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November 22, 2016

VIA ELECTRONIC MAIL AND FED EX

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RE: Center for Biological Diversity, et al. EA Comments for the April 19, 2017 Competitive Oil and Gas Lease Sale, Oklahoma Field Office

Dear Mr. Stong:

The Center for Biological Diversity, Sierra Club, including its Lone Star Chapter, Public Citizen Texas, and Clean Water Action write to submit the following comments on the proposed April 19, 2017 Competitive Oil and Gas Lease Sale, Oklahoma Field Office ("OFO"), and draft Environmental Assessment DOI-BLM-NM-040-2016-028. The BLM New Mexico State Office is proposing to offer 18 parcels encompassing approximately 4,376.86 total acres for lease; nine of the 18 parcels totaling 1,205.14 acres are in Oklahoma, with the other nine totaling 3,171.72 acres in Texas. Three of the 18 parcels are located on split-estate with Federal minerals and private surface.

For the reasons set forth in this letter, and in our August 29, 2016 scoping comment letter (attached hereto as Exhibit A and incorporated by reference), we insist that BLM: (1) cease all new leasing of fossil fuels in the planning area, including oil and natural gas; or, at a minimum (2) withdraw the proposed April 2017 Sale pending a programmatic review of all federal fossil fuel leasing which must consider a "no leasing" and "no fracking" plan amendments. Should BLM proceed with the sale, BLM must: (1) initiate formal consultation with the Fish and Wildlife Service, as required by the Endangered Species Act ("ESA"); and (2) prepare a full EIS for the proposed lease sale in consideration of significant unexamined impacts from the consequences of leasing. Any such EIS must consider a full range of alternatives, including an alternative that bans new hydraulic fracturing and other unconventional well stimulation activities, and require strict controls on natural gas emissions and leakage.

The EA as prepared is unlawfully deficient. Relying on the RMPs as the basis for BLM's FONSI was improper: the broad-brush analysis contained in the land use planning stage omits several significant environmental consequences specific to the proposed lease sale, and fails to

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consider new information that has arisen over the last two decades, which we discussed in the attached scoping comment, and as we discuss in greater detail below:

I. The Draft EA and Finding of No Significant Impact ("FONSI") do not Satisfy the National Environmental Policy Act's ("NEPA") "Hard Look" Requirement

NEPA requires agencies to undertake thorough, site-specific environmental analysis at the earliest possible time and prior to any "irretrievable commitment of resources" so that the action can be shaped to account for environmental values. Pennaco Energy, Inc. v. United States DOI, 377 F.3d 1147, 1160 (10th Cir. 2004). Oil and gas leasing is an irretrievable commitment of resources. S. Utah Wilderness All. v. Norton, 457 F. Supp. 2d 1253, 1256 (D. Utah 2006). Thus, NEPA establishes "action-forcing" procedures that require agencies to take a "hard look," at "all foreseeable impacts of leasing" before leasing can proceed. Center for Biological Diversity v. United States DOI, 623 F.3d 633, 642 (9th Cir. 2010); N.M. ex rel. Richardson v. BLM, 565 F.3d 683, 717 (10th Cir. 2009). Chief among these procedures is the preparation of an environmental impact statement ("EIS"). Id.

BLM, however, did not prepare an EIS; nor did BLM even prepare a sufficient analysis for the impacts we raised in our scoping comment, in the EA for the proposed lease sale. In our scoping letter (Ex. A), we pointed out numerous foreseeable, significant impacts likely to be caused by the exploration and development of these parcels. However, BLM did not take a hard look at these impacts in its draft EA and arbitrarily declined to prepare an Environmental Impact Statement ("EIS") despite the likelihood of significant impacts. Instead, BLM claims that these impacts were already analyzed in severely outdated RMPs that were signed into record more than two decades ago. The EA tiers to the Oklahoma Resources Management Plan (RMP) (1994) and the Texas RMP (1996) for the required analysis, and relies on several lease stipulations to mitigate the impacts of future development on these parcels. However, BLM never looked at, or made any determination as to, whether such stipulations will actually reduce impacts to less than significant levels; nor does BLM provide any scientific evidence or data, or conduct any analysis of site-specific impacts, to support any such determination. Without any analysis of site-specific impacts at the parcel level, there is no basis for concluding that such measures would reduce impacts to less than significant levels, or that lease stipulations attached to a lease are adequate to address site-specific concerns.

Furthermore, even at the programmatic level, the meager analysis BLM has provided thus far is unlawfully deficient. Relying on the RMPs as the basis for BLM's FONSI was improper: the broad-brush analysis contained in the programmatic EA omits several significant environmental consequences specific to the proposed lease sale, which we discuss in detail below:

a. BLM Failed to Take a Hard Look at the Risks of Induced Seismicity or Other Geological Hazards

It is incredible that the EA's discussion of the impacts of earthquakes in Oklahoma and Texas can be so cursory despite both the astonishing number of powerful earthquakes to hit these

states in recent years (e.g., last year in 2015, Oklahoma experienced approximately 905 earthquakes measuring at least 3.0 in magnitude, up from fewer than two in 2008[1]), and the significant amount of information that has arisen linking this dramatic spike in earthquakes to oil and gas activity in these areas. We provided numerous studies in our comments in scoping supporting the link (see Ex.A at pp. 52-56), which we incorporate herein by reference. Despite the foreseeability of more and greater earthquakes resulting from the proposed action, the EA does not discuss any of the direct or indirect impacts that these earthquakes are likely to have on the resources in the areas to be leased.

The only times earthquakes are brought up at all in the EA are in Sections 3.3.3 Seismicity and 4.3.3 Water Resources. In both sections, BLM only discusses seismicity in Oklahoma, but not Texas. The omission is baseless given the studies we provided in scoping to show elevated levels of seismic activity in Texas linked to oil and gas wastewater injection.[2]

Section 3.3.3 barely acknowledges a connection between Oklahoma's recent increase in seismic events and the increase in disposal volumes of *produced water*, but completely ignores the fact that the extraction processes and hydraulic fracturing, can cause earthquakes.[3] Earlier this year, a study confirmed a causal relationship not only between wastewater injection and fracking, but to the process of hydraulic fracturing itself.[4]

In Section 4.3.3, BLM only mentions the potential for Oklahoma's wastewater induced earthquakes to contaminate water. Nowhere else in the EA are the many other foreseeable

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[1] Oklahoma experienced 905 earthquakes of magnitude 3 or greater in 2015 alone, a 55% increase over 2014 which saw 585 earthquakes of magnitude 3 or greater, up from 109 earthquakes of the same magnitude in 2013, and an average of about 2 earthquakes a year prior to 2009. *See* Oklahoma Geological Survey, Earthquakes in Oklahoma What We Know, available at http://earthquakes.ok.gov/what-we-know/ (Accessed September 26, 2016); Darold, A., et al. Oklahoma Earthquake Summary Report 2014, Oklahoma Geological Survey Open-File Report OF1-2015 (February 19, 2015) at 13; USGS Record Numer of Oklahoma Tremors Raises Possibility of Damaging Earthquakes (May 2, 2014), available at https://earthquake.usgs.gov/contactus/golden/newsrelease_05022014.php

[2] See Center for Biological Diversity Scoping Comments on the April 19, 2017 Competitive Oil & Gas Lease Sale, August 29, 2016 at 52-55; *See, e.g.*, Brown, W.A. et al. Abstract: Investigating the cause of the 17 May 2012 M4.8 earthquake near Timpson, East Texas, Abstract 84 Seismol. Res. Lett 374 (2013); 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; USGS, Texas Area Seismicity Map (2005 – August 2016); 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/; *see also* M.J. Hornbach et al., Ellenburger wastewater injection and seismicity, Physics of the Earth and Planetary Interiors (2016), available at http://www.sciencedirect.com/science/article/pii/S0031920116301133

[3] *See* National Research Council, Induced Seismicity Potential in Energy Technologies, 44-45 (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; Hornbach, Matthew J. et al., Causal Factors for Seismicity near Azle, Texas, Nature Communications 6:6728 (April 21, 2015), 1 and 5-6, available at http://www.nature.com/ncomms/2015/150421/ncomms7728/full/ncomms7728.html; Choy, G., et al., A Rare Moderate-Sized (Mw 4.9) Earthquake in Kansas: Rupture Process of the Milan, Kansas, Earthquake of 12 November 2014 and Its Relationship to Fluid Injection. Seismological Research Letters. September 2016. DOI: 10.1785/0220160100; Shirzaei, M., et al. Surface Uplift and Time-Dependent Seismic Hazard Due to fluid injection in eastern Texas. *Science*, 23 Sep 2016: Vol. 353, Issue 6306, pp. 1416-1419 DOI: 10.1126/science.aag0262

