



Feb. 19, 2016

VIA FAX (505) 954-2010

Amy Lueders
Bureau of Land Management
New Mexico State Office
P.O. Box 27115
Santa Fe, NM 87502-0115

Re: Protest of April 20, 2016 Lease Sale

Dear Ms. Lueders:

Center for Biological Diversity, Clean Water Action, Sierra Club, Earthworks, and Environment Texas hereby file this Protest of the Bureau of Land Management (“BLM”)’s planned April 20, 2016 oil and gas lease sale and Environmental Assessment DOI-BLM-NM-040-2015-61-EA, pursuant to 43 C.F.R. § 3120.1-3:

We formally protest the inclusion of each of the following parcels located in Oklahoma, Kansas, and Texas:

NM-201604-001	NM-201604-007	NM-201604-013	NM-201604-039
NM-201604-002	NM-201604-008	NM-201604-034	NM-201604-040
NM-201604-003	NM-201604-009	NM-201604-035	NM-201604-041
NM-201604-004	NM-201604-010	NM-201604-036	NM-201604-042
NM-201604-005	NM-201604-011	NM-201604-037	NM-201604-043
NM-201604-006	NM-201604-012	NM-201604-038	

This protest does not include parcel nos. 14-33, which are located on Texas’ National Forest lands (the parcel numbers throughout this protest refers to the lease sale notice’s numbering). On February 18, the Forest Service withdrew its consent to leasing of these lands.¹

PROTEST

1. Protesting Parties: Contact Information and Interests:

¹ Letter from Timothy Abing, U.S. Forest Service to Ann Lueders, BLM (Feb. 18, 2016). All references cited herein have been compiled on a CD that will be delivered to your office via FedEx.

This Protest is filed on behalf of:

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The Center is a non-profit environmental organization with 47,955 members, many of whom live and recreate in Kansas, Oklahoma, and Texas. The Center uses science, policy and law to advocate for the conservation and recovery of species on the brink of extinction and the habitats they need to survive. The Center has and continues to actively advocate for increased protections for species and their habitats in Texas, Oklahoma, and Kansas. The lands that will be affected by the proposed lease sale include habitat for listed, rare, and imperiled species that the Center has worked to protect including the lesser-prairie chicken, red-cockaded woodpecker, and Sprague's pipit. The Center's board, staff, and members use the public lands in Texas,

Oklahoma, and Kansas, including the lands and waters that would be affected by actions under the lease sale, for quiet recreation (including hiking and camping), scientific research, aesthetic pursuits, and spiritual renewal. Many of the Center's members also live and work near the areas for lease and rely on the public water reservoirs with parcels for lease for their drinking water, which could be adversely affected if these parcels were leased for new oil and gas development.

Clean Water Action has more than 44,000 members in cities and counties in Texas. Its goals include clean, safe and affordable water and prevention of health threatening pollution. Its members who live in the Houston metropolitan area, Corpus Christi, the Dallas-Fort Worth Metroplex, and Brenham rely on the water supplies adjacent to the parcels for lease for drinking water. Clean Water Action's members also utilize the Sabine, Sam Houston, and Davy Crockett National Forests for recreational purposes such as hiking, birding, fishing, etc. Clean Water Action and its members are concerned about the negative impacts that could result to the quality of surface water and drinking water, the possible impact to the dam infrastructures near which parcels could be leased, and the natural areas where our members recreate.

The Sierra Club was founded in 1892 and is the nation's oldest grassroots environmental organization. The Sierra Club is incorporated in California, and has approximately 600,000 members nationwide and is dedicated to the protection and preservation of the environment. The Sierra Club's mission is to explore, enjoy and protect the wild places of the earth; to practice and promote the responsible use of the earth's ecosystems and resources; and to educate and enlist humanity to protect and restore the quality of the natural and human environments. The Sierra Club has chapters in the states covered by this protest, with thousands of members. The Sierra Club has members that live in and use the affected areas for recreation such as hiking, backpacking, camping, fishing and wildlife viewing, as well as for business, scientific, spiritual, aesthetic and environmental purposes.

The Sierra Club's Lone Star Chapter has over 20,000 members and 100,000 supporters in Texas. Its members and supporters, and its paid staff, use the public lands in Texas, including the lands and waters that would be affected by actions under the lease sale, for quiet recreation (including hiking and camping), scientific research, aesthetic pursuits, and spiritual renewal. Many of the Chapter's members live in areas like Corpus Christi, Dallas, Houston and Brenham whose water sources could be impacted if care is not taken in the development of oil and gas in the proposed parcels, since they impact water resources relied upon by those cities.

The Oklahoma Chapter of the Sierra Club has more than 3,000 members throughout the state. Many of these individuals live and work in areas where they experience earthquake tremors caused by induced seismicity triggered by underground oil and gas wastewater disposal. New oil and gas leasing will likely result in increased wastewater injection and increased earthquake activity, which could damage these members' homes and property and threaten their physical safety. Many of the Chapter's members also rely on water from Lake Canton or Heyburn Lake, which could be contaminated by oil and gas development in the areas for lease around these lakes. Oklahoma's Sierra Club members enjoy viewing wildlife such as the least tern, lesser prairie-chicken, whooping crane, red knot and piping plover in their natural habitats. These species and their habitats would be threatened by increased oil and gas development that could result from the proposed lease auction.

The Kansas Chapter of the Sierra Club has almost 5,000 members across the state. The Chapter has concerns about the potential damage to habitat for federal/state “listed” species living on or near BLM lands proposed for auction, including, but not limited to, the lesser prairie chicken, whooping crane, snowy plover, piping plover and least tern. Many of the Chapter's members enjoy viewing these imperiled birds in their natural habitat, including around the areas proposed for lease. Many of these members also live and work in areas where they experience earthquake tremors caused by underground oil and gas wastewater disposal, and are concerned that new oil and gas development in the areas proposed for lease could worsen these impacts.

Earthworks is interested in keeping fossil fuels in the ground in Texas, Oklahoma and Kansas. Earthworks’ regional organizer has lived her entire life in Texas and frequently travels to Oklahoma and Kansas.

Environment Texas is a non-profit, citizen-funded advocate for clean air, clean water and open spaces. The organization has over 30,000 members and activists across the state of Texas, including many in the Dallas-Fort Worth area. Environment Texas researches the challenges confronting our environment and educates the public about what’s at stake. The organization has worked to limit the negative environmental impacts of drilling for over a decade. Environment Texas’ staff and members use the Texas public lands that would be affected by actions under the lease sale for drinking water and recreation.

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

BLM’s proposed decision to lease the parcels listed above is substantively and procedurally flawed for the reasons discussed below.

I. BLM Failed to Provide the Public Adequate Notice of the Proposed Auction and Solicit Public Comment

As described in our letter of February 9, 2016 (attached hereto as Exhibit A and incorporated by reference),² BLM, the Forest Service, Army Corps, and Bureau of Reclamation failed to adequately notify the public of the leasing auction, in violation of NEPA. Because the public was denied a fair opportunity to participate in these agencies’ decisions to allow new oil and gas leasing, BLM should cancel the auction, or at minimum, postpone the auction and hold public hearings to allow the public to voice their concerns and have their questions addressed.

In addition, as described in our e-mail of February 15 (attached hereto as Exhibit B and incorporated by reference), BLM’s sale notice failed to properly notify the public of the correct deadline for submission of a protest, effectively denying many members of the public an adequate opportunity to review BLM’s leasing proposal and file a protest. The sale notice incorrectly stated a deadline of February 18, instead of February 19. Despite that the Center notified BLM of the error on the day of the sale notice’s posting, BLM took no action to correct

² A number of organizations have since joined the February 9 letter. See Addendum to Center for Biological Diversity et al.’s February 9, 2016 Letter Regarding BLM’s April 20, 2016 Lease Sale (included in Exhibit A). Those groups are: Friends of the Neches River, Texas Association of Bass Clubs, Texas Black Bass Unlimited, Denton Drilling Awareness Group, Prairie and Timbers Audubon Society, and Houston Climate Protection Alliance.

it until February 11, after the Center notified BLM that a number of news articles had published the incorrect deadline.

The failure to provide proper notice to the public results in shortening the public's time to participate in BLM's leasing decision in violation of Instruction Memorandum 2010-117's 30-day protest period requirement. Further, because BLM performed no outreach to local communities regarding the lease sale and many members of the public only found out about this sale through recent local news stories (including those reflecting the inaccurate February 18 deadline), the misinformation significantly curtailed the public's time to review BLM's leasing proposal.

BLM's violation of its Instruction Memorandum and its egregious delay in correcting the sale notice compounds the deficiencies in its public outreach detailed in our February 9 letter. Given the importance of public review and participation and the high level of public interest in the lease sale, BLM should postpone the sale or extend the comment deadline 30 days to allow the public adequate time to review BLM's auction proposal.

II. Parcel NM-201604-043 Is Ineligible for Leasing under the Mineral Leasing Act for Acquired Lands

A large portion of parcel NM-201604-43 (Parcel 43) is ineligible for leasing under the Mineral Leasing Act, because it falls within the boundaries of several incorporated cities. *See* Parcel 43 Map.³ The Mineral Leasing Act for Acquired Lands prohibits mineral leasing of federally acquired lands within incorporated cities, towns and villages:

[A]ll deposits of coal, phosphate, oil, oil shale, gas, sodium, potassium, and sulfur which are owned or may hereafter be acquired by the United States and which are within the lands acquired by the United States (*exclusive of such deposits in such acquired lands as are (a) situated within incorporated cities, towns and villages, national parks or monuments, (b) set apart for military or naval purposes, or (c) tidelands or submerged lands*) may be leased by the Secretary under the same conditions as contained in the leasing provisions of the mineral leasing laws, subject to the provision hereof.

30 U.S.C. § 352. The Mineral Leasing Act similarly sets forth a prohibition for lands within the public domain. *See* 30 U.S.C. § 181; 43 C.F.R. 3100.0-3(a)(2)(iii). Public domain lands are those that were “never in state or private ownership,” in contrast to acquired lands, which the United States acquired from a state or private party. *See Watt v. Alaska*, 451 U.S. 259, 264 n.7 (1981).

Presumably, Parcel 43 overlies acquired lands. *See* BLM Sale Notice at 11-14 (listing Parcel 43 under “Texas Acquired” heading). In any case, BLM cannot offer municipally incorporated areas for oil and gas leasing, whether acquired or public domain. Parcel 43 falls within the City of Corinth, Town of Hickory Creek, and the City of Highland Village. Each of

³ All maps cited herein can be found within the “Maps” folder included in the CD of references.

these cities is an incorporated municipality.⁴ BLM must withdraw Parcel 43, or at minimum carve out and withdraw those areas that fall within incorporated city limits.

III. BLM Must Cancel the Lease Sale and Halt All New Leasing Until It Properly Considers the Climate Change Effects of New Leasing and Fracking

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 Kansas, Oklahoma, and Texas planning areas, (2) across all of these states, and (3) across all public lands. Proceeding with new leasing proposals *ad hoc* in the absence of a comprehensive plan that addresses climate change and fracking is premature and risks irreversible damage before the agency and public have had the opportunity to weigh the full costs of oil and gas and other fossil fuel extraction and consider necessary limits on such activities. Therefore BLM must cease all new leasing at least until the issue is adequately analyzed in a programmatic review of all U.S. fossil fuel leasing, or at least within amended RMPs.

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

Expansion of fossil fuel production will substantially increase the volume of greenhouse gases emitted into the atmosphere and jeopardize the environment and the health and well being of future generations. BLM's mandate to ensure "harmonious and coordinated management of the various resources *without permanent impairment of the productivity of the land and the quality of the environment*" requires BLM to limit the climate change effects of its actions.⁵ Keeping all unleased fossil fuels in the ground and banning fracking and other unconventional well stimulation methods would lock away millions of tons of greenhouse gas pollution and limit the destructive effects of these practices.

A ban on new fossil fuel leasing and fracking is necessary to meet the U.S.'s greenhouse gas reduction commitments. On December 12, 2015, 197 nation-state and supra-national organization parties meeting in Paris at the 2015 United Nations Framework Convention on Climate Change Conference of the Parties consented to an agreement (Paris Agreement) committing its parties to take action so as to avoid dangerous climate change.⁶ As the Paris

⁴ See City of Corinth Home Rule Charter, available at <https://www.cityofcorinth.com/documentcenter/view/1099>; see also Texas Sesquicentennial Corinth, Corinth Yesterday and Today: A Brief History of Our Town (1986), available at <https://www.cityofcorinth.com/DocumentCenter/View/5225>; City of Highland Village Charter, available at <http://z2.franklinlegal.net/franklin/Z2Browser2.html?showset=highlandvillageset>; Hickory Creek, available at <http://z2.franklinlegal.net/franklin/Z2Browser2.html?showset=hickorycreekset>.

⁵ 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).

⁶ Paris Agreement, Art. 2.

Agreement opens for signature in April 2016⁷ and the United States is expected to sign the treaty⁸ as a legally binding instrument through executive agreement,⁹ 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.¹⁰

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.”¹¹ The Paris Agreement articulates the practical steps necessary to obtain its goals: parties including the United States have to “reach global peaking of greenhouse gas emissions *as soon as possible* . . . and to *undertake rapid reductions* thereafter in accordance *with best available science*,”¹² imperatively commanding that developed countries specifically “should continue taking the lead by undertaking economy-wide absolute emission reduction targets”¹³ and that such actions reflect the “highest possible ambition.”¹⁴

The Paris Agreement codifies the international consensus that climate change is an “urgent threat” of global concern,¹⁵ 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”¹⁶ (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.¹⁷ 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

⁷ Paris Agreement, Art. 20(1).

⁸ For purposes of this Petition, the term “treaty” refers to its international law definition, whereby a treaty is “an international law agreement concluded between states in written form and governed by international law” pursuant to article 2(a) of the Vienna Convention on the Law of Treaties, 1155 U.N.T.S. 331, 8 I.L.M. 679 (Jan. 27, 1980).

⁹ See U.S. Department of State, Background Briefing on the Paris Climate Agreement, (Dec. 12, 2015), <http://www.state.gov/r/pa/prs/ps/2015/12/250592.htm>.

¹⁰ 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.

¹¹ *Id.*, Recitals.

¹² *Id.*, Art. 4(1).

¹³ *Id.*, Art. 4(4).

¹⁴ *Id.*, Art. 4(3).

¹⁵ *Id.*, Recitals.

¹⁶ *Id.*, Art. 2.

¹⁷ 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 UNFCCC on October 7, 1992. See <https://www.congress.gov/treaty-document/102nd-congress/38>.

dangerous, and potentially irreversible impacts.¹⁸ 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.¹⁹ As scientists noted, the impacts associated with 2°C temperature rise have been “revised upwards, sufficiently so that 2°C now more appropriately represents the threshold between ‘dangerous’ and ‘extremely dangerous’ climate change.”²⁰ 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 CO₂ 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 CO₂ to exceed this limit several times over.²¹

The question of what amount of fossil fuels can be extracted and burned without negating a realistic chance of meeting a 1.5 or 2°C target is relatively easy to answer, even if the answer is framed in probabilities and ranges. The IPCC Fifth Assessment Report and other expert assessments have established global carbon budgets, or the total amount of remaining carbon that can be burned while maintain some probability of staying below a given temperature target. According to the IPCC, total cumulative anthropogenic emissions of CO₂ must remain below about 1,000 gigatonnes (GtCO₂) from 2011 onward for a 66% probability of limiting warming to 2°C above pre-industrial levels.²² Given more than 100 GtCO₂ have been emitted since 2011,²³

¹⁸ 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); IPCC AR5 Synthesis Report at 65 & Box 2.4.

¹⁹ 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).

²⁰ 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).

²¹ Marlene Cmons, Keep It In the Ground 6 (Sierra Club *et al.*, Jan. 25, 2016).

²² IPCC, 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change; Summary for Policymakers at 27; IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change at 64 & Table 2.2 [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)] at 63-64 & Table 2.2 (“IPCC AR5 Synthesis Report”).

the remaining portion of the budget under this scenario is well below 900 GtCO₂. To have an 80% probability of staying below the 2°C target, the budget from 2000 is 890 GtCO₂, with less than 430 GtCO₂ remaining.²⁴

To have even a 50% probability of achieving the Paris Agreement goal of limiting warming to 1.5°C above pre-industrial levels equates to a carbon budget of 550-600 GtCO₂ from 2011 onward,²⁵ of which more than 100 GtCO₂ has already been emitted. To achieve a 66% probability of limiting warming to 1.5°C requires adherence to a more stringent carbon budget of only 400 GtCO₂ from 2011 onward,²⁶ of which less than 300 GtCO₂ remained at the start of 2015. An 80% probability budget for 1.5°C would have far less than 300 GtCO₂ remaining. Given that global CO₂ emissions in 2014 alone totaled 36 GtCO₂,²⁷ humanity is rapidly consuming the remaining burnable carbon budget needed to have even a 50/50 chance of meeting the 1.5°C temperature goal.²⁸

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

- Potential GHG emissions of federal fossil fuels (leased and unleased) if developed would release up to 492 gigatons (Gt) (one gigaton equals 1 billion tons) of carbon dioxide equivalent pollution (CO₂e); representing 46 percent to 50 percent of potential emissions from all remaining U.S. fossil fuels.
- Of that amount, up to 450 Gt CO₂e have not yet been leased to private industry for extraction;
- Releasing those 450 Gt CO₂e (the equivalent annual pollution of more than 118,000 coal-fired power plants) would be greater than any proposed U.S. share of global carbon limits that would keep emissions below scientifically advised levels.

Fracking has also opened up vast reserves that otherwise would not be available, increasing the potential greenhouse gas emissions that can be released into the atmosphere. BLM

²³ From 2012-2014, 107 GtCO₂ was emitted (*see* Annual Global Carbon Emissions at <http://co2now.org/Current-CO2/CO2-Now/global-carbon-emissions.html>).

²⁴ Carbon Tracker Initiative, Unburnable Carbon – Are the world’s financial markets carrying a carbon bubble? available at <http://www.carbontracker.org/wp-content/uploads/2014/09/Unburnable-Carbon-Full-rev2-1.pdf>; Meinshausen, M. *et al.*, Greenhouse gas emission targets for limiting global warming to 2 degrees Celsius, 458 Nature 1158, 1159 (2009)

²⁵ IPCC AR5 Synthesis Report at 64 & Table 2.2.

²⁶ *Id.*

²⁷ *See* Global Carbon Emissions, <http://co2now.org/Current-CO2/CO2-Now/global-carbon-emissions.html>

²⁸ In addition to limits on the *amount* of fossil fuels that can be utilized, emissions pathways compatible with a 1.5 or 2°C target also have a significant temporal element. Leading studies make clear that to reach a reasonable likelihood of stopping warming at 1.5° or even 2°C, global CO₂ emissions must be phased out by mid-century and likely as early as 2040-2045. *See, e.g.* Joeri Rogelj *et al.*, Energy system transformations for limiting end-of-century warming to below 1.5°C, 5 Nature Climate Change 519, 522 (2015). United States focused studies indicate that we must phase out fossil fuel CO₂ emissions even earlier—between 2025 and 2040—for a reasonable chance of staying below 2°C. *See, e.g.* Climate Action Tracker, <http://climateactiontracker.org/countries/usa>. Issuing new legal entitlements to explore for and extract federal fossil fuels for decades to come is wholly incompatible with such a transition.

must consider a ban on this dangerous practice and a ban on new leasing to prevent the worst effects of climate change.

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

Development of unleased oil and gas resources will fuel climate disruption and undercut the needed transition to a clean energy economy. As BLM has not yet had a chance to consider no leasing and no-fracking alternatives as part of any of its RMP planning processes or a comprehensive review of its federal oil and gas leasing program, BLM should suspend new leasing until it properly considers this alternative in updated RMPs or a programmatic EIS for the entire leasing program. BLM demonstrably has tools available to consider the climate consequences of its leasing programs, and alternatives available to mitigate those consequences, at either a regional or national scale.²⁹

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

A programmatic review and moratorium on new leasing would be consistent with the Secretary of Interior's recent order to conduct a comprehensive, programmatic EIS (PEIS) on its coal leasing program, in light of the need to take into account the program's impacts on climate change, among other issues, and "the lack of any recent analysis of the Federal coal program as a whole." *See* Secretary of Interior, Order No. 3338, § 4 (Jan. 15, 2016). Specifically, the Secretary directed that the PEIS "should examine how best to assess the climate impacts of continued Federal coal production and combustion and how to address those impacts in the management of the program to meet both the Nation's energy needs and its climate goals, as well as how best to protect the public lands from climate change impacts." *Id.* § 4(c).

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

Lease sales and lease modifications result in lease terms of 20 years and for so long thereafter as coal is produced in commercial quantities. Continuing to conduct lease sales or approve lease modifications during this programmatic

²⁹ *See, e.g.*, 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); BLM, Proposed Rule: Waste Prevention, Production Subject to Royalties, and Resource Conservation, 81 Fed. Reg. 6615 (Feb. 8, 2016) (proposing BLM-wide rule for prevention of methane waste).

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

Id. § 5.

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

IV. The Significant Public Health Impacts of Increased Fracking Compel Consideration of No Leasing and No Fracking Alternatives

In addition to climate change effects, oil and gas leasing and fracking entail significant public health risks that should compel BLM to consider a ban on these practices in a programmatic review and in the current leasing proposal. The EA fails to study these public health risks, precluding meaningful review of the proposed action.

Ample scientific evidence indicates that well development and well stimulation activities have been linked to an array of adverse human health effects, including carcinogenic, developmental, reproductive, and endocrine disruption effects. This is all the more alarming when considering how close wells may be developed to schools, residences, and businesses under BLM's proposed leasing decision. *See* Cities Map. Just as troubling, is how much is *unknown* about the chemicals used in well stimulation activities.³⁰ The potential human health dangers and the precautionary principle should further compel BLM to consider not allowing further development of oil and gas minerals in the areas for lease. In comparing the no-leasing and no-fracking alternatives to leasing and continued unconventional well development scenarios, BLM should include a health impact assessment, or equivalent, of the aggregate impact that unconventional extraction techniques, including fracking, will have on human health and nearby communities.

Due to the heavy and frequent use of chemicals, proximity to fracked wells is associated with higher rates of cancer, birth defects, poor infant health, and acute health effects for nearby residents who must endure long-term exposure:

³⁰ *See, e.g.* EPA 2015 at 5-73, 10-7.

- In one study, residents living within one-half mile of a fracked well were significantly more likely to develop cancer than those who live more than one-half mile away, with exposure to benzene being the most significant risk.³¹
- Another study found that pregnant women living within 10 miles of a fracked well were more likely to bear children with congenital heart defects and possibly neural tube defects.³² A separate study independently found the same pattern; infants born near fracked gas wells had more health problems than infants born near sites that had not yet conducted fracking.^{33, 34}
- A study analyzed Pennsylvania birth records from 2004 to 2011 to assess the health of infants born within a 2.5-kilometer radius of natural-gas fracking sites. They found that proximity to fracking increased the likelihood of low birth weight by more than half, from about 5.6 percent to more than 9 percent.³⁵ The chances of a low Apgar score, a summary measure of the health of newborn children, roughly doubled, to more than 5 percent.³⁶ Another recent Pennsylvania study found a correlation between proximity to unconventional gas drilling and higher incidence of lower birth weight and small-for-gestational-age babies.³⁷
- A recent study found increased rates of cardiology-patient hospitalizations in zip codes with greater number of unconventional oil and gas wells and higher well density in Pennsylvania.³⁸ The results suggested that if a zip code went from having zero wells to well density greater than 0.79 wells/km², the number of cardiology-patient hospitalizations per 100 people (or “cardiology inpatient prevalence rate”) in that zip code would increase by 27%. If a zip code went from having zero wells to a well density of 0.17 to 0.79 wells/km², a 14% increase in cardiology inpatient prevalence rates would be expected. Further, higher rates of neurology-patient hospitalizations were correlated with zip codes with higher well density.

