 2015 Sage-Grouse ARMPA because BLM did not prioritize oil and gas development on sage-grouse non-habitat and habitat according to its own prior commitments. In fact the Final EA omits mention of the prioritization requirement altogether. Nevertheless, the Sage-Grouse ARMPA states, "Objective MR 1: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMAs and GHMAs. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMAs and GHMAs, that are subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG."[17]

Besides not complying with the Sage-Grouse ARMPA, the Proposed Action's lack of prioritization does not comply with the commitment to prioritization that BLM made in the Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region, Including the Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana Nevada and Northeastern California, Oregon, Utah (Great Basin ROD). The Great Basin ROD explained why prioritization is necessary:

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

Great Basin ROD at 1-23.

Furthermore, the Proposed Action does not follow the guidance that BLM developed to guide implementation of the Objective.[18] BLM's IM 2016-143 sets out the methods by which BLM will prioritize leasing in and around Greater Sage Grouse habitat. The IM directs the agency to prioritize leasing in the following order:

1. Lands outside of GHMAs and PHMAs: BLM State Offices will first consider leasing EOIs

[16] *Id.* at 35.
[17] NV/NE CA RMPA at 2-28.
[18] IM 2016-143, Implementation of Greater Sage-Grouse Resource Management Plan Revisions or Amendments — Oil & Gas Leasing and Development Sequential Prioritization.

for lands outside of PHMAs and GHMAs. These lands should be the first priority for leasing in any given lease sale.

2. Lands within GHMAs: BLM State Offices will consider EOIs for lands within the GHMAs, after considering lands outside of both GHMAs and PHMAs. When considering the GHMA lands for leasing, the BLM State Office will ensure that a decision to lease those lands would conform to the conservation objectives and provisions in the GRSG Plans (e.g., Stipulations).

3. Lands within PHMAs: BLM state offices will consider EOIs for lands within PHMAs after lands outside of GHMAs and PHMAs have been considered, and EOIs for lands within GHMA have been considered. When considering the PHMA lands for leasing, the BLM State Offices will ensure that a decision to lease those lands would conform to the conservation objectives and provisions in the GRSG Plans (e.g., Stipulations) including special consideration of any identified SFAs.

IM 2016-143 also identifies additional prioritization factors that BLM must consider. They are as follows:

> Parcels immediately adjacent or proximate to existing oil and gas leases and development operations or other land use development should be more appropriate for consideration before parcels that are not near existing operations. This is the most important factor to consider, as the objective is to minimize disturbance footprints and preserve the integrity of habitat for conservation.
>
> Parcels that are within existing Federal oil and gas units should be more appropriate for consideration than parcels not within existing Federal oil and gas units.
>
> Parcels in areas with higher potential for development (for example, considering the oil and gas potential maps developed by the BLM for the GRSG Plans) are more appropriate for consideration than parcels with lower potential for development. The Authorized Officer may conclude that an area has "higher potential" based on all pertinent information, and is not limited to the Reasonable Foreseeable Development (RFD) potential maps from Plans analysis.
>
> Parcels in areas of lower-value sage-grouse habitat or further away from important life-history habitat features (for example, distance from any active sage-grouse leks) are more appropriate for consideration than parcels in higher-value habitat or closer to important life-history habitat features (i.e. lek, nesting, winter range areas). At the time the leasing priority is determined, when leasing within GHMA or PHMA is considered, BLM should consider, first, areas determined to be non-sage-grouse habitat and then consider areas of lower value habitat.
>
> Parcels within areas having completed field-development Environmental Impact Statements or Master Leasing Plans that allow for adequate site-specific mitigation and are in conformance with the objectives and provisions in the GRSG Plans may be more

appropriate for consideration than parcels that have not been evaluated by the BLM in this manner.

Parcels within areas where law or regulation indicates that offering the lands for leasing is in the government's interest (such as in instances where there is drainage of Federal minerals, 43 CFR § 3162.2-2, or trespass drilling on unleased lands) will generally be considered more appropriate for leasing, but lease terms will include all appropriate conservation objectives and provisions from the GRSG Plans.

The Final EA fails to follow IM 2016-143's guidance. The IM clearly states that land outside of PHMA or GHMA will be considered first by the State Office, followed by GHMA, and finally PHMA. Instead, BLM appears to be leasing lands with absolutely no consideration for their sage-grouse habitat designation.

3. The Final EA fails to address impacts to springsnails.

The Ely District is home a number of endemic springsnails, aquatic invertebrates which do not live anywhere else on earth. A number of the lease parcels are adjacent to or encompass springs which harbor these rare creatures. As outlined in our draft EA comment letter on pages 25-27 (incorporated herein), the EA fails to disclose or analyze the impacts of the proposed action. Other than adding a list of three springsnails which may occur near the parcels, BLM made no changes in the Final EA regarding springsnails, and thus failed to adequately respond to our comments.

4. The Final EA fails to address impacts to desert tortoise

The BLM's proposed lease sale includes substantial areas of habitat, including designated critical habitat, for the threatened desert tortoise (*Gopherus agassizii*). EA at 44 & Table 3.6. The EA, however fails to provide any analysis whatsoever of the effects of leasing and resulting exploration and development on the federally threatened Agassiz desert tortoise, despite the fact that the proposed sale includes 13,453 acres of "general" desert tortoise habitat, and 3,604 acres of designated critical habitat. *Id.* The EA admits the possibility of both adverse and inadequately understood impacts to this listed species:

> Tortoises of the *Gopherus* genus in North America have a highly evolved otolithic ear, which could be used to detect seismic vibrations (Bramble and Hutchison 2014). Exact impacts are unknown, but tortoises underground in their burrows could be highly sensitive to geophysical exploration if seismic vibrations are sent through an area with desert tortoises. Exploration and development for oil and gas would likely disturb or destroy critical habitat in the Beaver Dam Slope Critical Habitat Unit.

EA at 45. The EA, however, completely fails to acknowledge that the Revised Recovery Plan for the Mojave Population of the Desert Tortoise recommends withdrawal of critical habitat units

from mineral entry.[19] The EA also fails to even consider any alternative that would comply with this Recovery Plan recommendation by deferring leasing of the Beaver Dam Slope Critical Habitat Unit, and initiating the process of withdrawing that unit from fluid mineral leasing.