[4] Atkinson, G., et al., Hydraulic Fracturing and Seismicity in the Western Canada Sedimentary Basin. Seismological Research Letters. Volume 87, Number 3 May/June 2016. doi: 10.1785/0220150263

impacts from induced earthquakes discussed, even though earthquakes have the potential to damage or destroy property, and to cause injuries and even death. Earlier this month, for example, on November 6, 2016, a 5.0 magnitude earthquake hit Cushing, Oklahoma causing power outages and "substantial damage" to 40 to 50 buildings.[5] The same earthquake left some residents homeless.[6] The local school system announced that schools would be closed to assess damage, and the Red Cross announced that it was opening a shelter at a youth center in the city for people concerned about the safety of their homes.[7]

Earthquakes like these have also caused structural damage to dams, which are sensitive to any movement of basement faults. 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.[8] The breach destroyed or damaged 277 homes and killed five people.[9] 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 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."[10]

As explained in the attached report by geologist Gerald Bartz, seismicity in and around dams is a significant risk of BLM's leasing proposal. All of the Texas parcels are near or underlie dams which are underlain by lineaments, i.e., cracks in the earth's surface. Those lineaments may reflect the existence of parallel dormant faults below the earth's surface. Injecting frack fluid at high pressure near those faults may cause a shift in rocks, resulting in an earthquake, which could cause damage to the dam. Despite the threats that earthquakes impose, the EA does not take into consideration any of the potential impacts that earthquakes would have on the human environment or wildlife, other than the contamination of water—but even that analysis is unlawfully deficient.

Rather than take a hard look at the potential for earthquakes to cause water contamination, BLM assumes that containment systems would be placed in, under, and/or around any tank, pit, or ditch associated with the drilling process, and then jumps to the conclusion that this will prevent any chemicals from penetrating the soil and impacting the aquifer. However, BLM does not analyze whether these containment systems will actually reduce the risks to such a degree that would justify a finding of no significant impacts, nor disclose how BLM can conclude as such. BLM also only mentions "BLM and state regulations

[5] Soraghan, Mike, Energywire: Signficant quake damages buildings near Oklahoma pipeline hub. E&E. November 7, 2016 ("Soraghan November 2016"); Juozapavicius, Justin. Official: 40 to 50 Buildings Damaged in Oklahoma Earthquake, November 7, 2016, available at http://abcnews.go.com/US/wireStory/quake-oklahoma-oil-hub-prompts-infrastructure-concerns-43351330 ("Juozapavicius 2016"

[6] Norris, David. Earthquake leaves some Cushing residents homeless, November 7, 2016, available at http://ktul.com/news/local/earthquake-leaves-some-cushing-residents-homeless ("Norris 2016")

[7] Soraghan November 2016.

[8] NRC 2012 at 197.

[9] *Id*.

[10] *Id*. at 198.

regarding casing and cementing," which it claims will "greatly reduce the chance of aquifer contamination" but again does not actually provide any scientific evidence or data showing how these measures will remove all significant risks of contamination. BLM does not even identify the specific regulations to which it is referring. BLM then puts its responsibilities to look at these impacts on the Environmental Protection Agency ("EPA"), the Oklahoma Corporation Commission ("OCC") and the Texas Railroad Commission ("RRC") to "enforce federal rules." Once again BLM does not at all discuss the basis for its determination that there are no significant impacts that could arise from earthquakes caused by fluid and waste injection and/or extraction processes. Rather, BLM appears to assume either that its obligations to analyze and disclose foreseeable impacts of its decision to open up these parcels for oil and gas activities are somehow fulfilled by the mere existence of other agencies that have jurisdiction over such operations, or that no impacts could possibly result from oil and gas leasing simply because there are some BMPs, monitoring and testing requirements, as well as other regulations in place. But BLM cannot pass on its NEPA obligations by assuming all significant adverse impacts will be taken care of by these agencies or regulations. Even if other state and federal agencies are charged with overseeing oil and gas drill operations, BLM nevertheless has a duty to perform a thorough analysis of foreseeable environmental impacts of its leasing decision, subject to the public's review and input, prior to leasing public lands for oil and gas development. BLM may take into account any regulations in its analysis of foreseeable impacts, but cannot claim – without analysis and quantification of potential effects and of effectiveness of potential mitigation or state regulations – that no significant impacts would result from its action simply because other agencies have regulatory authority.

Given recent events, it is especially critical that BLM look at these impacts. In this year alone, Oklahoma has been hit with *three* 5.0 magnitude or greater earthquakes – what a U.S. Geological Survey scientist referred to as "unbelievable" and "unprecedented."[11] The 5.0 magnitude earthquake in Cushing, discussed above, was not the largest, but is in some ways the most troubling in a series of temblors over the past few years. As Bloomberg put it:

> Not only did it strike within a mile of what is arguably one of the country's most important strategic assets—Cushing is the largest crude oil trading hub in North America, with almost 60 million barrels of stored crude—but its occurrence raises questions over the state's ability to do anything about the significant rise in earthquakes, which has been linked to oil and gas activity. While regulations limiting the underground disposal of wastewater have succeeded in reducing the overall frequency of earthquakes, they haven't been able to stop the really big ones from happening.[12]

[11] Jones, Corey, Oklahoma's trio of magnitude-5.0 quakes this year is 'unprecedented,' boosts chances for another large one, TULSA WORLD, November 10, 2016, available at http://m.tulsaworld.com/earthquakes/oklahoma-s-trio-of-magnitude--quakes-this-year-is/article_38765045-2646-57f0-9b2b-e1e1ceaa9756.html?mode=jqm ("Jones November 2016")

[12] Philips, Matthew. Why Oklahoma Can't Turn Off Its Earthquakes. BLOOMBERG BUSINESSWEEK. November 7, 2016, available at http://www.bloomberg.com/news/articles/2016-11-08/why-oklahoma-can-t-turn-off-its-earthquakes ("Philips 2016")

In March, the U.S. Geological Survey released a study forecasting the country's seismic potential for the rest of 2016, with Oklahoma's hazards on par with California.[13] Daniel McNamara, a research geophysicist at the National Earthquake Information Center, said that hazard model's predictions were on target with the amount of ground-shaking Oklahomans have experienced with the three 5.0s.[14] However, he said, the USGS didn't expect three of them, so the model likely underpredicted the frequency and likely will be revised upward in 2017.

But experts had predicted that wastewater injections would lead to a rise in larger earthquakes, which the recent earthquake activity in 2016 confirms.[15] A 5.8 earthquake near Pawnee occurred on September 3, 2016 (only a couple of months prior to the 5.0 Cushing earthquake) and is the largest recorded quake to hit the state, prompting Oklahoma's governor to declare a state of emergency.[16] The Pawnee earthquake injured one person and damaged 14 buildings[17]; the consequences could have been much worse if the epicenter had been closer to population centers and happened in the middle of the day.[18] According to scientists, the Pawnee quake was likely linked to the previous clusters of earthquakes that have struck to the south and west, from the outskirts of Oklahoma City to the Kansas border.[19] Numerous studies have linked those earthquakes to a large increase in waste disposal occurring from 2011 to 2015.[20] A class action lawsuit was filed by residents last Friday November 18 against the oil and gas companies in the area, alleging that wastewater pumped into wells for disposal contributed to a 5.8-magnitude earthquake as well as the many aftershocks that followed.[21]

