April 10, 2017

Via Hand Delivery

Ruth Welch, Colorado State Director
Bureau of Land Management
Colorado State Office
2850 Youngfield Street
Lakewood, CO 80215

Re: Center for Biological Diversity et al.'s Notice of Protest and Statement of Reasons Regarding the June 8, 2017 Colorado Bureau of Land Management Oil and Gas Lease Sale

Dear Director Welch:

The Center for Biological Diversity (the "Center"), Living Rivers, the Sierra Club, and Waterkeeper Alliance hereby request your State Director Review of the Bureau of Land Management's proposed June 2017 Colorado Competitive Oil and Gas Lease Sale. We hereby formally protest the inclusion of each of the 106 parcels:

COC78269	**COC78270**	**COC78271**	**COC78272**	**COC78273**	**COC78274**	**COC78275**
COC78276	**COC78277**	**COC78278**	**COC78279**	**COC78280**	**COC78281**	**COC78282**
COC78283	**COC78284**	**COC78285**	**COC78286**	**COC78287**	**COC78288**	**COC78289**
COC78290	**COC78291**	**COC78292**	**COC78293**	**COC78294**	**COC78295**	**COC78296**
COC78297	**COC78298**	**COC78299**	**COC78300**	**COC78301**	**COC78302**	**COC78303**
COC78304	**COC78305**	**COC78306**	**COC78307**	**COC78308**	**COC78309**	**COC78310**
COC78311	**COC78312**	**COC78313**	**COC78314**	**COC78315**	**COC78316**	**COC78317**
COC78318	**COC78319**	**COC78320**	**COC78321**	**COC78322**	**COC78323**	**COC78324**
COC78325	**COC78326**	**COC78327**	**COC78328**	**COC78329**	**COC78330**	**COC78331**
COC78332	**COC78333**	**COC78334**	**COC78335**	**COC78336**	**COC78337**	**COC78338**
COC78339	**COC78340**	**COC78341**	**COC78342**	**COC78343**	**COC78344**	**COC78345**
COC78346	**COC78347**	**COC78348**	**COC78349**	**COC78350**	**COC78351**	**COC78352**
COC78353	**COC78354**	**COC78355**	**COC78356**	**COC78357**	**COC78358**	**COC78359**
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COC78367	**COC78368**	**COC78369**	**COC78370**	**COC78371**	**COC78372**	**COC78373**
COC78374						

I. Protesting Parties: Contact Information and Interests

This Protest is filed on behalf of the Center for Biological Diversity, Living Rivers, the Sierra Club, Waterkeeper Alliance and their boards and members, by:

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The Center for Biological Diversity is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center also works to reduce greenhouse gas emissions to protect biological diversity, our environment, and public health. The Center has over 1.1 million members and on-line activists, including those living in Colorado who have visited these public lands in the Kremmling, Little Snake, and White River management areas for recreational, scientific, educational, and other pursuits and intend to continue to do so in the future, and are particularly interested in protecting the many native, imperiled, and sensitive species and their habitats that may be affected by the proposed oil and gas leasing.

Living Rivers is a nonprofit organization based in Moab, Utah that promotes river restoration through mobilization. By articulating conservation and alternative management strategies to the public, Living Rivers seeks to revive the natural habitat and spirit of rivers by undoing the extensive damage done by dams, and water-intensive energy development on the Colorado Plateau. Living Rivers has approximately 1,200 members in Utah, Colorado and other states. Living Rivers' members and staff use the public lands in Utah and Colorado, 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.

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 740,000 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 a Rocky Mountain Chapter, with more than 20,500 members across Colorado, including members in the areas of this lease sale. The Sierra Club has members that live in, work and use this area for recreation such as hiking, snowshoeing, cross-country skiing, climbing, backpacking, camping, fishing and wildlife viewing, as well as for business, scientific, spiritual, aesthetic and environmental purposes.

Waterkeeper Alliance ("Waterkeeper") is a not-for-profit, member supported, international environmental organization based in New York City. Waterkeeper strengthens and grows a global network of grassroots leaders protecting everyone's right to clean water. Comprised of 315 Waterkeeper Organizations and Affiliates around the world, including 166 in the United States and six in Colorado, Waterkeeper's goal is swimmable, drinkable and fishable water everywhere. Over the past several years, Waterkeeper, through its Clean and Safe Energy campaign, has increasingly engaged in public advocacy, administrative proceedings and litigation aimed at reducing the water quality and climate change impacts of fossil fuel

extraction, transport and combustion, including from BLM-controlled lands, throughout the United States. Waterkeeper advocates for government policymakers and implementing agencies to take a rational and comprehensive approach to land management that accounts for the short-, medium- and long-range implications of fossil fuel exploitation on public lands, including foreseeable adverse impacts to water quality, water quantity and our climate.

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

BLM's proposed decision to lease the parcels listed above is procedurally and substantively flawed for the reasons discussed below and in the following attachments:

(1) the Center's scoping comments, and attached exhibits, previously submitted September 7, 2016, which are re-submitted as Exhibit A and are hereby incorporated by reference;
(2) the scoping comments of WildEarth Guardians and Save the Colorado, previously submitted September 7, 2016, which are re-submitted as Exhibit B and are hereby incorporated by reference
(3) the Center's comments on the Environmental Assessment ("EA"), submitted December 12, 2016, which are re-submitted as Exhibit C and hereby incorporated by reference.

In addition to the issues raised in the protesting parties' prior scoping comments and EA comments regarding consideration of greenhouse gas emissions, impacts of unconventional oil and gas drilling methods, and impacts to wildlife, the BLM's EA fails to meet the requirements of the National Environmental Policy Act and its implementing regulations, BLM's Finding of No Significant Impact is arbitrary and capricious, and BLM has failed to meet the requirements of Section 7 of the Endangered Species Act.

Although BLM's Final EA acknowledges receipt of the Center's comments on the draft Environmental Assessment, *see* Final EA at 10, the BLM fails entirely to respond to any of those comments in Appendix F, Response to Public Comments, *see* Final EA, Attachment F. This complete failure to address detailed and substantive comments and proposed alternatives violates the regulatory requirement that agencies involve the public in the preparation of Environmental Assessments insofar as practicable. *See* 40 C.F.R. § 1501.4(b) ("The agency shall involve environmental agencies, applicants, and the public, to the extent practicable, in preparing assessments required by §1508.9(a)(1)."); *Forest Guardians v. U.S. Fish and Wildlife Service*, 611 F.3d 692, 717 (10th Cir. 2010) ("The purpose behind NEPA is to ensure that the agency will only reach a decision on a proposed action after carefully considering the environmental impacts of several alternative courses of action and *after taking public comment into account*.").

Responding to substantive comments in detail is plainly practicable, as demonstrated by the responses to other commenters' submission in Attachment F to the Final EA. Yet BLM has failed to offer any substantive response to the Center's detailed December 12, 2016 comments.

A. BLM's Environmental Assessment Fails to Take a Hard Look at Direct, Indirect, and Cumulative Impacts of the Proposed Lease Sale

The National Environmental Policy Act ("NEPA"), 42 U.S.C. § 4321 *et seq*., and its implementing regulations, promulgated by the Council on Environmental Quality ("CEQ"), 40 C.F.R. §§ 1500.1 *et seq*., is our "basic national charter for the protection of the environment" achieving its purpose through "action forcing procedures. . . requir[ing] that agencies take a hard look at environmental consequences." 40 C.F.R. § 1500.1; *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989) (citations omitted). This includes the consideration of best available information and data, as well as disclosure of any inconsistencies with federal policies and plans.