Although impacts to the threatened desert tortoise from oil and gas development are not yet as extensive or well-studied as other impacts to the species, the best science available, including BLM's own review of the science, as well as FWS's recovery plan, acknowledge a significant threat to the species from oil and gas development within its remaining habitat.[20] FWS states that "Energy and mineral development and extraction also pose a significant threat to desert tortoises through habitat loss and fragmentation.[21] The EA's less-than-cursory treatment of energy development, habitat loss, and ensuing indirect effects from fragmentation and human disturbance fails to provide the public, BLM, or FWS with any of the potentially available information to engage in a reasoned assessment of the potential effects on the desert tortoise, its survival, and potential recovery. This violates NEPA's requirements that agencies take a "hard look" at reasonably foreseeable environmental consequences, and that it give due consideration to all reasonable alternatives – including an alternative that excludes leasing of desert tortoise habitat. Furthermore, the likely destruction of desert tortoise critical habitat, along with the uncertainties surrounding impacts to tortoises from seismic exploration, are factors that preclude issuance of a Finding of No Significant Impact, and require, at a minimum, the preparation of a full Environmental Impact Statement prior to leasing.

5: The Final EA fails to address impacts to air quality.

We provided comments on the potential impacts of the proposed action to seismicity in our draft EA comment letter, pages 29-42. We incorporate those comments herein. Beyond the addition of hydrogen sulfide as a listed emission, BLM has provided no further analysis of impacts to air quality, and thus has failed to respond to our comments.

6. The Final EA fails to address impacts to human health and safety.

We provided comments on the potential impacts of the proposed action to health and human safety in our draft EA comment letter, pages 57-63. We incorporate those comments herein. BLM has provided absolutely no analysis of the proposed action's impacts on human health and safety in the Final EA, and thus has failed to respond to our comments.

7. The Final EA fails to address impacts to seismicity.

[19] U.S. Fish and Wildlife Service, Revised Recovery Plan for the Mojave Desert Population of the Desert Tortoise (Gopherus agassizii) (2011).
[20] U.S. Fish and Wildlife Service, Revised Recovery Plan for the Mojave Desert Population of the Desert Tortoise (Gopherus agassizii) (2011); Boarman, William, Threats to Desert Tortoise Populations: A Critical Review of the Literature, United States Geological Survey 17 (2002).
[21] USFWS 2011 at 18 (*citing* (Luke et al. 1991; Lovich and Bainbridge 1999; LaRue and Dougherty 1999).

We provided comments on the potential impacts of the proposed action to seismicity in our draft EA comment letter, pages 50-59. We incorporate those comments herein. Beyond a cursory mention in a generic white paper on hydraulic fracturing in Appendix E of the Final EA, BLM has provided absolutely no analysis of the proposed action's impacts on seismicity in the Final EA, and thus has failed to respond to our comments.

B. BLM Will Violate Section 7 of the Endangered Species Act If It Fails to Consult with the U.S. Fish and Wildlife Service Regarding Impacts to Endangered Species and Critical Habitat

We commented on the potential impacts of the proposed action to threatened and endangered species in our draft EA comment letter on pages 19-24, and we incorporate those comments herein. BLM failed to respond to these comments in a substantive fashion, and has unlawfully forgone any legitimate analysis of the impacts of oil and gas development to endangered species; has failed to ensure that the proposed action does not jeopardize the continued existence of those species; and has failed to consult with the U.S. Fish and Wildlife Service about the proposed action.

Specifically, the proposed action is reasonably certain to affect listed species and critical habitat, including the desert tortoise (*Gopherus agassizii*) through destruction and fragmentation of critical habitat and harm to individual tortoises from seismic operations, direct mortality, and habitat loss. Furthermore, as set forth in detail in attachment A, the memorandum of hydrologist Dr. Tom Myers, the reasonably certain consequences of oil and gas leasing, including hydraulic fracturing, have a substantial likelihood of affecting surface and ground water quality and hydrology within multiple stream reaches. As Dr. Myers indicates:

> An assessment of stream reaches dependent on discharge of groundwater from shallow aquifers, so that placement of wells could minimize the risk to the surface waters. Stream channels connected to shallow groundwater occur in Railroad Valley North, White River Valley, and Pahranagat Valley. There could also be intermittent surface waters connected to shallow groundwater on the east side of the Diamond Range and in the Snake Range. [22]

The Final EA, by failing to include any such analysis, improperly ignores the potential effects on multiple listed aquatic and riparian listed species present in the White River Valley, Railroad Valley, Virgin River Valley, and Pahranagat Valley: the White River spinedace, Railroad Valley springfish, Virgin River chub, woundfin, southwestern willow flycatcher, yellow-billed cuckoo, White River springfish, Hiko White River springfish, and Pahranagat roundtail chub. EA at 44-46 & Table 3.7. The EA acknowledges that "some species like the White River Spinedace (*Lepidomeda albivallis*) and the Railroad Valley Springfish (*Crenichthys nevadae*) are

[22] Attachment A at 2-3.

endemic to these hydrobasins. If a failure were to occur, the effects could be catastrophic for habitat and the species in aquatic and riparian environments within these connected hydrobasins." EA at 46. This admission is not merely an admission that reasonably certain consequences of leasing "may affect" the White River spinedace and Railroad valley springfish – rather it is an admission that a "failure" would result in "catastrophic" impacts to the species and their aquatic habitat. This is precisely the risk of extinction that ESA Section 7 requires action agencies to avoid through consultation with the Fish and Wildlife Service.

The Final EA fails to provide adequate substantive analysis of the impacts of oil and gas development on the proposed lease parcels to the many threatened and endangered species which occur on or near the parcels. Instead, BLM provides a list of potentially affected endangered species.[23] BLM then offers two paragraphs of analysis, noting potential impacts to threatened desert tortoises and offering one ominous sentence regarding threatened and endangered fishes which live in or near the lease parcels: "If a [well] failure were to occur, the effects could be catastrophic for habitat and the species in aquatic and riparian environments within these connected hydrobasins."

BLM's refusal to consult with the Fish and Wildlife Service regarding impacts to listed species prior to leasing violates Section 7 of the Endangered Species Act. 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 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.