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[13] Jones November 2016
[14] *Id.*
[15] Fox, Keaton, Oklahoma's record-tying quake was predicted, more expected, Fox25 (Sept. 5, 2016), available at http://okcfox.com/news/local/oklahomas-record-tying-quake-was-predicted-more-expected ("Fox 2016").
[16] Lee, Mike, Oklahoma Quake Was a Record-Setter, and Anger is Still High. E&E Energy Wire. (September 8, 2016), available at http://www.eenews.net/energywire/stories/1060042493/ ("Lee 2016").
[17] Fieldstadt, Elisha & AP, State of Emergency Declared in Oklahoma After Magnitude 5.6 Earthquake, NBC News, September 4, 2016, available at http://www.nbcnews.com/news/us-news/state-emergency-declared-oklahoma-after-magnitude-5-6-earthquake-n642676. ("Elisha 2016")
[18] Wines, Michael, Geologist Sees Clues, and Further Dangers, in Puzzle of Oklahoma's Earthquake, New York Times (Sept. 6, 2016) ("Oklahoma got very lucky in that the epicenter of this quake was functionally in the middle of nowhere. And it happened in the early morning. If you'd stuck it underneath a town at a different time of day, when people were on the sidewalks, you would have had a much greater problem.") ("Halihan Interview 2016").
[19] *Id.*
[20] *See, e.g.*, McNamara, D.E., et al., Earthquake Hypocenters and Focal Mechanisms in Central Oklahoma Reveal a Complex System of Reactive Subsurface Strike-Slip Faulting, faulting, *Geophys. Res. Lett.*, 42, 2742–2749, doi:10.1002/2014GL062730 (April 23, 2015) ("McNamara 2015"); *and* Keranen, Katie et al., Potentially Induced Earthquakes in Oklahoma, USA: Links Between Wastewater Injection and the 2011 Mw5.7 Earthquake Sequence, Geology doi:10.1130/G34045.1 (March 26, 2013) ("Keranen 2013"); F. R. Walsh, M. D. Zoback, Oklahoma's recent earthquakes and saltwater disposal. Sci. Adv. 1, e1500195 (2015); Keranen 2013; McNamara 2015; *see also* Oklahoma Geological Survey Summary Statement on Oklahoma Seismicity (April 21, 2015) ("The rate of magnitude 3+ earthquakes has increased from 1 ½ per year prior to 2008 to the current average rate of 2 ½ per day, a rate that is approximately 600 times the historical background. The Oklahoma Geological Survey (OGS) considers it very likely that the majority of recent earthquakes, particularly those in central and north-central Oklahoma, are triggered by the injection of produced water in disposal wells.") (emphasis added).
[21] Wertz, J., Groundwork Laid For Class-Action Lawsuit Against Oil Companies After Record Earthquake in Pawnee. State Impact (November 18, 2016), available at https://stateimpact.npr.org/oklahoma/2016/11/18/groundwork-laid-for-class-action-lawsuit-against-oil-companies-after-record-earthquake-in-pawnee/; Krausz, J., Pawnee Earthquakes: Lawsuit Claims Energy Companies at Fault.

The third of the trio is the 5.1 magnitude earthquake that occurred near Fairview on February 13.[22] These comprise more than half of all earthquakes equal to or greater than 5.0 magnitude in Oklahoma's history. The two others were a 5.6 earthquake near Prague in 2011 and a 5.5 near Yukon in 1952.[23] This pattern reflects an increasing trend of larger earthquakes: "In 2016, while the total number of earthquakes is down, the larger, more damaging earthquakes make up a large percentage of those types of quakes in history."[24] Of earthquakes magnitude 4.0 or higher, 20 percent of those (17 earthquakes) were recorded in 2016.[25] The only year with a higher number of 4.0 or greater quakes was 2015, which had 29.[26] Overall energy released from earthquakes has tripled over time, even as the number of earthquakes has declined.[27]

Jeremy Boak, director of the Oklahoma Geological Survey, said the chances of experiencing a magnitude-6.0 quake in the next four years has increased to about 10 percent since the state-record 5.8-magnitude temblor near Pawnee in September and the recent 5.0 by Cushing.[28] The probability of a magnitude-5.5 has gone up to about 40 percent, he said. The magnitude-5.0 quakes are occurring on the outskirts of the seismic region of interest, which fits a theory Boak has that an underground "pressure pulse" is moving outward and triggering quakes.[29] Boak had rightly warned that there could be more large quakes since the record breaking September 3 magnitude 5.8 temblor that hit Pawnee.[30] His prediction came true only two months after. But he isn't the only one to make such predictions. For the past year, experts have noted that large earthquakes are likely to follow a series of smaller earthquakes, suggesting that wastewater injections can cumulatively lead to larger seismic events. For example, at the beginning of this year two earthquakes of 4.7 and 4.8 magnitude struck rural northern Oklahoma; some experts said those quakes hinted at the possibility of a larger shock.[31] They were right.

Experts predict that earthquake activity will continue to rise and larger quakes can continue to be expected, despite declines in wastewater injections: "It could be up 10 to

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Newsmax: The Wire. (November 18, 2016), available at http://www.newsmax.com/TheWire/pawnee-earthquakes-lawsuit-energy-companies/2016/11/18/id/759717/;

[22] *Id.*

[23] *Id.*

[24] *Id.*

[25] *Id.*

[26] *Id.*

[27] *Id.*

[28] *Id.*

[29] *Id.*

[30] Soraghan, Mike, Fewer Disposal Wells to Close in Oklahoma From Quake. E&E Energy Wire. (September 13, 2016), available at http://www.eenews.net/energywire/stories/1060042721/search?keyword=pawnee ("'We see a continued possibility of an equal or larger-sized earthquake' in the state's sizable quake zone, said Jeremy Boak, director of the Oklahoma Geological Survey.")

[31] Wines, Michael, Earthquakes in Oklahoma Raise Fears of a Big One, New York Times (Jan. 7, 2016), available at http://www.nytimes.com/2016/01/08/us/earthquakes-in-oklahoma-raise-fears-of-a-big-one.html?action=click&contentCollection=U.S.&module=RelatedCoverage&region=Marginalia&pgtype=article ("Wines 2016").

100 years. We don't know—even if they shut down everything today," McNamara said.[32] Boak seconded the opinion stating that he expects it to be a "long time" before Oklahoma gets back to its historical average of two 3.0 earthquakes a year.[33] He is more interested in how long it will take to get back to 2012 levels (35 magnitude-3.0s), before seismicity took a terrific leap skyward.[34] Even if Oklahoma were to stop injecting wastewater tomorrow, McNamara said, the chance of large quakes will remain elevated for years to come.[35] The pressure that fracking wastewater has added to the complex network of fault lines running beneath Oklahoma isn't going away. "We're looking at many, many years of earthquakes as that energy dissipates through the system," he said.[36]

In other words, "even though the rash of earthquakes in Oklahoma has subsided somewhat since its peak last year, the size of the latest tremor makes it more likely that a similar-sized event will happen in the future, according to state and federal geologists. The smaller quakes are likely to continue, too, even though their numbers have tapered off since state regulators started limiting the amount of wastewater injection last year."[37] With the added restrictions, Oklahoma has gone from averaging more than four earthquakes a day to around two per day. The reduction, in some ways, confirms the connection between wastewater disposal and earthquakes.[38] But it also shows the limited power of strict regulations in reducing the largest earthquakes, which has muted some of the enthusiasm around the OCC restrictions: "For about six months, the story was that these restrictions were working, but then the 5.8 hit," said McNamara. "The small events may be trending down, but the frequency of the largest ones is going up, and that is what's troubling about this latest cluster of activity, particularly around Cushing."[39]

The scientific evidence also shows that cumulative pressure increase from injection may also trigger swarms of earthquakes on faults located tens of kilometers or more from injection wells.[40] In the Fort Worth Basin in Texas, for example, the cumulative number of earthquakes having magnitudes of 3 or more increased roughly exponentially, since 2008, with discrete

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[32] Jones, Corey, Record quake renews concerns of even stronger tremblors in Oklahoma, Tulsa World (Sept. 4, 2016), available at http://www.tulsaworld.com/homepagelatest/record-quake-renews-concerns-of-even-stronger-temblors-in-oklahoma/article_f4e03860-9a1b-5bce-8b41-e93f99cbc443.html ("Jones Sept 2016")
[33] *Id.*
[34] Jones Sept 2016; Lee 2016 ("'Even if all the wells were shut down, there's still energy in the system,' Daniel McNamara, a researcher with the U.S. Geological Survey, told reporters at a meeting of scientists in Norman."); Fox 2016 ("Large earthquakes typically beget large earthquakes, said USGS seismologist Daniel McNamara. "There will certainly be large M4 aftershocks associated with the M5.6," McNamara said by email from his office in Colorado.") ; Wines, Michael, Oklahoma Puts Limits on Oil and Gas Wells to Fight Quakes, New York Times, available at http://www.nytimes.com/2016/03/08/us/oklahoma-earthquakes-oil-gas-wells.html?hp&action=click&pgtype=Homepage&clickSource=story-heading&module=second-column-region&region=top-news&WT.nav=top-news&_r=0 (deputy chief of USGS man-made earthquake program noting "You really can't rule out the possibility of a larger earthquake.") ("Wines 2016").
[35] Philips 2016.
[36] *Id.*
[37] Lee 2016.
[38] Philips 2016.
[39] *Id.*
[40] Hornbach, M.J., et al., Ellenburger wastewater injection and seismicity in North Texas, *Physics of the Earth and Planetary Interiors* (2016), doi: http://dx.doi.org/10.1016/j.pepi.2016.06.012 ("Hornbach 2016")

increases associated with individual earthquake sequences.[41] In other words, small earthquakes may be precursors to large earthquakes or swarms. Many North Texas earthquake sequences consist of swarms of small earthquakes. The published investigations of all these sequences concluded that it was plausible or probable that they were induced by increased subsurface fluid pressures associated with the injection of wastewater.[42] A new study suggests far-field pressurization from clustered, high-rate wells greater than 12 km from an earthquake sequence in Fairview, Oklahoma (of five earthquakes with Mw 4.4 or larger) induced these earthquakes, and points to the far-reaching impact of wastewater injection.[43]

Accordingly, it is highly likely that new oil and gas development, and increased wastewater injection associated with new development, would cumulatively increase the risk of increased earthquake activity, and larger quakes. The sheer volume of earthquake activity suggests that continued injections would exacerbate the risk of a larger earthquake, despite measures to reduce wastewater injections overall. But neither the EA nor the RMPs to which it tiers have taken any look at this issue.