Recognizing that "each person should enjoy a healthful environment," NEPA ensures that the federal government uses all practicable means to "assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings," and to "attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences," among other policies. 43 U.S.C. § 4331(b).

NEPA regulations explain, in 40 C.F.R. §1500.1(c), that:

> Ultimately, of course, it is not better documents but better decisions that count. NEPA's purpose is not to generate paperwork – even excellent paperwork – but to foster excellent action. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment.

Thus, while "NEPA itself does not mandate particular results, but simply prescribes the necessary process," *Robertson v*, 490 U.S. at 350, agency adherence to NEPA's action-forcing statutory and regulatory mandates helps federal agencies ensure that they are adhering to NEPA's noble purpose and policies. *See* 42 U.S.C. §§ 4321, 4331.

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. U. S. 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).

NEPA also imposes "action forcing procedures … requir[ing] that agencies take a *hard look* at environmental consequences." *Methow Valley*, 490 U.S. at 350 (citations omitted) (emphasis added). As discussed in greater detail below, the Final Environmental Assessment ("EA") failed to take a hard look at several foreseeable and significant environmental consequences, including impacts to water resources, air quality, climate change, induced seismicity, human health and safety, and endangered, threatened, or other special status species.

These "environmental consequences" may be direct, indirect, or cumulative. 40 C.F.R. §§ 1502.16, 1508.7, 1508.8. A cumulative impact – particularly important here – is defined as:

> [T]he impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

40 C.F.R. § 1508.7. The courts have repeatedly recognized that combustion impacts foreseeably resulting from leasing and infrastructure decisions are indirect and/or cumulative impacts that must be considered under the NEPA regulations. *See S. Fork Band Council Of W. Shoshone Of Nevada v. U.S. Dep't of Interior*, 588 F.3d 718, 725 (9th Cir. 2009); *Center for Biological Diversity v. Nat'l Highway Traffic Safety Admin*., 538 F.3d 1172, 1214-15 (9th Cir. 2008); *Mid States Coalition for Progress v. Surface Transp. Bd.*, 345 F.3d 520, 550 (8th Cir. 2003); *WildEarth Guardians v. United States Office of Surface Mining, Reclamation & Enf't*, 104 F. Supp. 3d 1208, 1230 (D. Colo. 2015); *Dine Citizens Against Ruining Our Env't v. United States Office of Surface Mining Reclamation & Enf't*, 82 F. Supp. 3d 1201 (D. Colo. 2015); *High Country Conservation Advocates v. United States Forest Serv*., 52 F. Supp. 3d 1174 (D. Colo. 2014).

1. BLM's Carbon Budget Analysis is Inaccurate, Lacks Scientific Integrity, and Fails to Comply With the National Environmental Policy Act and Its Regulations

The urgent need to prevent the worst impacts of climate change means that the world in general – and the United States' – cannot afford to invest in new fossil fuel development and infrastructure that locks in carbon intensive oil production for years into the future.

A robust body of scientific research has established that most fossil fuels must be kept in the ground to avoid the worst dangers of climate change. The severe impacts of global warming from the 1°C warming that the planet has already experienced highlight the urgency for stronger climate action to avoid truly catastrophic dangers to people and planet. Human-caused climate change is already causing widespread damage from intensifying global food and water insecurity, the increasing frequency of heat waves and other extreme weather events, flooding of coastal regions by sea level rise and increasing storm surge, the rapid loss of Arctic sea ice and Antarctic ice shelves, increasing species extinction risk, and the worldwide collapse of coral reefs.[1] The Third National Climate Assessment makes clear that "reduc[ing] the risks of some of the worst impacts of climate change" will require "aggressive and sustained greenhouse gas emission reductions" over the course of this century.[2]

The United States has committed to the climate change target of holding the long-term global average temperature "to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels"[3] under the Paris Agreement.[4] The United States signed the Paris Agreement on April 22, 2016 as a legally binding instrument through executive agreement,[5] and the treaty entered into force on November 4, 2016. The Paris Agreement codifies the international consensus that climate change is an "urgent threat" of global concern.[6] The Agreement also requires a "well below 2°C" climate target because 2°C of warming is no longer considered a safe guardrail for avoiding catastrophic climate impacts and runaway climate change.[7]

Immediate and aggressive greenhouse gas emissions reductions are necessary to keep warming well below 2°C rise above pre-industrial levels. The IPCC Fifth Assessment Report

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[1] Melillo, Jerry M., "Climate Change Impacts in the United States: The Third National Climate Assessment," Terese (T.C.) Richmond, and Gary W. Yohe, Eds., U.S. Global Change Research Program, (2014).
[2] Melillo, Jerry M., at 13, 14, and 649.
[3] *See* United Nations Framework Convention on Climate Change, Conference of the Parties, Nov. 30-Dec. 11, 2015, Adoption of the Paris Agreement Art. 2, U.N. Doc. FCCC/CP/2015/L.9 (Dec. 12, 2015), http://unfccc.int/resource/docs/2015/cop21/eng/l09.pdf ("Paris Agreement").
[4] 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 the Paris Agreement committing its parties to take action so as to avoid dangerous climate change.
[4] *See* United Nations Treaty Collection, Chapter XXVII, 7.d Paris Agreement, List of Signatories (2015); U.S. Department of State, Background Briefing on the Paris Climate Agreement (Dec. 12, 2015). 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.
[5] *Id.*
[6] *See* Paris Agreement, at Recitals.
[7] *See* the comprehensive scientific review under the United Nations Framework Convention on Climate Change (UNFCCC) of the global impacts of 1.5°C versus 2°C warming: U.N. Subsidiary Body for Scientific and Technological Advice, "Report on the Structured Expert Dialogue on the 2013-2015 review," FCCC/SB/2015/1NF.1 (2015), http://unfccc.int/resource/docs/2015/sb/eng/inf01.pdf; Schleussner, Carl-Friedrich. et al., Differential climate impacts for policy-relevant limits to global warming: the case of 1.5C and 2C, 7 Earth Systems Dynamics 327 (2016).

and other expert assessments have established global carbon budgets, or the total amount of carbon that can be burned while maintaining some probability of staying below a given temperature target. According to the IPCC, total cumulative anthropogenic emissions of CO_2 must remain below about 1,000 gigatonnes ($GtCO_2$) from 2011 onward for a 66 percent probability of limiting warming to 2°C above pre-industrial levels, and to 400 $GtCO_2$ from 2011 onward for a 66 percent probability of limiting warming to 1.5°C.[8] These carbon budgets have been reduced to 850 $GtCO_2$ and 240 $GtCO_2$, respectively, from 2015 onward.[9] Given that global CO_2 emissions in 2015 alone totaled 36 $GtCO_2$,[10] humanity is rapidly consuming the remaining carbon budget.

According to a large body of scientific research, the vast majority of global and US fossil fuels must stay in the ground in order to hold temperature rise to well below 2°C.[11] Studies estimate that 68 to 80 percent of global fossil fuel reserves must not be extracted and burned to limit temperature rise to 2°C based on a 1,000 $GtCO_2$ carbon budget.[12] For a 50 percent chance of limiting temperature rise to 1.5°C, 85 percent of known fossil fuel reserves must stay in the ground.[13] Effectively, fossil fuel emissions must be phased out globally within the next few decades.[14]

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[8] 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 (2013), at 25; IPCC, 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, R.K. Pachauri and L.A. Meyer (eds.) (2014), at 63-64 and Table 2.2.