³¹ McKenzie, L. et al., Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources, 424 Science of the Total Environment 79 (2012) (“McKenzie 2012”).

³² McKenzie, L. et al., Birth Outcomes and Maternal Residential Proximity to Natural Gas Development in Rural Colorado, Advance Publication Environmental Health Perspectives (Jan. 28, 2014), <http://dx.doi.org/10.1289/ehp.1306722> (“McKenzie 2014”).

³³ Hill, Elaine L., Unconventional Natural Gas Development and Infant Health: Evidence from Pennsylvania, Cornell University (2012).

³⁴ Whitehouse, Mark, *Study Shows Fracking is Bad for Babies*, Bloomberg View, Jan. 4, 2014, available at <http://www.bloombergview.com/articles/2014-01-04/study-shows-fracking-is-bad-for-babies>.

³⁵ *Id.*, citing Janet Currie of Princeton University, Katherine Meckel of Columbia University, and John Deutch and Michael Greenstone of the Massachusetts Institute of Technology.

³⁶ *Id.*

³⁷ Stacy, Shaina L. et al. (2015) Perinatal Outcomes and Unconventional Natural Gas Operations in Southwest Pennsylvania. PLoS ONE 10(6): e0126425. doi:10.1371/journal.pone.0126425, available at <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0126425>.

³⁸ Jemielital, T. et al. Unconventional Gas and Oil Drilling Is Associated with Increased Hospital Utilization Rates. PLoS ONE 10(7): e0131093, available at <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0131093>.

- Recently published reports indicate that people living in proximity to fracked gas wells commonly report skin rashes and irritation, nausea or vomiting, headache, dizziness, eye irritation and throat irritation.³⁹
- In Texas, a jury awarded nearly \$3 million to a family who lived near a well that was hydraulically fractured.⁴⁰ The family complained that they experienced migraines, rashes, dizziness, nausea and chronic nosebleeds. Medical tests showed one of the plaintiffs had more than 20 toxic chemicals in her bloodstream.⁴¹ Air samples around their home also showed the presence of BTEX — benzene, toluene, ethylbenzene and xylene —colorless but toxic chemicals typically found in petroleum products.⁴²

Chemicals used for fracking also put nearby residents at risk of endocrine disruption effects. A study that sampled water near active wells and known spill sites in Garfield County Colorado found alarming levels of estrogenic, antiestrogenic, androgenic, and antiandrogenic activities, indicating that endocrine system disrupting chemicals (EDC) threaten to contaminate surface and groundwater sources for nearby residents.⁴³ The study concluded:

[M]ost water samples from sites with known drilling-related incidents in a drilling-dense region of Colorado exhibited more estrogenic, antiestrogenic, and/or antiandrogenic activities than the water samples collected from reference sites[,] and 12 chemicals used in drilling operations exhibited similar activities. Taken together, the following support an association between natural gas drilling operations and EDC activity in surface and ground water: [1] hormonal activities in Garfield County spill sites and the Colorado River are higher than those in reference sites in Garfield County and in Missouri, [2] selected drilling chemicals displayed activities similar to those measured in water samples collected from a drilling-dense region, [3] several of these chemicals and similar compounds were detected by other researchers at our sample collection sites, and [4] known spills of natural gas fluids occurred at these spill sites.

The study also noted a linkage between EDCs and “negative health outcomes in laboratory animals, wildlife, and humans”:

Despite an understanding of adverse health outcomes associated with exposure to EDCs, research on the potential health implications of exposure to chemicals used

³⁹ Rabinowitz, P.M. et al., Proximity to Natural Gas Wells and Reported Health Status: Results of a Household Survey in Washington County, Pennsylvania. Environmental Health Perspectives Advance Publication (2014); Bamberger, Michelle and R.E. Oswald, Impacts of Gas Drilling on Human and Animal Health, 22 New Solutions 51 (2012); Steinzor, N. et al., Gas Patch Roulette: How Shale Development Risks Public Health in Pennsylvania, Earthworks Gas & Oil Accountability Project (2012).

⁴⁰ *Parr v. Aruba Petroleum, Inc.*, Case No. 11-01650-E (Dallas Cty., filed Sept.13, 2013).

⁴¹ Deam, Jenny, *Jury Awards Texas family Nearly \$3 million in Fracking Case*, Los Angeles Times (Apr. 3, 2014) <http://www.latimes.com/nation/la-na-fracking-lawsuit-20140424-story.html>.

⁴² *Id.*

⁴³ Kassotis, Christopher D. et al., Estrogen and Androgen Receptor Activities of Hydraulic Fracturing Chemicals and Surface and Ground Water in a Drilling-Dense Region. *Endocrinology*, March 2014, 155(3):897–907, pp. 905-906, available at <http://press.endocrine.org/doi/full/10.1210/en.2013-1697>.

in hydraulic fracturing is lacking. Bamberger and Oswald (26) analyzed the health consequences associated with exposure to chemicals used in natural gas operations and found respiratory, gastrointestinal, dermatologic, neurologic, immunologic, endocrine, reproductive, and other negative health outcomes in humans, pets, livestock, and wildlife species.

Of note, site 4 in the current study was used as a small-scale ranch before the produced water spill in 2004. This use had to be discontinued because the animals no longer produced live offspring, perhaps because of the high antiestrogenic activity observed at this site. There is evidence that hydraulic fracturing fluids are associated with negative health outcomes, and there is a critical need to quickly and thoroughly evaluate the overall human and environmental health impact of this process. It should be noted that although this study focused on only estrogen and androgen receptors, there is a need for evaluation of other hormone receptor activities to provide a more complete endocrine-disrupting profile associated with natural gas drilling.⁴⁴

Operational accidents also pose a significant threat to public health. For example in August 2008, Newsweek reported that an employee of an energy-services company got caught in a fracking fluid spill and was taken to the emergency room, complaining of nausea and headaches.⁴⁵ The fracking fluid was so toxic that it ended up harming not only the worker, but also the emergency room nurse who treated him. Several days later, after she began vomiting and retaining fluid, her skin turned yellow and she was diagnosed with chemical poisoning.⁴⁶

Harmful chemicals are also found in the flowback fluid after well stimulation events. Flowback fluid is a key component of oil-industry wastewater from stimulated wells. A survey of chemical analyses of flowback fluid dating back to April 2014 in California revealed that concentrations of benzene, a known carcinogen, were detected at levels over 1,500 times the federal limits for drinking water.⁴⁷ Of the 329 available tests that measured for benzene, the chemical was detected at levels in excess of federal limits in 320 tests (97 percent).⁴⁸ On average, benzene levels were around 700 times the federal limit for drinking water.⁴⁹ Among other carcinogenic or otherwise dangerous chemicals found in flowback fluid from fracked wells

⁴⁴ *Id.*, p. 905.

⁴⁵ Wiserman, Hannah, Untested Waters: the Rise of Hydraulic Fracturing in Oil and Gas Production and the Need to Revisit Regulation, *Fordham Envtl. Law Rev.* 115 (2009), 138-39.

⁴⁶ *Id.*

⁴⁷ California Department of Conservation Division of Oil, Gas, & Geothermal Resources, California Well Stimulation Public Disclosure Report, *available at* <http://www.conservation.ca.gov/dog/Pages/WellStimulationTreatmentDisclosure.aspx>. The highest concentration was 7,700 parts per billion (ppb) for a well with API number 03052587. The US EPA's maximum contaminant level for benzene is 5 ppb.

⁴⁸ *Id.*

⁴⁹ *Id.*, see also Cart, J., High Levels of Benzene Found in Fracking Wastewater, *Los Angeles Times*, Feb. 11, 2015, <http://www.latimes.com/local/california/la-me-fracking-20150211-story.html#page=1>.

are toluene and chromium-6.⁵⁰ These hazardous substances were detected in excess of federal limits for drinking water in over one hundred tests. This dangerous fluid is commonly disposed of in injection wells, which often feed into aquifers, including some that could be used for drinking water and irrigation.

Acidizing presents similarly alarming risks to public health and safety. In acidizing operations, large volumes of hydrochloric and hydrofluoric acid are transported to the site and injected underground. These chemicals are highly dangerous due to their corrosive properties and ability to trigger tissue corrosion and damage to sensory organs through contact.

While many risks are known, much more is unknown about the hundreds of chemicals used in fracking. The identity and effects of many of these additives is unknown, due to operators' claims of confidential business information. But, as the EPA recognizes, chemical identities are "necessary to understand their chemical, physical, and toxicological properties, which determine how they might move through the environment to drinking water resources and any resulting effects."⁵¹ Compounds in mixtures can have synergistic or antagonistic effects, but again, it is impossible to know these effects without full disclosure.⁵² The lack of this information also precludes effective remediation: "Knowing their identities would also help inform what chemicals to test for in the event of suspected drinking water impacts and, in the case of wastewater, may help predict whether current treatment systems are effective at removing them."⁵³

Even where chemical identities are known, chemical safety data may be limited. In EPA's study of the hazards of fracking chemicals to drinking water, EPA found that "[o]ral reference values and oral slope factors meeting the criteria used in this assessment were not available for the majority of chemicals used in hydraulic fracturing fluids [87%], representing a significant data gap for hazard identification."⁵⁴ Without this data, EPA could not adequately assess potential impacts on drinking water resources and human health.⁵⁵ Further, of 1,076 hydraulic fracturing fluid chemicals identified by the EPA, 623 did not have estimated physiochemical properties reported in EPA's toxics database, although this information is "essential to predicting how and where it will travel in the environment."⁵⁶ The data gaps are actually much larger, because EPA excluded 35% of fracking chemicals reported to FracFocus from its analysis because it could not assign them standardized chemical names.⁵⁷

The EA fails to incorporate a literature review of the harmful effects of each of the chemicals known to be used in fracking and other unconventional oil and gas extraction

⁵⁰ *Id.*; see also Center for Biological Diversity, Cancer-causing Chemicals Found in Fracking Flowback from California Oil Wells (2015) Feb. 11, 2015, available at http://www.biologicaldiversity.org/news/press_releases/2015/fracking-02-11-2015.html.

⁵¹ EPA 2015 at 10-18.

⁵² Souther, Sara et al. Biotic Impacts of Energy Development from Shale: Research Priorities and Knowledge Gaps, *Front Ecol Environ* 2014; 12(6): p. 334.

⁵³ EPA 2015 at 10-18.

⁵⁴ *Id.* at 10-7, 9-7.

⁵⁵ *Id.* at 9-37-38.

⁵⁶ *Id.* at 5-73.

⁵⁷ *Id.* at 9-38.

methods. Without knowing the effects of each chemical, the EA cannot accurately project the true impact of unconventional oil and gas extraction.

The EA also fails to study the human health and safety impacts of noise pollution, light pollution, and traffic accidents resulting from oil and gas development. A recent study found that automobile and truck accident rates in counties in Pennsylvania with heavy unconventional oil and gas extraction activity were between 15 and 65 percent higher than accident rates in counties without unconventional oil and gas extraction activities.⁵⁸ Rates of traffic fatalities and major injuries may be higher in areas with heavy drilling activity than areas without.⁵⁹

V. The EA Improperly Relies on the Outdated Oklahoma, Kansas, and Texas RMPs For Its Analysis of Fracking and Greenhouse Gas Impacts

If BLM will not discontinue oil and gas leasing, BLM must suspend the April 2016 lease sale as well as any further leasing until it has completed its ongoing RMP revision process for the Oklahoma, Kansas, and Texas planning areas. The Kansas, Oklahoma and Texas RMPs were last updated in 1991, 1994, and 1996, respectively. The Oklahoma Field Office is undergoing a process of revising the plans, which will take many more months to complete. Since the existing RMPs were adopted, new drilling practices, including hydraulic fracturing and horizontal drilling, have greatly expanded access to oil and gas reserves that were previously unavailable. As detailed above and in the Center's EA comment, those practices entail significant risks to air, water, public health, and species. In addition, major climate disruption resulting from the continued extraction and burning of fossil fuels will have catastrophic consequences for the planning areas and beyond. But the governing RMPs have never taken these issues into account. BLM cannot rely on the existing RMPs to guide further leasing decisions.

Suspension of new leasing would avoid the adverse effects of hydraulic fracturing, until BLM fully considers these impacts, and balances other competing resource uses in a comprehensive planning process. Conditions have dramatically changed since over 20 years ago, when the Kansas, Oklahoma, and Texas RMPs last considered oil and gas leasing, due to climate change, rapid population growth, and increasing water scarcity and other climate- and human-induced strains on natural resources. Fracking and horizontal drilling are relatively new and dangerous extraction methods that the current RMPs do not address. All of these changed conditions require a comprehensive look at the public health, environmental, environmental justice, and industrialization impacts of fossil fuel extraction and especially fracking across the three states' planning areas, including the areas proposed for lease. Furthermore, they require a re-evaluation of conservation needs and objectives for increasingly scarce and/or fragile natural resources.

Piecemeal analyses of individual APDs or lease sales do not provide the appropriate perspective for examining the cumulative effects of fracking at the regional and landscape scale and for making such land management decisions. Proceeding with new leasing and fracking

⁵⁸ Graham, J., Irving et al., Increased Traffic Accident Rates Associated with Shale Gas Drilling in Pennsylvania. 74 Accident Analysis and Prevention 203 (2015).

⁵⁹ *Id.*

proposals *ad hoc* in the absence of a comprehensive plan that addresses these changed conditions is premature and risks irreversible damage before the agency and public have had the opportunity to weigh the full costs of oil and gas extraction and consider necessary limits on fracking.

The critical need for updated comprehensive analysis and standards is confirmed by BLM's own ongoing planning process. The preliminary Analysis of the Management Situation (AMS) for the ongoing RMP update expressly acknowledges deficiencies in the existing plans and that they are not "responsive to current issues."⁶⁰ For example, with respect to oil and gas impacts on water resources, the AMS notes the potential for significant and new impacts as a result of "new forms of development and locations" enabled by hydraulic fracturing:

Coal, oil, and gas development and locations have changed dramatically over the past 20 years. Decisions should address new forms of development and locations in order to prevent contamination and loss of water supply and to identify practices for managing requirements for cleaning up contaminants.⁶¹

Similarly, with respect to climate change, the AMS indicates that the plan must be updated to account for greenhouse gas emissions, impacts that were not anticipated in the existing RMPs or their EISs. It notes that BLM must include measures to minimize methane emissions:

The oil and gas industry contributes to greenhouse gas emissions. Some of these emissions can be reduced greatly through proven cost-effective technologies and practices. These improve operational efficiency and reduce emissions of methane, a potent greenhouse gas....⁶²

Continued drilling without the imposition of "proven cost-effective measures" would violate BLM's mandate to prevent "unnecessary or undue degradation." According to the Acting Field Manager for the Oklahoma Field Office, however, new standards under the RMP would not apply to parcels auctioned in the April 2016 lease sale, since they would pre-date the revisions.⁶³

The RMPs further lack adequate protections for species that are based on the best available science. Under the existing plans, stipulations to protect listed species "[a]ppl[y] to only a select few counties and tracts, based on preliminary information on the presence of federal- and state-listed species." The AMS acknowledges that "[b]ased on new survey data, these ranges may have changed."⁶⁴ Other gaps include: a comprehensive inventory of cultural, paleontological, and visual resources, and areas open to oil and gas leasing⁶⁵; standards to

⁶⁰ BLM, BLM Oklahoma, Kansas, and Texas Planning Area and BIA Eastern Oklahoma and Southern Plains Regions Joint EIS/BLM RMP and BIA Integrated RMP Final Analysis of the Management Situation (June 2015) at 4-2 ("AMS") (available at http://www.blm.gov/style/medialib/blm/nm/field_offices/oklahoma/oklahoma_planning/docs_general_Par.78085_File.dat/OKT_AMS-Final_061215_508.pdf).

⁶¹ *Id.* at 4-4 – 4-5.

⁶² *Id.* at 4-2 – 4-3.

⁶³ Pers. Tel. Comm. between Wendy Park and Rick Fields, Acting Field Manager, BLM Oklahoma Field Office (Nov. 24, 2015).

⁶⁴ AMS at 4-7; *see also id.* at 4-17.

⁶⁵ *Id.* at 4-9 – 4-10, 4-15

address geological hazards and soil resources⁶⁶; and No Surface Occupancy stipulations to protect sensitive riparian and wetland resources from oil and gas development.⁶⁷ Without an effective plan in place to address the impacts of hydraulic fracturing and expanded drilling on these significant resources, BLM may not rely on the existing RMPs to continue leasing oil and gas within the Oklahoma, Kansas, and Texas planning areas.

The EA fails to provide any meaningful cumulative impacts analysis of the proposed lease auction on the erroneous basis that the RMPs have already comprehensively examined the impacts of new leasing.⁶⁸ In addition, BLM's proposed finding of no significant impact (FONSI) states that "[t]he impacts of leasing the fluid minerals estate in the areas described within this EA have been previously analyzed in the Oklahoma Resources Management Plan (RMP) (1994), as amended; and the Texas RMP (1996), as amended; and the Kansas RMP (1991) and the lease stipulations that accompany the tracts proposed for leasing would mitigate the impacts of future development on these tracts." The EA and proposed FONSI are contrary to BLM's own reports. Instead, "[t]he evidence before BLM show[s] that the scale of fracking in shale-area drilling today involves risks and concerns that were not addressed by the [RMP/EISs'] general analysis of oil and drilling development in the area. Because the [RMP/EISs] do[] not address these concerns that are specific to these 'new and significant environmental impacts,' further environmental analysis [in an EIS] [is] necessary." *Center for Biological Diversity v. BLM* ("CBD"), 937 F. Supp. 2d 1140, 1157 (N.D. Cal. 2013).

VI. The EA's Analysis of Greenhouse Gas Emissions Is Deficient

A. The EA Fails to Quantify the Full Life Cycle of Greenhouse Gas Emissions that Could Result from Developing the Areas Proposed for Lease

The EA fails to quantify greenhouse gas emissions that could result from the lease sale, but instead simply provides a comparison of operational emissions from oil and gas development on federal leases in Texas, Oklahoma, and Kansas to emissions throughout these states overall. This reasoning does not meaningfully inform the public as to the potential quantity of greenhouse gases that could be emitted by oil and gas extraction activities. Nor does it analyze at all the significance of these emissions. The EA, however, seems to imply that because these operational emissions from federal leasing makes up a relatively small percentage of total greenhouse gas emissions in each state, those emissions are not significant. *See* EA at 53, Table 13.

The analysis is flawed on several levels. As an initial matter, BLM does not bother to calculate or estimate total greenhouse gas emissions from federal leasing within the three states, let alone the emissions that would result from developing the proposed areas for lease. Instead, it simply assumes that oil and gas production on federal leases within the Kansas, Oklahoma, and Texas planning areas produce a portion of U.S. greenhouse gas emissions proportionate to the leases' share of total U.S. oil and gas production. This assumption lacks any evidentiary support.

⁶⁶ *Id.* at 4-3 – 4-4.

⁶⁷ *Id.* at 4-5 – 4-6.

⁶⁸ EA at 70-71.

Depending on the type of extraction (e.g., fracking v. conventional) emissions could be much higher than the proportionate share of overall production. It is clear that these leases in Texas and Oklahoma would most likely be fracked, given the shale formations they overlie, such as the Eagle Ford Shale, Barnett Shale, and Woodford Shale.

Even assuming this is a valid method of analysis, the EA fails to take into account the full scope of greenhouse gas emissions that could result from development of federal oil and gas leases, such that the greenhouse gas emissions totals for federal leasing within each state and their percentage of U.S. greenhouse gas emissions reflected in Table 13 are misleading. The EA excludes analysis of emissions from transportation, refining, fossil-fuel combustion during production, construction, and reclamation:

Because oil and gas leaves the custody and jurisdiction of the BLM after the production phase and before processing or refining, only emissions from the production phase are considered here. It should also be remembered that following EPA protocols, these numbers do not include fossil fuel combustion which would include such things as truck traffic, pumping jack engines, compressor engines and drill rig engines. Nor does it include emissions from power plants that generate the electricity used at well sites and facilities. The estimates are only for operations, not for construction and reclamation of the facilities, which may have a higher portion of a project's GHG contribution.

These emissions are reasonably foreseeable and therefore must be taken into account. For example, for a recent lease sale, BLM's Fillmore Field Office in Utah attempted a general analysis of GHG emissions from operational combustion, construction, and reclamation activities (although this analysis was also incomplete in its failure to analyze emissions from transportation, refining, and pipeline and casing leakage). *See* Fillmore EA at 57-58. That these emissions occur after "leav[ing] the custody and jurisdiction of the BLM" does not render them any less foreseeable. The EA's vague reference to "EPA protocols" in support of its exclusion of fossil fuel combustion emissions sources does not constitute a reasoned explanation for their exclusion. Nor does the bare statement that construction and reclamation activities are excluded lack any rational basis.

It is unclear what emissions the EA actually analyzes. Venting, flaring, and leakage from casing, equipment and pipelines, are other GHG emissions sources, but the EA fails to disclose whether these emissions were fully taken into account. The failure to disclose the EA's emissions inventory precludes any meaningful review or understanding of the EA's methodology and conclusions.

In addition, the EA arbitrarily concludes that it need not analyze the end-user combustion emissions of extracted oil and gas:

Environmental impacts of GHG emissions from oil and gas consumption are not effects of the proposed action as defined by the Council on Environmental Quality (CEQ), and thus are not required to be analyzed under NEPA. GHG emissions from consumption of oil and gas are not direct effects under NEPA because they

do not occur at the same time and place as the action. *They are also not indirect effects because oil and gas leasing and production would not be a proximate cause of GHG emissions resulting from consumption.*

EA at 53-54 (emphasis added).

The EA's bald assertion that "oil and gas leasing and production would not be a proximate cause of GHG emissions resulting from consumption," is not only unsupported by the record, but is legally incorrect. "Indirect effects... are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable." 40 C.F.R. 1508.8(b). The development of an area for lease and subsequent oil and gas production would certainly result in combustion of the extracted product, which the EA implicitly acknowledges. As courts have held in similar contexts, combustion emissions resulting from opening up a new area to development are "reasonably foreseeable," and therefore a "proximate cause" of the leasing. *See Mid States Coal. for Progress v. Surface Transp. Bd.*, 345 F.3d 520, 549 (8th Cir. 2003) (holding that agency violated NEPA when it failed to disclose and analyze the future coal combustion impacts associated with the agency's approval of a railroad line that allowed access to coal deposits); *High Country Conserv'n Advocates v. United States Forest Serv.*, 52 F. Supp. 3d 1174, 1197 (D. Colo. 2014) (same with respect to GHG emissions resulting from approval of coal mining exploration project).

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

increase the supply of [oil and natural gas]. At some point this additional supply will impact the demand for [oil and gas] relative to other fuel sources, and [these minerals] that otherwise would have been left in the ground will be burned. This reasonably foreseeable effect must be analyzed, even if the precise extent of the effect is less certain.