The ESA provides a safety net for species at risk of extinction. Its purpose is "to provide a program for the conservation [of] endangered species and threatened species" and "to provide a means whereby the ecosystems upon which [such] species depend may be conserved." 16 U.S.C. § 1531(b). Pursuant to the ESA, the FWS has a duty to list a species as threatened or endangered solely on the basis of biological criteria and the best available scientific and commercial data. Id. §§ 1533(b), 1533(c). A threatened species is "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Id. § 1532(20). An endangered species is "any species which is in danger of extinction throughout all or a significant portion of its range[.]" Id. § 1532(6). Once a species is listed as threatened or endangered, its critical habitat must be designated. Id. § 1533(a)(3). Critical habitat includes both occupied and unoccupied areas that contain habitat features that are "essential to the conservation of the species[.]" Id. § 1532(5)(A)(i)(I).

The ESA regulates federal agency actions that impact threatened and endangered species. Section 7(a)(2) of the ESA requires that all federal agencies avoid actions that are "likely to jeopardize the continued existence" of any listed species or "result in the destruction or adverse modification of" critical habitat. 16 U.S.C. § 1536(a)(2). Jeopardy results when it is reasonable to expect that the action would "reduce appreciably the likelihood of both the survival and

[23] Final EA, at 44-45.

recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." 50 C.F.R. § 402.02. Adverse modification occurs when it is reasonable to expect that the action will result in "a direct or indirect alteration that appreciably diminishes the value of critical habitat for ... the survival [or] recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical." Id. § 402.02.

To ensure compliance with these Section 7(a)(2) prohibitions, the "action agency" must undergo a consultation process with FWS upon proposing to authorize, fund, or carry out an action that "may affect" a species or its critical habitat. 16 U.S.C. § 1536(a)(2); 50 C.F.R. § 402.02. A "may affect" determination is required when any "possible effect, whether beneficial, benign, adverse, or of an undetermined character" occurs.[24] The consultation process ensures a rigorous review of the actions' impacts on threatened and endangered species and serves as an independent check on the tendency of federal agencies to pursue their other goals and mandates at the expense of imperiled species. "Formal" consultation is required when the agency's action is likely to "adversely affect" listed species or critical habitat. 50 C.F.R. §§ 402.13, 402.14(a). Formal consultation concludes with a FWS biological opinion. In a biological opinion, FWS determines whether "jeopardy" or "adverse modification" is likely to occur due to the action and, if so, sets forth the reasonable and prudent alternatives that could avoid such ESA violations. 16 U.S.C. § 1536(b)(3)(A).

In considering an agency's proposed action, FWS must identify the action area, the environmental baseline, and the effects of the action. 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." 50 C.F.R. § 402.02. The *environmental baseline* "includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area." Id. The *effects of the action* include the direct, indirect, and cumulative effects to a species from the proposed agency action, as well as "interrelated and interdependent actions." Id. (defining "effects of action"), § 402.14(c)(4) & (8). Direct impacts are caused by the action and occur at the same time and place. Id. § 402.02. Indirect impacts are those that are caused by the proposed action, but are later in time and reasonably certain to occur. Id. Cumulative effects include "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." Id. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Id. Interdependent actions are those that have no independent utility apart from the action under consideration. Id. During the ESA consultation process and in developing a biological opinion, both FWS and the action agency must use the best scientific and commercial data available. Id. § 1536(a)(2).

In addition to the Section 7(a)(2) prohibitions on agency actions, the ESA also prohibits agency actions that "take" threatened and endangered species. 16 U.S.C. § 1538(a)(2); 50 C.F.R. § 17.31(a). "Take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." 16 U.S.C. § 1532(19). ESA regulations further define "harm" as "significant habitat modification or degradation where it actually kills

[24] *Center for Biological Diversity v. BLM*, 698 F.3d 1101 (9th Cir. 2012) (emphasis added).

or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering." 50 C.F.R. § 17.3.

Congress created two "incidental take" exceptions to the take prohibition, including "incidental take statements" that are issued to federal agencies. 16 U.S.C. §§ 1536(b)(4)(A), 1536(o)(2). Like biological opinions, FWS issues incidental take statements at the conclusion of the ESA section 7(a)(2) consultation process. Id. § 1536(b)(4)(A). FWS must issue incidental take statements if it (1) concludes in a biological opinion that the agency's action will neither jeopardize the species nor destroy or adversely modify critical habitat, and (2) the agency action "may" take a listed species. 50 C.F.R. §§ 402.14(g)(7); 402.14(i)(1). An incidental take statement must (1) limit and quantify the amount of take, (2) specify the reasonable and prudent measures that FWS considers necessary to minimize such impact, (3) set forth terms and conditions that must be complied with by the federal agency to implement these reasonable and prudent measures, and (4) establish monitoring and reporting requirements. 16 U.S.C. § 1536(b)(4); 50 C.F.R. § 402.14(i). Any taking that exceeds the limits set forth in an incidental take statement triggers the need to immediately reinitiate consultation. See 50 C.F.R. § 402.16.

BLM must consult with the Service regarding the impacts of the lease sale on affected listed species, in compliance with its section 7 obligations under the ESA. To the extent that BLM relies on section 7 programmatic consultations for the several management plans governing the lease sale, that reliance is plainly not proper for the site-specific effects, including hydrologic effects, on any of the listed species and critical habitat affected by BLM's action. The potential for fracking and horizontal drilling and its associated impacts within the planning area constitutes "new information reveal[ing] effects of the [RMPs] that may affect listed species or critical habitat in a manner or to an extent not previously considered [in the prior section 7 programmatic consultations]." 50 CFR § 402.16(b). BLM must therefore initiate consultation on all of the planning documents for these areas. In any case, it must formally consult over the lease sale's potential adverse effects on listed species and consider the full scope of fracking and other drilling activities that could affect these species.

C. BLM Has Failed to Consider Climate Impacts or Analyze Reasonable Alternatives to Mitigate Those Impacts

We provided comments on the potential of the proposed action to contribute to climate change in our draft EA comment letter, pages 42-50, which is incorporated herein.