[9] Rogelj, Joeri et al., Differences between carbon budget estimates unraveled, 6 Nature Climate Change 245 (2016), at Table 2.

[10] *See* Le Quéré, Corrine et al., Global Carbon Budget 2016, 8 Earth Syst. Sci. Data 605 (2016), www.globalcarbonproject.org/carbonbudget/16/data.htm.

[11] The IPCC estimates that global fossil fuel reserves exceed the remaining carbon budget for staying below 2°C by 4 to 7 times, while fossil fuel resources exceed the carbon budget for 2°C by 31 to 50 times. *See* Bruckner, Thomas et al., Ch. 7: 2014: Energy Systems, in Climate Change 2014: Mitigation of Climate Change, Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (2014), http://ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter7.pdf, at Table 7.2.

[12] To limit temperature rise to 2°C based on a 1,000 $GtCO_2$ carbon budget from 2011 onward, studies indicate variously that 80 percent (Carbon Tracker Initiative, Unburnable Carbon – Are the world's financial markets carrying a carbon bubble? (2013) ("Carbon Tracker Initiative 2013"), http://www.carbontracker.org/wp-content/uploads/2014/09/Unburnable-Carbon-Full-rev2-1.pdf;), 76 percent (Raupach, Michael et al., "Sharing a quota on cumulative carbon emissions," 4 Nature Climate Change 873 ("Raupach 2014"), and 68 percent (Oil Change International, The Sky's Limit: Why the Paris Climate Goals Require A Managed Decline of Fossil Fuel Production, (September 2016) ("Oil Change International 2016") (Attached as Exh. E)) of global fossil fuel reserves must stay in the ground. *See* Carbon Tracker Initiative 2013; Raupach 2014; Oil Change International 2016.

[13] Oil Change International 2016 at 6.

[14] Joeri Rogelj et al. (2015) estimated that a reasonable likelihood of limiting warming to 1.5° or 2°C requires global CO_2 emissions to be phased out by mid-century and likely as early as 2040-2045. *See* Rogelj, Joeri et al., Energy system transformations for limiting end-of-century warming to below 1.5°C, 5 Nature Climate Change 519 (2015). Climate Action Tracker indicated that the United States must phase out fossil fuel CO_2 emissions even earlier—between 2025 and 2040—for a reasonable chance of staying below 2ºC. *See, e.g.* Climate Action Tracker, "USA" (last updated 25 January 2017), http://climateactiontracker.org/countries/usa

A 2016 analysis found that potential carbon emissions from developed reserves in currently operating oil and gas fields and mines would lead to global temperature rise beyond 2°C.[15] Excluding coal, currently operating oil and gas fields alone would take the world beyond 1.5°C.[16] To stay well below 2°C, the clear implication is that no new fossil fuel extraction or transportation infrastructure should be built, and governments should grant no new permits for new fossil fuel extraction and infrastructure.[17] Moreover, some fields and mines, primarily in rich countries, must close before fully exploiting their resources. The analysis concludes that, because "existing fossil fuel reserves considerably exceed both the 2°C and 1.5°C carbon budgets[, i]t follows that exploration for new fossil fuel reserves is at best a waste of money and at worst very dangerous."[18]

According to a U.S. focused analysis,[19] the United States alone has enough recoverable fossil fuels, split about evenly between federal and non-federal resources, that if extracted and burned, would exceed the global carbon budget for a 1.5°C limit, and would consume nearly the entire global budget for a 2°C limit.[20] Specifically, the analysis found:

- Potential greenhouse gas emissions of federal fossil fuels (leased and unleased) if developed would release up to 492 gigatons (Gt) of carbon dioxide equivalent pollution (CO_2e), representing 46 percent to 50 percent of potential emissions from all remaining U.S. fossil fuels.
- Of that amount, up to 450 Gt CO_2e have not yet been leased to private industry for extraction;
- Releasing those 450 Gt CO_2e (the equivalent annual pollution of more than 118,000 coal-fired power plants) would be greater than any proposed U.S. share of global carbon limits that would keep emissions well below 2°C.[21]

Hydraulic fracturing has also opened up vast resources that otherwise would not be available, such as the Mancos Shale formation, increasing the potential for future greenhouse gas emissions. The long-lived greenhouse gas ("GHG") emissions and fossil fuel infrastructure that would result from this project will contribute to undermining national and state climate commitments and increase climate change impacts, at a time when there is urgent need to keep most fossil fuels in the ground.

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[15] Oil Change International 2016 at 5.
[16] *Id.*, at 5.
[17] *Id.*
[18] *Id.*, at 17.
[19] Mulvaney, Dustin et al., The Potential Greenhouse Gas Emissions of U.S. Federal Fossil Fuels, EcoShift Consulting (2015) at 4, http://www.ecoshiftconsulting.com/wpcontent/uploads/Potential-Greenhouse-Gas-Emissions-U-S-Federal-Fossil-Fuels.pdf (Attached as Exh. D)
[20] *Id*, at 4.
[21] For the United States, Raupach et al. (2014) provided a mid-range estimate of the U.S. carbon quota of 158 $GtCO_2$ for a 50 percent chance of staying below 2°C, using a "blended" scenario of sharing principles for allocating the global carbon budget among countries. This study estimated US fossil fuel reserves at 716 $GtCO_2$, of which coal comprises the vast majority, indicating that most fossil fuel reserves in the US must remain unburned to meet a well below 2°C carbon budget. Raupach 2014 at Supplementary Figure 7.

Although we commend BLM for recognizing, EA at 49-50, that "downstream" greenhouse gas emissions from combustion are a consequence of the agency's fossil fuel leasing decisions, and that meeting climate change mitigation goals requires consideration of "the total amount of CO_2 emissions released over time, where the cumulative emissions (i.e. the area under the curve)," EA at 48. BLM's analysis, however, of those cumulative emissions fails to meet NEPA's scientific integrity requirements, for the reasons detailed below.

Contrary to BLM's assertion, leasing is not merely a "paper transaction," but rather an action that conveys concrete property rights to explore for, extract, and market oil and gas. The readily foreseeable development of the proposed leases will cause, directly and indirectly, greenhouse gas emissions that could amount to millions of metric tons of carbon dioxide equivalent.

NEPA requires BLM to inform the public of the "significance" of these emissions, 40 C.F.R. § 1502.16(a)-(b); for example, BLM must "evaluate the[ir] severity." *Robertson*, 490 U.S. at 352 . 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).

Unfortunately, however, the carbon budget analysis in the Final EA at 48-50 has reporting and math errors, and lacks transparency in failing to cite most of the sources for its numbers or provide the math behind the estimates. Council on Environmental Policy regulations, 40 C.F.R. § 1502.24, require agencies to disclose their methodology and insure the scientific accuracy of NEPA analyses:

> Agencies shall insure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements. They shall identify any methodologies used and shall make explicit reference by footnote to the scientific and other sources relied upon for conclusions in the statement.

40 C.F.R. § 1502.24. As discussed below, BLM's carbon budget analysis fails to either insure scientific integrity or accurately identify its methodologies in five distinct ways.

In addition, at a fundamental level, the carbon budget analysis relies on faulty reasoning. Its main conclusion is the annual downstream greenhouse gas emissions from Colorado federal oil and gas production is a small percentage of the global total: "the BLM CO downstream oil and gas portion of the global burden would be approximately 0.0147%." EA 50.

BLM then makes the unsubstantiated statement that climate change impacts from combustion of federal oil and gas would be negligible: "Based on our understanding of current climate change models, we expect that the residual impacts of climate change resulting from other worldwide emissions likely would be the same with or without the contribution from combustion of federal oil and gas."