Id. See also WildEarth Guardians v. United States Office of Surface Mining, Reclamation & Enft, 104 F. Supp. 3d 1208, 1229-30 (D. Colo. 2015) (coal combustion was indirect effect of agency's approval of mining plan modifications that "increased the area of federal land on which mining has occurred" and "led to an increase in the amount of federal coal available for combustion"); Council on Environmental Quality (CEQ) Revised Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts at 12 (2014) ("NEPA analysis for a proposed open pit mine could include the *reasonably foreseeable effects* of various components of the mining process, such as clearing land for the extraction, building access roads,

transporting the extracted resource, refining or processing the resource, *and using the resource.*” [emphasis added]).⁶⁹

The EA’s failure to quantify reasonably foreseeable GHG emissions that could result from new leasing within the Kansas, Oklahoma, and Texas areas for lease—including emissions from construction, operating fossil-fuel powered equipment during production, reclamation, transportation, processing and refining, and combustion of the extracted product—is unlawful and unsupported by evidence or reasoned analysis. Consequently, even if the comparison of emissions from federal leasing within the Kansas, Oklahoma, and Texas planning areas to total U.S. emissions were a valid basis for understanding the significance of the proposed action, which it is not—the EA’s truncated analysis of GHG emissions from federal leasing within the Kansas, Oklahoma, and Texas planning areas does not properly reflect the total potential emissions from federal leasing.

B. The EA Fails to Properly Analyze the Effects of Increased Greenhouse Gas Emissions, Including the Social Cost of Carbon

As explained in the Center’s comment on the EA, social cost of carbon analysis is an appropriate tool for analyzing the cumulative impacts of greenhouse gas emissions, which the EA inexplicably fails to perform and BLM’s response to comments fails to address. The effects of cumulative greenhouse gas emissions will have far-reaching impacts on natural and social systems, but the EA fails to provide any meaningful analysis of the proposed action’s contribution to these effects.

1. The effects of cumulative GHG emissions will inflict extraordinary harm to natural systems and communities

On December 12, 2015, nearly 200 governments, including the United States, agreed to the commitments enumerated in the Paris Agreement to “strengthen the global response to the threat of climate change.”⁷⁰ The Paris Agreement codified the international consensus that the climate crisis is an urgent threat to human societies and the planet, with the parties recognizing that:

Climate change represents an *urgent and potentially irreversible threat to human societies and the planet* and thus requires the widest possible cooperation by all countries, and their participation in an effective and appropriate international response, with a view to accelerating the reduction of global greenhouse gas emissions (emphasis added).⁷¹

Numerous authoritative scientific assessments have established that climate change is causing grave harms to human society and natural systems, and these threats are becoming increasingly dangerous. The Intergovernmental Panel on Climate Change (IPCC), in its 2014

⁶⁹ Available at

https://www.whitehouse.gov/sites/default/files/docs/nepa_revised_draft_ghg_guidance_searchable.pdf.

⁷⁰ Paris Agreement, Art. 2(1).

⁷¹ Paris Agreement, Decision, Recitals.

Fifth Assessment Report, stated that: “Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased” and that “[r]ecent climate changes have had widespread impacts on human and natural systems.”⁷²

The 2014 Third National Climate Assessment, prepared by a panel of non-governmental experts and reviewed by the National Academy of Sciences and multiple federal agencies similarly stated that “That the planet has warmed is ‘unequivocal,’ and is corroborated through multiple lines of evidence, as is the conclusion that the causes are very likely human in origin,”⁷³ and “[i]mpacts related to climate change are already evident in many regions and are expected to become increasingly disruptive across the nation throughout this century and beyond.”⁷⁴ The United States National Research Council similarly concluded that: “[c]limate change is occurring, is caused largely by human activities, and poses significant risks for—and in many cases is already affecting—a broad range of human and natural systems.”⁷⁵

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

While scientists continue to refine projections of the future, observations unequivocally show that climate is changing and that the warming of the past 50 years is primarily due to human-induced emissions of heat-trapping gases. These emissions come mainly from burning coal, oil, and gas, with additional contributions from forest clearing and some agricultural practices.⁷⁶

CO₂ emissions from fossil fuel combustion and industrial processes contributed about 78% to the total GHG emission increase between 1970 and 2010, with a contribution of similar percentage over the 2000–2010 period (*high confidence*).⁷⁷

These impacts ultimately emanating from the extraction and combustion of fossil fuels are harming the United States in myriad ways, with the impacts certain to worsen over the coming decades absent deep reductions in domestic and global GHG emissions. EPA recognized these threats in its 2009 Final Endangerment Finding under Clean Air Act Section 202(a), concluding that greenhouse gases from fossil fuel combustion endanger public health and

⁷² IPCC AR5 Synthesis Report at 2.

⁷³ Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014: Climate Change Impacts in the United States: The Third National Climate Assessment(U.S. Global Change Research Program). doi:10.7930/J0Z31WJ2 (“Third National Climate Assessment”) at 61 (quoting IPCC, 2007: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor, and H. L. Miller, Eds., Cambridge University Press, 1-18.).

⁷⁴ Third National Climate Assessment at 10.

⁷⁵ National Research Council, Advancing the Science of Climate Change (2010), available at www.nap.edu. (“Advancing the Science of Climate Change”) at 2.

⁷⁶ Third National Climate Assessment at 2.

⁷⁷ IPCC AR5 Synthesis Report at 46.

welfare: “the body of scientific evidence compellingly supports [the] finding” that “greenhouse gases in the atmosphere may reasonably be anticipated both to endanger public health and to endanger public welfare.”⁷⁸ In finding that climate change endangers public health and welfare, EPA has acknowledged the overwhelming evidence of the documented and projected effects of climate change upon the nation:

Effects on air quality: “The evidence concerning adverse air quality impacts provides strong and clear support for an endangerment finding. Increases in ambient ozone are expected to occur over broad areas of the country, and they are expected to increase serious adverse health effects in large population areas that are and may continue to be in nonattainment. The evaluation of the potential risks associated with increases in ozone in attainment areas also supports such a finding.”⁷⁹

Effects on health from increased temperatures: “The impact on mortality and morbidity associated with increases in average temperatures, which increase the likelihood of heat waves, also provides support for a public health endangerment finding.”⁸⁰

Increased chance of extreme weather events: “The evidence concerning how human induced climate change may alter extreme weather events also clearly supports a finding of endangerment, given the serious adverse impacts that can result from such events and the increase in risk, even if small, of the occurrence and intensity of events such as hurricanes and floods. Additionally, public health is expected to be adversely affected by an increase in the severity of coastal storm events due to rising sea levels.”⁸¹

Impacts to water resources: “Water resources across large areas of the country are at serious risk from climate change, with effects on water supplies, water quality, and adverse effects from extreme events such as floods and droughts. Even areas of the country where an increase in water flow is projected could face water resource problems from the supply and water quality problems associated with temperature increases and precipitation variability, as well as the increased risk of serious adverse effects from extreme events, such as floods and drought. The severity of risks and impacts is likely to increase over time with accumulating greenhouse gas concentrations and associated temperature increases.”⁸²

Impacts from sea level rise: “The most serious potential adverse effects are the increased risk of storm surge and flooding in coastal areas from sea level rise and more intense storms. Observed sea level rise is already increasing the risk of storm surge and flooding in some coastal areas. The conclusion in the assessment literature that there is the potential for hurricanes to become more intense (and even some evidence that Atlantic hurricanes have already become more intense) reinforces the judgment that coastal communities are now endangered by human-induced climate change, and may face substantially greater risk in the future. Even if there is a low probability of raising the destructive power of hurricanes, this threat is enough to support a

⁷⁸ Final Endangerment Finding, 74 Fed. Reg. at 66,497.

⁷⁹ *Id.*

⁸⁰ *Id.*

⁸¹ *Id.* at 66,497-98.

⁸² *Id.* at 66,498.

finding that coastal communities are endangered by greenhouse gas air pollution. In addition, coastal areas face other adverse impacts from sea level rise such as land loss due to inundation, erosion, wetland submergence, and habitat loss. The increased risk associated with these adverse impacts also endangers public welfare, with an increasing risk of greater adverse impacts in the future.”⁸³

Impacts to energy, infrastructure, and settlements: “Changes in extreme weather events threaten energy, transportation, and water resource infrastructure. Vulnerabilities of industry, infrastructure, and settlements to climate change are generally greater in high-risk locations, particularly coastal and riverine areas, and areas whose economies are closely linked with climate-sensitive resources. Climate change will likely interact with and possibly exacerbate ongoing environmental change and environmental pressures in settlements, particularly in Alaska where indigenous communities are facing major environmental and cultural impacts on their historic lifestyles.”⁸⁴

Impacts to wildlife: “Over the 21st century, changes in climate will cause some species to shift north and to higher elevations and fundamentally rearrange U.S. ecosystems. Differential capacities for range shifts and constraints from development, habitat fragmentation, invasive species, and broken ecological connections will likely alter ecosystem structure, function, and services, leading to predominantly negative consequences for biodiversity and the provision of ecosystem goods and services.”⁸⁵

In addition to these acknowledged impacts on public health and welfare more generally, climate change is causing and will continue to cause serious impacts on natural resources that the Department of Interior is specifically charged with safeguarding.⁸⁶

Impacts to Public Lands: Climate change is causing and will continue to cause specific impacts to public lands ecosystem services. Although public lands provide a variety of difficult-to-quantify public benefits, one recent Forest Service attempt at quantification estimates the public land ecosystem services at risk from climate change at between \$14.5 and \$36.1 billion annually.⁸⁷ In addition to the general loss of ecosystem services, irreplaceable species and aesthetic and recreational treasures are at risk of permanent destruction. High temperatures are causing loss of glaciers in Glacier National Park; the Park’s glaciers are expected to disappear entirely by 2030, with ensuing warming of stream temperatures and adverse effects to aquatic ecosystems.⁸⁸ With effects of warming more pronounced at higher latitudes, tundra ecosystems on Alaska public lands face serious declines, with potentially serious additional climate

⁸³ *Id.*

⁸⁴ *Id.*

⁸⁵ *Id.*; see also Third National Climate Assessment at 195-219.

⁸⁶ See Federal Land Policy and Management Act of 1976, 43 U.S.C. §§ 1701(a)(8), 1712(c)(1); Multiple-Use Sustained Yield Act of 1960, 16 U.S.C. § 528; National Environmental Policy Act of 1969, 42 U.S.C. §§ 4331-4332.

⁸⁷ Esposito, Valerie et al., Climate Change and Ecosystem Services: The Contribution and Impacts on Federal Public Lands in the United States, USDA Forest Service Proceedings RMRS-P-64 at 155-164 (2011).

⁸⁸ U.S. Environmental Protection Agency, Climate Change and Public Lands (1999).

feedbacks from melting permafrost.⁸⁹ In Florida, the Everglades face severe ecosystem disruption from already-occurring saltwater incursion.⁹⁰ Sea level rise will further damage freshwater ecosystems and the endangered species that rely on them.

Impacts to Biodiversity and Ecosystems: Across the United States ecosystems and biodiversity, including those on public lands, are directly under siege from climate change—leading to the loss of iconic species and landscapes, negative effects on food chains, disrupted migrations, and the degradation of whole ecosystems.⁹¹ Specifically, scientific evidence shows that climate change is already causing changes in distribution, phenology, physiology, genetics, species interactions, ecosystem services, demographic rates, and population viability: many animals and plants are moving poleward and upward in elevation, shifting their timing of breeding and migration, and experiencing population declines and extirpations.⁹² Because climate change is occurring at an unprecedented pace with multiple synergistic impacts, climate change is predicted to result in catastrophic species losses during this century. For example, the IPCC concluded that 20% to 30% of plant and animal species will face an increased risk of extinction if global average temperature rise exceeds 1.5°C to 2.5°C relative to 1980-1999, with an increased risk of extinction for up to 70% of species worldwide if global average temperature exceeds 3.5°C relative to 1980-1999.⁹³

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

2. The EA ignores the social cost of carbon tool to analyze the cumulative contribution of increased oil and gas development on climate change

Despite the grave enumerated climate change effects and the availability of tools to analyze the leasing proposal's cumulative contribution to these effects, the EA summarily dismisses their analysis in one conclusory paragraph:

The cumulative impacts of GHG emissions and their relationship to climate change are evaluated at the national and global levels in the Air Resources Technical Report (BLM 2014). The very small increase in GHG emissions that could result from approval of the proposed action would not produce climate

⁸⁹ See National Climate Assessment at 48; MacDougall, A. H., et al., Significant contribution to climate warming from the permafrost carbon feedback, 5 Nature Geoscience 719-721 (2012), doi:10.1038/ngeo1573.

⁹⁰ See National Climate Assessment at 592; Foti, R., Met al., Signs of critical transition in the Everglades wetlands in response to climate and anthropogenic changes, 110 Proceedings of the National Academy of Sciences 6296-6300, (2013), doi:10.1073/pnas.1302558110.

⁹¹ National Climate Assessment at 13.

⁹² See Parmesan, C. and G. Yohe, A globally coherent fingerprint of climate change impacts across natural systems, 421 Nature 37-42 (2003); Root, T. et al., Fingerprints of global warming on wild animals and plants, 421 Nature 57-60 (2003); Chen, I. et al., Rapid range shifts of species associated with high levels of climate warming, 333 Science 1024-1026 (2011).

change impacts that differ from the No Action Alternative. This is because climate change is a global process that is impacted by the sum total of GHGs in the Earth's atmosphere. The incremental contribution to global GHGs from the proposed action cannot be translated into effects on climate change globally or in the area of this site-specific action. It is currently not feasible to predict with certainty the net impacts from particular emissions associated with Federal actions; however, EPA's recently finalized oil and gas air quality regulations have a co-benefit of methane reduction that will reduce greenhouse gas emissions from any oil and gas development that would occur on this lease.

EA at 72.

That emissions from new leasing are relatively small compared to the "sum total of GHGs in the Earth's atmosphere" is not a valid reason to discount these emissions. *[case law]* The Council on Environmental Quality (CEQ) Revised Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts...

In addition, the EA's position that "[t]he incremental contribution to global GHGs from the proposed action cannot be translated into effects on climate change globally or in the area of this site-specific action" lacks merit. Neither the EA nor BLM's response to comments address the social cost of carbon analysis. As explained in the Center's comment on the EA, although cost-benefit analysis is not necessarily the ideal or exclusive method for assessing contributions to an adverse effect as enormous, uncertain, and potentially catastrophic as climate change, BLM does have tools available to provide one approximation of external costs and has previously performed a "social cost of carbon" analysis in prior environmental reviews.⁹⁴ Its own internal memo identifies one available analytical tool: "For federal agencies the authoritative estimates of [social cost of carbon] are provided by the 2013 technical report of the Interagency Working Group on Social Cost of Carbon, which was convened by the Council of Economic Advisers and the Office of Management and Budget."⁹⁵ As explained in that report:

The purpose of the "social cost of carbon" (SCC) estimates presented here is to allow agencies to incorporate the social benefits of reducing carbon dioxide (CO₂) emissions into cost-benefit analyses of regulatory actions that impact cumulative global emissions. The SCC is an estimate of the monetized damages associated with an incremental increase in carbon emissions in a given year. It is intended to include (but is not limited to) changes in net agricultural productivity, human

⁹⁴ See *High Country Conserv'n Advocates v. United States Forest Serv.*, 2014 U.S. Dist. Lexis 87820 (D. Colo. 2014) (invalidating environmental assessment ["EA"] for improperly omitting social cost of carbon analysis, where BLM had included it in preliminary analysis); Taylor, P., "BLM crafting guidance on social cost of carbon -- internal memo," Greenwire, April 15, 2015, available at <http://www.eenews.net/greenwire/stories/1060016810/>; BLM Internal Memo from Assistant Director of Resources and Planning Ed Roberson ("Roberson Internal Memo"), April 2015, available at http://www.eenews.net/assets/2015/04/15/document_gw_01.pdf (noting "some BLM field offices have included estimates of the [social cost of carbon] in project-level NEPA documents") (accessed July 29, 2015); see also Council on Environmental Quality, Revised Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts, p. 18, available at www.whitehouse.gov/administration/eop/ceq/initiatives/nepa/ghg-guidance (accessed Jul 29, 2015) (quantitative analysis required if GHGs > 25k tons/yr).

⁹⁵ BLM, Roberson Internal Memo.

health, property damages from increased flood risk, and the value of ecosystem services due to climate change.⁹⁶

Further, other analytical tools exist to evaluate the cost of methane emissions.⁹⁷ EPA has peer reviewed and employed such a tool in its “Regulatory Impact Analysis of the Proposed Emission Standards for New and Modified Sources in the Oil and Natural Gas Sector.”⁹⁸

The failure to employ these tools improperly skews the EA’s socioeconomic analysis. The EA touts the positive, short-term economic benefits of new leasing, but without any acknowledgment of the potential costs of carbon emissions on ecological services and social conditions. *See, e.g.*, EA at 69 (“Indirect impacts could include an increase in overall employment opportunities related to the oil and gas and service support industry in the region, as well as the economic benefits to State and County governments related to royalty payments and severance taxes.”) ; *id.* at 49 (noting opposite “negative effects” “by not leasing the proposed parcels under the No Action Alternative”).

Leasing and development of unconventional wells could exact extraordinary financial costs to communities and future generations, setting aside the immeasurable loss of irreplaceable, natural values that can never be recovered. BLM’s environmental review must provide an accounting of these potential harms and costs.

VII. The EA Does Not Acknowledge the Risk of Induced Seismicity

As described in the Center’s comment on the EA, induced seismicity resulting from fracking and wastewater injection is a real threat. This is especially true in the areas proposed for lease, which have experienced increased seismic activity since the beginning of the fracking boom in the early 2000s.⁹⁹ Data from the U.S. Geological Survey show an enormous spike in earthquake activity since 2009.¹⁰⁰ As recently as January 2016, 70 earthquakes with epicenters in

⁹⁶ *See* Interagency Working Group on Social Cost of Carbon, United States Government, Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis - Under Executive Order 12866, May 2013, *available at* https://www.whitehouse.gov/sites/default/files/omb/inforeg/social_cost_of_carbon_for_ria_2013_update.pdf (accessed July 29, 2015); *see also* Interagency Working Group on Social Cost of Carbon, United States Government, Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866, Feb. 2010, *available at* <http://www.epa.gov/otaq/climate/regulations/scc-tsd.pdf> (accessed July 29, 2015).

⁹⁷ *See* Marten A.L., Kopits K.A., Griffiths C.W., Newbold S.C., Wolverton A. 2014, online publication (2015, print publication). “Incremental CH₄ and N₂O mitigation benefits consistent with the US Government’s SC-CO₂ estimates,” *Climate Policy* 15(2):272-298, abstract available at <http://www.tandfonline.com/doi/abs/10.1080/14693062.2014.912981>.

⁹⁸ *See* USEPA, Social Cost of Carbon, *available at* <http://www3.epa.gov/climatechange/EPAactivities/economics/scc.html> (noting application of social cost of methane supported by peer review); USEPA, Regulatory Impact Analysis of the Proposed Emission Standards for New and Modified Sources in the Oil and Natural Gas Sector, Ch. 4, *available at* http://www3.epa.gov/airquality/oilandgas/pdfs/og_prop_ria_081815.pdf.

⁹⁹ *See* CBD Seismic Activity maps (showing lease sale parcels’ locations relative to earthquake activity in Kansas, Texas, and Oklahoma since 2005).

¹⁰⁰ USGS, Oklahoma Area Seismicity Map (1970 - 5/27/2015); USGS, Texas Area Seismicity Map (1973 – 1/31/2015).

Oklahoma occurred in one week, including some of magnitude 4.7 or greater, which could be felt throughout the state and in Kansas and Texas.¹⁰¹ In early 2015, 40 earthquakes occurred in the Dallas area alone.¹⁰²

Various studies have identified a link between wastewater injection and the recent surge in earthquakes in Kansas, Oklahoma, and Texas, which have not traditionally experienced this frequency or magnitude of seismic activity.¹⁰³ As the National Research Council notes, however, these risks are rarely accounted for before wastewater injection occurs, and are poorly understood:

Class II injection wells used only for the purpose of water disposal normally do not have a detailed geologic review performed and often data are not available to make such a review. Thus, although fluid pressure in the injection zone and the fracturing pressure of the injection zone can be measured after the disposal well is drilled, the location of possible faults is often not known as part of standard well siting and drilling procedures. Importantly, the mere presence of a fault does not always correlate to increased potential for induced seismicity.¹⁰⁴

In addition, a recent study linked earthquake activity near Azle, Texas to brine production resulting from hydraulic fracturing in the Barnett Shale (where the Lewisville Lake parcel is found), as well as underground wastewater injection. The study's authors noted:

[P]ore-pressure models demonstrate that a *combination of brine production and wastewater injection* near the fault generated subsurface pressures sufficient to induce earthquakes on near-critically stressed faults. On the basis of modeling results and the absence of historical earthquakes near Azle, brine production combined with wastewater disposal represent the most likely cause of recent seismicity near Azle.¹⁰⁵ [emphasis added]

Further, the authors noted “[i]t is notable that we observe earthquake swarms in the

¹⁰¹ Leberfinger, Mark, Oklahoma, Kansas, Texas rattled by strong back-to-back earthquakes, AccuWeather (Jan. 7, 2016), available at <http://www.sott.net/article/309892-Oklahoma-Kansas-Texas-rattled-by-strong-back-to-back-earthquakes>; Hughes, Trevor, Oklahoma hit with 70 quakes in a week, USA Today (Jan. 13, 2016), available at <http://www.usatoday.com/story/news/2016/01/07/small-earthquakes-shaking-oklahoma-blamed-deep-injection-wells/78421444/>.

¹⁰² Lett, Chris and Jason Morris, What's causing Texas earthquakes? Fracking 'most likely,' report says, CNN (May 11, 2015), available at <http://www.cnn.com/2015/05/09/us/texas-earthquakes-fracking-studies/>.

¹⁰³ See Center EA Comment at 26-27; National Research Council, Induced Seismicity Potential in Energy Technologies, 38-43, 77-81 (2013) (“NRC 2013”), available at http://www.nap.edu/login.php?record_id=13355&page=http%3A%2F%2Fwww.nap.edu%2Fdownload.php%3Frecord_id%3D13355; see also Kansas Geological Survey, Public Information Circular (PIC) 36, Induced Seismicity: The Potential for Triggered Earthquakes in Kansas (Aug. 2015), available at <http://www.kgs.ku.edu/Publications/PIC/pic36.html>; Goebel, T.H.W., Wastewater disposal and earthquake swarm activity at the southern end of the Central Valley, California, Geophysical Research Letters (Feb. 4, 2016), available at <http://onlinelibrary.wiley.com/doi/10.1002/2015GL066948/abstract>.

¹⁰⁴ NRC 2015 at 81.

¹⁰⁵ Hornbach, Matthew J. et al., Causal Factors for Seismicity near Azle, Texas, Nature Communications 6:6728 (April 21, 2015), 1, available at <http://www.nature.com/ncomms/2015/150421/ncomms7728/full/ncomms7728.html>.

Ellenburger [i.e., the area of study] apparently associated with extraction, not just injection.”¹⁰⁶ In other words, brine production adjacent to faults—a common phenomena that results from fracking—is associated with seismic activity. The authors explained:

Earthquakes caused by fluid extraction near faults are not a new phenomenon in the United States or even Texas. Induced seismicity is often associated with subsurface pressure changes, and extensional stresses will concentrate on the boundary of the fluid draw-down region, promoting normal faulting. It is therefore perhaps no coincidence that we observe swarms of normal-faulting events in regions where more significant near fault stress changes occur.¹⁰⁷

Another study examining induced seismicity in the Eagle Ford shale region (in which the Choke Canyon Reservoir parcels are found) found that “the majority of small earthquakes may be triggered/induced by human activity” in this region and “are more often associated with fluid extraction than with injection.”¹⁰⁸ The study noticed several examples of increased fluid extraction (i.e., oil and water) preceding earthquakes of substantial magnitude (3.4 to 4.8), suggesting a link between the two.¹⁰⁹

The National Resource Council’s review of human induced seismicity notes the well-documented causes of induced seismicity resulting from fluid extraction:

Fluid extraction from a reservoir can cause declines in the pore pressure that can reach hundreds of bars. The declining pore pressure causes large contraction of the reservoir, which itself induces stress changes in the surrounding rock (Segall, 1989), in particular increasing horizontal stresses above and below the reservoir that could lead to reverse faulting (Figure 2.2). *Grasso (1992) estimates that volume contraction of reservoirs from fluid withdrawal can cause earthquakes up to M 5.0.*

Several examples of induced seismicity associated with fluid withdrawal and associated pore pressure decrease have been reported, notably at the Lacq gas field in France (Box 2.5). A study of induced seismicity associated with natural gas extraction in the Netherlands (Van Eijs et al., 2006) indicates that the three most important factors in producing seismicity are the pore pressure drop from pumping, the density of existing faults overlying the gas field, and the contrast in crustal stiffness between the reservoir rock and the surrounding rock.