BLM's final EA acknowledges the existence of climate change and greenhouse gas emissions, EA at 29-30, and even provides a crude range of possible downstream combustion emissions from development scenarios of 0 or 100 wells. EA at 29-30 & Table 29-30. The final EA, however, then goes on to ignore NEPA requirements and well-established methods for assessing greenhouse gas emissions, by claiming that "It is currently not feasible to predict the net impacts from the Proposed Action on climate, as leasing is an administrative action and has

no direct effects. The inconsistency in results of scientific models used to predict climate change at the global scale, coupled with the lack of scientific models designed to predict climate change on regional or local scales, limits the ability to quantify potential future impacts of decisions made at this level." On the contrary, NEPA requires evaluation of the indirect and cumulative effects of leasing decisions, and reasonable methods exist for describing emissions scenarios and quantifying impacts.

Finally, the EA continues to state that it is not possible to assign a "significance" value or impact to the GHG emissions estimates and asserts that "the United States does not have a carbon budget."[25] However, as detailed in our comment letter on the Draft EA, as a signatory to the Paris Agreement, the United States remains committed to keeping global average temperature rise to "well below 2°C" to avoid the worst dangers of climate change. Scientific studies have estimated the U.S. portion of the global carbon budget for staying "well below2°C," which is rapidly been exhausted. The approximately 17 million metric tons of CO_2 that could foreseeably result from the lease sale[26] comprise a measurable ~0.048 percent of the remaining U.S. carbon budget for staying well below 2°C, which is clearly significant in the scope of national, state, and local level commitments to implementing rapid GHG emissions reductions. At a time when the U.S. must rapidly ratchet down GHG emissions to avoid the worst dangers of climate change, the BLM should not be committing to new fossil fuel development and infrastructure on our public lands that locks in carbon intensive oil production for years into the future.

As NEPA requires, an agency must analyze the impacts of "similar" and "cumulative" actions in the same NEPA document in order to adequately disclose impacts in an EIS or provide sufficient justification for a FONSI in an EA. *See* 40 C.F.R. §§ 1508.25(a)(2) and (3). Here, the BLM failed to take into account the greenhouse gas emissions resulting from other proposed oil and gas leasing in Nevada and other neighboring states, as well as related oil and gas development, and to analyze the impacts of these actions in terms of their direct, indirect, and cumulative greenhouse gas emissions.

The EA also fails to conduct <u>any</u> cumulative impacts analysis for greenhouse gas emissions and associated climate change impacts. EA at 70-73. BLM's failure to appropriately analyze and assess reasonably foreseeable greenhouse gas emissions from cumulative and similar leasing actions, and failure to demonstrate that the climate impacts will not be significant is a clear violation of NEPA.

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 all of the planning areas affected by the leases in updated RMPs is absolutely necessary. BLM has *never* thoroughly considered the cumulative climate change impacts of *all* potential fossil fuel extraction and fracking (1) within each of the planning areas, (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

[25] Final EA at 30.
[26] *See* Final EA at 29 Table 3.1, conservatively assuming a 20-year production horizon.

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 defer all new leasing at least until the issue is adequately analyzed in a programmatic review of all U.S. fossil fuel leasing, or at least within amended RMPs. BLM's argument, in response to our comments, that a permanent cessation of leasing would require RMP amendment beyond the scope of the leasing decision ignores the established principle that agencies are obligated to consider all reasonable alternatives. Considering a no-leasing alternative would allow the agency to preserve the status quo and avoid irretrievable commitment of resources until such time as it can consider the regional and national impacts of fossil fuel leasing and undertake appropriate land use plan amendments or other actions.

i. The Cumulative Effects of Federal Fossil Fuel Leasing and Production Contributes Significantly to Adverse Impacts of Climate Change

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.[27] 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. Specifically, BLM's consideration of large-scale leasing in previously-undeveloped areas of Nevada threatens to significantly increase oil and gas reserves and resulting emissions, but BLM has improperly evaded meaningful consideration of those impacts.

BLM must consider an alternative ending new public lands fossil fuel leasing and fracking is in the interest of meeting 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.[28] 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.[29]

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."[30] 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

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[27] *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).
[28] U.N. Framework Convention on Climate Change, Paris Agreement ("Paris Agreement"), Art. 2.
[29] 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.
[30] *Id.*, Recitals.

accordance *with best available science*,"[31] imperatively commanding that developed countries specifically "should continue taking the lead by undertaking economy-wide absolute emission reduction targets"[32] and that such actions reflect the "highest possible ambition."[33]

The Paris Agreement codifies the international consensus that climate change is an "urgent threat" of global concern,[34] 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"[35] (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.[36] 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 dangerous, and potentially irreversible impacts.[37] 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.[38] 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'

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[31] *Id.*, Art. 4(1).
[32] *Id.*, Art. 4(4).
[33] *Id.*, Art. 4(3).
[34] *Id.*, Recitals.
[35] *Id.*, Art 2.
[36] *See* U.N. Framework Convention on Climate Change, Cancun Agreement. *available at* http://cancun.unfccc.int/ (last visited Jan 7, 2015); United Nations Framework Convention on Climate Change, Copenhagen Accord. *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* https://www.congress.gov/treaty-document/102nd-congress/38.
[37] *See* Paris Agreement, Art. 2(1)(a); U; U.N. 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).
[38] *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 2°C 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).

and 'extremely dangerous' climate change."[39] Consequently, a target of 1.5 °C 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 1.5° 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 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.[40] See our discussion about this in our draft EA comment letter, pages 45-47.

Oil and gas production operates in a global market where changes in U.S. production translate into shifts in global prices, global consumption, and associated greenhouse gas pollution. Analyses show that increasing U.S. oil and gas production lowers prices and increases global consumption, while leaving U.S. oil and gas undeveloped increases prices and decreases global consumption. In short, every barrel of oil, and unit of gas, that is left undeveloped results in a significant reduction in global oil and gas consumption with associated decreases in greenhouse gas pollution, as detailed below.

A comprehensive analysis of the GHG consequences of ending new oil leasing on U.S. federal lands and waters, and avoiding renewal of existing leases for resources that are not yet producing, found that ceasing new leasing would result in large GHG and climate benefits.[41] This study accounted for the effects of substitution by other fuels for the oil that would be foregone by ending new leasing. The study estimated that for each unit (QBtu) of federal oil production cut, other oil supplies would substitute for about half a unit (0.56 QBtu) and net oil consumption would drop by nearly half a unit (0.44 QBtu). In short, every barrel of federal oil left undeveloped would result in nearly half a barrel reduction in net oil consumption, with associated reductions in GHG emissions. The analysis estimated that ending new federal oil leasing would reduce 2030 global CO_2 emissions from oil consumption by 54 Mt CO_2, with an increase in CO_2 emissions from other fuels of 23 Mt CO_2, for a net emissions benefit of 31 Mt CO_2. The analysis recommended that "policy-makers should give greater attention to measures that slow the expansion of fossil fuel supplies."