In addition to failing to disclose or explain this "understanding" of climate change models, this reasoning is contrary to NEPA scientific integrity requirements. It is demonstrated that emissions from federal oil and gas production contribute a substantial amount to global emissions and to direct, indirect, and cumulative climate change impacts,[22] and that unleased federal oil and gas reserves are sufficient to exhaust the remaining carbon budget.[23]

Second, the Council on Environmental Quality has explicitly explained that dismissing emissions as globally insignificant is not an appropriate basis for consideration of climate change impacts under NEPA:

> Therefore, a statement that emissions from a proposed Federal action represent only a small fraction of global emissions is essentially a statement about the nature of the climate change challenge, and is not an appropriate basis for deciding whether or to what extent to consider climate change impacts under NEPA. Moreover, these comparisons are also not an appropriate method for characterizing the potential impacts associated with a proposed action and its alternatives and mitigations because this approach does not reveal anything beyond the nature of the climate change challenge itself: the fact that diverse individual sources of emissions each make a relatively small addition to global atmospheric GHG concentrations that collectively have a large impact. When considering GHG emissions and their significance, agencies should use appropriate tools and methodologies for quantifying GHG emissions and comparing GHG quantities across alternative scenarios. Agencies should not limit themselves to calculating a proposed action's emissions as a percentage of sector, nationwide, or global emissions in deciding whether or to what extent to consider climate change impacts under NEPA.[24]

[22] Stratus Consulting, Greenhouse Gas Emissions From Fossil Energy Extracted From Federal Lands and Waters: An Update (2014), perma.cc/59G3-Z3BX.
[23] *See* Mulvaney 2015 at 4
[24] 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 10-11 (Aug. 1, 2016).

Although the 2016 CEQ guidance has been "withdrawn for further consideration," 82 Fed. Reg. 16,576 (April 5, 2017), the underlying requirement to consider climate change impacts under NEPA, including indirect and cumulative combustion impacts foreseeably resulting from fossil fuels leasing decisions, has not changed. *See S. Fork Band Council Of W. Shoshone Of Nevada v. U.S. Dep't of Interior*, 588 F.3d 718, 725 (9th Cir. 2009); *Center for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1214-15 (9th Cir. 2008); *Mid States Coalition for Progress v. Surface Transp. Bd.*, 345 F.3d 520, 550 (8th Cir. 2003); *WildEarth Guardians v. United States Office of Surface Mining, Reclamation & Enf't*, 104 F. Supp. 3d 1208, 1230 (D. Colo. 2015); *Dine Citizens Against Ruining Our Env't v. United States Office of Surface Mining Reclamation & Enf't*, 82 F. Supp. 3d 1201 (D. Colo. 2015); *High Country Conservation Advocates v. United States Forest Serv.*, 52 F. Supp. 3d 1174 (D. Colo. 2014).

Consideration of NEPA principles and practices in the analysis of GHG emissions and climate change requires: (1) that agencies quantify a proposed action's projected direct and indirect GHG emissions, taking into account available data and GHG quantification tools; (2) that agencies use projected GHG emissions as a proxy for assessing potential climate change effects when preparing a NEPA analysis; (3) where GHG emission tools, methodologies, or data inputs are not reasonably available, that agencies include a qualitative analysis in the NEPA document and explain the basis for determining that quantification is not reasonably available; (4) that agencies analyze foreseeable direct, indirect, and cumulative GHG emissions and climate effects; (5) that agencies consider reasonable alternatives and the short- and long-term effect and benefits in the alternatives and mitigation analysis; (6) that agencies consider alternatives that would make the actions and affected communities more resilient to the effects of a changing climate; and (7) that agencies assess the broad-scale effects of GHG emissions and climate change, either to inform programmatic decisions, or at both the programmatic and project-level.[25]

According to the IPCC, as of 2011, the remaining carbon budget of cumulative CO_2 emissions from all anthropogenic sources must remain below 1,000 $GtCO_2$ to provide a 66% probability of limiting warming to 2°C above pre-industrial levels.[26] For years 2012-2014, approximately 107 $GtCO_2$ was emitted, averaging approximately 36 $GtCO_2$ per year, which left us at the start of 2016 with a carbon budget of only 850 $GtCO_2$.[27] These emissions were the

[25] Council on Environmental Quality 2016 at 4-6.
[26] IPCC AR5 Synthesis Report at 63-64 & Table 2.2. For an 80% probability of staying below 2°C, the budget from 2000 is 890 $GtCO_2$, with less than 430 $GtCO_2$ remaining. Malte Meinshausen *et al., Greenhouse-gas emission targets for limiting global warming to 2°C*, Nature (2009) at 1159.
[27] *See* Annual Global Carbon Emissions, available at: https://www.co2.earth/global-co2-emissions; *see also* C. Le Quéré, *et al., Global Carbon Budget 2015*, Earth Syst. Sci. Data (Dec. 2015).

highest in human history and 60% higher than in 1990 (the Kyoto Protocol reference year). Of course, the Paris Agreement aim of limiting global warming to 1.5°C requires adherence to a more stringent carbon budget of only 400 $GtCO_2$ from 2011 onward, of which about 250 $GtCO_2$ remained at the start of 2016.[28] "With global annual emissions amounting to 36 $GtCO_2$ in 2015, scientists predict that at current rates global emissions will exceed the carbon budgets necessary to stay under the 1.5°C target by 2021 and the 2°C target by 2036.[29]

The potential carbon emissions from *existing* fossil fuel reserves—the known belowground stock of extractable fossil fuels—considerably exceed both 2°C and 1.5°C of warming. "Estimated total fossil carbon reserves exceed this remaining [carbon budget] by a factor of 4 to 7."[30] "For the 2°C or 1.5°C limits, respectively 68% or 85% of reserves must remain in the ground."[31] The reserves in currently operating oil and gas field alone, even with no coal, would take the world beyond 1.5°C.[32]

In order for the world to stay within a carbon budget consistent with Paris Agreement goals—"holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C"[33]—significant fossil fuel resources must remain in the ground. More specifically, to meet the target of 2°C, globally "a third of oil reserves, half of gas reserves and over 80 percent of current coal reserves should remain unused from 2010-2050."[34] Studies estimate that global coal, oil and gas resources considered currently economically recoverable contain potential greenhouse gas emissions of 4,196 $GtCO_2$,[35] with other estimates as high as 7,120 $GtCO_2$.[36]

Critically, the United States carbon quota—equivalent to 11% of the global carbon budget needed for a 50% chance of limiting warming to 2°C—allocates approximately 158

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[28] Dustin Mulvaney, *et al.*, *Over-Leased: How Production Horizons of Already Leased Federal Fossil Fuels Outlast Global Carbon Budgets*, EcoShift Consulting (July 2016) at 2 (Mulvaney et al. 2016) (attached as Exh. F) (citing Joeri Rogelj, *et al.*, *Difference between carbon budget estimates unraveled*, Nature Climate Change (2016).

[29] Mulvaney at 2 (citing Oak Ridge National Laboratories, Carbon Dioxide Information Analysis Center (2015), available at: http://cdiac.ornl.gov/GCP/).

[30] IPCC AR5 Synthesis Report at 63.

[31] Oil Change International 2016 at 6; *see also* Kevin Anderson and Alice Bows, *Reframing the climate change challenge in light of post-2000 emission trends*, Phil. Trans. R. Soc. (2008) ("to provide a 93% mid-value probability of not exceeding 2°C, the concentration (of atmospheric greenhouse gases) would need to be stabilized at or below 350 parts per million carbon dioxide equivalent (ppm CO_2e)" compared to the current level of ~485 ppm CO_2e.).