Another proposed mechanism for initiating slip on pre-existing faults is linked to the reduction of the vertical stress on the layers underlying the reservoir from which a large mass of hydrocarbons has been extracted (McGarr, 1991). In this

¹⁰⁶ *Id.* at 5-6.

¹⁰⁷ *Id.*

¹⁰⁸ Frohlich, Cliff and Michael Brunt, Two-year survey of earthquakes and injection/production wells in the Eagle Ford Shale, Texas, prior to the MW4.8 20, *Earth and Planetary Science Letters*, 402:15, 257 (Sept. 2014), available at <http://www.sciencedirect.com/science/article/pii/S0012821X14003835>.

¹⁰⁹ *Id.* at 263.

mechanism, the buoyancy force of the Earth's lithosphere will cause an upward movement in the part of the crust that has been unloaded, thereby inducing slip on pre-existing faults at depth.¹¹⁰

The EA, however, makes no mention of the potential for fracking or wastewater disposal to induce earthquakes, let alone the possible risks of induced seismicity in the specific areas for lease. These risks could possibly include catastrophic property damage, such as dam failures. In Texas, Oklahoma, and Kansas, dams were not built to withstand seismic events, since historically earthquakes were not common occurrences until the fracking boom.¹¹¹ These structures could therefore be increasingly at risk as seismic events increase.¹¹²

The EA further fails to analyze mitigation or alternatives to reduce these risks. This failure to even acknowledge the potential risks of fracking and wastewater injection on induced seismicity at both a general and parcel-specific level violates NEPA's requirement to take a "hard look" at the leasing proposal's potentially significant impacts.

VIII. The EA Fails to Properly Study Impacts on Groundwater and Surface Water Resources

Groundwater Contamination

Contamination of groundwater is a significant concern that the EA has failed to adequately address. Several cities surrounding Lewisville Lake, obtain a portion of their drinking water from several groundwater wells near Lewisville Lake.¹¹³ Many groundwater wells are likely present within the vicinity of other lease sale parcels for sale in this auction, but the EA fails to specifically identify the presence of groundwater wells in the areas for lease.

Contamination of groundwater of these drinking water sources is a real risk, as evidenced by recent studies showing that groundwater contamination in the Barnett Shale region is likely a result of unconventional well development activities.¹¹⁴ One study detected "multiple volatile organic carbon compounds throughout the region, including various alcohols, the BTEX family of compounds, and several chlorinated compounds" in private and public drinking water well samples drawn from aquifers overlying the Barnett shale formation."¹¹⁵

Another study found that "arsenic, selenium, strontium and total dissolved solids (TDS) exceeded the Environmental Protection Agency's Drinking Water Maximum Contaminant Limit (MCL) in some samples from private water wells located within 3 km of active natural gas wells," while lower levels of these contaminants were found at sites outside the Barnett Shale region, as well as sites within the Barnett Shale region located more than 3 km from active

¹¹⁰ NRC 2013 at 44-45.

¹¹¹ Hill, David, Engineers Work to Ensure Dam Safety as Earthquakes Increase, Civil Engineering, 38 (Dec 2015).

¹¹² *Id.*

¹¹³ *See, e.g.*, Protest of City of The Colony (Feb. 17, 2016).

¹¹⁴ Hildenbrand, Zacariah, A Comprehensive Analysis of Groundwater Quality in The Barnett Shale Region, Environ. Sci. Technol. (June 16, 2015), available at <http://pubs.acs.org/doi/abs/10.1021/acs.est.5b01526>.

¹¹⁵ *Id.*

natural gas wells.¹¹⁶ Many of the detected compounds were associated with unconventional oil and gas extraction.¹¹⁷

The Center's EA comments documented numerous sources and pathways of groundwater contamination including surface spills and leaks; methane and fracking fluid migration via abandoned wells, natural faults, or intentionally created fractures; failed or degraded casings; and improperly constructed wells. For example, in the last 150 years, as many as 12 million "holes" have been drilled across the United States in search of oil and gas, many of which are old and decaying, or are in unknown locations.¹¹⁸ Fracking can contaminate water resources by intersecting one of those wells. For instance, one study found at least nineteen instances of fluid communication in British Columbia and Western Alberta.¹¹⁹ Wells as far away as 1.8 miles away have provided pathways for surface contamination.¹²⁰

And given that a substantial portion of wells experience well barrier or integrity failure—6.3% in the Marcellus shale between 2005 and 2013—the threat of groundwater contamination is not at all hypothetical.¹²¹ Dr. Ingraffea of Cornell has noted an 8.9 percent failure rate for wells in the Marcellus Shale.¹²²

The Draft EPA Investigation of Ground Water Contamination near Pavillion, Wyoming, found that chemicals found in samples of groundwater were from fracked wells.¹²³ These results have been confirmed with follow-up analyses.¹²⁴ Another study based on modeling found that advective transport of fracking fluid from a fracked well to an aquifer could occur in less than 10 years.¹²⁵ The injection of fracking waste underground can also lead to leaks and spills.¹²⁶

¹¹⁶ Fontenot, Brian et al., An Evaluation of Water Quality in Private Drinking Water Wells Near Natural Gas Extraction Sites in the Barnett Shale Formation, *Environ. Sci. Technol.*, 47 (17), 10032–10040 DOI: 10.1021/es4011724, available at <http://pubs.acs.org/doi/abs/10.1021/es4011724> ("Fontenot 2013").

¹¹⁷ *Id.*

¹¹⁸ Kusnetz, Nicholas, *Deteriorating Oil and Gas Wells Threaten Drinking Water, Homes Across the Country*, ProPublica (April 4, 2011).

¹¹⁹ BC Oil & Gas Commission, Safety Advisory 2010-03, Communication During Fracture Stimulation (2010).

¹²⁰ King, Pamela, 'Frack hits' provide pathways for methane migration study, *E&E News* (Oct. 21, 2015).

¹²¹ Davies, Richard J. et al. Oil and gas wells and their integrity: Implications for shale and unconventional resource exploitation, *Marine and Petroleum Geology* 56 (2014) 239e254, available at http://ac.els-cdn.com/S0264817214000609/1-s2.0-S0264817214000609-main.pdf?_tid=7344676e-d5f1-11e5-9200-00000aab0f02&acdnat=1455767050_bdf90f64ecdb607187778614024039c4.

¹²² Ingraffea, Anthony R., Some Scientific Failings within High Volume Hydraulic Fracturing Proposed Regulations 6 NYCRR Parts 550-556, 560, Comments and Recommendations Submitted to the NYS Dept. of Environmental Conservation (Jan 8, 2013).

¹²³ EPA Draft Pavillion Investigation.

¹²⁴ Drajem, Mark, *Wyoming Water Tests in Line with EPA Finding on Fracking*, Bloomberg (Oct. 11, 2012); U.S. Environmental Protection Agency, Investigation of Ground Water Contamination near Pavillion, Wyoming Phase V Sampling Event - Summary of Methods and Results (September 2012); Myers, Tom, Review of DRAFT: Investigation of Ground Water Contamination near Pavillion Wyoming Prepared by the Environmental Protection Agency, Ada OK (Apr. 30, 2012).

¹²⁵ Myers, Tom, Potential Contaminant Pathways from Hydraulically Fractured Shale to Aquifers, *Ground Water* 50, no. 6, p. 1 (2012).

¹²⁶ Kusnetz, Nicholas, North Dakota's Oil Boom Brings Damage Along with Prosperity at 4, ProPublica (June 7, 2012); Lustgarten, Abraham, Polluted Water Fuels a Battle for Answers, ProPublica (2012); Lustgarten, Abraham,

Despite these risks, the EA provides little discussion of the various pathways for groundwater contamination to occur, and no assurance that these significant impacts will be mitigated. Instead, the EA downplays the risk of groundwater contamination by noting that existing regulatory controls will prevent their contamination but fails to acknowledge that contamination of groundwater via fracking and unconventional well development is already a problem. The EA cannot simply discount these risks by pointing to existing regulations, when contamination has likely occurred despite these supposed controls. Further, the failure to acknowledge existing contamination in the Barnett Shale region undercuts BLM's conclusion that cumulative impacts of new oil and gas development resulting from the lease sale will not be significant. Due to the impossibility of remediating groundwater that has been contaminated, additional contamination due to new wells would likely be unavoidable and significant.

Contamination within Floodplains and Wetlands

The EA finds that stipulation ORA-1 would reduce the risk to floodplains, purportedly because it allows BLM to prohibit surface disturbance within up to 200 meters of the outer edge of the floodplain. EA 18, 51. This measure is inadequate, as the BLM has determined that "surface and groundwater contamination, due to oil and gas development... [has] occurred between 1,000 to 1,800 feet from ... drilling" in Colorado."¹²⁷ Nevertheless, the sale notice does not actually require a 200-foot buffer zone around floodplains for any parcel within a floodplain, contrary to the EA's description of ORA-1 or other notice that should accompany ORA-1. BLM's proposed finding that impacts to floodplains will be reduced to less than significant based on this mitigation measure is therefore unreliable.

Stipulation ORA-2 is also ineffective to protect wetlands. It prohibits surface occupancy of wetland or riparian areas without BLM's approval in writing and that "impacts or disturbance to wetlands and riparian habitats which occur on this lease must be avoided, or mitigated." This measure provides no criteria for guiding BLM's discretion to approve disturbance within these areas, and no specific criteria for determining adequate mitigation or avoidance. The open-ended nature of BLM's approval authority for surface disturbance in wetland and riparian areas renders the EA's finding of no significant impact arbitrary and lacking in evidentiary support.

Contamination from Spills

Spills and leaks from oil and gas operations commonly contaminate groundwater and surface water resources, according to numerous reports, and as described in the Center's EA comment. The EA provides no evidence or analysis showing that such incidents will be mitigated, except the bare statement that "[a]uthorization of the proposed projects would require

Injection Wells: The Poison Beneath Us, ProPublica at 2 (2012); Lustgarten, Abraham, Whiff of Phenol Spells Trouble, ProPublica (2012).

¹²⁷ BLM Grand Junction Resource Management Plan FEIS at 6-271, available at http://www.blm.gov/style/medialib/blm/co/field_offices/grand_junction_field/Proposed_RMP.Par.26577.File.dat/Chapter_6_Response_to_Comment_GJFO_PRMP%20Updated%20Electronic.pdf.

full compliance with BLM directives and stipulations that relate to surface and groundwater protection.”¹²⁸ BLM’s finding that water resource impacts will be mitigated is unsupported.

IX. The EA Fails to Study the Risk of Fracking Beneath and Around Dams

Over 3,200 acres of land beneath dams supplying public drinking water could be auctioned, yet the EA provides no analysis of the potential risks of fracking or drilling beneath dams in general, or beneath or near the specific dams at issue—Lewisville Lake, Somerville Lake, Lake Conroe, Heyburn Lake, Canton Lake, and Choke Canyon Reservoir. The EA failed to analyze each of the risks below.

Seismic and Geological Hazards

The EA failed to analyze geological hazards associated with fracking near or beneath dams, including the potential for such activities to damage dams and cause a breach. The Army Corps has investigated concerns that fracking beneath dams may cause a shift in natural faults, weakening dam foundations. As reported by the Dallas Morning News, in its interview of Anita Branch, an Army Corps engineer:

Fracking usually takes place thousands of feet underground, so deep that many experts say it can have little or no effect near the surface.

But corps experts have envisioned a scenario in which naturally occurring faults might transfer the high-pressure force of fracking upward toward a dam’s foundation.

“They’re basically changing the stress state of the existing geology,” Branch said. “You’ve got the geology as it exists today, and they’re going in and changing that by increasing the pressures that are in that.

“And those increased pressures are associated with those high pressures used as part of the hydrofracturing process.”

The weight of a reservoir’s water also applies great pressure to the earth, but in a uniform load rather than the concentrated force of fracking, Branch said.

“The fracture pressures they’re using are in the neighborhood of 8,000 pounds per square inch, and that’s a much more significant load than you get from the weight of the pool,” she said.

Potential damage to a dam from differential movement of the earth shifting along a fault would probably be gradual, allowing repairs as it happens, Branch said. But it could be quick, posing immediate risks, she added.

¹²⁸ EA at 57-58.

Hydraulic fracturing, or fracking, in which drillers inject millions of gallons of water at extreme pressures to fracture rock and release gas, tops the corps' list of worries.

The corps wants to know whether increased geological pressures from fracking could cause differential movement, or shifts along natural faults, weakening dam foundations.

"That could precipitate a fairly quick failure if it was not detected in time," Branch said.¹²⁹

With respect to Lewisville Lake, as detailed in the report provided by Gerald Bartz, attached as Exhibit C and incorporated here by reference, fracking beneath the lake could cause movement in natural faults.¹³⁰ Specifically, according to USGS data three lineaments underlie the lake, one of which directly underlies the Lewisville Lake parcel for lease, Parcel 43.¹³¹ Potentially, the lineament overlies a fracture that is susceptible to movement. Fracking could induce movement of the fracture which could cause an earthquake of sufficient magnitude to cause a breach.¹³² Lewisville Lake already suffers from structural integrity problems and is "very high risk" under extreme loading conditions, due to foundation seepage and piping, inadequate "erodibility" of the spillway, and inadequate embankment foundation stability.¹³³

Subsidence of dam foundations due to fracking is another concern. The Army Corps has expressed concerns that "disruption to the geologic structure of natural gas shale formations could result in subsidence of the underground structures supporting dams, resulting in damage to the dams and associated structures."¹³⁴

In 1963, oil-and-gas-operations-induced subsidence of the ground underlying the Baldwin Hills Reservoir in southwest Los Angeles was a potential cause of the dam's breach that resulted in the release of 250 million gallons of water into the housing subdivisions below the dam.¹³⁵ The breach destroyed or damaged 277 homes and killed five people.¹³⁶ Movement of geologic faults crossing the floor of the reservoir caused a crack in the asphalt bottom of the reservoir and allowed water to enter the porous soil beneath the dam. The movement of the faults

¹²⁹ Loftis, Randy Lee, Corps worries that fracking gas wells might hurt dams, Dallas Morning News ("Loftis 2011") (July 31, 2011) available at <http://www.dallasnews.com/news/community-news/grand-prairie/headlines/20110731-corps-worries-that-fracking-gas-wells-might-hurt-dams.ece>.

¹³⁰ See Ex. C.

¹³¹ *Id.*

¹³² *Id.*

¹³³ U.S. Army Corps of Engineers, Fort Worth District, Lewisville Lake, Lewisville, Texas, Dam Safety Modification Report - Project Review Plan, 3-4 (Dec. 7, 2012); see also Getschow, George, The Dam Called Trouble, The Dallas Morning News (Dec. 12, 2015), available at <http://interactives.dallasnews.com/2015/lewisville-dam/>.

¹³⁴ U.S. Army Corps of Engineers, Southwestern Division, Mineral Exploration and Production Activities in Close Proximity to Flood Risk Management Structures, SWDP 1110-2-1156, Pamphlet No. 1110-2-1156 (March 17, 2011) ("SWDP 1110-2-1156"), available at http://www.swf-wc.usace.army.mil/grapevine/Realestate/Oil%20and%20Gas%20Outgrants_Update_2011.pdf.

¹³⁵ NRC 2012 at 197.

¹³⁶ *Id.*

was possibly caused by “either 1) natural causes inherent in the geologic setting; 2) subsidence of the ground surface caused by oil and gas operations or by the filling of the reservoir with water; or 3) pressure injection of water in the [neighboring] Inglewood Field at shallow depths for oil and gas operations and in the presence of a fault system.”¹³⁷

Other concerns with fracking near or beneath dams identified by the Army Corps’ engineer Anita Branch include:

Transmission of fracking fluids outside target zone via natural faults

- Erosion of embankment in contact with faults could trigger failure

Disposal of flowback water

- Potential for contamination of ground and surface water

Wells can be fractured multiple times, so project risk associated with frac’ing can occur over the life of the well ...

Poorly controlled hydrofracturing (“breakouts”)

- Erosion of the embankment along existing faults located in the foundation, abutments or outlet works could lead to project failure*

*Failure defined as an uncontrolled loss of pool or flood storage

Induced Seismicity

- Consolidation of granular drains
- Liquefaction
- Stability
- Cracking
- Displacement¹³⁸

According to Branch, these concerns must be addressed because when dams were constructed, mitigation for hydraulic fracturing impacts were “not incorporated into project design.”¹³⁹

Additional risk factors specific to the lakes at issue here (e.g, their age and foundation composition), are further described in Clean Water Action’s February 19, 2016 protest.

The EA, however, performs no analysis of whether any of the dams overlie geological hazards, much less analyze the risk of a breach that could result from fracking. Nor does it address the water contamination issues identified above. The failure to address these issues results in the failure of the EA to assess the sufficiency of mitigation, and makes it impossible for the public to understand whether proposed stipulations for drilling near Lewisville Lake, Somerville Lake, Lake Heyburn, Lake Canton, and Choke Canyon Reservoir are sufficient.

¹³⁷ *Id.* at 198.

¹³⁸ Branch, Anita, U.S. Army Corps, Potential Impacts of Hydrofracturing on Dam & Levee Safety, ASTM D18.26 Committee Meeting (Jan. 29, 2013), available at http://www.astm.org/COMMIT/images/6C_Branch_2013-01-29_ASTM.pdf.

¹³⁹ *Id.*

Indeed, there is no evidence that mitigation measures identified in proposed lease stipulations would be adequate to address the above risks. In 2011, in response to concerns about the risks of fracking beneath dams, the Corps adopted a policy of requiring “a 3,000 foot lateral exclusion zone” for all oil and gas projects within the Corps’ Southwestern Division.¹⁴⁰ “Within this exclusion zone, no surface occupancy and no drilling (including horizontal drilling) will be allowed within 3,000-feet of critical facilities such as dams, embankments, and other areas critical for project operation when [Army Corps] owns the [surface]...without prior approval by the District Commander.”¹⁴¹ This measure is incorporated as a lease stipulation to the Somerville, Lewisville, Heyburn, and Canton Lake parcels. This setback, however, does not in any way address the geological risks associated with fracking identified above. As a “lateral exclusion zone” it simply disallows surface operations within a certain radius, but says nothing about what may or may not happen underground. As earlier noted, the depth and location of hydraulic fracturing operations may not matter, as the pressure from fracking could be transferred upward via natural faults towards a dam’s foundation, causing structural damage. Further, this setback is adopted from BLM’s Texas Field Office’s Resource Management Plan, last revised in 1996, which did not anticipate or analyze the impacts of hydraulic fracturing on dam structures.¹⁴²

Moreover, as of February 2015, the Army Corps was still completing studies as to the safety of hydraulic fracturing beneath and around dams, given that, according to the agency, “[m]uch is unknown about the impact of hydraulic fracturing and removal of oil and natural gas from formations in close proximity to USACE dams and other key structures.”¹⁴³ It is unclear whether that study has since been completed. But as Bruce Tschantz, a professor of civil and environmental engineering at the University of Tennessee and first chief of dam safety at the Federal Emergency Management Agency noted in 2013: “Until the science involving any short- and long-term relationship between hydraulic fracturing and foundation destabilization, dam safety and reservoir stability is better understood...we should approach hydrofracturing in the vicinity of these structures very cautiously.”¹⁴⁴

There is no reason to believe that the 3,000 foot setback is sufficient protection in the interim. No environmental analysis accompanies the Army Corps’ written policy, and that policy appears not to have been subject to public notice and comment or environmental review under NEPA. Further, the policy provides no explanation as to what specific protection this setback is intended to provide.¹⁴⁵ In the absence of studies or some other analysis indicating the effectiveness of this measure in safeguarding dams from hydraulic fracturing and geological hazards, reliance on the setback to address the above geological risks does not assure that those risks will be avoided or sufficiently mitigated.

¹⁴⁰ SWDP 1110-2-1156.

¹⁴¹ *Id.*

¹⁴² See SWDP 1110-2-1156 at 2; BLM, Texas Resource Management Plan and Record of Decision (May 1996).

¹⁴³ See SWDP 1110-2-1156 at 2.

Griffey, Eric, A Shift in Thinking: Grand Prairie citizens’ complaints about drilling near dams has led to a national study, Fort Worth Weekly (Feb. 18, 2015), available at <http://www.fweeky.com/2015/02/18/a-shift-in-thinking/>.

¹⁴⁴ Loftis 2011.

¹⁴⁵ See SWDP 1110-2-1156.

Flooding Resulting in Spills

Another unique risk near or around dams is the risk of spill disasters resulting from flooding and extreme weather events. For example, in summer of 2015, Lake Somerville experienced massive flooding, which caused water levels to rise 20 feet above its normal levels and submerge surrounding state park units, campgrounds, homes, and other buildings in 10 to 20 feet of water.¹⁴⁶ In at least one instance, a well pad site near the lake was inundated.¹⁴⁷ In the event of a rapid rise in the dam's water level and flooding, pits, tanks, and other storage devices could be at risk of toppling, breaching, or overflowing, risking contamination of surface and groundwater. Floods in Colorado have shown that weather events may result in uncontrolled chemical spills and leaks on a massive scale.¹⁴⁸ The EA fails to acknowledge the potential for dams to flood neighboring areas and cause spills and leaks at well sites, which could contaminate these reservoirs and other surface waters.

Water Contamination From Methane or Fracking Fluid Migration

As described above, fracking below or near dams could result in migration of methane and/or fracking fluids that could result in contamination of these public water supplies. A study performed for New York City found that hydraulic fracturing near water supply infrastructure, including dams, posed such a risk:

The primary subsurface risk to DEP infrastructure is considered to be the potential for the inadvertent establishment of flow pathways between natural gas wells (or underground injection wells) and the water supply structures. Flow paths could be established via existing faults or poorly constructed wells. Numerous occurrences of faults crossing beneath reservoirs, watershed boundaries, streams, and tunnels illustrate the potential for below-grade flow transmission across surface boundaries. Undetected faults and improperly abandoned wells also present opportunity for the development of unanticipated gas or contaminant migration pathway.¹⁴⁹

¹⁴⁶ Fish Tales: Flooded Lake Somerville, YouTube (June 5, 2015), available at <https://www.youtube.com/watch?v=b0aLB43soDU>; FishTales tour of flooded Lake Somerville, YouTube (June 5, 2015), available at <https://www.youtube.com/watch?v=Z122llQKpkA>; Overturf, Jordan, Lake Somerville struggling to stay a summer hot spot due to May flooding, The Eagle (June 6, 2015), available at http://www.theeagle.com/news/local/lake-somerville-struggling-to-stay-a-summer-hot-spot-due/article_734afb5a-915f-5c3e-9ca0-2462cb8ce263.html; Overturf, Jordan, Tour of Flooding at Lake Somerville, The Eagle (June 6, 2015), available at http://www.theeagle.com/gallery/featured/tour-of-flooding-at-lake-somerville/collection_948189b0-0c26-11e5-9861-73b9fbe79701.html (photos available).