As summarized by the study authors, oil and gas production operates in a global market, where increases or decreases in U.S. production translate into changes in prices and consumption:

> [T]he oil market is also highly global, with oil readily traded among countries, and substantial infrastructure in place to do so. The US both imports and exports

[39] Anderson, K. and A. Bows, Beyond 'Dangerous' Climate Change: Emission Scenarios for a New World, 369 Philosophical Transactions, Series A, Mathematical, Physical, and Engineering Sciences 20, 20–44 (2011).
[40] Cimons, M., Keep It In the Ground 6 (Sierra Club *et al.*, Jan. 25, 2016).
[41] Erickson, P. and M. Lazarus, How would phasing out US federal leases for fossil fuel extraction affect CO_2 emissions and 2°C goals?, Stockholm Environment Institute, Working Paper No. 2016-2 (2016).

> oil, and world and domestic oil prices very closely track each other (US EIA 2016).
>
> For this reason, we expect that changes in US oil production would affect an integrated global oil market, an assumption also made by many other analysts that have looked at changes in US oil supply (Bordoff and Houser 2015; Rajagopal and Plevin 2013; Allaire and Brown 2012; Metcalf 2007; IEC 2012). Though in the past the oil market could be strongly influenced by cartel behavior among a small number of producers, many analysts now see the market as more likely to behave competitively (The Economist 2016; US EIA 2016), meaning that increases or decreases in supply do translate into shifts in prices and, in turn, consumption.[42]

Similarly, an analysis published in the prominent journal *Nature Climate Change* concluded that increased oil production would significantly increase global oil consumption as the result of greater supplies and lower global oil prices.[43] Using publicly available global oil supply curves from the International Energy Agency and peer-reviewed elasticities, the analysis estimated that each barrel of increased oil production would result in an increase of 0.59 barrels of global oil consumption. Although this study focused on the effects of increases in Canadian tar sands production, the lead author stated the results are applicable to U.S. oil production and that each barrel of oil not produced in the U.S. leads to substantially reduced oil consumption.[44]

An analysis of the effects of removing subsidies for U.S. oil and gas production found that decreases in the U.S. oil and gas supply would result in substantial decreases in global oil and gas consumption.[45] In the case of oil, the model estimated that a decrease of 600,000 barrels per day in U.S. oil supply, resulting from a drop in U.S. oil production due to subsidy removal, would lead to a decrease in global oil consumption of 300,000 to 500,000 barrels per day.[46] In the model, the decreased U.S. oil supply is only partially replaced by other sources of U.S., OPEC, and other rest-of-world supply. In short, each U.S. barrel not developed would result in a net reduction in global oil consumption of 0.5 barrels to 0.8 barrels. Similarly, for natural gas, a 1.06 to 1.32 Tcf per year decrease in U.S. natural gas supply would lead to a net reduction in global gas consumption of 0.94 to 1.06 Tcf per year,[47] which translates into a net reduction in global gas consumption of 0.7 to 1 unit for each unit of U.S. natural gas left undeveloped.

An analysis by experts at Columbia University and the Rhodium Group on the effects of lifting U.S. crude oil export restrictions shows that U.S. oil production affects global crude oil

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[43] *Id.* at 23.
[43] Erickson, P. and M. Lazarus, Impact of the Keystone XL Pipeline on Global Oil Markets and Greenhouse Gas Emissions, 4 Nature Climate Change 778 (2016).
[44] Telephone Communication with Peter Erickson Re: Stockholm Environment Institute (November 1, 2017).
[45] Metcalf, G, The Impact of Removing Tax Preferences for U.S. Oil and Gas Production, Council on Foreign Relations, August 2016; Erickson, P., Rebuttal: Oil Subsidies—More Material for Climate Change Than You Might Think, November 2, 2017.
[46] *Id.* at Table 2.
[47] *Id.* at Table 3.

prices,[48] which is only possible without perfect substitution. As illustrated in Figure 23 of the study, when U.S. crude oil exports are permitted, as they were by the lifting of the crude oil export ban in December 2015, all modeling groups agreed that the international oil market will respond to changes in U.S. production. Specifically, all modeling groups projected that global crude prices will decrease as U.S. production increases, resulting in an increase in global crude oil demand: "a 1.2 million b/d increase in U.S. production due to removing current export restrictions could result in anywhere between a 0 and 1 million b/d increase in global crude demand."[49] In short, this study demonstrates that crude oil operates in a global market, where increasing U.S. supply increases global consumption and resulting greenhouse gas pollution.

Finally, the modeling results from a Bureau of Ocean Energy Management (BOEM) analysis of lifecycle GHG emissions that would result from the 2017–2022 OCS Oil and Gas Leasing Final Proposed Program[50] estimated that leaving U.S. oil and gas undeveloped under the no-leasing alternative would result in a significant decrease in global oil consumption with associated reductions in GHG pollution.[51] Importantly, BOEM's global market model, MarketSim, estimated that foreign oil consumption would be reduced under the No Action Alternative by "approximately 1, 4, and 6 billion barrels of oil for the low-, mid-, and high-price scenarios, respectively, over the duration of the 2017–2022 Program."[52] Under the mid-price scenario, the model projected that each barrel of oil left undeveloped under the No Action Alternative would result in approximately a half-barrel decrease in global oil consumption. Specifically, the choice to leave ~8 billion barrels of oil undeveloped under the No Action Alternative in the mid-price scenario[53] would result in a reduction in global oil consumption of 4 billion barrels of oil.[54]

Although BOEM did not calculate the GHG emissions reductions from the decrease in global oil consumption, energy experts at the Stockholm Environment Institute (SEI) calculated the GHG benefits. Using standard energy contents (from the US Department of Energy) and carbon contents (from the US Environmental Protection Agency), and discounting the oil used in products and not combusted (International Energy Agency), SEI estimated that the reduction in global oil consumption would result in a savings of 2.3 billion tonnes CO_2 in high-price scenarios for oil, 1.6 billion in mid-price scenarios, and 0.4 billion in the low-price