[32] Oil Change International 2016 at 5, 17.

[33] Paris Agreement at Art. 2.

[34] Christophe McGlade & Paul Ekins, *The geographical distribution of fossil fuels unused when limiting global warming to 2°C*, Nature (Jan 2015).

[35] Raupach 2014.

[36] IPCC AR5, Mitigation of Climate Change, Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (2014) at Table 7.2.

$GtCO_2$ to the United States as of 2011.[37] By way of comparison, federal and non-federal fossil fuel emissions together would produce between 697 and 1,070 $GtCO_2$.[38] Regarding just federal fossil fuel resources, the United States contains enough recoverable coal, oil and gas that, if extracted and burned, would result in as much as 492 $GtCO_2$, far surpassing the entire global carbon budget for a 1.5°C target and nearly eclipsing the 2°C target—to say nothing of the United States 'share' of global emissions.[39] Unleased federal fossil fuels comprise 91% of these potential emissions, with already leased federal fossil fuels accounting for as much as 43 $GtCO_2$.[40]

In 2012, "the GHG emissions resulting from the extraction of fossil fuels from federal lands by private leaseholders totaled approximately 1,344 $MMTCO_2e$."[41] Between 2003 and 2014, approximately 25% of all United States and 3-4% of global fossil fuel greenhouse gas emissions are attributable to federal minerals leased and developed by the Department of the Interior.[42] Continued leasing and development of federal fossil fuel resources commits the world to 'extremely dangerous' warming well beyond the 2°C threshold. As one study put it, "the disparity between what resources and reserves exist and what can be emitted while avoiding a temperature rise greater than the agreed 2°C limit is therefore stark."[43] In short, *any* new leasing of federal fossil fuel resources is inconsistent with a carbon budget that would seek to avoid catastrophic climate change.

a. The EA's estimate of the global carbon budget on page 48 misrepresents and underestimates the IPCC budget

The EA at 48 states, "[t]he IPCC's AR5 recently quantified the global 'carbon budget' at 1,000 PgC, which represents the amount of carbon emissions humans can emit while still having a likely chance of limiting global temperature rise to 2 degrees Celsius above pre-industrial levels. As of 2011 the world had already emitted approximately 515 PgC or 52% of the total budget over the last 250 years (period since industrialization began)."

The EA then indicates that the remaining carbon budget for a likely chance of limiting warming below 2C is 485 PgC (i.e., 1,000 PgC minus 515 PgC), equal to 485 GtC (i.e., PgC=GtC), which equates to 1,780 GtCO2. This is a vast underestimate.

[37] Raupach at 875.
[38] Mulvaney 2015 at 16.
[39] *Id.*
[40] *Id.*
[41] Stratus 2014 at 9.
[42] *See* Energy Information Administration, *Sales of Fossil Fuels Produced from Federal and Indian Lands, FY 2003 through FY 2014* (July 2015); *see also* Stratus 2014.
[43] McGlade & Ekins at 188.

According to the IPCC AR5, total cumulative anthropogenic emissions of CO_2 must remain below about 1,000 $GtCO_2$ from 2011 onward for a 66% probability of limiting warming to 2°C above pre-industrial levels.[44] Specifically, the AR5 states that limiting the warming caused by anthropogenic CO_2 emissions alone with a probability of >66% to less than 2°C since the period 1861–1880, will require cumulative CO_2 emissions from all anthropogenic sources to stay below 1000 GtC (3670 $GtCO_2$) since that period.[45] The AR5 goes on to state that 1000 GtC is reduced to about 790 GtC (2900 $GtCO_2$) when accounting for non-CO_2 radiative forcings. Furthermore, an amount of 515 GtC (1890 $GtCO_2$), was already emitted by 2011. This leaves a carbon budget of only 275 GtC or 1010 $GtCO_2$ as of 2011 (i.e., 790 GtC minus 515 GtC leaves 275 GtC which equates to 1009 GtCO2).

Given that global CO_2 emissions in 2015 alone totaled 9.8 GtC (36 $GtCO_2$),[46] this carbon budget is being rapidly consumed. The 275 GtC (1010 $GtCO_2$) carbon budget from 2011 onward has been reduced to 232 GtC (850 $GtCO_2$) from 2015 onward.[47]

b. The EA's timeline for exhausting the carbon budget is incorrect

The EA further distorts reasonable consideration of greenhouse gas emissions by employing incorrect assumptions regarding the timing of remaining carbon budgets. The EA states: "If one assumes an emissions trajectory that tracks the RCP8.5 scenario, the world would exceed the remaining budget in approximately 30 years (2045)."[48] It further asserts that: "In terms of the IPCC carbon budget, the World Resource Institute estimates that 2011 global CO2 emissions were approximately 32,274 million metric tons or 8.79 PgC of carbon. At current emissions rates the remaining budget would be exhausted in approximately 54 years."[49]

As detailed above, the IPCC AR5 estimated that the remaining budget in 2011 for a likely chance of staying below 2C was 275 GtC. On the RCP emissions trajectory, the remaining carbon budget would be consumed in closer to 18 years after 2011, rather than 30 years. At a

[44] IPCC AR5 Physical Science Basis at 27; IPCC AR5 Synthesis Report at 63-64 & Table 2.2.
[45] IPCC AR5 Physical Science Basis at 25-26 ("Limiting the warming caused by anthropogenic CO_2 emissions alone with a probability of >33%, >50%, and >66% to less than 2°C since the period 1861–1880, will require cumulative CO_2 emissions from all anthropogenic sources to stay between 0 and about 1570 GtC (5760 $GtCO_2$), 0 and about 1210 GtC (4440 $GtCO_2$), and 0 and about 1000 GtC (3670 $GtCO_2$) since that period, respectively. These upper amounts are reduced to about 900 GtC (3300 $GtCO_2$), 820 GtC (3010 $GtCO_2$), and 790 GtC (2900 $GtCO_2$), respectively, when accounting for non-CO_2 forcings as in RCP2.6. An amount of 515 [445 to 585] GtC (1890 [1630 to 2150] $GtCO_2$), was already emitted by 2011.").
[46] *See* Global Carbon Budget 2016, www.globalcarbonproject.org/carbonbudget/16/data.htm
[47] *See* Table 2 in Rogelj 2016.
[48] EA at 49.
[49] *Id.*

steady emissions rate of 8.79 GtC, the remaining global carbon budget would be exhausted in 31 years after 2011, not 54 years.