Several of the parcels are in areas that have a high risk of damage from an earthquake, or are near wastewater wells associated with earthquake activity.[44] However, given uncertainties in where damaging earthquakes are most likely to occur and how to reduce these risks, the proximity of the parcels to these areas may matter less, rendering all of the parcels a significant potential risk. For example, the Pawnee earthquake resulted from activation of a previously unknown fault in an area where regulators had not previously ordered cutbacks in wastewater injection.[45] Regulators therefore do not appear to have much of a handle on where wastewater disposal is likely to result in earthquake activity. Even the USGS's 2016 forecast for where damage from induced earthquakes is most likely to occur is based only on *past* activity patterns, rather than an evaluation of areas with geological characteristics or faults most susceptible to induced seismicity.[46] Moreover, while the state has targeted wastewater injections in areas with

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[41] *Id*. (Cumulative pressure increase across the basin may trigger earthquakes on faults located tens of kilometers or more from injection wells, and this process may have triggered the Irving-Dallas earthquake sequence).
[42] *Id*.
[43] Yeck, W. L., M. Weingarten, H. M. Benz, D. E. McNamara, E. A. Bergman, R. B. Herrmann, J. L. Rubinstein, and P. S. Earle (2016), Far-field pressurization likely caused one of the largest injection induced earthquakes by reactivating a large preexisting basement fault structure, Geophys. Res. Lett., 43, 10,198–10,207, doi:10.1002/ 2016GL070861.
[44] Center for Biological Diversity, Seismic Hazard Maps (2016), attached as Exhibit D.
[45] Jones September 2016 (noting fault causing Pawnee quake was "undiscovered"); Soraghan, Mike, EPA orders shutdown of disposal wells after Okla. quake, E&E News (Sept. 7, 2016), available at http://www.eenews.net/energywire/2016/09/07/stories/1060042410 ("EPA has not announced any [restrictions] concerning disposal wells in Osage [County] before now.").
[46] USGS, 2016 One-Year Seismic Hazard Forecast for the Central and Eastern United States from Induced and Natural Earthquakes, Open-File Report 2016–1035, 12 (2016) , available at http://pubs.usgs.gov/of/2016/1035/ofr20161035.pdf ("Our assessment of induced earthquake hazard was dependent on the assumption that past earthquake rates will remain constant over the next year of the forecast. While this assumption will not hold for areas of injection over long periods, recent studies…indicate that assessing earthquake rates observed over short time windows of a year or less are currently the best method available for forecasting the next year's rate of induced earthquakes. This model, however, does not account for increased, reduced, or new induced activity in 2016.").

high levels of seismic activity, earthquakes of magnitude 5.0 or greater have mysteriously occurred on the outskirts of these areas.[47]

Similarly, in Texas, seismic activity has occurred far away from sites of wastewater injection. A recent study of earthquake activity in North Texas documented the pressure buildup in the deep rocks. It was their conclusion that the spread of earthquakes was likely caused by the migratory directions of fluids introduced into the subsurface by wastewater-injection operations.[48] These fluids migrated and continued to build up pressure after the wastewater-injection operations had ceased. The study documented the cessation of wastewater-injection in approximately July-October of 2012, but the earthquakes continued until mid-2015. Some of the earthquakes occurred more than 10 miles from the wastewater-injection operations.[49] Dr. Todd Halihan, a geologist at Oklahoma State University recently noted the need for "large-scale studies" to understand how and where earthquakes occur.[50] Experts and regulators thus have much to learn in where earthquakes may be triggered, what risk factors may contribute to the activation of a larger quake, and how to manage these risks. It is therefore entirely possible that the next large earthquake could be triggered by wastewater injections in an area not previously on the radar of state and federal agencies.

These significant knowledge gaps compel the preparation of an EIS. *See* 40 C.F.R. § 1508.27 (consideration of whether action "significantly" affects environments involves evaluating "degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks"). As we stated previously, BLM cannot pass on its NEPA obligations by assuming these problems will be taken care of by the Oklahoma Corporation Commission. Moreover, the OCC has largely proven ineffective in preventing earthquakes from underground oil and gas injections. Rather than conducting the necessary studies to gain a handle on which areas are seismically at risk, the OCC is largely relying on reactive measures by directing operators to cutback wastewater disposal when a large earthquake occurs.[51] These so-called "proactive" measures simply restrict the volume of wastewater injections allowed, rather than requiring a permanent shutdown of wells.[52] Even these "directives" issued by the OCC are requests for voluntary action and not mandatory.[53] Operators may therefore continue injecting wastewaters until OCC completes a formal process to order shut down of injection wells.

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[47] Jones September 2016 (Boak noted an apparent oddity in that Oklahoma's three magnitude-5.0s since 2011 have occurred on the fringe — not in the heart — of seismic activity.)
[48] Hornbach 2016.
[49] *Id*.
[50] Halihan Interview 2016.
[51] *See id*. (expert noting "we need to be proactive instead of reactive").
[52] *See* Wertz, Joe, Oklahoma Oil Regulator Issues New Restrictions after Earthquake—Updated, KGOU.org (Aug. 24, 2016), available at http://kgou.org/post/oklahoma-oil-regulator-issues-new-restrictions-after-earthquakes-updated-0 (listing directives issued by OCC through August 2016).
[53] *See, e.g.*, Monies, Paul, Oklahoma Regulators Issue Expanded Disposal Well Directive for Earthquakes, The Oklahoman (Feb. 17, 2016), available at http://www.emergencymgmt.com/disaster/Oklahoma-regulators-issue-expanded-disposal-well-directive-for-earthquakes.html?flipboard=yes (noting "voluntary" directive requesting operators to reduce saltwater injections); Soraghan, Mike, SandRidge defies Okla. directive to close 6 wells, E&E News (Dec. 21, 2015), available at http://www.eenews.net/stories/1060029814 ("The OCC 'directives' are voluntary, but if a company refuses, OCC staff can take formal legal action against the company.").

For all of the aforementioned reasons, it is shocking that the EA continues to disregard all of the new information regarding the risks of underground oil and gas wastewater disposal in inducing earthquakes that has emerged, and to omit this glaring issue from public review, ignoring the potential for significant impacts from oil and gas production on Oklahoma and Texas parcels. BLM has yet to acknowledge, let alone conduct the required analysis of, impacts relating to induced seismicity. The EA limits its analysis to the potential for induced seismic events to cause water contamination, and ignores the potential for wastewater injections to cumulatively increase the risk of a large earthquake, and the associated risk to homes, public infrastructure, and human lives. Given that earthquakes occur at much shallower depth in Oklahoma than in other states, such as California or Alaska, earthquakes of the same magnitude have a greater potential for shaking and damage in Oklahoma than in other states.[54] If BLM's treatment of seismic activity in the draft EA is any indication of how it plans to respond to the issues raised in all of our comments on this issue, including our protest letters concerning the April 2016 lease sale,[55] then a Finding of No Significant Impacts looks to be disingenuous at best and an EIS must be prepared so that the public can understand the implications of its proposed action.

b. BLM Failed to Take a Hard Look at the Impacts to Dams and Neighboring Communities' Drinking Water Supplies

Several of the nominated parcels are located on the shore of or below Choke Canyon and above Lake Texana.[56] Both Choke Canyon Reservoir and Lake Texana are two of three major water supply lakes for the City of Corpus Christi. The Corpus Christi Water Department supplies water not only to Corpus Christi but also to 18 cities, serving more than 440,000 residential customers (2010 census data). Thus the potential threat of structural damage to the dams could be catastrophic to the communities relying on these dams. Again, the EA does not at all address or acknowledge the potential impacts for induced seismicity in Texas. Section 3.3.3 Seismicity, for example, only mentions seismic activity in Oklahoma, but ignores that in Texas. The EA does not include any analysis of the foreseeable impacts of induced seismicity to dam infrastructure, nor the potential risk to pipelines such as the 64-inch distribution line that conveys water from Lake Texana to the population of Corpus Christi.