[48] Bordoff, J. and T. Houser, Navigating the U.S. Oil Export Debate, Columbia University Center on Global Energy Policy and the Rhodium Group (2015).
[49] *Id.* at 57.
[50] Wolvovsky, E. and Anderson, W., OCS Oil and Natural Gas: Potential Lifecycle Greenhouse Gas Emissions and Social Cost of Carbon. BOEM OCS Report 2016-065. 44 pp (2016).
[51] Unfortunately, in direct contradiction to its global oil market model results, BOEM erroneously concludes in this report that producing 3.7 billion barrels of oil would make no difference for GHG emissions, and would even reduce GHG emissions compared to the No Action alternative of no new leasing, by failing to account for the large-scale decrease in global oil consumption and the resulting enormous decrease in GHG pollution under the No Action Alternative. BOEM acknowledged that its GHG analysis was limited in "not fully capturing global market and GHG implications" (at Forward) and in not including the GHG savings from reduced global oil and gas consumption in its emissions estimate for the No Action Alternative (at page 23).
[52] *Id.* at Table 6-2. Table 6-2 estimates production from the Final Proposed Program with a range of 2.2 billion barrels for the low price scenario, 3.7 billion barrels for the mid-price scenario and 5.9 billion barrels for the high price scenario.
[53] *Id. at* Table 6-2.
[54] *Id.* at 23.

scenarios.[55] As the SEI analysis points out, the decreases in global GHG emissions under the No Action Alternative are enormous:

> These *decreases* in rest-of-world emissions dwarf the official estimated *increases* in US emissions that BOEM's official Programmatic Environmental Impact Statement reports for its No Action Alternative (relative to the Proposed Program), which instead amount to just 0.13 billion, 0.12 billion and 0.013 billion tonnes CO_2 for the high, mid, and low-price scenarios, respectively. Those calculations *exclude* the far larger emissions attributable to the global market effect.[56]

If BOEM were to account for the effects of reducing U.S. oil production on international oil consumption, the global GHG impact of the No Action Alternative over the life of the 2017-2022 Program would be a decrease of up to 2.3 billion tonnes of CO_2 which is greater than a year's worth of emissions from the entire U.S. transportation section (i.e., 1.7 billion tonnes CO_2).

In sum, numerous scientific and economic analyses, including those by federal agencies, show that the assumption of perfect substitution in GHG analyses for U.S. oil and gas production is unfounded and unreasonable, and dramatically misrepresents the GHG and climate impacts from oil and gas leasing.

ii. 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.[57]

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

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[55] Erickson, Peter, Final Obama administration analysis shows expanding oil supply increases CO_2, Stockholm Environment Institute, January 30, 2017.
[56] *Id.*
[57] *See, e.g.*, U.S. BLM 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).

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.

BLM claims that in order to halt all leasing, it would have to amend the "current" RMPs through a public process which is beyond the scope of the EA. Nevertheless, BLM is only required to "consider" leasing of areas that have been nominated for lease. As BLM explained in its EA, "[i]f there are known resource conflicts that cannot be addressed using a stipulation, then the parcel may be deferred until the known resource conflict is resolved."

III. Conclusion

The expansion of fossil fuel leasing into vast areas of previously-unleased Nevada public lands serves no legitimate public purpose, but threatens both the waters and native wildlife of the area and the climate at large. Unconventional oil and gas development not only fuels the climate crisis but entails significant public health risks and harms to the environment. Accordingly, BLM should cancel the lease auction, or else prepare an EIS that thoroughly analyzes the effects of the proposed lease auction, as compared to the alternative of no new fossil fuel leasing and no fracking or other unconventional well stimulation methods within the Ely District planning area.

As authorized representative on behalf of Protestors:

M. A. Saul

Michael Saul
Senior Attorney
Center for Biological Diversity
1536 Wynkoop Street, Suite 421
Denver CO 80202
303-915-8308
msaul@biologicaldiversity.org

Patrick Donnelly
Nevada State Director
Center for Biological Diversity
PO Box 364414
North Las Vegas, NV 89156
702-483-0449
pdonnelly@biologicaldiversity.org

Katie Fite
Public Lands Director
WildLands Defense
PO Box 125
Boise, ID 83701
208-871-5738
katie@wildlandsdefense.org

Laura Cunningham
Executive Director
Basin and Range Watch
PO Box 70
Beatty, NV 89003
775-553-2806
bluerockiguana@gmail.com

Encl.:
Attachment A: Technical Memorandum from Tom Myers, Ph.D.

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ATTACHMENT A

Tom Myers, Ph.D.
Hydrologic Consultant
6320 Walnut Creek Road
Reno, NV 89523
775-530-1483
tommyers1872@gmail.com

November 13, 2017

Technical Memorandum

Prepared for: Center for Biological Diversity

Subject: Review of Hydrogeologic Aspects of the December 2017 Oil and Gas Lease Sale, Ely District Office

This technical memorandum reviews hydrogeologic aspects of the Final Environmental Assessment DOI-BLM-NV-L030-2017-0021–EA (EA) for a December 2017 oil and gas lease sale. It is anticipated that any development would be unconventional, meaning that it would be necessary to use hydraulic fracturing (fracking) to open the target formation to release oil or gas. Although it is not limited to specific formations, the EA specifies that the target formations are the Chainman and Pilot Shale. The shale has very low permeability so that the oil or gas is not easily released unless the formation is broken apart by fracking.

The memorandum concludes that fracking development in the proposed lease area threatens the hydrogeology of the area, including regional springs and intermittent and perennial streams. The potential impacts include both contamination and depletion of flow. The following sections outline in detail the many issues the final EA failed to consider or adequately disclose. The first section considers the fracking fluids and brine possibly found in the targeted formation. The following sections consider how those fluids could affect surface water, groundwater, and other resources of the proposed lease area.

Chemistry of Fracking Fluid and Natural Brine

Unconventional O&G development potentially releases three fluids to the environment. These are fracking fluid, natural brine from the targeted formation, and natural gas (methane and higher chain hydrocarbons). Every operator has a formula that varies for every targeted formation rendering it impossible to know in advance the exact chemicals that will be injected into the formation, but the EA should consider the risks of releases of that fluid in a risk-based analysis and consider policies that would reduce the toxicity of the fluid. The analysis would include an assessment of chemical interactions of the fluids with the formations to be fracked

and formations surrounding the targeted formation. This would include an assessment of daughter products caused by reactions between the fracking fluid and the formations.