Furthermore, the EA's 2011 estimate of global CO2 emissions is low compared with other sources. The Global Carbon Budget Project, which produces annual published estimates of global ghg emissions resulting from the work of numerous institutions, observational networks and modeling groups around the world, estimated 2011 global CO2 emissions at 34.92 GtCCO2 or 9.54 GtC, excluding the added emissions from land use change.[50] At a steady emissions rate of 9.54 GtC, the remaining global carbon budget would be exhausted in 29 years after 2011, not 54 years.

c. The EA's statement of the US "obligation" for meeting a two degree temperature target is an underestimate

The EA asserts that "[t]o meet the two degree temperature target, the U.S. obligation is to reduce annual GHG emissions by 83% relative to 2005 levels (7,228.3 Mt CO2e, excluding land use and changes) by mid-century. Other nations would also have to follow suit, albeit at slightly different targeted rates."[51]

Although the US has pledged a long-term goal of reducing annual ghg emissions by 83% below 2005 by 2050, the US "obligation" in order to meet Paris climate goals is much greater. Holding temperature rise well below 2°C means that global fossil fuel emissions must end almost entirely by mid-century. A reasonable likelihood of limiting warming to 1.5° or 2°C requires global CO_2 emissions to be phased out by mid-century and likely as early as 2040-2045.[52]

A 2015 analysis by international team of climate experts[53] suggests that for a likely probability of limiting warming to 2°C, the U.S. must reduce its GHG emissions in 2025 by 68% to 106% below 1990, with the range of reductions depending on the sharing principles used. U.S. emissions in 2025 would need to range between 2 $GtCO_2e$ (i.e., 68% below 1990) and -0.4 $GtCO_2e$ (i.e., 106% below 1990). Negative emissions are required by 2050.[54]

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[50] *See* Global Carbon Budget 2016, www.globalcarbonproject.org/carbonbudget/16/data.htm; Le Quéré 2016.
[51] EA at 49.
[52] *See* Rogelj 2015.
[53] Climate Action Tracker is a joint project of Climate Analytics, Ecofys, Potsdam Institute for Climate Impact Research, and the NewClimate Institute.
[54] Climate Action Tracker. 2015. Are governments doing their "fair share"? New method assesses climate action. 27 March 2015. See Figures 2 and 3.

Current US climate policy is insufficient to keep temperature rise below 2°C. The US ratified the Paris Agreement on 3 September 2016 and its pledged Nationally Determined Contribution (NDC) is to reduce net GHG emissions by 26–28% below 2005 in 2025 including land use, land use change and forestry (LULUCF), which is equivalent to 19–24% below 2005 levels excluding LULUCF, and equivalent to 6–12% below 1990 levels excluding LULUCF.[55] The US also set a long-term goal of reducing emissions by 83% below 2005 levels by 2050.[56] The US Nationally Determined Contribution has been ranked as insufficient to keep warming below 2°C by as international team of climate experts: the US NDC is "not yet consistent with limiting warming to below 2°C, let alone with the Paris Agreement's stronger 1.5°C limit."[57] Current US climate policy has also been evaluated as insufficient to meet the US NDC.[58]

d. The EA text and table 3-11 on federal and total oil and gas production have numerous inaccuracies

The EA describes public lands oil and gas production as follows:

> The Office of Natural Resources Revenue, U.S. Department of the Interior data shows that in 2015 total federal (onshore) production of oil and gas in the country stood at approximately 719,083,022 bbls of oil and 4,594,061,773 thousand cf of natural gas. The country as a whole (federal and non-federal) produced approximately 3,442,208,000 bbls of oil and 27,033,686 million cf of dry natural gas (U.S. Energy Information Administration). Federal oil and gas represents 21% and 17% for each resource respectively. Similarly, federal minerals in Colorado represent 1.3% and 10% of federal oil and gas, and 0.3% and 1.7% of total U.S. production. BLM has assumed, for purpose of conservative analysis, that all of the oil and gas produced in the U.S. (including from federal oil and gas in Colorado) is combusted as described above. Table 3-11 provides a comparison of these annual 2015 downstream emissions estimates with the EPA's data for 2014.[59]

The Office of Natural Resources Revenue, U.S. Department of the Interior data shows that in 2015, total federal onshore and offshore production was approximately 719,083,022 bbls

[55] US Nationally Determined Contribution submitted to the UNFCCC: http://www4.unfccc.int/Submissions/INDC/Published%20Documents/United%20States%20of%20America/1/U.S.%20Cover%20Note%20INDC%20and%20Accompanying%20Information.pdf
[56] United States Department of State. 2010, U.S. Climate Action Report 2010 (June 2010); see also Climate Action Tracker, 2016, USA analysis, updated 2 November 2016, http://climateactiontracker.org/countries/usa.html
[57] Climate Action Tracker, USA analysis, updated 2 November 2016, http://climateactiontracker.org/countries/usa.html
[58] Id.
[59] EA at 49.

of oil and 4,594,061,773 mcf of natural gas.[60] It should be noted, however, that the US Energy Information Administration estimates somewhat higher federal production in 2015 of 755,158,065 bbls of oil and 4,782,557,794 mcf of natural gas.[61] According to the US Energy Information Administration, the country as a whole (federal and non-federal) in 2015 produced approximately 3,436,515,000 bbl of oil[62] and 27,059,503,000 mcf of dry natural gas.[63]

Based n U.S. EIA information, the numbers in Table 3-11 should be as follows:

2015 production	Oil (bbl)	Gas (Mcf)
BLM CO	5,687,216	745,357,166
US federal (onshore and offshore)	719,083,022	4,594,061,775
US total (onshore and offshore)	3,436,515,000	27,059,503,000

Using the ONRR estimates for federal production and the EIA estimates for total US production, federal oil represents 21% of total US production, and federal gas represents 17% of total US production. If the estimates of federal oil and gas production in CO in 2015 in Table 3-11 are correct (5,687,216 bbl of oil and 745,357,166 mcf of gas), then in 2015, federal minerals in CO represented 0.8% of federal oil production and 16% of federal gas production, and 0.2% of US oil production and 2.8% of US gas production.

e. The EA estimates of the CO portion of global ghg emissions lack scientific integrity

There are significant problems with the EA's assumptions and methods for estimating Colorado's share of global emission. BLM contends that:

> [a]s shown above, the BLM CO estimated downstream emissions from oil and gas are approximately 17% of the total federal oil and gas emissions, and all federal downstream oil and gas combustion emissions are approximately 8.4% of the annual U.S. total. In 2015 the U.S. total estimated combustion (oil, gas, coal, etc.) emissions represent approximately 33% of the EPA's reported 2014 GHG emissions for the entire U.S. Presently, the total 2014 U.S. emissions represent approximately 21.3% of the 2011 global emissions, and thus the BLM CO

[60] See https://www.onrr.gov/About/production-data.htm
[61] US EIA at https://useiti.doi.gov/explore/#all-production
[62] US EIA at https://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbbl_a.htm
[63] US EIA at http://www.eia.gov/dnav/ng/ng_prod_sum_a_EPG0_FPD_mmcf_a.htm

downstream oil and gas portion of the global burden would be approximately 0.0147%.[64]

The EA does not disclose how it calculates the downstream emissions. Using the EPA conversion factors for bbl and mcf[65] yields the following CO_2 estimates in metric tonnes:

2015 production	Oil (bbl)	Gas (Mcf)
BLM CO	5,687,216	745,357,166
US federal (onshore and offshore)	719,083,022	4,594,061,775
US total (onshore and offshore)	3,436,515,000	27,059,503,000

As explained above, the EA's comparison of annual downstream GHG emissions from Colorado minerals to total annual GHGs is an incorrect analysis. However, if one were to do such a conversion, global CO_2 emissions from fossil fuels and cement in 2015 were 9.897 GtC, equivalent to 32.66 $GtCO_2$.[66] BLM Colorado downstream oil and gas emissions in 2015 (43,228,943 $mtCO_2$) represented about 0.12% of the global total CO2 emissions in 2015, not 0.0147% as estimated in the EA – an order of magnitude difference.