BLM provides no scientific basis or reasoning for its Finding of No Significant Impacts with respect to the potential structural damage to dams that could result from BLM opening up these parcels for oil and gas development. Instead, BLM appears to rely on 33 U.S. Code § 408 which provides that it is unlawful for any person to "impair the usefulness" of any flood control work built by the United States.[57] BLM also cites to the USACE's prohibition of oil and gas exploration and production activities within 2,000-feet of any major structure (3,000 feet in Texas).[58] However, BLM provides no explanation for its conclusion that these regulations will

[54] Halihan Interview 2016.
[55] CBD Scoping Comments (Exhibit A); see also Center for Biological Diversity's Protest of April 20, 2016 Oil and Gas Lease Sale (February 19, 2012), attached hereto as Exhibit C.
[56] Parcels NM-201704-009, NM-201704-010, and NM-201704-017. See CBD Water Resources Maps (2016), attached as Exhibit E.
[57] EA at 66.
[58] *Id*.

prevent any and all significant damage to dams that could result from induced seismicity. As we have explained above, the mere existence of a regulation does not automatically minimize the foreseeable impacts of this lease sale or satisfy BLM's obligations under NEPA to look at and disclose to the public the potential impacts. Given the substantial amount of information we have provided regarding earthquakes in Oklahoma and Texas, it remains to be seen how any of the regulations have rendered the impacts of earthquakes "not significant."

Dams are sensitive to any movement of basement faults. Movement of basement rocks sufficient to damage a dam may not be detectable by our current distribution of seismic stations. However, the basement areas that are susceptible to movement may be detectable by those trained to use aerial photos and maps made from aerial photos to detect the probable existence of dormant faults. Thus, 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 represents a subsurface fault, the surface objects such as homes, intrastructures and dams could be damaged by the movement. The magnitude of fault movement will vary with amount of stress put on the fault as well as the composition of the surface material.The use of lineaments to characterize earthquake areas and propose areas prone to damage from earth movements was evaluated in the Barnett Shale area. The Irving earthquake site occurred at the intersection of a northwesterly and a northern lineament. Similar lineaments were found at the Lake Lewisville Dam. Later studies revealed that the lineaments at the Lewisville Dam were associated with structural damage at the dam. At Lake Grapevine, the lineament passed to within 600 feet of the dam slide area. Further to the west, a lineament was very close to the damaged Reno City Hall in Texas.[59]

Former oil and gas geologist, Gerald Bartz, found four lineaments (which mark the presence of probable faults) associated with Choke Canyon and one lineament associated with Lake Texana.[60] There have been more than a dozen earthquakes between 2008 and 2016 within a 57-mile radius of Choke Canyon, ranging in magnitude from 2.5 to 4.8.[61] One of those earthquakes measured magnitude 3.4 within 5 miles of the dam.[62] Further evidence has revealed that Parcel NM-201704-010 is located directly in line with lineament #3.[63] According to a mid-1990's memo by the Bureau of Reclamation and Freese & Nichols, Choke Canyon has a 3.5 mile earthen dam.[64] This memo noted that Choke Canyon was classified as a "High Risk" dam by the Texas Commission on Environmental Quality (TCEQ).[65] Its outlet works discharges into a concrete stilling basin. The memo notes, "The basin concrete had been damaged to the point that

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[60] Bartz, Gerald. Comments of Gerald Bartz Regarding Seismicity Risks Near Texas Parcels Offered in April 2017 Lease Sale (November 2016), attached hereto as Exhibit B.
[61] Earthquake Track (info supplied by USGS), Recent Earthquakes Near Three Rivers, Texas, United States, http://earthquaketrack.com/us-tx-edna/recent
[62] *Id.*
[63] See Figures 7 and 8a, attached as Exhibit F.
[64] Freese & Nichols, Repair of Choke Canyon Outlet Works, 143.pdf, https://www.freese.com/node/18187
[65] *Id.*

reinforcing steel was exposed. Model studies by the Reclamation in the early 1990's showed this type of basin is prone to abrasion damage caused by downstream channel material being pulled into the basin by bottom currents that flow upstream." It further stated that the "The City of Corpus Christi noticed this concrete damage in the outlet works stilling basin in 1994. There had been approximately 2 to 3 inches of concrete loss on the floor and 1⁄2 to 1 inch on the side walls. Steel reinforcement was exposed in the chute blocks.[66] The damage was attributed to abrasion by a mixture of sand, gravel, and shells in the basin."[67] This memo shows how susceptible Choke Canyon is to erosion. All these water supply lakes with earthen dam structures raise concerns as soil erosion plays a critical role in the stability and safety of these structures. Researcher Austin Holland has noted that "magnitude 4.7 can potentially damage nearby structures."[68] Surroundings within 57 miles of Choke Canyon have already experienced earthquakes of that level.[69]

Lake Texana has experienced numerous earthquakes in the region between 38 and 38 and 70 nautical miles including a 3.1 magnitude in Halletsville in 2015, as well as 4.8 magnitude and 3.9 magnitude in Karnes City in 2011 and 2008 respectively.[70] Both of these earthquake sites have shown increasing magnitude of seismic activity in the last 25 years.[71]

Earthquakes of magnitude 2.7 and 2.3 have been identified within 34 miles of Somerville Lake in magnitudes 2.7 and 2.3 (12 miles from the lake's center) in the general area.[72]

As we explained in scoping, the dams in Oklahoma and Texas were not built to withstand seismic events, since historically earthquakes were not common occurrences until the fracking boom.[73] These structures could therefore be increasingly at risk as seismic events increase. An EIS must fully assess the risk of induced seismicity caused by all unconventional oil and gas extraction and injection activities.

c. BLM Failed to Take a Hard Look at the Impacts to Water Resources

As we pointed out in scoping, several significant water resources overlap the parcels, including Choke Canyon Reservoir, Somerville Lake, Lake Texana, Middle Branch Brushy Creek, and Brushy Creek in Texas; and the Canadian River, critical habitat for the Arkansas River shiner, and Griever Creek in Oklahoma. BLM's cursory analysis of these impacts is limited to BLM mentioning a few regulations that may reduce potential contamination. In

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[66] *Id.*
[67] *Id.*
[68] Holland, Austin A., et al. Probabilistic Seismic Hazard Assessment and Observed Ground Motions for the Arcadia, Oklahoma, Dam Site, 10 Results of PHSA for Arcadia Dam, 2013, p. 54, par. 2,, available at http://wichita.fwsmnnsvr.ou.edu/documents/SP2013-01/SP2013-01_PSHA-Arcadia.pdf
[69] Earthquake Track (info supplied by USGS), Recent Earthquakes Near Three Rivers, Texas, United States, http://earthquaketrack.com/us-tx-edna/recent
[70] Earthquake Track (info supplied by USGS), Recent Earthquakes Near Edna, Texas, United States, http://earthquaketrack.com/us-tx-edna/recent
[71] *Id.*
[72] Earthquake Track (info supplied by USGS), Recent Earthquakes Near Brenham, Texas, United States, http://earthquaketrack.com/us-tx-brenham/recent
[73] Hill, David, Engineers Work to Ensure Dam Safety as Earthquakes Increase, Civil Engineering, 38 (Dec 2015).

addition to our aforementioned objections to the deficiencies in the EA's analysis of the contamination issue, the EA fails to analyze any site-specific impacts. Surface water in the area in and around the land for these parcels in Texas flows directly to Choke Canyon and Lake Texana; thus oil and gas production around these two lakes pose a significant risk to surface water quality. As a result, any spills or releases of oil and gas waste and their hazardous components have the potential to impact the drinking water of Corpus Christi and the residents of the 18 cities the utility serves. Yet the EA continues to ignore the issue, failing to provide any studies or discussion of the direct impacts from oil and gas activities on water quality. For example, Parcel NM-201704-017 is located atop streams that flow into Lake Texana including Middle Branch Brushy Creek and Brushy Creek. The EA does not consider the water quality implications of leasing this parcel for oil and gas development with respect to these local water bodies.