¹⁴⁷ Whitehead, Mark, Aerial View of Flooding Around Lake Somerville, KWHI 1280 (June 2, 2015) <http://kwhi.com/aerial-view-of-flooding-around-lake-somerville/> (aerial photos including several showing well pad and oil derrick surrounded by water).

¹⁴⁸ Trowbridge, A. *Colorado Floods Spur Fracking Concerns*, CBS News, Sept. 17, 2013, available at http://www.cbsnews.com/8301-201_162-57603336/colorado-floods-spur-fracking-concerns/ ("Trowbridge 2013") (accessed July 30, 2015).

¹⁴⁹ New York City Dept. of Env'tl. Protection, Impact Assessment of Natural Gas Production in the New York City Water Supply Watershed, Rapid Impact Assessment Report, ES-4 (Sept. 2009), available at http://s3.amazonaws.com/publicassets/docs/rapid_impact_assessment_091609.pdf?_ga=1.212538198.379319457.1455767234.

In addition, the study observed that faults “can develop or widen over time,” and that extraction activities “may increase the likelihood of movement of existing, naturally occurring faults.”¹⁵⁰ Induced seismicity caused by wastewater well injection could cause or accelerate these changes in subsurface faults and result in the “creation of new or enhanced flow paths,” further putting at risk water supply infrastructure.¹⁵¹

The EA failed to analyze these specific risks associated with the contamination of critical water supplies that serve millions of residents in Texas and Oklahoma.

X. The EA Does Not Adequately Consider the Impact of Impact of Natural Gas and Oil Development on Ozone Formation

The EA does not adequately consider the impact of increased oil and gas development on the formation of ozone in Texas. The EA does acknowledge that several areas in Texas have ozone levels that exceed both the previous 2008 and the current 2015 health-based National Ambient Air Quality Standards (NAAQS) established by the United States Environmental Protection Agency under authority of the Clean Air Act (42 U.S.C. 7401 et seq.) that apply for outdoor air ozone throughout the country. On March 27, 2008, the EPA lowered the primary and secondary eight-hour ozone NAAQS to 0.075 parts per million (**73 FR 16436**). On May 21, 2012, the EPA published in the *Federal Register* final designations for the 2008 eight-hour ozone standard (**77 FR 30088**). The **Dallas-Fort Worth (DFW)** area was designated moderate nonattainment and the **Houston-Galveston-Brazoria (HGB)** area was designated marginal nonattainment. The effective date of the final rule is July 20, 2012.

On October 1, 2015, the United States Environmental Protection Agency (EPA) revised the primary and secondary NAAQS for ozone to an eight-hour standard of 0.070 parts per million (ppm), or 70 parts per billion (ppb) (**80 FR 65292**). The Federal Clean Air Act (FCAA) requires state designation recommendations to the EPA within one year of NAAQS promulgation. By October 1, 2016, the governor of each state must recommend designations of attainment, nonattainment, or unclassifiable under the 2015 eight-hour ozone standard for all areas of the state. The EPA is expected to make final designations by October 1, 2017.

While final designations will not occur until 2017, preliminary data indicates that in Texas, the Dallas-Fort Worth, Houston-Galveston-Brazoria and the San Antonio Metropolitan Areas would all fail to meet the new ozone standard, and would be required to develop State Implementation Plans to lower ozone pollution.

Additional development in or near these areas would negatively impact compliance with these health-based standards. The EA, however, does not reach this conclusion, because purportedly there is inadequate information about the detailed future activities at these sites.

¹⁵⁰ *Id.*

¹⁵¹ *Id.*

To the contrary, there is sufficient information to know that increased oil and gas drilling—and associated activity—will put additional ozone-forming pollutants into the atmosphere, and will make meeting these health-based standards more difficult.

In particular, the proposed development of parcels in Denton County would negatively impact the ability of the state to meet both the 2008 and the 2015 ozone standards in Dallas - Fort Worth. Currently, the monitoring station with the highest design value for ozone is the Denton South Airport - C56 station with a 2006 design value of 93.33 parts per billion, and a 2013-2015 design value of 83 ppb, well above both standards. As part of the development of its 2008 State Implementation Plan, TCEQ estimated that in Denton County alone, oil and gas source categories resulted in more than 4,690 tons of nitrogen oxides and 13,254 tons of volatile organic compounds on an annual basis.¹⁵² In the DFW SIP itself, TCEQ identifies 50.4 tons per day in VOCs and 27.5 tons per day in NOx emissions from DFW Oil and Gas sources in 2017 for a total of almost 78 tpd – the fourth largest total of any major source category. VOCs have remained stable while projected NOx volumes have gone up over 50% from the previous version of this SIP.

TCEQ's inventory of emissions from oil and gas source categories found that compressor engines and drilling rigs are the largest sources of NOx, while condensate tanks, pneumatic devices and pneumatic pumps are the largest sources of VOCs in the Dallas-Fort Worth area. All of these emissions contribute to high levels of ozone pollution.

In addition to the emissions inventory associated with TCEQ's 2008 SIP, a recent analysis by two professors from the University of North Texas – Mahdi Ahmadi and Kuruvilla John – suggest that there appears to be a growing influence of ozone formation from the areas in North Central Texas mostly associated with fracking. Thus, their preliminary analysis found that recent data show there was a greater reduction – about 4 percent—in the formation of ozone in the non-fracking region than in the area where fracking was occurring. The fracking appeared in particular to lead to higher ozone levels in the winter time.

After the year 2008, when as mentioned the number of high ozone days began to rise again, the two professors found that there was a 12% increase in the mean value of ozone in the fracking zone as compared to only a 4% increase in the non-fracking zone. During the winter time, the difference between the fracking region and non-fracking region was even more pronounced.¹⁵³

A more recent study by the same authors pinpointed nitrogen oxide from compressor engines as being a major source of ozone formation in the Dallas-Fort Worth area.¹⁵⁴

¹⁵² Texas Commission on Environmental Quality, CHARACTERIZATION OF OIL AND GAS PRODUCTION EQUIPMENT AND DEVELOP A METHODOLOGY TO ESTIMATE STATEWIDE EMISSIONS, 2013-016-SIP-NR, Adoption July 2, 2014, Table 1-3. Statewide Emissions Inventory for 2008 by County.

¹⁵³ Ahmadi and John, April 17, 2014, "An Evaluation of the spatio-temporal characteristics of meteorologically-adjusted ozone trends in North Texas," Air Quality Technical Meeting, NCTCOG, Arlington, Texas.

¹⁵⁴ Drs. Mahdi Ahmadi and Kuruvilla John, "North Texas Ozone Attainment Initiative Project," November 2015, <http://dfwozonestudy.org/>.

Moreover, in a presentation at a recent North Texas Council of Governments meeting, Dr. David Allen showed – based on preliminary data – that the emissions inventory for oil and gas operations was likely underreporting methane emissions because of the large leakage of methane emissions, particularly from pneumatic devices.¹⁵⁵ Overall, Allen reports that some 6000 tons of VOC emissions should likely be added to TCEQ’s Barnett Shale Special Inventory

His report also showed consistently higher levels of hydrocarbons, particularly at Eagle Mountain Lake, than was expected over a 20-month time period. However, understanding why this was occurring – and the impact of hydrocarbon development – was much more difficult to surmise. Still, the data suggest there are real ozone impacts of oil and gas development in the Dallas-Fort Worth region.

Recently, both the Sierra Club and the group Downwinders at Risk submitted written testimony opposing TCEQ’s proposed State Implementation Plan for ozone because among other issues it failed to take specific action to reduce emissions from compressor engines in the Dallas-Fort Worth area.¹⁵⁶ Specifically, those comments note:

Recent NOx trends (Figure 5-10 in TCEQ’s Proposal) indicate a fairly flat NOx trend for several NO monitors in the western area of the DFW area (Eagle Mtn. Lake, Denton, and Parker County monitors). These monitors are in areas more impacted by the growth in NOx sources for Oil and Gas Development that seem to be countering the normal reduction in NOx levels seen at other monitors due to fleet turnover reductions (on-road and Nonroad). These higher NOx levels in the modeling domain that seem to be fairly flat with no change since 2009 raise concern that the area is not seeing the NOx reductions needed to bring the ozone levels down at these monitors.¹⁵⁷

These groups are hopeful that the US EPA will reject the proposed SIP and impose more restrictive actions on oil and gas development precisely because of its impact on ozone formation in Dallas-Fort Worth.

Yet despite the real impacts of oil and gas activities on ozone formation, BLM is proposing to open up additional areas to oil and gas in Denton, Burleson, and Washington Counties. We believe it is inappropriate to open up such new areas to new development when Dallas Fort Worth is not meeting either the 2008 or 2015 ozone standard, and when their current SIP to even meet the 2008 standard has yet to be approved by the US EPA. The EA should acknowledge the potential for new oil and gas activities in the proposed areas for lease to

¹⁵⁵ David Allen, “Air Quality Research Relevant to Shale Gas Production in the Dallas-Fort Worth Region,” April 17, 2014, Air Quality Technical Meeting, NCTCOG, Arlington, Texas.

¹⁵⁶ Sierra Club and Downwinders at Risk, Comments submitted on Docket No. 2015-1380-SIP Commission Approval for Proposed Dallas-Fort Worth (DFW) 2008 Ozone Nonattainment Area Attainment Demonstration (AD) State Implementation Plan (SIP) Revision for the 2017 Attainment Year, SIP Project No. 2015-014-SIP-NR, January 29, 2016.

¹⁵⁷ Sierra Club and Downwinders at Risk, EPA Comments DFW AD SIP at 5.

contribute to non-attainment of the ozone standards. Any increase in these activities would undermine attainment of these standards and would therefore be significant.

In addition to the parcels in Denton, Burleson, and Washington Counties, we believe the proposal to open up additional development in Live Oak and McMullen Counties without analysis of its impact on formation of ozone in the San Antonio area is an oversight in the Environmental Assessment and the decision to move forward with opening up these parcels to fracking.

While statewide emissions inventory have been conducted in Texas on oil and gas point and source categories, scientific understanding between the development of oil and gas in South Texas and its impact on San Antonio air quality is still undergoing development. Recent reports suggest that increased development in counties in the Eagle Ford Shale are influencing ozone formation in San Antonio, and yet these potential findings and impacts were ignored in the EA's review of the Live Oak and McMullen parcels.

The Alamo Council of Governments (ACOG) through grants with the Texas Commission on Environmental Quality has produced a number of inventories and studies in recent years that are attempting to quantify the emissions and possible impacts on local and regional ozone formation. After an initial report found that moderate or increased development could raise ozone levels in the San Antonio area, ACOG was directed to conduct a more exhaustive emissions inventory and study. Currently, ACOG is conducting a 2015 emissions inventory, though a final report will not be developed until 2017.¹⁵⁸ The initial report finds that oil and gas activities in the Eagle Ford emitted an estimated 121 tons of NO_x and 223 tons of VOCs per ozone season day in 2012. However, NO_x emissions increase under the 2018 moderate growth scenario by 302 tons per day and under the high scenario by 423 tons per day. By 2018, VOC emissions are expected to increase significantly to 689 tons per ozone season day under the low development scenario and to 1,248 tons per ozone season day under the high development scenario.¹⁵⁹

The cumulative impact of ozone precursor emissions from development of the Choke Canyon parcels should be considered in the EA's air quality analysis. The failure to consider this information renders the EA's

XI. BLM Must Consult with Fish and Wildlife Service Regarding the Lease Sale's Impacts to the Lesser Prairie Chicken and Should Cancel All Parcels In Proximity to Lesser Prairie Chicken Focal Areas.

¹⁵⁸ Alamo Area Council of Governments, *Oil and Gas Emission Inventory, Eagle Ford Shale, Quality, Assurance Procedure Plan (QAPP)*, November 2015.

¹⁵⁹ Alamo Area Council of Governments, *Oil and Gas Emissions Inventory Update, Eagle Ford Shale, Technical Report, 2015*.

The lesser prairie-chicken (*Tympanuchus pallidicinctus*), is a grassland bird found in southeastern Colorado, western Kansas, eastern New Mexico, western Oklahoma, and the Texas Panhandle. The birds have feathered feet and a stout build. They are a ground-dwelling species known for their lek mating behavior. Lesser prairie-chicken's preferred habitat types are native short- and mixed-grass prairies having a shrub component dominated by sand sagebrush or shinnery oak.

Today, lesser prairie chickens survive in just 8 percent to 16 percent of their historic range due to habitat loss and fragmentation.¹⁶⁰ The species' populations have plummeted as a result of habitat loss — dropping 37 percent between 2003 and 2015 — with an all-time low of just 17,616 birds in 2013.¹⁶¹ Oil and gas activities are an identified threat to the species that contributes to habitat loss and fragmentation.¹⁶² Structures—such as oil and gas rigs—that put height on the landscape are avoided by the birds for up to a mile due to fear of predation.¹⁶³ Fragmentation of remaining lesser prairie-chicken habitat impacts the species' breeding success and ability to withstand drought, as well as its ability to survive on the landscape.¹⁶⁴

As a result of the threat of habitat loss and fragmentation, and other threats, lesser prairie-chickens were protected as a threatened species in April, 2014. This listing happened despite the States throughout the range of the lesser prairie-chicken preparing a Range Wide plan for the species.¹⁶⁵ The plan hinges on voluntary enrollment by landowners and their willingness and ability to conserve certain areas identified as “focal” habitat for the species.¹⁶⁶

On September 1, 2015, the Honorable Judge Junell of the Western District of Texas ruled that the Service did not properly apply its Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE) raising concerns with the Service's findings that enrollment would drop if the species was not listed, raising concerns about the timeframes in the plan, and whether the plan would ultimately be effective.¹⁶⁷ The Court then vacated the threatened listing of the lesser prairie-chicken¹⁶⁸ and the U.S. Fish and Wildlife Service sought reconsideration of the order vacating the threatened listing and asking the Court to leave the listing in place during remand proceedings.¹⁶⁹

¹⁶⁰ Final Rule, 79 Fed. Reg. 20,074, 20,008 (Apr. 10, 2014) (lesser prairie chicken 4(d) rule).

¹⁶¹ 79 Fed. Reg. 19,974, 20,011 (Apr. 10, 2014) (final listing rule).

¹⁶² 77 Fed. Reg. 73,828, 73,874-75 (Dec. 11, 2012).

¹⁶³ 79 Fed. Reg. at 20,065.

¹⁶⁴ 77 Fed. Reg. at 73,853 (“Pitman et al. (2005, pp. 1267-1268) also observed that female lesser prairie chickens selected nest sites that were significantly further from powerlines, roads, buildings, and oil and gas wellheads than would be expected at random.”); 77 Fed. Reg. at 73,840 (“lesser prairie-chicken home ranges increase during periods of drought”).

¹⁶⁵ Lesser Prairie-Chicken Range-Wide Conservation Plan, 2013 (available at: <http://www.wafwa.org/Documents%20and%20Settings/37/Site%20Documents/Initiatives/Lesser%20Prairie%20Chicken/2013LPCRWPfinalfor4drule12092013.pdf>).

¹⁶⁶ *Id.* at 72.

¹⁶⁷ Order Granting Plaintiffs' Motion for Summary Judgment & Order Granting in Part and Denying in Part Defendants' Motion for Summary Judgment (ECF No. 93) (filed in *Permian Basin Petroleum Association, et al. v. Dep't of Interior*, 7:14-cv-00050-RAJ (W.D. Texas)).

¹⁶⁸ *Id.*

¹⁶⁹ Defendants' Motion to Amend (ECF No. 95) (filed in *Permian Basin Petroleum Association, et al. v. Dep't of Interior*, 7:14-cv-00050-RAJ (W.D. Texas)).

In support of its motion for reconsideration, the Service has explained that it can readily justify its threatened determination for the lesser prairie-chicken and correct the issues identified by the court.¹⁷⁰ As a result, we ask that BLM treat the lesser prairie-chicken as a threatened species, or at least treat it as a species that is proposed for listing, which would require you to confer with the Service under Section 7(a)(4) of the ESA.¹⁷¹

Given the overlap or proximity of several of the sale parcels to identified “focal” habitat areas, we ask that you cancel these parcels. Specifically, parcels 1-4, 7, and 9 should be canceled due to their ramifications to lesser prairie-chickens and their habitat. We say this relying upon recent statements made by the U.S. Fish and Wildlife Service regarding the drastic consequences of the loss and fragmentation of such habitat for lesser prairie-chickens. The Service, through its counsel the Department of Justice, has recently explained:

Even if members of the species are not currently found in certain areas, suitable habitat that lies in close proximity to focal and connectivity habitat is important to the species. The species’ numbers are very low and its habitat is already highly fragmented. On these facts, the loss and fragmentation of even relatively small amounts of existing and suitable habitat can easily put the species on a path towards a “death spiral” from which it cannot recover, as the Service has seen for similar prairie grouse species such as the now-extinct heath hen and endangered Attwater’s prairie-chicken.¹⁷²

The Service’s Acting Assistant Regional Director for the Southwest Region further explained:

The fragmented habitat conditions are similar to those experienced by the endangered Attwater's prairie-chicken. The Attwater's prairie-chicken once occupied expansive prairie grasslands of coastal Texas and Louisiana. Similar to the lesser prairie-chicken, populations of Attwater's prairie-chicken declined with a loss of native prairie grassland habitat. The Attwater's prairie-chicken population was estimated to historically peak near I million birds that once occupied up to 6 million acres of coastal prairie. Approximately 93% of that habitat was lost to the species by 1937. Coastal prairie loss continued throughout the remainder of the 20th century. By 1987, the estimated range-wide population had declined to I, 108 individuals. Populations began to disappear more rapidly because the species occupied smaller, isolated parcels. By 1996, the estimated population had declined to 42 individuals. Since 1996, the remaining Attwater's prairiechicken populations have been supplemented with captive-reared birds. In the absences of this supplementation, the species would have gone extinct in the wild.

¹⁷⁰ Docket Entries 95, 107, 115 (filed in *Permian Basin Petroleum Association, et al. v. Dep’t of Interior*, 7:14-cv-00050-RAJ (W.D. Texas)).

¹⁷¹ 16 U.S.C. § 1536(a)(4).

¹⁷² Defendants’ Additional Filing in Support of their Opposed Motion to Amend Judgment at 7-8 (ECF No. 115) (filed in *Permian Basin Petroleum Association, et al. v. Dep’t of Interior*, 7:14-cv-00050-RAJ (W.D. Texas)) (internal citations omitted).

The now-extinct heath hen presents another example of a prairie grouse species dramatically affected by habitat fragmentation. The heath hen previously occupied grasslands along the mid-Atlantic coast of the United States. At the beginning of the 19th century, heath hens were estimated to number in the tens of thousands. By 1890, only 200 heath hens remained in existence, in an isolated population on the island of Martha's Vineyard. The decline of the species is believed to be linked to habitat loss and fragmentation, which led to poor reproductive success due to low genetic variation, overexploitation from hunting, and disease. Despite significant conservation efforts, the last living heath hen was seen in 1932.¹⁷³

As these statements demonstrate, even the loss of a small amount of existing, suitable lesser prairie-chicken habitat could send the species into a death spiral. BLM has an obligation to prevent jeopardy of ESA-listed and proposed for listing species and an obligation to carry “out programs for the conservation of endangered species and threatened species.”¹⁷⁴ For these reason, the identified parcels should be cancelled out right given the potential ramifications for this imperiled species.

Moreover, given the significance of the potential impacts of several of these lease sales to lesser prairie-chickens, an EIS is necessary here. The NEPA regulations define significance to include “[t]he 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 ESA.¹⁷⁵ In light of the Fish and Wildlife Service’s stated concerns that loss of even a small amount of existing, suitable habitat could send the remaining lesser prairie chicken populations into a death spiral, at the very least an EIS is required here.

In any event, the EA itself is inadequate as it fails to even mention that parcels 1, 2, 3, 4, 7, and 9 fall near or within focal areas. It therefore fails to discuss and set forth adequate measures to mitigate the impacts of oil and gas development within these areas. Moreover, only minimal stipulations (i.e., timing limitations) for protection of the lesser-prairie chicken are required for parcels 7 and 9. Given the sensitivity of the lesser prairie chicken to oil and gas development year-round and its precarious numbers, these protections are completely inadequate. Parcels 1, 2, 3, and 4 do not include any stipulations to protect the lesser-prairie chicken, although they are even more deserving of protection than parcels 7 and 9 because they fall within or much closer to focal areas. *See* Lesser Prairie-Chicken Map. BLM improperly concludes that impacts on the lesser-prairie chicken are less than significant.

XII. BLM’s Failure to Consider Impacts to Sprague’s Pipit Violates BLM Regulations Regarding Conservation of Bureau Sensitive Species.

¹⁷³ Declaration of Jennifer Norris at 3-4 n.1 (ECF No. 115-1) (filed in *Permian Basin Petroleum Association, et al. v. Dep’t of Interior*, 7:14-cv-00050-RAJ (W.D. Texas)).

¹⁷⁴ 16 U.S.C. §§ 1536(a)(2), (a)(4), (a)(1).

¹⁷⁵ 40 C.F.R. § 1508.27(9).

The Sprague's pipit (*Anthus spragueii*) is a native grassland specialist and is one of only 12 birds endemic to the Great Plains grasslands. The bird breeds in the northern prairie regions of the United States and Canada and winters in parts of the U.S. southwest east to Louisiana and south through northern Mexico. According to the EA, the bird potentially occurs in all of the Kansas parcels for sale. EA at 63. Moreover, the bird's migratory range encompasses all of the Oklahoma and Kansas parcels for sale, while its wintering range encompasses all of the sale parcels in Texas. See Sprague's pipit map.

The Sprague's pipit depends on large patches of open, native grassland. The Northern Plains have lost up to 99% of native grasslands in the Sprague's pipit's breeding grounds. Drainage of wetlands has further resulted in a 50% loss of wetland and wet meadow habitat used by the pipit. In the bird's wintering range, habitat degradation by tree, shrub, and weed encroachment is a particular problem, along with permanent habitat loss to human uses of the land. Climate change is and will continue to exacerbate all of these threats to pipit habitat and will also change natural fire cycles to the detriment of the bird.

Due to this loss of habitat, the Sprague's pipit has experienced a 79% population drop across its range. The population has been declining at an average rate of 4.1% since 1966, when the Breeding Bird Survey (BBS) began monitoring bird population trends.¹⁷⁶

The species was petitioned for listing under the Endangered Species Act ("ESA") in 2008. On September 14, 2010, the U.S. Fish and Wildlife Service ("Service") determined that listing Sprague's pipit as "Endangered" or "Threatened" was warranted but precluded by higher listing priorities. Sprague's pipits are therefore considered a "candidate" species under the ESA, and are listed as a "Species of Conservation Concern" by the Service's Division of Migratory Bird Management.

The Sprague's pipit is particularly sensitive to anthropogenic disturbance. The birds avoid roads, for example. Sprague's pipits have a strong preference for native grasses over exotic species such as smooth brome (*Bromus inermis*) and crested wheatgrass (*Agropyron cristatum*).¹⁷⁷ Increased oil and gas exploration and extraction have likely already increased disturbances and habitat loss throughout the pipit's range.

Many grassland birds are experiencing catastrophic declines. Knopf described the magnitude of avian losses:

¹⁷⁶ Sauer, J. R., J. E. Hines, and J. Fallon. 2005. The North American Breeding Bird Survey, Results and Analysis 1966 - 2005. Version 6.2.2006. Laurel, MD: USGS Patuxent Wildlife Research Center.