The EA provides an estimate of 780,174,013 CO_2e as the "total (upstream, midstream and downstream) future year 2021 CO_2e emissions from combustion of oil and gas produced in Colorado (Federal and non-Federal) assuming continuation of current O&G rates reflected in the CARMMS Low Scenario (see Table 3-12)." EA at 50. The EA provides no explanation, however, of how it arrives at this estimate, and then attempts to claim that it is not important, even though these emissions are substantial in viewed in the context of the remaining global and US carbon budget for staying well below 2ºC.

f. The EA's Climate Analysis Fails to Consider Relevant Policies or Reasonable Alternatives

Finally, although the EA does make some attempt to quantify emissions and disclose the existence of carbon budget, the EA's treatment of climate impacts is violates NEPA in two significant respects. NEPA regulations require agencies to account for conflicts with existing

[64] EA at 49-50.
[65] EPA conversion factors for **oil (**0.43 metric tons CO_2/barrel) and natural gas: 0.005302 metric tons CO_2/therm and 10.32 therms/Mcf; factors taken from https://www.epa.gov/energy/ghg-equivalencies-calculator-calculations-and-references; EPA (2015). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2013. Annex 2 (Methodology for estimating CO_2 emissions from fossil fuel combustion), Table A-40 and Table A-47. U.S. Environmental Protection Agency, Washington, DC. U.S. EPA #430-R-15-004.
[66] See Global Carbon Budget 2016 at http://www.globalcarbonproject.org/carbonbudget/16/data.htm

laws and requirements imposed for the protection of the environment when engaging in environmental analysis.[67] For example, BLM must disclose whether each of the proposed plan alternatives would interfere with efforts to meet federal and international greenhouse gas emission reduction targets.[68] As explained by the CEQ, federal agencies evaluating the climate impacts of their decisions should "discuss relevant approved federal, regional, state, tribal, or local plans, policies, or laws for GHG emission reductions or climate adaptation to make clear whether a proposed project's GHG emissions are consistent with such plans or laws."[69] The EA's flawed and incomplete treatment of climate impacts fails to consider the required question of whether BLM's leasing policies conflict with such policies, including the United States's commitments under the Paris Agreement, discussed above.

BLM's treatment of climate impacts also fails to consider reasonable alternatives for minimizing and mitigating greenhouse gas emissions. NEPA requires federal agencies to pause before committing resources to a project and consider the likely environmental impacts of the preferred course of action as well as reasonable alternatives. *See* 42 U.S.C. § 4331(b) (congressional declaration of national environmental policy); *U.S. Dep't of Transp. v. Public Citizen*, 541 U.S. 752, 756–57 (2004). NEPA's regulations require BLM to "rigorously explore and objectively evaluate all reasonable alternatives" to the proposed action in comparative form, so as to provide a "clear basis for choice among the options" open to the agency. 40 C.F.R. § 1502.14. The agency should address all reasonable alternatives to the proposed action. *See Colorado Envtl. Coal. v. Salazar*, 875 F. Supp. 2d 1233, 1245 (D. Colo. 2012). An alternative is "reasonable" if it falls within the agency's statutory mandate, and meets at least a part of the agency's purpose and need. *Westlands Water Dist. v. U.S. Dep't of the Interior*, 376 F.3d 853, 868 (9th Cir. 2004); *Idaho Conservation League v. Mumma*, 956 F.2d 1508, 1520 (9th Cir. 1992).

In the Center's September 7, 2016 Scoping Comments on the proposed May (now June) Colorado lease sale, the Center recommended that the BLM consider not only a no-leasing alternative, but also an alternative that minimized greenhouse gas emissions from federal leasing by including an alternative that bans new unconventional well stimulation activities, such as

[67] *See* 40 C.F.R. § 1506.2(d) (EISs must discuss inconsistencies with state law); 40 C.F.R. § 1508.27(b)(10) (when examining whether actions are "significant" within the meaning of NEPA, agencies must consider whether the action "threatens a violation of Federal, State, or local law or *requirements imposed for the protection of the environment*.").

[68] *See* 40 C.F.R. § 1506.2(d); 40 C.F.R. § 1508.27(b)(10).

[69] 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, 81 Fed Reg 51866 (Aug 5, 2016).

hydraulic fracturing, and require strict controls on natural gas emissions and leakage.[70] The BLM improperly declines to even consider either a no-leasing or an emissions-minimizing alternative. The range of alternatives is the heart of a NEPA document because "[w]ithout substantive, comparative environmental impact information regarding other possible courses of action, the ability of [a NEPA analysis] to inform agency deliberation and facilitate public involvement would be greatly degraded." *New Mexico v. BLM*, 565 F.3d 683, 708 (10th Cir. 2009). That analysis must cover a reasonable range of alternatives, so that an agency can make an informed choice between options. The Environmental Assessment (EA) for the June lease sale fails to meet this requirement, by analyzing only two alternatives: (1) the No Action alternative, which would defer all lease parcels, and (2) leasing "all 106 nominated parcels available for leasing" under the governing resource management plans (RMPs). EA at 11. BLM's "Preferred Alternative" is simply a minor correction to the lease-all-parcels alternative, removing portions of two parcels closed to leasing under the Northwest Colorado Greater Sage-Grouse RMP Amendments. EA at 11.

BLM improperly dismisses all alternatives that would not merely defer the proposed leases but recommend closure of some or all areas for new leasing as equivalent to the no action alternative. EA at 13. BLM also cursorily dismisses any alternative that would "add additional stipulations." EA at 13-14. Alternatives that would (a) consider limiting future leasing to attain consistency with carbon budget and mitigate climate change and/or (b) impose stipulations that significantly restrict unconventional drilling techniques and require mitigation of methane and other emissions are both reasonable differ from the no-action alternative. BLM cannot dismiss consideration of such alternatives with a cursory assertion that "the no-action, proposed, and preferred alternatives adequately describe a range of alternatives for analysis, BLM can choose any combination of those alternatives (including deferral of additional parcels or portions of parcels) in the final leasing decision." EA at 14. BLM cannot claim that it has considered an alternative that would either remove significant oil and gas resources from availability for leasing, or place constraints upon drilling methods and emissions, simply because it has considered a "lease everything" alternative and a no action alternative. *See Colorado Envtl. Coal. v. Salazar*, 875 F. Supp. 2d at 1245

B. The EA Fails to Disclose Or Analyze Significant Impacts to the Human Environment, Wildlife, Recreation, and other Non-Mineral Resource Values from Leasing

[70] Center for Biological Diversity, Scoping Comments on the May 2017 Competitive Oil & Gas Lease Sale 2, 10-11 (Sept. 7, 2016).

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. Instead BLM's proposed decision to proceed with the June 2017 lease sale is based solely on the broad-brush analysis contained in the EA regarding some general potential effects on resources throughout the planning area. The EA's analysis does not provide any sense of how specific streams and watersheds in the proposed action area would be impacted by increased oil and gas development, including already impaired streams and watersheds. Nor does it discuss how the proposed lease sale could worsen poor air quality in those areas that already have significant well development, or significantly alter and industrialize relatively pristine or rustic landscapes and degrade prime habitat for wildlife.

Instead, BLM presupposes that it can auction off the parcels and issue the leases first, and then fulfill its NEPA obligations after the leases enter into the development stage. As we have stated in previous comments, this approach to NEPA has already been rejected by the courts. *See New Mexico*, 565 F.3d at 688 (rejecting BLM's position that it was not required to conduct any site-specific environmental reviews until the issuance of an APD and holding that "NEPA requires BLM to conduct site-specific analysis before the leasing stage").