The EA should also consider the contaminants in natural fluids, including high salinity and naturally occurring radioactive material. Brine contains extremely high concentrations of salt and naturally occurring radioactive materials. The injection of fracking fluid may displace brine into pathways that will start it flowing to the near surface. Increasing salt loads to pristine streams could ruin their water quality as a coldwater fishery. The EA should disclose the expected chemistry of the brine and assess the effects of that brine reaching streams or soils in the lease areas.

Methane is also a fluid released by well drilling and development in many ways. It is the most common gas in natural gas, which includes ethane, propane, and other gaseous hydrocarbons. Although not toxic itself, natural gas can accumulate and either explode or burn. It can also replace dissolved oxygen in surface water, thereby causing problems for aquatic life. The EA fails to consider the potential for gas to reach surface water or the effect that gas could have on aquatic life.

Effects on Surface Water

The EA's analysis of surface water effects (p 35) related simply to disturbance related effects, which are similar to other types of land disturbing activity. The analysis neglected to consider the potential for spills of contaminants, such as fracking fluid or spilled flowback. The EA analysis should relate the risks of contamination to the distance a wellpad, the site of most spills, would be from drainages.

The EA fails also to consider the potential for contaminated shallow groundwater to reach surface water, and the effects it could have. The transport of fracking fluid or produced water through the groundwater to shallow aquifers is discussed below, but the EA fails to relate the risks to surface to the proximity that surface water has to potentially contaminated groundwater.

The environmental analysis for a lease sale should include:

- An assessment of the distance a well pad is to surface water. This would be a GIS exercise of buffering the drainages and determine the areas greater than certain distances from the drainage.
- An assessment of stream reaches dependent on discharge of groundwater from shallow aquifers, so that placement of wells could minimize the risk to the surface waters. Stream channels connected to shallow groundwater occur in Railroad Valley North,

White River Valley, and Pahranagat Valley. There could also be intermittent surface waters connected to shallow groundwater on the east side of the Diamond Range and in the Snake Range.

Effects on Groundwater

The target formations are Chainman Shale and Pilot Shale (EA, p 1). Stratigraphically, these shale formations are part of the uppersiliciastic rock unit, which separates the upper and lower carbonate rock units (Welch et al. 2008). Both carbonate rock units are essential aquifers, as acknowledged in the EA, and discussed in Welch et al. (2008) and Heilweil and Brooks (2011). The carbonate aquifer has been targeted by the Southern Nevada Water Authority (SNWA) for its groundwater development project, as well (FEIS for SNWA Groundwater Development).

Well-bore drilling would occur through the upper carbonate aquifer to reach the shale that lies between the carbonate units. The upper carbonate aquifer is thousands of feet thick, thus there is a long well bore intersecting the aquifer. Leaks would be directly into the aquifer. Fracking would occur in the layer between two highly productive and highly important aquifers. Out-of-formation-fracking, which is much more common than commonly acknowledged (see below), would allow fracking fluids to directly flow into carbonate aquifers.

The carbonate aquifers also support many springs in the area. Most egregiously, Group D is upgradient of Big and Little Warm Spring in Duckwater Valley. Group B lies along the White River Flow System path from White River Valley to Pahranagat Valley, so drilling would occur upgradient of the springs in Pahranagat Valley. Group E is in the northern portion of White River Valley, near many carbonate-based springs. Group H is in the central to southern portion of White River Valley, also near carbonate-based springs. However, spills at these areas would contaminate surficial aquifer and perched aquifer that support cold-water springs. Group F would be in a recharge zone for both Spring and Snake Valleys, so spills could contaminate recharge to both basin fill and carbonate aquifers. White River Valley and Pahranagat Valley are hydrologic basins of concern because of the presence of threatened fish dependent on the springs. The EA failed to consider the risks to these springs or specify management practices that could minimize the risks.

The cursory discussion of hydrogeology in the EA (p 32-35) does not pass for an analysis. The EA is wrong with regard to interbasin flow from the Death Valley Flow System (DVFS) (EA, p 32); although some have suggested flow moved from DVFS to the White River Flow System (WRFS), the broader consensus is that flow goes in the other direction, from WRFS to DVFS. The cited reference, Harrill and Prudic (1998),is out of date and has been superseded by Heilweil and Brooks and studies of the DVFS. It is not relevant to the consideration of impacts of leasing, and should not be part of the EA.

The EA lists groundwater basins in Table 3.3. It is incorrect in two respects. The total appropriations have not been adjusted for supplemental water rights, meaning some uses are limited in the total amount of water that can be used, but the water could be obtained from more than one source. Each source may have a water right equal to total amount, but not all sources could be used fully in one year; they are limited to the total amount that can be used. Second, the total appropriations include amounts awarded to SNWA in 2011, but those awards have been set aside by the courts.

Pathways for Contaminants to Reach the Surface

Natural gas released by unconventional O&G development has been found to contaminate shallow aquifers, wells, and springs near gas developments. However, the EA for this lease sale has not considered this potential in any way.

Natural gas can discharge from three different sources -the deep shale, a natural gas well bore, or shallow microbial sources - to shallow groundwater or to streams and springs. Fracking can mobilize gas from either source which can cause short-term or long-term methane contamination on streams and springs. Simply drilling through formations with natural gas can provide a pathway for the gas in that formation to move vertically toward the surface; the pathway can be along the annulus between the casing and the hole wall; the formation can be sandstone or other conventional type gas formation that is not extensive enough to be developed conventionally. The well does not have to provide the entire pathway to the shallow groundwater but could simply connect the source with a shallow fault or fracture which could link the well to shallow groundwater.

Fracking releases both fracking fluid injected into the formation and brine which can follow natural or artificial pathways to shallow groundwater. The high pressure required for fracking can cause fracking fluid to leak from the well bores into surrounding formations, if the well bore leaks. From those sources, the fluid can follow natural pathways to shallow groundwater, streams and springs. The natural pathways include faults and fractures.