¹⁷⁷ Madden, E. M. 1996. Passerine communities and bird-habitat relationships on prescribe-burned, mixed-grass prairie in North Dakota. M.S. thesis, Montana State Univ., Bozeman; Prescott, D. R. C. and G. M. Wagner. 1996. Avian responses to implementation of a complimentary/rotational grazing system by the North American Waterfowl Management Plan in southern Alberta: the Medicine Wheel project. Alberta NAWMP Centre. NAWMP-018. Edmonton, Alberta; Prescott, D. R. C., R. Arbuckle, B. Goddard and A. Murphy. 1993. Methods for monitoring and assessment of avian communities on NAWMP landscapes in Alberta, and 1993 results. Alberta NWMP Centre. NAWMP-007. Edmonton, Alberta;

During the last 25 years, grassland species have shown steeper, more consistent, and more geographically widespread declines than any other behavioral or ecological guild of North American birds, including Neotropical migrants.¹⁷⁸

Similarly, Peterjohn and Sauer proclaimed, "...the potential for species extinctions in grasslands is relatively high; for example, populations of grassland birds are declining more precipitously than other groups of North American bird species."¹⁷⁹ The Sprague's pipit is one of these birds at risk. Wells described the Sprague's pipit as, "one of the fastest declining songbirds of North America."¹⁸⁰

The Sprague's pipit is particularly vulnerable during the spring and summer months. Nest building generally begins in mid-May, and clutching can start from the second week of May through July.¹⁸¹ Fledging occurs from around June 13 through the end of August.¹⁸² Sprague's pipits have a low frequency of re-nesting and high rates of nest abandonment.¹⁸³

Oil and gas exploration and extraction is likely a severe threat to Sprague's pipit's habitat. The imposition of infrastructure for oil and gas extraction facilitates the spread of weeds and establishes structures and roads that pipits avoid. Specifically, mineral extraction development causes habitat fragmentation that perpetuates and exacerbates degradation. According to a U.S. Forest Service technical report,

The potential effects of petroleum development on wildlife in wildland environments are numerous and varied...The major wildlife groups affected... are ungulates, carnivores, water birds, upland birds and raptors.¹⁸⁴

Possible environmental disruption that would adversely affect Sprague's pipit includes, but is not limited to: noise pollution, human intrusion, alteration of vegetation and land and introduction of harmful substances. Habitat alteration from oil and gas development, one of the greater threats to Sprague's pipit, is caused by seismic trail clearing, clearing and grading of right of ways, site development, excavation of storage and mud pits, borrow pit excavation, construction of process, treatment and storage facilities, installation of flow lines, erection of power lines, communication systems development, trenching and pipe installation, pipe burial and backfill, effluent accidents and development of ancillary industry (i.e., boomtowns associated with labor forces).¹⁸⁵

¹⁷⁸ Knopf, F.L. 1994. Avian assemblages on altered grasslands. *Studies in Avian Biology*. 15: 247-257.

¹⁷⁹ Peterjohn, B.G., and J.R. Sauer. 1999. Population status of North American grassland birds from the North American Breeding Bird Survey, 1966 -1996. *Studies in Avian Biology*. 19:27-44.

¹⁸⁰ Wells, J.V. 2007. *Birder's Conservation Handbook: 100 North American Birds at Risk*. Princeton University Press.

¹⁸¹ Maher, W. J. 1973. *Birds: I. Population dynamics*. Canadian Committee for the International Biological Programme (Matador Project) Technical Report no. 34. Univ. of Saskatchewan, Saskatoon.

¹⁸² *Id.*

¹⁸³ Sutter, G.C., D.J. Sawatzky, D. M. Cooper and R. M. Brigham. 1996. Renesting intervals in Sprague's Pipit, *Anthus spragueii*. *Can. Field-Nat.* 110: 1-4.

¹⁸⁴ Bromley, M. 1985. Wildlife management implications of petroleum exploration and development in wildland environments. U.S. Forest Service Technical Report INT-191.

¹⁸⁵ *Id.*

Effects from secondary activities may be greater in the long term than those from development itself. It is possible that disrupted ecosystems may never be totally rehabilitated, as human settlement occurring during development and production may persist, and invasive grass species may diminish viable habitat. Moreover, impacts will have been cumulative over many years during the life of an oil field.

Oil and gas facilities can cause direct mortality as well. There are reports from several state governments of avian deaths in extraction pits. These were caused when birds 1) were coated with oil from the pit and their flight was thereby impeded; 2) ingested toxic substances when drinking in the pits; and 3) drowned in the pits.¹⁸⁶ Avian species are also susceptible to moderate mortality rates from collisions with overhead power lines associated with increased oil and gas and other human activities.¹⁸⁷

Linnen (2008) examined the effects of oil and gas disturbances, including road establishment, and suggested that Sprague's Pipits tended to occur in lower numbers and at fewer sites near natural gas wells and trails than in interior habitat patches. According to the Service's Sprague's pipit conservation plan,

Energy exploration and extraction are expected to continue to be a threat to Sprague's Pipits habitat and populations into the future as demands for resources increase globally (Environment Canada 2008). Sprague's Pipits abundance decreases within 300 m of oil wells (Linnen 2008).

Currently, no regulatory mechanisms exist for many of these activities to ensure that drilling and associated activities avoid nesting habitat. In the United States, much of the Sprague's Pipit's breeding range overlaps major areas of oil production in eastern Montana, western North Dakota and northwestern South Dakota. Areas with a high density of oil production may also decrease migration and wintering habitats available.¹⁸⁸

The Service further found that "[e]xpanding energy development (wind energy and oil and gas) in grassland regions may result in increased noise levels and subsequently interfere with male song in Sprague's Pipits. The effect of anthropogenic noise on Sprague's Pipit breeding success is unmeasured."¹⁸⁹

Sprague's pipit are found throughout the Texas, Kansas, and Oklahoma areas for lease planning area, with viable habitat within several of the proposed lease parcels.¹⁹⁰ Significant new

¹⁸⁶ *Id.*

¹⁸⁷ *Id.*

¹⁸⁸ U.S. Fish and Wildlife Service, Sprague's Pipit (*Anthus spragueii*) Conservation Plan at 20 (2010) (citing Linnen, C.G. 2008. Effects of oil and gas development on grassland birds. Unpublished report, prepared for Petroleum Technology Alliance Canada. Saskatoon, Saskatchewan, Canada.)

¹⁸⁹ *Id.*

¹⁹⁰ U.S. Fish and Wildlife Service, 12-Month Finding on a Petition to List Sprague's Pipit as Endangered or Threatened Throughout Its Range, 75 Fed. Reg. 56,028 (Sept. 15, 2015).

research since the Service's 2010 warranted but precluded finding shows that the unconventional (i.e., fracking) techniques now at play in the Bakken shale and elsewhere cause even greater levels of disruption to Sprague's pipit habitat use and breeding than previously understood.¹⁹¹

U.S. Geological Survey and other researchers examined oil infrastructure ("Single-bore well pads, developed with hydraulic fracturing and horizontal drilling, were the most common oil-related infrastructure on the landscape at the time of the study") and conducted bird surveys in the Williston Basin and Bakken formations of North Dakota and eastern Montana.¹⁹² Their analysis of grassland bird densities showed avoidance of infrastructure to various degrees by different grassland bird species, but confirmed that Sprague's pipit in particular avoided infrastructure by 350 meters.¹⁹³

As a result of this extensive avoidance distance, researchers found that "[b]ecause negative effects extend into surrounding habitat, variation in well and road configurations can dramatically alter the amount of habitat that will remain suitable for grassland birds as oil development continues in the region."¹⁹⁴ Their research concluded that "of endemic grassland birds, Sprague's pipit is one of the most sensitive to disturbances associated with oil development, raising further concern about the impact of ongoing oil development in the region."¹⁹⁵ Further, they recommended potential strategies and avenues of research for determining whether alternative patterns of development (scattered single-bore wells versus corridors and multi-bore pads) might mitigate this sensitivity.

The EA acknowledges none of this, but simply notes that a stipulation for listed and candidate species will apply to lease parcels. Under this stipulation, BLM defers all analysis and consultation to the drilling permit stage:

The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.

¹⁹¹ See Sarah J. Thompson *et al.*, Avoidance of unconventional oil wells and roads exacerbates habitat loss for grassland birds in the North American great plains, 192 Biological Conservation 82-90 (2015).

¹⁹² *Id.* at 83-85.

¹⁹³ *Id.* at 86.

¹⁹⁴ *Id.* at 86.

¹⁹⁵ *Id.* at 89.

EA at 64, 80.

This piecemeal approach to analysis and consultation is squarely foreclosed by the Ninth Circuit's decision in *Conner v. Burford*, 848 F.2d 1441, 1454-57 (9th Cir. 2012), where the court found that it was improper to exclude the potential effects of future lessee activity when reviewing the leasing phase for oil and gas permits on public lands.

Moreover, BLM's attempt to defer analysis of the potential impacts to Sprague's pipit to the APD stage is in direct violation of BLM's regulations regarding Bureau sensitive species as set forth in BLM Manual 6840 - Special Status Species Management.

Pursuant to Manual 6840, "[a]ll Federal candidate species, proposed species, and delisted species in the 5 years following delisting will be conserved as Bureau sensitive species."¹⁹⁶ The Objective of Manual 6840 is "[t]o initiate proactive conservation measures that reduce or eliminate threats to Bureau sensitive species to minimize the likelihood of and need for listing of these species under the ESA."¹⁹⁷ Manual 6840 further states that it is the BLM's Policy to promote the "conservation and to minimize the likelihood and need for listing" Bureau sensitive species.¹⁹⁸ Piecemeal analyses of individual lease sales does not provide the appropriate perspective for examining and developing the proactive conservation measures necessary to reduce or eliminate threats to Sprague's pipit from oil and gas leases.

Furthermore, pursuant to Manual 6840 it is the responsibility of State Directors to not only inventory BLM lands to determine the occurrence of BLM special status species, but also to determine "the condition of the populations and their habitats, and how discretionary BLM actions affect those species and their habitats."¹⁹⁹ The leasing of federal lands for oil and gas extraction is a discretionary BLM action that has the potential to adversely affect Sprague's pipit. Deferring an analysis of the potential effects of selling oil and gas leases to the APD stage is entirely inconsistent with the requirements of Manual 6840. If a lease is sold, the lessee acquires certain contractual rights constraining BLM authority. For example, according to 43 C.F.R. § 3101.1-2, once a lease is issued to its owner, that owner has the "right to use as much of the lease lands as is necessary to explore for, drill for, mine, extract, remove and dispose of the leased resource in the leasehold" subject to specific nondiscretionary statutes and lease stipulations. Therefore, once the lease is sold, it will be too late for BLM to ensure that sufficient protections will be in place to protect this species from the cumulative impacts of extraction-related activities.

Furthermore, pursuant to Manual 6840 Bureau sensitive species are considered BLM special status species, and Section 2 of the Manual provides specific measures that BLM is required to undertake in order to "conserve these species and their habitats."²⁰⁰ To implement this section, BLM "shall... minimize or eliminate threats" affecting Bureau sensitive species, by

¹⁹⁶ Manual 6840 at § .01.

¹⁹⁷ *Id.* at § .02 (emphasis added).

¹⁹⁸ *Id.* at § .06.

¹⁹⁹ *Id.* at § .04.

²⁰⁰ *Id.* at § .2 ("All federally designated candidate species, proposed species, and delisted species in the 5 years following their delisting shall be conserved as Bureau sensitive species.").

determining their current threats and habitat needs, and ensuring that BLM activities “are carried out in a way that is consistent with its objectives for managing those species and their habitats at the appropriate spatial scale.”²⁰¹ Due to the potential harms from habitat loss and fragmentation, the appropriate spatial scale for determining threats to Sprague’s pipit from oil and gas development is the entire area subject to lease sales, rather than the piecemeal, limited APD-specific review that BLM is attempting to employ.

The need for a broader analysis to assess the threats to this species from the lease sale itself is further supported by Manual 6840’s requirement that BLM work with partners and stakeholders to “develop species-specific or ecosystem-based conservation strategies,” and in the absence of such strategies, to incorporate standard operating procedures and other conservation measures “to mitigate specific threats to Bureau sensitive species during the planning of activities and projects.”²⁰² Postponing any analysis of impacts to Sprague’s pipit until the later APD stage forecloses the implementation of standard procedures and conservation measures necessary to mitigate threats to the species during exploration or other actions that might take place prior to an APD being filed, since as noted above once a lease is issued, the owner has the “right to use as much of the lease lands as is necessary to explore for, drill for, mine, extract, remove and dispose of the leased resource in the leasehold.”²⁰³

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

Where activities have the potential to adversely impact species of concern, the general practice is to consider those impacts and address them “at the earliest possible time,” in order to avoid delay, ensure that impacts are avoided and opportunities for mitigation are not overlooked.²⁰⁴ This is likewise true in the context of even more general environmental review, such as under NEPA.²⁰⁵ Furthermore, it is general practice to evaluate the impacts of several related projects with cumulative impacts proposed or reasonably foreseeable in the same geographic region in a single, comprehensive, analysis.²⁰⁶ Likewise, under the ESA an analysis of the effects of an action must consider actions that are interrelated or interdependent.²⁰⁷ This suggests that BLM should consider the effects of oil and gas extraction activities at the lease sale stage, since those actions are inherent in leasing land for such purposes. It is therefore evident

²⁰¹ *Id.* at § .2(C) (emphasis added).

²⁰² *Id.* (emphasis added).

²⁰³ 43 C.F.R. § 3101.1-2.

²⁰⁴ 50 C.F.R. §§ 402.14(a), (g)(8).

²⁰⁵ See 40 C.F.R. § 1501.2 (“Agencies shall integrate the NEPA process with other planning at the earliest possible time to insure that planning and decisions reflect environmental values, to avoid delays later in the process, and to head off potential conflicts.”).

²⁰⁶ See *Kleppe v. Sierra Club*, 427 U.S. 390, 410 (1976) (“when several proposals for . . . actions that will have cumulative or synergistic environmental impact upon a region are pending concurrently before an agency, their environmental consequences must be considered together.”).

²⁰⁷ 50 C.F.R. §§ 402.14 and 402.02.

that in order to effectuate the policy of protecting Bureau sensitive species set forth in Manual 6840,²⁰⁸ and consistent with the established practice of early, comprehensive review of potential impacts to sensitive species, BLM must consider impacts to Sprague's pipit at the lease sale, rather than waiting until the APD stage for project specific review.

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

XIII. The EA Fails to Adequately Study the Impact of New Leasing on Migratory Birds

The EA makes no attempt at disclosing the cumulative impacts of destroying and fragmenting the habitat of migratory birds in the areas proposed for lease, including the Sprague's pipit, red knot, and others.

As we previously noted in our EA comment, BLM's "MOU "To Promote the Conservation of Migratory Birds" does not assure mitigation of oil and gas drilling impacts on migratory birds. At most, it requires operators to "[s]trive to complete all disruptive activities outside the peak of migratory bird nesting season *to the greatest extent possible*," without any specific criteria for how successful completion should be measured.²⁰⁹ This directive does not list specific measures necessary for the protection of any of the migratory birds found within the areas available for leasing, and ultimately allows take of migratory birds "outside of their nesting season" "[i]f the proposed project...includes a reasonable likelihood that take of migratory birds will occur."²¹⁰ In addition, destruction of habitat may occur "[i]f no migratory birds are found nesting in proposed project or action areas immediately prior to the time when construction and associated activities are to occur." This short-sighted approach fails to take into account the long-term habitat needs of migratory birds that may need large areas to disperse.

XIV. The EA's Treatment of Wildlife Impacts is cursory and Inadequate

The EA's cursory treatment wildlife impacts relies on sweeping general statements without evidentiary support and without any specifics as to how oil and gas development could impact individual species. For example, the EA states without any citations or discussion, "In general, most wildlife species would become habituated to the new facilities."²¹¹ While with respect to less tolerant species, the EA notes that "operations on the well pad would continue to

²⁰⁸ See BLM Manual 6840 at .06 ("Bureau sensitive species will be managed consistent with species and habitat management objectives in land use and implementation plans to promote their conservation and to minimize the likelihood and need for listing under the ESA.").

²⁰⁹ EA at 65.

²¹⁰ *Id.*

²¹¹ EA at 66.

displace wildlife from the area due to ongoing disturbances such as vehicle traffic, noise and equipment maintenance,” it suggests without any reasonable basis that populations could recover when “the activity was completed and the vegetative community restored.”²¹² Further, it generally lists various measures that could be used to “alleviate most losses of wildlife species,” but those measures lack any specific details.²¹³ For example, general reference to “timing limitations” without any discussion of what those limitations entail does not provide adequate assurance that sensitive species such as the Sprague’s pipit will not be significantly impacted during sensitive breeding seasons.

XV. BLM Must Perform Section 7 Consultation With Respect to All of the Listed Species that May Be Affected by the Lease Sale and the EA must analyze the Lease Sale’s Impacts on these Listed Species

BLM has failed to analyze within the EA, and perform section 7 consultation under the ESA, the potential impacts that the proposed leasing action could have on listed species:

- The Somerville Lake parcels could potentially be upstream from Navasota ladies’ tresses populations, smooth pimpleback mussel, and Texas fawnsfoot mussel populations. These species could be impacted spill, runoff, and water withdrawals. Likewise, golden orb are potentially downstream from the Chokeyville Canyon parcels and could also be impacted by similar effects.
- Interior least tern recovery plan river habitat and Arkansas river shiner critical habitat intersects many of the Oklahoma parcels, which again could be impacted by spills, runoff, and water withdrawals within these watersheds.
- Texas Prairie- dawn-flower and Neches River rose mallow are also potentially downstream from the Davy Crockett National forest parcels, as well as Parcels 34-36. These species could suffer water pollution and water withdrawal impacts.
- Smalleye shiner (*Notropis buccula*) and Sharpnose shiner (*Notropis oxyrhynchus*) could potentially be downstream from Somerville Lake. This species is found in Yegua Creek, downstream of Somerville Lake.²¹⁴ Water pollution and water withdrawal impacts resulting from fracking have not been analyzed.
- The Interior Least Tern (*Sterna antillarum athalassos*) is known to nest at Choke Canyon Reservoir; water pollution and human activity interfere with breeding success, but these impacts have not been addressed in a section 7 consultation or the EA.²¹⁵

²¹² *Id.*

²¹³ *Id.*

²¹⁴ http://www.fws.gov/southwest/es/ArlingtonTexas/pdf/20140721%20SSA-Report_Brazos-Shiners.pdf.

²¹⁵ The TOS Handbook of Texas Birds, Second Edition By Mark W. Lockwood, Brush Freeman, 2014, p. 84 https://books.google.com/books/about/The_TOS_Handbook_of_Texas_Birds.html?id=Zvj31yQwNoAC&source=kp_read&printsec=frontcover&source=kp_read_button#v=onepage&q=interior&f=false

Maps indicating the above locations of these parcels with respect to these species and their habitat are included in our CD of references.

XVI. BLM Must Prepare an EIS

As described in our comments on the EA, BLM's failure to prepare an EIS for the proposed auction does not comport with NEPA. Additional factors bearing on the significance of the proposed action that compel the preparation of an EIS are:

- the geological risks to drilling beneath dams as described above and the potential risk of dam failure and threat to public safety;
- the risk of induced seismicity, including the cumulative risks resulting from development across all 36,000 acres for auction in Kansas, Oklahoma, and Texas;
- the risk of contamination of water resources, including major public water supplies for millions of people; and
- the potentially devastating impacts of increased oil and gas development on the lesser prairie-chicken.

All of the above factors indicate that significant impacts will result from the proposed auction, and therefore BLM should prepare an EIS.

XVII. The Army Corps and Bureau of Reclamation Have Not Complied with NEPA

Neither the Army Corps nor Bureau of Reclamation (Bureau) appear to have performed any environmental review of the lease auction, or independently determined as cooperating agencies that the EA (or other environmental review) performed by BLM was adequate. NEPA regulations provide that "[a] cooperating agency may adopt without recirculating the environmental impact statement of a lead agency when, after an independent review of the statement, the cooperating agency concludes that its comments and suggestions have been satisfied," 40 C.F.R. § 1506.3(c), but no such adoption of an EIS has occurred. Here, the cooperating agencies' failure to fulfill their independent environmental review obligations under NEPA renders their consents to the auction invalid, such that the auction must be cancelled.

Pursuant to an Interagency Agreement, the Bureau of Reclamation's consent is required before BLM may lease acquired lands under the Bureau's jurisdiction.²¹⁶ The Department of Defense's consent is also required with respect to leasing of Army Corps acquired lands.²¹⁷

²¹⁶ Interagency Agreement Between the Bureau of Reclamation and the Bureau of Land Management, § 6.H (Dec 1982) ("BLM will not issue permits, leases, or licenses on acquired or withdrawn lands under Reclamation's management without Reclamation's consent and concurrence on all conditions and stipulations."); *see also* 30 U.S.C. § 352 (leasing of acquired lands subject to "consent of the head of the executive department...having jurisdiction over the lands containing such deposit...[and] such conditions as that official may prescribe to insure the adequate utilization of the lands for the primary purposes for which they have been acquired or are being administered").

²¹⁷ 30 U.S.C. § 352; 32 C.F.R. § 643.35 (Department of Defense regulation noting "consent requirement is to insure the adequate utilization of the lands for the primary purposes for which they have been acquired or are being administered"); *see also* e-mail from Rebecca Hunt to Wendy Park (Feb. 1, 2016).

Because their consent is required by statute, the Army Corps of Engineers and Bureau of Reclamation here are agencies that have “jurisdiction by law,” and therefore “shall be a cooperating agency” under NEPA.²¹⁸ 40 C.F.R. § 1501.6(a).

As the “lead agency” BLM has primary responsibility in preparing the environmental document. *Id.* § 1501.5. As cooperating agencies, the Army Corps and Bureau may “adopt an environmental assessment that [BLM] has prepared, so long as the agency adopting the assessment reviews it and accepts responsibility for its scope and content.” *Anacostia Watershed Soc’y v. Babbitt*, 871 F. Supp. 475, 485 (D.D.C. 1994). “If the [cooperating] agency adopts an environmental assessment, however, it must issue its own FONSI [Finding of No Significant Impact].” *Id.*

Here, there is no indication that the Army Corps or Bureau of Reclamation each independently reviewed and adopted the EA before providing their consent to the lease sale, nor that the agencies have issued their own FONSI.²¹⁹ To the extent the agencies rely solely on BLM’s judgment in BLM’s adoption of the EA, this reliance is improper. “To rely entirely on the environmental judgments of other agencies is in fundamental conflict with the basic purpose of NEPA: to require federal agencies to make an informed judgment of the balance between the economic and technical benefits of an action and its environmental costs.” *See Anacostia Watershed*, 871 F. Supp. at 484 (internal quotation marks and alterations omitted).

The lack of independent environmental analysis by the Corps and Bureau is not merely a formal problem, but poses serious obstacles to the ability of the agencies and the public to understand the consequences of the proposed lease auction. Without expert assessment from the Corps and Bureau of the potential consequences of leasing for the resources within those agencies’ jurisdiction, including but not limited to water supply and dam safety and integrity, all three agencies, and the public, are deprived of a meaningful opportunity to evaluate the potential consequences of BLM’s proposed action.

XVIII. BLM Should Withdraw Parcels 34, 35, and 36 from the Lease Sale

On February 18, 2016, the Forest Service withdrew all Forest Service-managed parcels from the lease sale. According to a telephone conversation between the Center’s Wendy Park and Becky Hunt of your office today, Parcel 36, which is completely surrounded by national forest and overlies federal minerals, was not withdrawn, because the surface is privately owned. In addition, Ms. Hunt stated that Parcels 34 and 35 were also not withdrawn because they are

²¹⁸ Technically, BLM must solicit their participation and use their expertise. 40 C.F.R. § 1501.6(a). It is unclear whether BLM did so here.