Furthermore, the EA completely fails to address the issue of water depletion, an especially significant threat given that drought has diminished the Canadian River.[74] We pointed out in our scoping comment that unconventional extraction techniques—most notably fracking and horizontal drilling—require the use of tremendous amounts of freshwater, and that water used in large quantities may lead to several kinds of harmful environmental impacts. The extraction of water for fracking can, for example, lower the water table, affect biodiversity, harm local ecosystems, and reduce water available to communities. This impact is further compounded by climate change which is also likely to affect streamflows and water temperatures, affecting sensitive species that reside in streams. We discuss climate change effects on stream flows in greater detail below.

d. BLM Failed to Take a Hard Look at the Impacts of Climate Change

BLM failed to quantify greenhouse gas ("GHG") emissions or analyze the significant impacts of such. As we stated in scoping, the CEQ's finalized climate change guidance ("CEQ Guidance") "[r]ecommends that agencies quantify a proposed agency action's projected direct and indirect GHG emissions, taking into account available data and GHG quantification tools that are suitable for the proposed agency action."[75] Furthermore, the CEQ Guidance notes that "[q]uantification tools are widely available, and are already in broad use in the Federal and private sectors, by state and local governments, and globally."[76] BLM indeed has considerable data points and access to several widely used quantification tools, and therefore must quantify the amount of greenhouse gas (e.g. CO2e) emissions that are likely to result, even if indirectly, from the proposed action. It is rather incredible then that BLM ignores the CEQ Guidance and provided almost the same analysis of greenhouse gas emissions as in its EA for the 2016 Competitive Oil and Gas Lease Sale.

NEPA also requires BLM to inform the public of direct and indirect effects the "significance" of these emissions, 40 C.F.R. § 1502.16(a)-(b); for example, BLM must "evaluate

[74] See, e.g., Texas Water Development Board. Canadian River Basin. Available at http://www.twdb.texas.gov/surfacewater/rivers/river_basins/canadian/
[75] CEQ, Final Guidance on the Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews ("CEQ Guidance"), p. 4 (2016), 81 Fed. Reg. 51,866 (Aug. 5, 2016).
[76] CEQ Guidance, p. 12 (citing https://ceq.doe.gov/current_developments/GHG-accounting-tools.html).

the[ir] severity." Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 352 (1989). To serve NEPA's "twin aims" of informing agency decisionmakers and the public, this evaluation must be in terms that will meaningfully inform these intended audiences of the magnitude and consequences of these effects. Natural Res. Def. Council v. Nuclear Regulatory Comm'n, 685 F.2d 459, 487 n.149 (D.C. Cir. 1982) rev'd on other grounds sub nom. Balt. Gas & Elec. Co. v. Natural Res. Def. Council, 462 U.S. 87, 106-107 (1983); Columbia Basin Land Prot. Ass'n v. Schlesinger, 643 F.2d 585, 594 (9th Cir. 1981).

Similar to the EA for the 2016 sale, the EA here 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 and Oklahoma 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.[77]

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 two 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 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.[78] This assumption lacks any evidentiary support. Depending on the type of extraction (e.g., fracking v. conventional) emissions could be much higher than the proportionate share of overall production.

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 10 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.

[77] EA at 68.
[78] EA at 51.

These emissions are reasonably foreseeable and therefore must be taken into account. For example, for a recent lease sale, BLM's Vernal 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 social cost of carbon).[79] That these emissions occur after "leav[ing] the custody and jurisdiction of the BLM" does not render them any less foreseeable.[80] 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.[81] 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.*[82]

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).

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[79] See U.S. Bureau of Land Management Environmental Assessment November 2016 Competitive Oil and Gas Lease Sale DOI-BLM-UT-G010-2016-033-EA (October 14, 2016) at pp. 37-42.
[80] *Id.*
[81] *Id.*
[82] EA at 52 (emphasis added).

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 & Enf't, 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]).[83]

The EA's failure to quantify reasonably foreseeable GHG emissions that could result from new leasing within the 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 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 Oklahoma and Texas planning areas does not properly reflect the total potential emissions from federal leasing.

One widely used approach to evaluating the impact of GHG emissions is to estimate the costs of those emissions to society. The federal Interagency Working Group on the Social Cost of Carbon has developed estimates of the present value of the future costs of carbon dioxide, methane, and nitrous oxide emissions as a proxy for the magnitude and severity of those impacts.[84] These tools are easy to use by agencies, easy to understand by the public, and

[83] Available at https://www.whitehouse.gov/sites/default/files/docs/nepa_revised_draft_ghg_guidance_searchable.pdf.

[84] *See* Interagency Working Group on the Social Cost of Carbon, United States Government, *Technical Support Document: Technical Update on the Social Cost of Carbon for Regulatory Impact Analysis – Under Executive Order 12866* (May 2013) at 2 (hereinafter 2013 TSD); Interagency Working Group, Addendum to Technical Support Document on Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12866:

supported by years of peer-reviewed scientific and economic research. The EPA and other federal agencies have used these social cost protocols to estimate the effects of rulemakings on climate, and certain BLM field offices have used these tools in project level NEPA analysis. These protocols estimate the global financial cost of each additional ton of GHG pollution emitted to the atmosphere, taking into account factors such as diminished agricultural productivity, droughts, wildfires, increased intensity and duration of storms, ocean acidification, and sea-level rise. The Council on Environmental Quality has explicitly endorsed these tools, explaining that they were "[d]eveloped through an interagency process committed to ensuring that [these] estimates reflect the best available science and methodologies and used to assess the social benefits of reducing carbon dioxide emissions across alternatives in rulemakings, [the social cost protocols] provide[] a harmonized, interagency metric that can give decision makers and the public useful information for their NEPA review."[85]

The EA improperly determined that "including monetary estimates of the Social Cost of Carbon (SCC) in its NEPA analysis for this proposed action would not be useful."[86] However, analysis of the social cost of greenhouse gases plays an important—and otherwise unfilled—role regardless of whether BLM engages in a broader cost benefit analysis. Because BLM cannot identify the physical consequences of the greenhouse gas emissions caused by the leases, BLM must use "generally accepted" methods to discuss those impacts. 40 C.F.R. § 1502.22(b)(4). The social cost protocols, developed by a consortium of federal agencies specifically to address the impact of federal actions, are precisely such a generally accepted method. Given BLM's failure to adopt any other method for discussing these impacts, BLM's failure to use the social cost protocols was arbitrary and contrary to NEPA's requirements.

In addition, BLM's assertion that it is not conducting a cost benefit analysis ignores the fact that BLM *does* quantify economic benefits of the leases. The EA acknowledged and quantified various purported socioeconomic benefits of increased oil and gas development in the region.[87] Discussing those benefits without discussing costs skews the public's understanding of the full costs and benefits of oil and gas production.

BLM argues that "[t]here is no court case or existing guidance requiring the inclusion of SCC in the NEPA context." In 2014, the district court for the District of Colorado faulted the Forest Service for failing to calculate the social cost of carbon, refusing to accept the agency's explanation that such a calculation was not feasible. High Country Conservation Advocates v. U.S. Forest Service, 52 F.Supp.3d 1174 (D.Colo. 2014) (a decision the agency decided not to appeal, thus implicitly recognizing the importance of incorporating a social cost of carbon

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Application of the Methodology to Estimate the Social Cost of Methane and the Social Cost of Nitrous Oxide (August 2016), available at https://www.whitehouse.gov/sites/default/files/omb/inforeg/august_2016_sc_ch4_sc_n2o_addendum_final_8_26_16.pdf (last visited October 30, 2016).

[85] Council on Environmental Quality, Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews at 33 n.86 (August 1, 2016), available at https://www.whitehouse.gov/sites/whitehouse.gov/files/documents/nepa_final_ghg_guidance.pdf

[86] EA at 7.

[87] *See, e.g.*, EA at 48 and 65.

analysis into NEPA decisionmaking). In his decision, Judge Jackson identified the IWG's SCC protocol as a tool to "quantify a project's contribution to costs associated with global climate change." Id. at 1190.[88] To fulfill this mandate, they agency must disclose the "ecological[,] … economic, [and] social" impacts of the proposed action. 40 C.F.R. § 1508.8(b). Simple calculations applying the SCC to GHG emissions from this project offer a straightforward comparative basis for analyzing impacts, and identifying very significant costs.[89]

e. BLM Failed to Adequately Address Potential Impacts to Threatened, Sensitive, and Endangered Species as Required by NEPA

BLM failed to adequately address in the EA the potential impacts from the proposed oil and gas leasing on species that are federally designated as threatened or endangered with extinction, including the Arkansas River shiner, whose critical habitat intersects at least one of the Oklahoma parcels, specifically Parcel #NM-201704-001. Under Federal law, the Arkansas River shiner (*Notropis girardi*) is a threatened species.[90] This small ray-finned fish thrived in the Arkansas River and its major tributaries, giving the species its name. At one time, the Arkansas River shiner was abundant throughout the western Arkansas River basin in New Mexico, Oklahoma, Texas and Kansas.[91] Habitat devastation dramatically reduced the population and spread of the Arkansas River shiner, which now has disappeared from more than 80 percent of its historical range.[92] It is today almost entirely restricted to about 500 miles of the Canadian River, mostly in Oklahoma, with a small population in the Cimarron River.[93] Alteration of river flow patterns because of reservoir construction and the removal of water from the watershed are believed to have contributed to the decline.[94] Agricultural activities and industrial operations like oil and gas production have catastrophically decimated their existence, one sign of extensive habitat devastation.[95]

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[88] *See also id.* at 18 (noting the EPA recommendation to "explore other means to characterize the impact of GHG emissions, including an estimate of the 'social cost of carbon' associated with potential increases in GHG emissions.") (citing Sarah E. Light, *NEPA's Footprint: Information Disclosure as a Quasi-Carbon Tax on Agencies*, 87 Tul. L. Rev. 511, 546 (Feb. 2013)).