The first is that the industry assumes that most fracking operations do not cause fractures to leave the target formation. Based on observed experience in the Marcellus shale, that is not correct because many operations have been documented to cause fractures that leave the formation. Much fracking fluid leaves the shale during fracking through out-of-formation fractures which extend as much as 1500 feet above the Marcellus shale (Hammock et al. 2014; Fisher and Warpinski 2011). Hammock et al. (2014) documented 10,286 microseismic events as much as 1900 feet above the shale from 56 HF stages for six Marcellus wells, including many events that extended above the Tully limestone, which had been considered a barrier to fracturing. These fractures did not extend to shallow groundwater, but they provided a

pathway from the shale to much more permeable formations closer to shallow groundwater. The new fractures also potentially connect with natural fractures and faults.

The permeability of the target formation also changes due to fracking. Pre-fracking, the rate of flow through the shale can be measured in inches per millenia due to the shale's extremely low permeability. Hydraulic fracturing increases the permeability of the formation. This allows the oil/gas to flow with the natural groundwater (brine which becomes produced water) to the well more easily. If the fractures contact the edge of the shale, the increased permeability allows the fluids to contact more naturally permeable formations above or below the formation more easily. In this sale, these formations are carbonate aquifers.

The siliclastic formation which contains the shale is extensively folded and faulted. If fracking pressures or fractures contact these natural fractures, the natural fractures could provide a pathway for fluids to flow upward out of the shale (Caine et al 1996). If a target formation is close to a natural pathway, fracking fluids or natural brine could flow to the near surface. The fracking pressures could reactivate old faults that have been sealed, so faults that previously did not transmit fluid could begin to if the fracking pressures reactivated the fractures. The risks due to potential reactivation of existing pathways could be minimized if the setbacks were established. As part of this NEPA process, the BLM should establish setbacks from existing faults, and establish standards for determining the existence of faults, so that potential lease purchasers could understand their requirements. The required setbacks are not simply from the surface but also from the well, wherever it is located below the ground surface. This is important especially if the wells are directionally drilled.

Out-of-formation fracking, when the fractures leave the target formation, occurs frequently. The pressure forces fracking fluid to flow outside of the shale, whether through out-of-formation fractures or through just making a contact with more permeable formations above the shale, and start the movement of fluid to shallow groundwater through natural pathways. Travel time for contaminants to reach the surface could vary from tens to thousands of years, depending on the conductivity of the connections (Myers 2012).

The coincidence of fracking between two carbonate aquifers magnifies the potential for contaminants from the fracking to reach aquifers, and pathways to shallow aquifers, as compared to fracking development in other areas such as the Marcellus shale. The depth to the shale in this sale area does not protect water resources due to the connectivity of the carbonate aquifer. It is at the lease sale phase that analysis of the connectivity between the shale and carbonate aquifers would be most appropriate, both to the protect the environment and to inform potential lease buyers of the development risks they would face.

Water Use

Fracking requires millions of gallons of water, some of which remains underground, and the remainder is too contaminated for use. The EA (Appendix E) indicated that up to 10,000,000 gallons could be used, per well, depending on whether the well is vertical or horizontal. This water is effectively consumptively used because it either remains bound in the shale or it is so contaminated it would be disposed through an injection well. The EA (Appendix E) lists various potential sources of water for fracking, but they are all speculative. A NEPA analysis should consider the amounts of water that would be required, on average and at the upper end if prices allow for rapid development, to develop each of the eight lease areas. Although the potential sources may not be identifiable, it is reasonable to conclude it would be from a nearby source due to the costs of trucking tanks trucks full of water. The NEPA analysis should consider the potential effects on nearby water sources, such as springs, if all of the water was sourced locally. The NEPA analysis would then establish limits on the development, which the lease purchaser would have to work within or would have to truck water from outside the area.

The EA (Appendix E) discusses water use from a prior appropriations' perspective. However, the BLM must expand its consideration to include protecting the environment from water use decisions. The Nevada State Engineer (NSE) could grant a temporary water right without considering the impact on the environment if it would not harm senior water rights. Unless it can be shown that obtaining groundwater for fracking would affect a senior water right, the NSE would grant it. The BLM has the authority to limit fracking based on whether the water use would affect environmental resources associated with the streams. As part of analysis of potential leasing, the BLM should consider the potential impacts to water quantity in the basins that could be used to provide the water. The BLM should also determine water sources that could be off limits for large diversions necessary to frack a well.

Neither the EA nor Appendix E discuss in any detail the fact that water used for fracking is consumptively used, except possibly flowback that is treated for use in other ways. Fracking fluid either remains bound in the formation or that collected as flowback is reinjected for disposal. Either way, it is effectively lost. Produced water may be new water, but it is usually highly contaminated brine.

Flowback and Spills

Flowback is the fluid that flows back up the well from the formation after the pressure induced to cause fracturing is released. Flowback is a natural result of most fracking operations. Flowback can be either fracking fluid or natural fluids occurring in the targeted formation. The operator must be prepared to capture the flow, or a spill will result.

Drill pads should be sufficiently far from surface water that flowback will not contaminate the surface water if the operator is unable to contain it. The drill pad must also have sufficient

BMPs to contain spills on site. Most flowing streams in Nevada are very small, and contamination could devastate them due to their small size. As part of an analysis of potential leasing, the BLM should consider the potential contaminants in flowback and risks to surface water from spills. The analysis should include an assessment of risks as a function of distance from the well pad to the resource, so that setbacks can be established.

Cumulative Impacts

The EA cumulative effects analysis (EA, Chapter 4) does not include reference to the SNWA Groundwater Development Project (FEIS, Clark, White Pine, and Lincoln County Groundwater Development Project), even though it would affect water resources with both groundwater depletion and impact of surface disturbance, in some of the proposed lease sale areas.

Conclusion and Recommendations

This memorandum has detailed multiple risks that unconventional oil and gas development could cause to groundwater and surface water resources in the proposed lease sale area. The NEPA analysis should include much improved assessments of the existing hydrogeology and potential connections among the target formations and shallow aquifers. This should be done separately for all lease areas. The site-specifc analysis should include a detailed consideration of the hydrogeology at the site, including stratigraphy, fault mapping, and baseline hydrogeology data, such as groundwater levels and chemistry. A conceptual flow model for groundwater flow through the area and to downgradient water sources, as outlined in this memorandum, should be completed.

The analysis should be completed in a new draft environmental assessment or in a full Environmental Impact Statement (EIS). Alternatives should be considered, in addition to the no action alternative, based on the risks to water resources determined from the environmental assessment.

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