²¹⁹ To the extent either agency retains the right to review and reject future development plans does not change the agency’s obligation under NEPA. Purportedly—according to BLM’s long-held position— at a later development proposal stage these agencies would no longer have the ability to impose new conditions inconsistent with lease terms. The agency’s “retention of residual authority and its ability to consider the environmental effects of future decisions is ‘no substitute for an overarching examination of environmental problems at the time’ [its] initial decision was made.” *Anacostia Watershed*, 871 F. Supp. at 484 (quoting *Idaho v. ICC*, 35 F.3d 585, 596 (D.C. Cir. 1994)).

also split-estate parcels with privately owned surface that are located outside national forest land. The EA, however, notes that all three of these parcels are within the Davy Crockett National Forest. These parcels are identified as Parcels 35, 36, and 37, respectively in the EA.²²⁰ Because the EA misinforms the public as to the ownership status of these parcels, and we only learned of the error today, these parcels should be withdrawn from the lease sale. Due to BLM's error, we were under the wrong impression that the Forest Service had withdrawn these parcels from the lease sale and had not planned on commenting on these parcels. These errors have deprived the public a meaningful opportunity to comment.

Further, BLM's failure to include adequate maps of Parcels 34 and 35 in the draft and final EAs, make it extremely difficult for the public to understand their location with respect to national forest land and should also compel the Service to withdraw these parcels from the lease sale.

In any event, the Forest Service's concerns with respect to the adequacy of the Environmental Assessment, many of which are raised in this letter, and which led the Forest Service to withdraw all of the Forest Service parcels, equally apply to Parcel 36.²²¹ Parcel 36, is within the Davy Crockett National Forest and completely surrounded by Parcel 23 (or Parcel 24 in the EA), which the Forest Service has withdrawn from the sale based on environmental concerns.²²²

Finally, Parcels 34, 35, and 36 should be withdrawn for the reasons stated in the protest letter of Texas Conservation Alliance, attached hereto as Exhibit D and incorporated here by reference. As explained in that letter, the EA's failure to analyze the potential effects of oil and gas development on red-cockaded woodpecker habitat and recovery needs, water resources, and other sensitive resources is inadequate.²²³

XIX. Approval of the Lease Sale Violates the Federal Land Policy and Management Act and Mineral Leasing Act

The Mineral Leasing Act ("MLA") requires BLM to demand lessees take all reasonable measures to prevent the waste of natural gas. The MLA states:

All leases of lands containing oil or gas, made or issued under the provisions of this chapter, shall be subject to the condition that the lessee will, in conducting his explorations and mining operations, use all reasonable precautions to prevent waste of oil or gas developed in the land, or the entrance of water through wells

²²⁰ EA at 16.

²²¹ In telephone conversations with Forest Supervisor Mark Van Every and Timothy Abing, the Center's Wendy Park learned that the Forest Service decided to withdraw its consent from the lease sale, because it wanted to provide a better public process for the lease auction. In addition, the Service agreed the EA was inadequate, for many of the reasons we had raised in our February 9 letter and in a February 5 telephone conference with these officials.

²²² EA at 95.

²²³ See also red-cockaded habitat folder on our CD of references, which includes information about potential harms to red-cockaded woodpecker, which could result from new leasing, but which BLM has failed to take into account for purposes of both NEPA and ESA-compliance.

drilled by him to the oil sands or oil-bearing strata, to the destruction or injury of the oil deposits.

30 U.S.C. § 225; *see also id.* § 187 (stating that for the assignment or subletting of leases that “[e]ach lease shall contain . . . a provision . . . for the prevention of undue waste”). This statutory mandate is unambiguous and must be enforced. *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 184 n.29 (1978) (stating that “[w]hen confronted with a statute which is plain and unambiguous on its face,” “it is not necessary to look beyond the words of the statute.”). As already discussed in our comments on the EA, oil and gas operations emit significant amounts of natural gases, including methane and carbon dioxide, which can be easily prevented.²²⁴

Pursuant to the Federal Land Policy and Management Act (“FLPMA”), BLM must “take any action necessary to prevent unnecessary or undue degradation of the [public] lands.” 43 U.S.C. § 1732(b). Written in the disjunctive, BLM must prevent degradation that is “unnecessary” and degradation that is “undue.” *Mineral Policy Ctr. v. Norton*, 292 F.Supp.2d 30, 41-43 (D. D.C. 2003). The protective mandate applies to BLM’s leasing decisions. *See Utah Shared Access Alliance v. Carpenter*, 463 F.3d 1125, 1136 (10th Cir. 2006) (finding that BLM’s authority to prevent degradation is not limited to the RMP planning process). Greenhouse gas pollution for example causes “undue” degradation. Even if the activity causing the degradation may be “necessary,” where greenhouse gas pollution is avoidable, it is still “unnecessary” degradation. 43 U.S.C. § 1732(b).

In addition to being harmful to human health and the environment, the emissions from oil and gas operations are also an undue and unnecessary waste and degradation of public lands. Moreover, BLM has failed to prevent undue and unnecessary impacts to water resources, public health, air resources, and wildlife as described above and in the our EA comment, where mitigation measures are readily available and feasible. Consequently, BLM’s proposed gas and oil lease sale violates FLPMA. *See* 43 U.S.C. § 1732(b).

Conclusion

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 end all new leasing and fracking on BLM lands. Should BLM proceed with the lease sale it must thoroughly analyze the alternatives of no new leasing (or no action), and no fracking or other unconventional well stimulation methods in an EIS. Oil and gas leasing is an irrevocable commitment to convey rights to use of federal land – a commitment with readily predictable environmental consequences that BLM is required to address. These include the specific geological formations, surface and ground water resources, seismic potential, or human, animal, and plant health and safety concerns present in the area to be leased. BLM should thoroughly analyze impacts to each of these resources in an EIS.

²²⁴ *See* U.S. Government Accountability Office, Federal Oil and Gas Leases, Opportunities Exist to Capture Vented and Flared Natural Gas, Which Would Increase Royalty Payments and Reduce Greenhouse Gases 20 (2010)

Thank you for your consideration of these comments. The Center, Clean Water Action, Sierra Club, Earthworks, and Environment Texas look forward to reviewing a legally adequate EIS for this proposed oil and gas leasing action.

Sincerely,

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Feb. 9, 2016

VIA U.S. MAIL AND ELECTRONIC DELIVERY

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Dear Director Lueders, Supervisor Van Every, Colonel Hudson, Colonel Pratt, and Mr. Treviño:

Recently, many of our organizations and members learned for the first time that the Bureau of Land Management (BLM) is offering over 36,000 acres of federal parcels with oil and gas for lease in Texas, Kansas, and Oklahoma, including over 31,000 acres in the Davy Crockett,

Sam Houston, and Sabine National Forests, and several parcels underlying municipal water supplies for the Dallas-Fort Worth Area, Denton, Houston, Brenham and Corpus Christi. Despite the fact that the sale would open up large areas for oil and gas development, BLM has failed to provide the public a full and meaningful opportunity to participate in the agencies' leasing decisions, including its environmental review under the National Environmental Policy Act (NEPA).

NEPA regulations require that "[t]here shall be an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. This process shall be termed scoping." 40 C.F.R. § 1501.7. This requirement to provide "an early and open process" cannot be met when the people and communities most immediately affected by the proposed federal action receive no reasonable notice of the action. Effective analysis of "significant issues" requires that those who will feel the impacts of the action be notified and given the opportunity to identify the issues that will affect them.

We strongly urge BLM to postpone the auction, reinstate scoping and provide notice to "those persons...who may be interested or affected" and "solicit appropriate information from the public," in compliance with NEPA. *See* 40 C.F.R. § 1506.6. Due to the high level of public interest in this sale and the significant public safety issues and natural resources at stake, we further request your agencies to hold public meetings to address the public's concerns about (a) the risks of using dangerous hydraulic fracturing techniques in sensitive areas, such as Lewisville Lake, which is at risk of a breach; (b) impacts on the habitat of endangered red-cockaded woodpecker and lesser-prairie chicken and other sensitive species; (c) impacts to the Piney Creek Basin and other important watersheds in the Davy Crockett, Sam Houston, and Sabine National Forests; (d) potential air quality impacts, particularly those parcels located in the Dallas-Fort Worth Non-Attainment Area and in Live Oak and McMullen Counties, which could potentially impact the San Antonio near Non-Attainment Area; and (e) climate change impacts due to potential methane and other greenhouse gas emissions from oil and gas drilling and the combustion of extracted fossil fuels.

The only means that BLM used to publicize the sale is its website for the New Mexico State Office, which oversees oil and gas leasing in BLM's New Mexico, Texas, Oklahoma, and Kansas Field Offices. No public notice was disseminated in any of the communities near the areas for lease, or via the local offices of the surface management agencies—the Forest Service, U.S. Army Corps of Engineers, and Bureau of Reclamation. BLM's pro forma notice violated NEPA's mandate for agencies to "invite the participation of... interested persons" and "make diligent efforts to involve the public" in considering the environmental consequences of its actions. 40 C.F.R. §§ 1501.7(a)(1), 1506.6(a).

NEPA regulations repeatedly emphasize the need for early and effective public notice and involvement. NEPA procedures must ensure "environmental information is available to public officials and citizens before decisions are made and before actions are taken." 40 C.F.R. § 1500.1(b). "[P]ublic scrutiny [is] essential to implementing NEPA." *Id.* Accordingly, "agencies shall to the fullest extent possible...encourage and facilitate public involvement in decisions." *Id.* § 1500.2(d) (emphasis added). Specifically, agencies "shall...make *diligent* efforts to involve the public in preparing and implementing their NEPA procedures[,]...provide public notice of...the availability of environmental documents *so as to inform those persons...who may be interested*

or affected[,] [and]...solicit appropriate information from the public.” *Id.* § 1506.6(a), (b), (d); *see also id.* § 1501.4(b) (“The agency shall involve environmental agencies, applicants, and the public, to the extent practicable, in preparing [environmental] assessments.”). Moreover, as part of the scoping process, the lead agency must “[i]nvite the participation of affected Federal, State, and local agencies, any affected Indian tribe, the proponent of the action, and other interested persons.” 40 C.F.R. § 1501.7(a)(1). “In all cases the agency shall mail notice to those who have requested it on an individual action.” *Id.* § 1506.6(b)(1).

BLM’s efforts here fell far short of “diligent” efforts and public notice “so as to inform those persons... who may be interested or affected” by its leasing decision. Many of our groups’ leaders and members live in and around the national forests at issue, regularly visit these forests, participate in forest planning, and are on the Forest Service’s list of interested parties that the Service must notify regarding proposed projects. For example, Larry Shelton, a member of Texas Conservation Alliance who lives in Nacogdoches County, is on the Davy Crockett National Forest’s list of interested parties who must be notified about proposed projects and planning; has served for seven years on the Resource Advisory Committee for this forest; and has participated in project development on the National Forests and Grasslands in Texas for the past 30 years. Yet, neither BLM nor the Forest Service made any attempt to reach out to Mr. Shelton, other stakeholders, and residents living around or in the forests. In addition, the Lone Star Sierra Club Chapter has previously requested BLM to place it on the mailing or e-mail list for notice of leasing proposals in the National Forests and Grasslands in Texas, but the Chapter did not receive notice of this sale, in violation of 40 C.F.R. § 1506(b)(1). *See* Ex. A.

Likewise, BLM failed to notify communities neighboring Lake Lewisville, Lake Somerville, Choke Canyon Reservoir, Lake Conroe, Heyburn Lake, and Canton Lake, and the various municipalities that rely on these lakes for drinking water, about the potential for fracking beneath or near these lakes.¹ And despite that the Army Corps and Bureau of Reclamation both approved BLM’s offer of these parcels and necessary leasing stipulations, these agencies neither made any efforts to notify the public, or local governments and officials.

BLM routinely issues news releases about upcoming lease sale public comment opportunities in other field offices, but BLM made no such effort here. *See, e.g.,* Ex. B (BLM public comment notices for Nevada and Wyoming lease sales). The New Mexico State Office’s historical practice is to only send out a news release on the day before the lease sale, *after* the public comment period has closed, and shortly after the sale, to announce the sale’s gross proceeds. *See* Ex. C. If BLM can put out a news release to tout the sale results after an auction, it can surely do the same before the auction to “encourage and facilitate public involvement in [its leasing decisions].” BLM’s paltry efforts here do not encourage public involvement “*to the fullest extent possible.*” 40 C.F.R. § 1500.2(d); *see also Dine Citizens Against Ruining Our Env’t v. Klein*, 747 F. Supp. 2d 1234, 1262 (D. Col. 2010) (agency notice did not constitute “meaningful effort to provide information to the public affected by an agency’s actions” where it failed to provide notice of Environmental Assessment via news outlets that community relied on, as it had done previously).

¹ BLM’s Environmental Assessment (EA) also failed to provide maps of some of the areas for lease. *See* EA at 97-105 (missing maps of parcels 15, 16, 25, 26, 27, and 28). Some of the maps did not clearly depict that lease parcels were located beneath water bodies. *See, e.g.,* EA at 96, 101-105.

The Forest Service was also remiss in its failure to involve the public in its decision to allow new leasing of over 31,000 acres of national forest. Before BLM may allow new leasing of national forests, it must obtain the Forest Service's consent. *See* 30 U.S.C. § 226(h).² Generally, the Forest Service takes the position that NEPA compliance as to specific leasing decisions can be fulfilled with a programmatic "leasing analysis" performed under 36 C.F.R. § 228.102(c). The leasing analysis identifies lands available for oil and gas leasing and projects and analyzes the reasonably foreseeable impacts of leasing. 36 C.F.R. § 228.102(c). But "[i]f NEPA has not been adequately addressed [in the leasing analysis], or if there is significant new information or circumstances... requiring further environmental analysis, additional environmental analysis shall be done *before* a leasing decision for specific lands will be made." 36 C.F.R. § 228.102(e)(1) (emphasis added).

According to Forest Supervisor Mark Van Every, who oversees management of all of the Texas national forests, the Forest Service's decision to allow new leasing of the parcels at issue here was purportedly addressed in the 1996 Revised Land and Resource Management Plan and its underlying Environmental Impact Statement (LRMP and EIS). This severely outdated plan and EIS, however, do not adequately support the Forest Service's approval of new leasing. The 20-year old LRMP and EIS—which predate the Barnett shale fracking boom—do not take into account at all the potential impacts of hydraulic fracturing. These include the increased risks of water contamination from wastewater production, storage, transport, and disposal, and the underground injection of thousands of pounds of toxic fracking chemicals; seismic risks from wastewater injection; the increased potential of ozone pollution and other public health risks resulting from methane and other volatile organic compounds emissions; and the impacts of more intensive fracking operations on wildlife, soil, and vegetation. The LRMP and EIS also lack any analysis of the impact of greenhouse gas emissions on climate change, which would certainly result from new oil and gas development.

The Forest Service should have prepared a supplemental EIS, or at minimum an Environmental Assessment (EA) to determine whether a new EIS is required, either of which would have triggered its public notice and comment procedures. *See* 36 C.F.R. § 218.22. Instead, the Service failed to initiate any NEPA or other public notice, review, and comment process.

Given your agencies' utter failure to notify and involve the public, BLM should postpone the lease sale, reinstate scoping, and provide adequate notice of BLM's proposed leasing decisions. With respect to the Forest Service parcels, the Forest Service cannot rely solely on its decades-old, pre-fracking management plan, and should prepare a supplemental EIS for these lease parcels and initiate its public notice and comment procedures in compliance with 36 C.F.R. § 218.22.

We also request that your agencies hold public meetings regarding the proposed parcels for lease. "Agencies shall...hold or sponsor public hearings or public meetings whenever appropriate or in accordance with statutory requirements applicable to the agency." 40 C.F.R. 1506.6(c). The criteria for whether a public meeting is appropriate includes:

² "The Secretary of the Interior may not issue any lease on National Forest System Lands reserved from the public domain over the objection of the Secretary of Agriculture." 30 U.S.C. § 226(h).

- (1) Substantial environmental controversy concerning the proposed action or substantial interest in holding the hearing.
- (2) A request for a hearing by another agency with jurisdiction over the action supported by reasons why a hearing will be helpful....

Id. § 1506.6(c)(1)-(2).

Our organizations and members are deeply concerned about the risks of fracking beneath major municipal water supplies, including contamination of drinking water, which BLM's EA does not even discuss. With respect to Lake Lewisville, the EA fails to mention the dam's structural integrity problems ("one of the nation's most dangerous") and whether drilling beneath the lake could increase the risk of a breach. *See* George Getschow, *The Dam Called Trouble*, *The Dallas Morning News* (Dec. 12, 2015), <http://interactives.dallasnews.com/2015/lewisville-dam/> (Ex. D). A breach could result in the destruction of billions of dollars of property, including flooding in downtown Dallas, and put hundreds of thousands of people in harm's way. *Id.* We are also concerned that earthquakes induced by fracking beneath the dam or wastewater injection in neighboring areas could exacerbate this risk, but the EA has never addressed this issue. Wastewater injection and fracking have already been linked to numerous earthquakes in Texas and Oklahoma and significant property damage, including near Lewisville and many of the other areas for lease.³ *See* Ex. E (maps of earthquake activity).

In addition, numerous watersheds within the Davy Crockett, Sam Houston, and Sabine National Forests could be degraded by pollution from oil and drilling operations and increased runoff resulting from new wellpads and roads. BLM's maps show that numerous streams are within the national forest areas for lease. This includes the Piney Creek Basin, which represents the most miles traveled and most acreage drained of all the creeks on Forest Service lands within the Davy Crockett National Forest, and which provides important habitat for wildlife including the endangered red-cockaded woodpecker.

Several areas for lease are within the heart of the Piney Creek Conservation Corridor (PCCC), which Texas Conservation Alliance (TCA) has nominated as a Special Management Area (SMA). Public collaboration between the Forest Service and TCA over the PCCC proposal has been ongoing for several years. Any oil and gas development in this proposed SMA would have detrimental effects on the unique attributes of this area, and a decision to lease any portion of the PCCC during ongoing collaboration represents a breach of faith on the part of the BLM and Forest Service. The stale 1996 LRMP is currently being revised and could potentially result in special protection for the PCCC. Opening up the PCCC to oil and gas drilling before this update is completed could prejudice the consideration of special management of this area.

Several of the Kansas parcels also fall within important "focal" areas needed for conservation of the imperiled lesser-prairie chicken. Ex. F. Other imperiled species that could be potentially affected are the whooping crane, Sprague's pipit, and interior least tern. Given the highly important public resources and natural areas at stake, a public meeting regarding the safety of drilling within these sensitive areas is necessary to answer the public's concerns. Public

³ Hornbach, Matthew J et al. Causal factors for seismicity near Azle, Texas. *Nature Communications*, vol. 6, no. 6728 (April 21, 2015), available at <http://www.nature.com/ncomms/2015/150421/ncomms7728/full/ncomms7728.html> (Ex. G).

meetings in the Dallas Fort Worth Area, Houston, Brenham, Corpus Christi, Lufkin, Oklahoma City, and Wichita, Kansas would be appropriate.

Proceeding with the April oil and gas leasing auction without allowing the public a full opportunity to voice their concerns and have their questions answered does not comport with NEPA's public participation requirements. BLM should postpone the sale, and each of your agencies should comply with NEPA and public notice obligations, and hold public meetings to address the significant environmental controversies raised by the proposed leasing decisions. Our organizations would be happy to assist in reaching out to communities and local leaders to help ensure these public meetings are useful and productive.

Thank you for considering our request. If you have any questions, please do not hesitate to call us at the contact information below.

Sincerely,

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From: [Wendy Park](#)
To: "Hunt, Rebecca"
Cc: "Alueders@blm.gov"; "Sheila Mallory"; "Gloria Baca"; "Julieann Serrano"; "Ross Klein"; "Rita Beving"
Subject: RE: TX April 2016 lease sale
Date: Monday, February 15, 2016 11:36:00 AM
Attachments: [Roark 2016 Flower Mound may be next to contest land auction near Lewisville Lake.pdf](#)
[Scott 2016 North Texas Cities Protest Plan to Frack Near Lewisville Lake.pdf](#)
[Highland Village, TX 2016 City Submits Letter in Protest of BLM Gas Leases.pdf](#)
[Heinkel-Wolfe 2016 Lease auction draws fire.pdf](#)
[Southwell 2016 Cities protest BLM plans to lease Lewisville Lake for gas drilling.pdf](#)
[Roark 2016 Highland Village to send letter protesting gas lease at Lewisville Lake.pdf](#)
[Re Oklahoma-Kansas-Texas April 2016 lease sale protest.msg](#)
[Fwd Oklahoma-Kansas-Texas April 2016 lease sale protest.msg](#)

Dear Ms. Hunt:

Thank you for making the correction to the lease sale notice, but it is too late--there are still a number of news stories online noting the incorrect deadline for filing a protest. Please see the attached.

The inaccurate sale notice and failure to correct it until over three weeks after the notice was posted (or just eight days before the deadline) is likely to deprive many members of the public an adequate opportunity to review BLM's leasing proposal and file a protest. BLM Instruction Memorandum 2010-117 provides: "A 30-day protest period will begin the day the sale notice is posted." BLM has denied the public the full 30 days to which they are entitled.

On Jan. 20 I first notified BLM's Oklahoma Field Office (who had fielded my questions about the Environmental Assessment) of the discrepancy between the Feb. 19 deadline on BLM's website and the Feb. 18 deadline in the sale notice. On Jan. 24, the field office told me to contact you. See attached email #1. I promptly emailed your office that day. On Jan. 26, you told me "the sale notice is in error," and BLM "will honor either date." See attached email #2. The notice was not corrected until Feb. 11, after I notified you that news articles were publishing the wrong date. BLM's dilatory response in correcting the error led to the broad dissemination of the wrong deadline and has effectively reduced the public's time to respond. Further, because BLM performed no outreach to local communities regarding the lease sale and many members of the public are only finding out about this sale through recent local news stories (including those reflecting the inaccurate Feb. 18 deadline), the misinformation significantly curtails the public's time to review BLM's leasing proposal.

BLM has violated its Instruction Memorandum, and its egregious delay in correcting the sale notice compounds the deficiencies in its public outreach detailed in our February 9 letter. Given the importance of public review and participation and the high level of public interest in the lease sale, BLM should postpone the sale or extend the comment deadline 30 days to allow the public adequate time to review BLM's auction proposal.

Thank you for considering this request.

Best,

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From: Hunt, Rebecca [<mailto:rhunt@blm.gov>]
Sent: Thursday, February 11, 2016 9:55 AM
To: Wendy Park
Cc: Alueders@blm.gov; Sheila Mallory; Gloria Baca; Julieann Serrano; Ross Klein
Subject: Re: TX April 2016 lease sale

Ms. Park -

As discussed during our phone call this morning, I visited with our adjudication staff regarding the error in the Sale Notice. They made the change in the actual Sale Notice rather than creating an amendment. The Sale Notice now reflects the correct date. The link to the Sale Notice is below:

http://www.blm.gov/style/medialib/blm/nm/programs/0/og_sale_notices_and/2016/april_2016.Par.1467.File.dat/April2016Final%20Sale%20Notice.pdf

If you have any other questions, please let me know.