[89] It is important to note that, although the 2010 IWG SCC protocol did not address methane impacts, the 2013 IWG Technical Update explicitly addresses methane impacts. Thus, it is appropriate to calculate a SCC outcome that takes into account the full CO_2e emissions associated with the proposed leasing.

[90] U.S. Fish and Wildlife Service. News Release: Service Designate Critical Habitat for Arkansas River Shiner. (March 30, 2001), available at https://www.fws.gov/mountain-prairie/pressrel/01-11.htm

[91] U.S. Fish & Wildlife Service. Oklahoma Ecological Service Field Office: Arkansas River Shiner (August 2011), available at https://www.fws.gov/southwest/es/oklahoma/Documents/TE_Species/Species%20Profiles/AR%20River%20Shiner.pdf

[92] Oklahoma Department of Wildlife Conservation. Arkansas River Shiner, available at http://www.wildlifedepartment.com/wildlifemgmt/endangered/river_shiner.htm

[93] U.S. Fish and Wildlife Service. News Release: Service Designate Critical Habitat for Arkansas River Shiner. (March 30, 2001), available at https://www.fws.gov/mountain-prairie/pressrel/01-11.htm

[94] U.S. Fish & Wildlife Service. Oklahoma Ecological Service Field Office: Arkansas River Shiner (August 2011), available at https://www.fws.gov/southwest/es/oklahoma/Documents/TE_Species/Species%20Profiles/AR%20River%20Shiner.pdf

[95] *Id.*

In determining whether NEPA requires an EIS for a proposed action, agencies must consider the degree to which the action may adversely affect threatened or endangered species, or their critical habitat. 40 C.F.R. § 1508.27(b)(9). In the EA, the BLM failed to provide the required hard look at the potential impacts to listed species and their habitat. Furthermore, as we have stated in scoping, and discuss in greater detail below, BLM must consult with the Fish and Wildlife Service regarding the impacts of the lease sale on affected listed species, in compliance with its section 7 obligations under the ESA.

f. BLM Failed to Take a Hard Look at the Impacts to Minorities or Low Income Populations

Executive Order 12898 requires that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States."[96] We have raised in this letter, as well as in scoping, a number of substantial questions and concerns regarding air pollution, water contamination, earthquakes, and climate change that could have adverse effects on minority and low-income populations. BLM provides no analysis of these impacts—only the conclusory statement that "No minority or low income populations would be directly affected in the vicinity of the proposed lease parcels."[97] BLM must include such analysis in an EIS.

g. BLM Failed to Take a Hard Look at the Impacts to Recreational Activities in the Lake Texana and Somerville Areas

The EA makes no mention at all of the potential for degradation of recreational opportunities within the action area, which would result from new oil and gas development.

Parcels NM-201704-009 and NM-201704-010 are located on the Choke Canyon Reservoir, which when full holds 26,000 water surface acres and allows fishing year-round. Available species include black, white and largemouth bass; crappie; blue, channel and flathead catfish; bluegill and redear sunfish; and alligator gar.[98] Alligators are also known to be present in the park.[99] The Choke Canyon State Park consists of two units: South Shore and Calliham. The South Shore Unit is a day-use park that offers boating, fishing, picnicking, wildlife viewing and birding. The Calliham Unit, on which Parcel NM-201704-010 overlaps,[100] offers camping, picnicking, boating, hiking, wildlife viewing, birding, fishing, lake beach, and softball and volleyball areas. Seasonal guided bird walks are conducted on scheduled days.[101]

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[96] Executive Order 12,898, 59 Fed. Reg. No. 32 (Feb. 11, 1994).
[97] EA at 65.
[98] http://www.recreation.gov/recreationalAreaDetails.do?contractCode=NRSO&recAreaId=1169; http://tpwd.texas.gov/fishboat/fish/recreational/lakes/choke_canyon/;
[99] Moran, Lee. Teen bags biggest ever Texas gator on his first hunt. New York Daily News (May 16, 2013), available at http://www.nydailynews.com/news/national/teen-bags-biggest-texas-gator-1st-hunt-article-1.1345614
[100] Center for Biological Diversity, Water Resources Maps (2016) (Exhibit E).
[101] http://tpwd.texas.gov/state-parks/choke-canyon

Parcels NM-201704-011, NM-201704-012, NM-201704-013, NM-201704-014, NM-201704-015, and NM-201704-016 are located on Somerville Lake, a significant recreational area in south central Texas. Parcels NM-201704-012, NM-201704-013, NM-201704-014 overlap public parks, including Yegua Creek Park and Rocky Creek Park.[102] The lake attracts several hundreds of thousands of visitors annually.[103] By the early 1970s the reservoir had won renown for the quality of its bass fishing. At least seven parks have been developed in the vicinity, including four operated by the United States Army Corps of Engineers, a city-owned park, and the two-unit Lake Somerville State Recreation Area.[104] The shores are fringed with numerous camping facilities, two floating marinas, ten boat ramps, and extensive nature trails and playgrounds.[105]

Parcel NM-201704-017 is located within a couple of miles from Lake Texana. The lake covers 10,000 acres and has 125 miles of shoreline and has been stocked with species of fish intended to improve the utility of the reservoir for recreational fishing.[106] Fish present in Lake Texana include catfish, bass, and crappie. A wide variety of native plant species thrive in the lake, including water hyacinth, coontail, spikerush, cattail, pondweed, bull's tongue, pickerel weed, and duckweed. Visitors enjoy camping, picnic sites, hiking trails, outdoor sports activities and more at the Brackenridge Recreation Complex.[107] Parks and campsites surround the lake including the Brackenridge Park and Campground (240 acres) and Texana Park (590 acres).[108]

The lakes therefore provide unique opportunities for bird and wildlife viewing and other quiet recreation. The EA, however, fails to discuss or analyze the impacts of oil and gas development on recreational values in this important recreational area, including the potential disruption of quiet recreational activities and diminished opportunities for bird and wildlife observation and fishing, impacts on scenic resources along the lake, and public health impacts to visitors of the lakes. The EA's failure to acknowledge these land use conflicts and discuss measures to reduce or avoid these conflicts violates NEPA.

II. ESA Listed and Sensitive Species

The EA reveals the presence of numerous threatened, endangered, and sensitive species and their critical habitat within the areas proposed for leasing, but fails to provide any meaningful information regarding potential effects. BLM must not only evaluate the indirect and cumulative effects on special status species under NEPA, it must also (a) consult with the Fish and Wildlife Service under Section 7 regarding the effects of oil and gas development and water use on listed species and critical habitat, and (b) evaluate the effects on sensitive species under its own sensitive species policy.