Sincerely,
Becky Hunt

Becky Hunt

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Santa Fe, NM 87502-0115

POTENTIAL RISKS OF FRACKING BENEATH LEWISVILLE LAKE DAM

My name is Jerry Bartz. I have 5 years experience in locating fractured geothermal reservoirs, 9 years in Oil and Gas exploration and 6 years experience in environmental risk assessments, which includes assessment drilling at a weapons grade US Nuclear site. I have been granted 4 patents, one involving fault detection and delineation. I was trained to use remote sensing and geographic features to detect the probable existence of underground features, including faults, that localize natural resources. As a Senior Staff Exploration Geologist for a large Oil and Gas corporation, I used remote sensing to evaluate regional oil and gas lease acquisitions as well as optimize the placement of seismic surveys to define fault-influenced, successful, gas wells at depths greater than 13,000 feet. I currently serve as a full time tutor for as many as 16 courses in Geographic Information Systems (GIS). My GIS contributions are acknowledged in a widely used GIS textbook. GIS was used to create the maps used in this article.

The BLM is proposing oil and gas leasing that would allow the fracking of the Barnett shale on Parcel 43, on the west fork of Lewisville Lake, Denton County, Texas (Figure 1). Because of the proximity of Parcel 43 to the Lewisville Lake dam this site needs to be evaluated as a site subject to human-triggered earthquakes.

This dam is already experiencing what the U.S. Army Corps of Engineers calls "some known safety issues."

In December of 2015, it was reported that a 160 foot long landslide let loose on the east side of the dam and proximal to a similar slide site in 1995, prompting some engineers to question the stability of the dam's foundation². The location of the slide is shown in the attached PDF, Figure 4³. The slide followed a May 2015 observation of water and sand bubbling up near the dam, which dam engineers attributed to 'increasing seepage ... [that] created a passage under the base of the dam'.

Prior to the December 2015, incident, the dam was classified as a High Hazard dam. A high-hazard dam is one with great potential for loss of life and property in case of a failure. It does not mean that a dam failure is likely. Lewisville Lake Dam is listed -by the Corps (of Engineers) as the "nation's eight most hazardous dam."¹

The geology of the Dallas Fort Worth area, and in particular, plate tectonic forces may have impacted the stability of the Lewisville Lake Dam. Approximately 300 million years ago, these forces created faults associated with the formation of the ancient Ouachita Mountain. Continued tectonic movements, opened the Gulf of Mexico resulting in more faulting and erosion of the Ouachita Mountains. These mountains and faults are buried beneath the sediments that now lie at the surface.

Although geologists cannot directly see these deep faults at the surface, geologists trained in remote sensing and surface-pattern recognition can detect indirect evidence of probable faults. For example, river flow is sensitive to small changes in elevation. Many river channels contain wide sweeping curving patterns. If the channels are relatively straight, then the river might reflect a subsurface fault. A straight river channel can be called a **lineament**. If the lineament overlies a subsurface fault, the lineament could be subject to movement. Fault movement will vary with amount of stress put on the fault.

Now let's examine the setting of the Lewisville Lake dam. The dam exists at the south end of the lake (Figure 2). The contact of the blue water and the labeled geologic map units (for example Qt and Kwb) on the geologic basemap of Texas⁵ demarks the dam location. The dam exists at the confluence of three, rather straight river channels or **lineaments** (1, 2, and 3) shown on the geologic basemap of Texas.

The geologic basemap has many lineaments near the dam. I drew five lineaments on the Geologic Map (Figure 2). Lineament Number 1 trends beneath Parcel 43 before intersecting the dam. Lineaments 2 and 3 also intersect the dam. Number 1 parallels Number 5 beneath Lake Grapevine. These two parallel and northwest trending lineaments suggest that these are associated with below-the-surface faults. Lineament 4 was drawn along a river channel that intersects an area experiencing recent increased earthquake activity. Lineament 4 may be interpreted as a continuation of Lineament 2.

In Figure 3, a comparison of the Lineaments to seismic faults (red lines) (released by XTO energy⁶) and USGS earthquake data is presented. Based on the river channel patterns in Figure 2, Lineament 5 may be extended to to the southeast. The resulting intersection of Lineaments 4 and 5 correlates well with the recent movement of USGS defined earthquakes. Potentially, the intersection at the Lake Lewisville Dam of Lineaments 1 with either Lineaments 2 and 3 has already caused small movements in the dam and contributed to the dam's present classification as the "nation's eight most hazardous dam."¹

Fracking beneath Parcel 43 might, by itself, cause movement along Lineament #1 if it overlies an active fault. Movement of Lineament 1 by itself, or in combination with movement of Lineaments 2 and 3, may result in an earthquake and cause expensive structural damage to the dam. Such damage could result in a breach of the dam and impact downstream residents.

How large could the earthquake be.

Oklahoma has experienced a 5.6 magnitude earthquake, likely due to induced seismicity. Risk analysis by Mark Petersen^{6,7}, the head of a USGS effort to study the effect of human induced earthquakes, has projected that such earthquakes could have a magnitude of 6 and possibly as high as 7. The recent February 14, 2016 devastating Taiwan earthquake, which has so far resulted in 116 deaths, was a 6.4 magnitude earthquake⁴.

An earthquake of that predicted magnitude and associated with a structural element beneath the Lake Lewisville dam could cause catastrophic effects to both the human and economic municipal entities that depend on the Lake Lewisville flood control and water supply.

Again let's look at this from a historical perspective:

In 1889, the dam upstream from Johnstown, Pa failed. The ensuing flood killed over 2,000 people and caused catastrophic damage to the downstream communities. It is estimated that the Lewisville Dam

controls 125 times as much water as the Johnstown, Pa dam, and that a breach in the Lewisville Dam could inundate 431,000 people.

Army Corps Engineer Anita Branch has called attention to the potential risk that fracking could cause differential movement, or shifts along natural faults, weakening dam foundations.⁸ The Army Corps has been studying this risk since 2011.

In my professional opinion, this risk of possible frack-induced movement at the dams with parcels for lease should be evaluated before opening up acreage beneath the lake to fracking. A seismic network is needed to detect microseismic movement that might damage the dam, to evaluate this risk. If microseismic movement is detected, the risk of breach and potential damage may be too high to allow fracking beneath a dam reservoir.

I further recommend that such risk be evaluated and survey monitoring be installed on all dam reservoirs that are subject to fracking below the reservoir and/or in areas surrounding the reservoir, including river channels that feed the reservoir.

Notes:

- (1) Lewisville Lake A wellspring of Concern in *The Dallas Morning News*, Section A, pp. 1-2.
- (2) <http://interactives.dallasnews.com/2015/lewisville-dam>
- (3) Figure 4 ArcMap 10.3, Esri World Imagery Basemap.
- (4) Taiwan earthquake: Search ends as death toll reaches 116, CNN, <http://www.cnn.com/2016/02/13/asia/taiwan-earthquake/>
- (5) <https://tnris.org/data-catalog/entry/geologic-database-of-texas/>
- (6) <http://www.dallasnews.com/news/metro/20160122-xto-map-presents-detailed-if-unverified-picture-of-north-texas-faults.ece>
- (7) <http://www.usgs.gov/newsroom/article.asp?ID=4202#.Vsc9p020iC>
- (8) <http://www.dallasnews.com/news/community-news/grand-prairie/headlines/20110731-corps-worries-that-fracking-gas-wells-might-hurt-dams.ece>.

2-17-16

Amy Lueders
Bureau of Land Management
New Mexico State Office
P.O. Box 27115
Santa Fe NM 87502-0115

Re: Protest of April 20, 2016 minerals Lease Sale

Dear Ms. Lueders

The following is a formal **Letter of Protest** of the Bureau of Land Management (BLM) planned oil and gas lease sale and Environmental Assessment DOI-BLM-NM-2015-61-EA, pursuant to 43 CFR SS 3120.1-3.

This Protest includes the following parcels in Texas:

NM-201604-012 through NM-201604-043, inclusive.

PROTEST

I, Larry D. Shelton am filing this Protest on behalf of:

Texas Conservation Alliance (TCA)

15449 FM 1878

Nacogdoches, TX 75961

936-462-8848

larryosageshelton@yahoo.com

I have been duly authorized by TCA to represent the organization in this Letter of Protest.

TCA is a non-profit conservation organization with 1,000 members, and member organizations totaling 40,000 more, that has been engaged in environmental quality issues since 1968. TCA has been involved in issues related to the management of the National Forests and Grasslands in Texas (NFGT) during this time and has specifically engaged in collaborative project development on the NFGT since 2006.

Additionally, TCA member Larry D. Shelton has represented the organization on the Resource Advisory Committee (RAC) for the Davy Crockett National Forest (DCNF) since 2007.

RATIONALE FOR PROTEST OF THE PROPOSED LEASE SALE

NFGT Lands

Insufficient opportunities for public input-

Whereas the proposed lease and subsequent minerals development would involve the surface of NFGT, and the US Forest Service (FS) is responsible for both identifying potential resource impacts and protecting NFGT resources, then NFGT administrative mandates and protocols should be applicable. The FS maintains a mailing list of persons and organizations that are interested in NF management, whereby scoping letters can be sent to solicit public comments for proposed NFGT projects. In spite of its long-time involvement with NFGT management issues and being on the “mailing list”, TCA received no notification of the proposed minerals lease. Nor was the proposed project listed on the website for the NFGT. Apparently, the sole effort made by the BLM to solicit public input for the project was to list it on its own website. **The BLM was remiss in its obligations to solicit public comments by failing to utilize the FS list of interested parties or conduct ANY local public outreach aimed at soliciting local input.**

BLM made no efforts at public collaboration for the Lease proposal-

A Resource Advisory Committee has been in place on the DCNF since approximately 2006. Public collaboration is a mandate and the RAC is the primary collaborative body for all management projects proposed for the DCNF. The BLM made no effort to notify the RAC of the lease proposal, solicit input or collaborate in any way. The BLM was remiss in its obligation to collaborate with the RAC for the DCNF.

Insufficient Environmental Review

The 1996 Land and Resource Management Plan (LRMP) requires that an environmental review be conducted of each area proposed for minerals lease to identify any special needs or protection requirements (Forest wide standard 101). The BLM relied heavily on information from the Environmental Impact Statement (EIS) associated with the 1996 LRMP for their EA. The information in the EIS is outdated and does not meet a reasonable standard for utilization of current information. A FS interdisciplinary team (ID) was assembled to provide additional information to supplement that contained in the outdated 1996 LRMP. There is no evidence that the ID team conducted any site specific investigations of the proposed NF lease lands in order to determine if special protections were required. Although the FS ID team apparently provided some general stipulations and surface occupancy restrictions to the BLM for the EA, the ID team’s efforts were not comprehensive.

The FS ID team is responsible for determining if any “...new information has become available which might change any analysis conducted during the planning process...” (BLM EA pg. 3). TCA has proposed that a Special Management Area (SMA) called the Piney Creek Conservation Corridor (PCCC) be designated in the upcoming Revision of the LRMP. The Supervisor’s Office for NFGT (SO) was notified of

this proposal as early as 2008 and a field tour of a portion of PCCC was conducted on March 27, 2012. TCA requested that no management disturbances be allowed in the SMA proposal until the issue was addressed in the upcoming Revision of the LRMP. A copy of the PCCC proposal letter and the field trip description are attached to this Protest. Areas within TCA's PCCC SMA proposal that were listed for BLM leasing include NM-201604-032, 033 and 034 (FS administrative compartments 92, 93, 94 DCNF). The PCCC proposal is definitely "new information" and was clearly a part of the administrative record but was not mentioned in the BLM's EA. The BLM's EA is remiss in its omission of the PCCC SMA proposal and therefore lacks specified protection as required in the LRMP for sensitive resources. The Revised Planning Rule requires the FS to use the best available information and science in managing the NFGT. The use of outdated information from the 1996 LRMP, lack of specificity and the omission of warranted protection for identified sensitive areas (PCCC) all call into question the integrity of the EA for this lease proposal.

No analysis for long term habitat needs for the RCW-

The red-cockaded woodpecker (RCW) is a federally endangered species occurring on the NFTs in TX (NFT). The current NFT RCW populations are far below the target numbers set for a "recovered" population as mandated in the US Fish and Wildlife RCW Recovery Plan. The stipulations in the BLM EA only provide protection for **currently occupied** clusters and foraging areas. A **fully recovered** RCW population will require a much larger area of mature forest habitat. It is questionable as to whether there is currently enough suitable acreage within the Habitat Management Areas on the NFT to support a fully recovered RCW population. Minerals development will result in the clearing of forest areas for drill pads, roads and pipelines. **It is essential to conduct a comprehensive analysis of the future habitat needs for a fully recovered RCW population on NFT before any more forested areas are cleared for non-forest uses.** The analysis should consider gross acreage needed and future demographics.

Lack of objective economic analysis-

Page 69 discusses socioeconomics. The economic assertions in the EA are incomplete and biased. This section makes assumptions while providing no support data. The EA assumes that the proposed minerals development would provide economic benefits without harming lower income demographics. There is currently a severe global oversupply of oil and natural gas that has resulted in a major depression of prices for these resources. The production of federal minerals would in fact be in direct competition with other individuals seeking to produce their own privately owned minerals. Since federal mineral leases are developed through the use of taxpayer dollars, this can lead to unfair competition with other private land and mineral owners.

The current oversupply of oil and gas has directly caused a suppression of prices. It could be argued that the development and production of federal minerals would further exacerbate the oversupply situation, drive down prices further and cause greater financial hardship for private individuals seeking to develop their own minerals. Thousands of individuals have lost their jobs as a result of oversupply; this lease proposal could lead to further unemployment due to perpetuation of oversupply.

Offering federal minerals at this time of low prices for oil and gas would likely lead to low sale prices for the proposed lease areas. Publicly owned minerals should not be sold for bargain prices on a "down market".

Based on current market conditions, chances are high that a well-financed company will purchase the lease for a relatively low price and then wait for prices to rise before producing the minerals. This gives an advantage to the wealthier producers that have the financial resources to buy the lease and then wait a number of years for the price of oil to rebound before initiating production. On the other hand, producers without substantial financial reserves would not be able to pay for the lease and then wait a number of years before seeing a return on their investment. This would hurt smaller producers and locals that depend on private minerals development.

The EA provides no meaningful discussion of potential economic impacts from sale of the lease.

Incomplete information on effects on available water quantity-

Page 58 addresses impacts to available subsurface water quantities. While it is impossible to precisely determine the effects on available water quantity from minerals development, the EA could provide a better idea of what information is known relative to current consumption and availability. For example, large scale groundwater pumping above a particular quantity requires a permit and approval from the State of Texas. Permit applications have been filed for pumping as much as 40,000 acre/feet of groundwater annually from Houston and Trinity Counties. The EA contains no analysis of existing usage, permits for large scale pumping or overall capacity to give resource managers or the public any idea of what constitutes sustainable groundwater usage and whether the aquifer can support the proposed mineral development. The EA mentions that the groundwater resources would eventually recharge following accelerated depletion from minerals development but this is not a meaningful statement. It is not based on any reliable data. Drought and low rainfall have been the norm for much of the past ten years in Texas; how can the EA reliably predict when and if the aquifers will recharge?

The lease is premature-

The NFGT is currently in the process of revising the LRMP; the first step will be to perform an inventory of NFGT resources and gather other relevant information. Leasing of NFGT minerals at this time is premature since the information used in the BLM EA is largely based on outdated sources. By waiting until the revision of the LRMP for NFGT is complete to initiate new minerals leasing, the BLM will have current information to work with.

SUMMARY OF PROTEST

The BLM failed to make use of existing NFGT scoping lists to adequately publicize the proposed leases and solicit public comments. Use of these mailing lists is routine for NFGT projects.

The BLM did not carry out any public collaboration, even when Resource Advisory Committees were in place for the NFGT.

The mandated environmental review for NFGT is based on outdated information, contains only general information and clearly contains omissions of sensitive resources and appropriate protection.

The EA should have utilized a comprehensive analysis for the overall habitat needs for a recovered RCW population.

Economic analysis is lacking, no data is provided and there is no recognition of the current global oversupply of oil and natural gas.

The EA does not make use of currently available information to present a better idea of the sustainability of groundwater resources. The EA does not provide data or analysis for groundwater sustainability.

Leasing NFGT minerals at this time would be premature since the FS is currently engaged in a LRMP revision that will gather current information and address relevant issues and concerns at the local level.

There is great concern over the potential impacts to non-National Forest areas as well, especially lakes that are used for municipal water supplies.

REQUEST FOR WITHDRAWAL OF THE LEASE PROPOSAL

TCA requests that the entire minerals lease be withdrawn pending:

- The gathering of more current information,
- Greater public outreach to identify relevant issues and concerns.
- Public collaboration to reach consensus on relevant issues and concerns.
- Preparation of a new EA that addresses the shortcomings of the current document and provides necessary resource protection, data and analysis.

Sincerely,

Larry D. Shelton

Attachments:

Letter to Forest Supervisor nominating Compartment 93 for SMA Status

10-3-08

Fred Salinas- Supervisor NFGT

415 South First Suite 110

Lufkin, TX. 75901

Dear Mr. Salinas,

Texas Conservation Alliance (TCA) proposes that portions of compartment 93 on the Davy Crockett National Forest (DCNF) be examined for designation as a Special Management Area (SMA). The compartment contains numerous attributes that qualify it as a unique resource on the DCNF worthy of SMA status. This proposal is consistent with the overall management direction of the 1996 Land and Resource Management Plan (LRMP).

PURPOSE AND NEED FOR ADDITIONAL SMA DESIGNATIONS

According to the 1996 LRMP the DCNF has the largest gross acreage of the four NFs in Texas yet it has the least amount of acres in designated SMAs, therefore SMAs are underrepresented on this Forest. The designation of additional SMAs on the DCNF is necessary to insure that high quality examples of a full spectrum of biological resources are represented on the Forest.

Although the 1990 Texas Natural Heritage Program Report sought to identify and protect the full range of rare and sensitive species on the NFGT along with associated habitats, the effort was not able to find all sensitive species and exemplary ecological areas. TCA believes that federal mandates obligate the FS to protect high quality examples of the full range of biodiversity ON EACH FOREST based on the unique geographic conditions of that particular Forest. Since the DCNF is fundamentally different from the other NFs in Texas, specific criteria should be established for protection of exemplary and unique plant communities on this Forest. This proposal begins the process of establishing guidelines for protection of unique and valuable resources and identifies specific areas for consideration as SMAs.

The 1996 LRMP identifies old growth as an important issue and further states that "Regional direction has stressed the importance of identifying and providing existing and potential old growth on the National Forests." Compartment 93 contains one of the largest concentrations of potential old growth on the NFGT with approximately 1,323 acres identified as being between 92 and 120 years of age. This feature undoubtedly qualifies the area as unique. With this proposal TCA seeks to identify significant

areas of old growth and allocate these areas to Management Areas that are more appropriate for this valuable resource.

CURRENT MANAGEMENT STATUS

Compartment 93 is currently allocated to Management Area 1- Upland Forest Ecosystems. A portion of the compartment is also allocated to Management Area 4- Streamside Management Zones. TCA is not aware of any proposed management activities for C-93 at this time.

ECOLOGICAL ATTRIBUTES OF C-93

The Stand Prescription Summary for C-93 identifies approximately 18 stands totaling 1,323 acres as being over 92 years of age. These stands are typed mostly as pine but a variety of hardwoods is also found here. On the better sites, specimen trees exceed 36" diameter at breast height. This concentration of old timber constitutes one of the largest blocks of potential old growth on the NFGT.

A key geographic feature of C-93 is Piney Creek and its tributaries. Piney Creek traverses much of the DCNF and constitutes a major riparian resource on the Forest. Within C-93, Piney Creek offers numerous wildlife assets including water, a mature forest habitat and mast bearing hardwoods. Uncommon trees such as southern magnolia, black walnut and shag bark hickory are found within C-93.

C-93 harbors mature mesic forest sites at the western edge of the piney woods bio-region. Mesic forest indicator species such as southern tway-blade orchid (*Listera australis*), Walter's violet (*Viola walteri*) and purple meadow-rue (*Thalictrum dasycarpum*) are found in C-93. These areas represent significant biodiversity on the DCNF and are worthy of recognition and SMA status.

The area currently receives a substantial amount of recreational use from hunters, hikers and campers.

A full ecological assessment and botanical inventory should be prepared for this proposal area.

TCA recommends that no timber be removed from the stands proposed for SMA status. I will contact the District Ranger to schedule a field trip to the area to discuss the merits of this proposal.

Recommended Status for portions of C-93: Future Old Growth

Sincerely,

Larry D. Shelton

Cc: Gerald Lawrence

Eddie Taylor

Description of Piney Creek SMA Proposal
For
Field Trip March 27, 2012

PINEY CREEK WATERSHED

COMPARTMENT 93

DAVY CROCKETT NATIONAL FOREST

Piney Creek is a tributary of the Neches River that begins just south of SH 7 in Houston County and traverses over 20 miles through 10 compartments on the DCNF. A unique feature of Piney Creek is that it represents the most miles traveled and most acreage drained of all the creeks on Forest Service lands within the DCNF. Piney Creek offers a unique opportunity to manage a significant block of NF land at the watershed level on a Forest which has a high degree of fragmentation and few large bottomland areas.

C-93

Compartment 93 harbors extensive areas of low lying lands associated with Piney Creek and its tributaries. The area supports approximately 1,323 acres of older age forest, several species of conservation concern and bottomland forest with high value to wildlife.

The key feature of this tract is the extensive old age forest:

- Loblolly pine- 42"
- Cherry bark oak- 48"
- Bitternut hickory-30"
- White oak- 36"
- Shagbark hickory- 30"
- Black walnut- 24"
- Southern magnolia- 24"

Natural processes such as SPB, wind and beavers have created gaps and younger age classes within the overall matrix of old age forest. Mature mast producing hardwoods, snags, den trees and natural openings provide valuable wildlife habitat. Shagbark hickory is locally abundant.

Shagbark hickory and Southern magnolia have high conservation value. Shagbark hickory is an indicator of older forest conditions and mature stands of this tree are rare. Southern magnolia occurs very sparingly in Trinity County. Several large specimens are present on Piney Creek along with scattered younger trees. Increasing the Southern magnolia component should be a key management goal.

A wide diversity of herbaceous plants is present including several uncommon species:

- Twayblade orchid
- Purple meadow rue
- Walter's violet

- Adder's tongue fern

Management Goals

Compartment 93 should be included in a larger Piney Creek Conservation Corridor Special Management Area which would include all compartments that adjoin Piney Creek. Management goals would vary depending on the ecological potential of the specific landscape along the stream.

This management unit is needed to ensure that a **comprehensive management strategy** is utilized for a **unique and valuable NF resource**. Whereas the DCNF contains few large riparian areas, this management unit is needed to **conserve significant riparian communities and associated wildlife habitat**. The DCNF contains the fewest acres in SMAs on the Texas NFs therefore this management unit is needed to **provide greater representation of the unique attributes associated with SMAs**.

The purpose of the management unit would be to:

- Provide a comprehensive management strategy for a unique and valuable NF resource.
- Provide a significant wildlife travel corridor spanning over 20 linear miles across 2 counties.
- Provide enhanced opportunities to manage for old growth forest conditions.
- Provide specific elements of wildlife habitat such as dens, cavities, snags and large downed woody debris.
- Provide an abundant source of hard and soft mast wildlife foods.
- Provide core areas for wildlife that have minimal disturbance from roads and other forms of human ingress and egress.
- Enhance water quality and soil conservation within the Piney Creek watershed.
- Provide management opportunities that are generally not represented on private land.
- Provide a better representation of the attributes that are associated with SMAs.
- Provide opportunities to protect and enhance under-represented forest communities and species.
- Provide opportunities to protect and promote species of conservation concern.
- Provide unique recreational opportunities.
- Enhance ecosystem management for a large stream segment.
- Facilitate ecological and watershed restoration.

-Identify protection strategies for mesic forests in advance of predicted climate change scenarios.