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[102] Center for Biological Diversity, Water Resources Maps (2016) (Exhibit E).
[103] Texas State Historical Association. Lake Somerville State Recreation Area; https://tshaonline.org/handbook/online/articles/gkl15
[104] Texas State Historical Association. Somerville Lake. https://tshaonline.org/handbook/online/articles/ros15
[105] *Id*.
[106] http://www.brackenridgepark.com/p/about/190
[107] *Id*.
[108] *Id*.

a. Duty to Consult

Congress enacted the ESA in 1973 to provide for the conservation of endangered and threatened fish, wildlife, plants and their natural habitats.[109] The ESA imposes substantive and procedural obligations on all federal agencies with regard to listed and proposed species and their critical habitats.[110] Under section 7 of the ESA, federal agencies must "insure that any action authorized, funded, or carried out by such agency ... is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined ... to be critical."[111]

The definition of agency "action" is broad and includes "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies," including programmatic actions.[112] Likewise, the "action area" includes "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action."[113]

The duties in ESA section 7 are only fulfilled by an agency's satisfaction of the consultation requirements that are set forth in the implementing regulations for section 7 of the ESA, and only after the agency lawfully complies with these requirements may an action that "may affect" a protected species go forward.[114] The action agency must initially prepare a biological assessment (BA) to "evaluate the potential effects of the proposed action" on listed species.[115] If the action agency concludes that the proposed action is "not likely to adversely affect" a listed species that occurs in the action area, the Service must concur in writing with this determination.[116] If the Service concurs in this determination, then formal consultation is not required.[117] If the Service's concurrence in a "not likely to adversely affect" finding is inconsistent with the best available data, however, any such concurrence must be set aside.[118] If the action agency concludes that an action is "likely to adversely affect" listed species or critical habitat, it must enter into "formal consultation" with the Service.[119] The threshold for triggering the formal consultation requirement is "very low"; indeed, "any possible effect ... triggers formal consultation requirements."[120]

Formal consultation commences with the action agency's written request for consultation and concludes with the Service's issuance of a "biological opinion."[121] The biological opinion states the Service's opinion as to whether the effects of the action are "likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of

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[109] *Id.* §§ 1531, 1532.
[110] *See id.* §§ 1536(a)(1), (a)(2) and (a)(4) and § 1538(a); 50 C.F.R. § 402.
[111] 16 U.S.C. § 1536(a)(2).
[112] 50 C.F.R. § 402.02.
[113] *Id.*
[114] *Pac. Rivers Council v. Thomas*, 30 F.3d 1050, 1055-57 (9th Cir. 1994).
[115] 50 C.F.R. § 402.12.
[116] *Id.* §§ 402.13(a) and 402.14(b).
[117] *Id.* § 402.13(a).
[118] *See id.* § 402.14(g)(8); 5 U.S.C. § 706(2).
[119] 50 C.F.R. §§ 402.12(k), 402.14(a).
[120] *See* Interagency Cooperation Under the Endangered Species Act, 51 Fed. Reg. 19,926 (June 3 1996).
[121] 50 C.F.R. § 402.02.

critical habitat."[122] When conducting formal consultation, the Service and the action agency must evaluate the "effects of the action," including all direct and indirect effects of the proposed action, plus the effects of actions that are interrelated or interdependent, added to all existing environmental conditions – that is, the "environmental baseline."[123] The environmental baseline includes the past and present impacts of all Federal, state, and private actions and other human activities in the action area…."[124] The effects of the action must be considered together with "cumulative effects," which are "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation."[125]

If the Service concludes in a biological opinion that jeopardy is likely to occur, it must prescribe "reasonable and prudent alternatives" to avoid jeopardy.[126] If the Service concludes that a project is not likely to jeopardize listed species, it must nevertheless provide an incidental take statement (ITS) with the biological opinion, specifying the amount or extent of take that is incidental to the action (but which would otherwise be prohibited under Section 9 of the ESA), "reasonable and prudent measures" (RPMs) necessary or appropriate to minimize such take, and the "terms and conditions" that must be complied with by the action agency to implement any reasonable and prudent measures.[127]

The ESA requires federal agencies to use the best scientific and commercial data available when consulting about whether federal actions will jeopardize listed species.[128] Accordingly, an action agency must "provide the Service with the best scientific and commercial data available or which can be obtained during the consultation for an adequate review of the effects that an action may have upon listed species of critical habitat."[129] Likewise, "[i]n formulating its biological opinion…the Service will use the best scientific and commercial data available."[130] However, if the action agency failed "to discuss information that would undercut the opinion's conclusions," the biological opinion is legally flawed, and the ITS will not insulate the agency from ESA Section 9 liability.[131]

Section 7(d) of the ESA provides that once a federal agency initiates consultation on an action under the ESA, the agency, as well as any applicant for a federal permit, "shall not make any irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures which would not violate subsection (a)(2) of this section."[132] The purpose

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[122] *Id.* § 402.14(g)(4). To "jeopardize the continued existence of" means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species." *Id.* § 402.02.
[123] *Id.* §§ 402.14 and 402.02.
[124] *Id.*
[125] *Id.*
[126] *Id.* § 402.14(h)(3).
[127] 16 U.S.C. § 1536(b)(4); 50 C.F.R. § 402.14(i).
[128] *See* 16 U.S.C. § 1536(a)(2).
[129] 50 C.F.R. § 402.14(d).
[130] *Id.* § 402.14(g)(8).
[131] *See Ctr. for Biological Diversity v. BLM*, 698 F.3d 1101, 1127-28 (9th Cir. 2012).
[132] 16 U.S.C. § 1536(d).

of section 7(d) is to maintain the environmental status quo pending the completion of consultation. Section 7(d) prohibitions remain in effect throughout the consultation period and until the federal agency has satisfied its obligations under section 7(a)(2) that the action will not result in jeopardy to listed species or adverse modification of critical habitat.

BLM claims that Oklahoma Field Office biologists reviewed the proposed action and determined it would be in compliance with threatened and endangered species management and consultation guidelines outlined in the Oklahoma and Texas RMP biological assessments (BA) and that no further consultation with US Fish and Wildlife (USFWS) is required at this leasing stage. To the extent that BLM relies on its section 7 programmatic consultations for resource management plans governing the lease sale, that reliance is not proper for any of the listed species affected by BLM's action. The potential for fracking and horizontal drilling and its associated impacts within the planning area, as well as climate change effects on stream flows and long-term drought and increased water demand which has drastically reduced water supplies, constitute "new information reveal[ing] effects of the [RMPs] that may affect listed species or critical habitat in a manner or to an extent not previously considered [in the prior section 7 programmatic consultations]." 50 CFR § 402.16(b). BLM must therefore reinitiate consultation on all of the planning documents for these areas. In any case, it must formally consult over the lease sale's potential adverse effects on listed species and consider the full scope of fracking and other drilling activities that could affect these species.

Species responses to climate change are likely to be complex; thus a thorough analysis of studies and data relating to these responses in environmentally sensitive areas are vital for the protection of aquatic species and management of surface-water resources. The Third National Climate Assessment Report (2014) discussed future climate change projections that predicted a decrease in precipitation in the Southern Great Plains:

> In 2011, such a pattern was strongly manifest, with exceptional drought and recording-setting temperatures in Texas and Oklahoma and flooding in the Northern Great Plains. Many locations in Texas and Oklahoma experienced more than 100 days over 100ºF. Both states set new records for the hottest summer since record keeping began in 1895. Rates of water loss due in part to evaporation were double the long-term average. The heat and drought depleted water resources and contributed to more than $10 billion in direct losses to agriculture alone. These severe water constraints strained the ability to meet electricity demands in Texas during 2011 and into 2012, a problem exacerbated by the fact that Texas is nearly isolated from the national electricity grid.
>
> These recent temperature extremes were attributable in part to human-induced climate change (approximately 20% of the heat wave magnitude and a doubling of the chance that it would occur).[69] In the future, average temperatures in this region are expected to increase and will continue to contribute to the intensity of heat waves. [133]

[133] Shafer, M., D. Ojima, J. M. Antle, D. Kluck, R. A. McPherson, S. Petersen, B. Scanlon, and K. Sherman, 2014: Ch. 19: Great Plains. *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 441-461. doi:10.7930/J0D798BC.

As we pointed out, the RMPS are decades old and do not consider new information concerning climate change impacts on streamflows and drought severity—issues that are surely to affected federally listed species such as the Arkansas River shiner.

b. Arkansas River Shiner

Several proposed sale parcels have the potential to impact the Arkansas River shiner through water depletions resulting from oil and gas development.[134] Parcel NM-201704-001 (which is located on top of critical habitat) as well as Parcels NM-201704-005, NM-201704-006, and NM-201704-008 are all located on the Canadian River.[135] Climate change effects on stream flows such as increasing frequency and severity of drought, and reduced runoff may reduce stream flows in the Canadian River. Further, the increased risk of spills and leaks from fracking activities may weaken shiner populations. Each of these factors constitutes new information revealing effects that "may affect" the Arkansas River shiner in a manner or to an extent not previously considered. Thus BLM must initiate consultation on the proposed lease sale.

Conclusion

Oil and gas development not only fuels the climate crisis but entails significant public health risks and harms to the environment. Accordingly, BLM should prepare an EIS that thoroughly analyzes the effects of the proposed lease auction, as compared to the alternative of no new fossil fuel leasing and no fracking or other unconventional well stimulation methods within the proposed planning area. We strongly urge BLM to withdraw the proposed lease sale, prepare a legally adequate EIS for this proposed oil and gas leasing action, and consult under Section 7 of the ESA, prior to allowing the proposed action to move forward. Thank you for your consideration of these comments.

Sincerely,

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[134] EA at 29.
[135] Center for Biological Diveristy. Water Resources Maps (2016) (Exhibit E).

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