BLM can also project the type of development that would likely occur in the leased areas. Various maps prepared by BLM show the several formations underlying the parcels which could be developed, including areas of "high potential" coalbed methane gas development, conventional well development, and Mancos Shale play development.[71] And because many of the areas for lease are adjacent to or near areas that are already producing, the type of development (e.g., horizontal v. vertical well, natural gas v. oil v. coalbed methane) within these area should give some indication of the foreseeable type of development that could occur in the areas for lease. BLM's own studies provide readily available information that could be used to project the total footprint of leasing within these areas. The 2007 Reasonably Foreseeable Development Scenario for the White River Field Office estimates potential development levels

[71] BLM, White River Field Office Reasonably Foreseeable Development Scenario, Figures 5-11 (2007).

per township, average number of wells per pad, and total surface disturbance for the various types of wells that could be developed, including disturbance from well pads, pipelines, and roads. [72] It is also highly likely that hydraulic fracturing practices would be employed, which are necessary to recover "tighter" reserves that dominate the Piceance Basin.[73]

For example, it is highly likely that fracking and horizontal well development would occur on many of the lease parcels. Even in 2007, BLM acknowledged that "The emerging interest in the Mesaverde basin-centered play in the central part of the WRFO is principally related to the development of new completion technology (i.e. modern hydraulic fracturing techniques)."[74] The Reasonably Foreseeable Development Scenario for the adjoining Grand Junction RMP estimates similar figures for projected horizontal well development.[75] BLM also tracks water depletion figures for horizontal wells in each field office and throughout the Upper Colorado River Basin, which provide a reasonable basis for per well water use estimate.[76]

That BLM cannot precisely determine the type and amount of development that could occur on these lease parcels is a red herring. NEPA requires "reasonable forecasting," which includes the consideration of "reasonably foreseeable future actions…even if they are not specific proposals." *See N. Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1079 (9th Cir. 2011) (citation omitted). "Because speculation is . . . implicit in NEPA," agencies may not "shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as crystal ball inquiry." *Id.* Further, while specific development plans have not yet been proposed, such plans are not necessary to predict that development in these areas would entail significant impacts. The problem of increased surface disturbance, water pollution, degradation of air quality, greenhouse gas emissions, and wildlife impacts from new oil and gas leasing are "readily apparent," and there are "enough specifics to permit productive analysis of [oil and gas development], including proposals for alternative ways of dealing with the problem." *Kern v. BLM*, 284 F.3d 1062, 1073 (9th Cir. 2002).

The possibility of additional Conditions of Approval at the drilling permit stage does not alleviate BLM's obligation to consider site-specific impacts at the leasing stage. Although it is possible that "some or all of the environmental consequences of oil and gas development may be mitigated through lease stipulations, it is equally true that the purpose of NEPA is to examine the foreseeable environmental consequences of a range of alternatives *prior* to taking an action that

[72] *Id.* at 36-37.
[73] USGS 2016 (Mancos shale requires fracking, plus vertical drilling for shallower reserves and horizontal drilling for deeper reserves).
[74] WRFO RFDS at 22.
[75] BLM, GJFO Reasonably Foreseeable Development Scenario at 35-37, 46.
[76] BLM, Water Depletion Logs Submitted to Fish and Wildlife Service (2010-2015) ("Water Depletion Logs").

cannot be undone." *Montana Wilderness Ass'n v. Fry*, 310 F.Sup.2d 1127, 1145 (D.Mont., 2004) (citation omitted) (emphasis added); 40 C.F.R. § 1501.2. "[M]itigation measures, while necessary, are not alone sufficient to meet the [Agency's] NEPA obligations to determine the projected extent of the environmental harm to enumerated resources *before* a project is approved." *Northern Plains Resource Council v. Surface Transportation Board*, 668 F.3d 1067, 1085 (9th Cir. 2011) (emphasis in original). Consequently, if BLM discovers significant impacts at the APD stage, it may no longer be able to prevent them.

NEPA also does not allow BLM to defer the missing analysis until the APD stage on the theory that providing more information would be speculative at this point. "All environmental analyses required by NEPA must be conducted at "the earliest possible time."[77] Because issuance of the leases represents an irreversible commitment of resources that will limit BLM's ability to preclude drilling activities in the future, site-specific analysis is both reasonable and necessary at the leasing stage. As the Tenth Circuit has held, "assessment of all reasonably foreseeable impacts must occur at the earliest practicable point, and must take place before an irretrievable commitment of resources is made." *New Mexico*, 565 F.3d at 718 (quotation omitted).

BLM Instruction Memorandum 2010-117 further specifically directs BLM to conduct site-specific analysis of lease parcels in NEPA documentation.[78] *See, e.g.*, IM 2010-117 § III(E) ("The IPDR Team will complete site-specific NEPA compliance documentation for all BLM surface and split estate lease sale parcels..."); id. ("Most parcels that the field office determines should be available for lease will require site-specific NEPA analysis."). IM 2010-117 also calls upon BLM to consider a host of factors in deciding whether to propose parcels for lease, each of which calls for site-specific analysis. For example, BLM must consider whether "[c]onstruction and use of new access roads or upgrading existing access roads to an isolated parcel would have unacceptable impacts to important resource values."[79] Other considerations include whether:

- In undeveloped areas, non-mineral resource values are greater than potential mineral development values.
- Stipulation constraints in existing or proposed leases make access to and/or development of the parcel or adjacent parcels operationally infeasible, such as an NSO parcel blocking access to parcels beyond it or consecutive and overlapping timing restrictions that do not allow sufficient time to drill or produce the lease without harm to affected wildlife resources.

[77] 40 C.F.R. § 1501.2.
[78] Bureau of Land Management, IM 2010-117, Oil and Gas Leasing Use Planning and Lease Parcel Reviews (2010).
[79] IM 2010-117 § III(C)(4).

- Parcel configurations would lead to unacceptable impacts to resources on the parcels or on surrounding lands and cannot be remedied by reconfiguring.

- The topographic, soils, and hydrologic properties of the surface will not allow successful final landform restoration and revegetation in conformance with the standards found in Chapter 6 of the Gold Book.

- Leasing would result in unacceptable impacts to specially designated areas (whether Federal or non-Federal) and would be incompatible with the purpose of the designation.

Each of these factors should be analyzed with respect to the parcels at issue, given that site-specific impacts to non-mineral resource values include, in addition to the air, water, and climate impacts of leasing discussed above:

- Reasonably foreseeable water use impacts from the demands of Piceance Basin hydraulic fracturing and horizontal drilling
- Selenium loading impacts to the White and Yampa River watersheds
- Effects on known populations of sensitive plant species, including the Graham's and White River beardtongues
- Effects on conservation populations of Colorado River cutthroat trout, including threatened greenback lineage cutthroat trout
- Effects on individual subpopulations of Greater Sage-Grouse
- Effects on Canada lynx
- Effects on white-tailed prairie dog colonies and resulting implications for black-footed ferret research and recovery
- Large-scale effects on habitats necessary for multiple migratory bird species
- Impacts to mule deer winter range and migration corridors, particularly in North Park
- Approximately 27,500 acres in Grand County, a nationally-recognized destination for tourism and outdoor recreation
- Proximity to Rocky Mountain National Park, with potential impacts on scenic views, light pollution, and air quality
- Adverse effects on the tourism and outdoor recreation economies of Grand County communities
- Adverse effects on tourism and outdoor recreation at and around Dinosaur National Monument

C. The EA Fails to Consider Current Information Regarding Mancos Shale Development Potential

The EA for the proposed leasing action fails to consider new information concerning increased Mancos shale development potential in the Piceance Basin that emerged earlier this year. In 2015, when the White River RMPA-EIS was adopted, the total number of wells projected to be developed in the White River planning area, including federal and non-federal wells, was in the neighborhood of 50,000 wells over the next 15 years. This projection, however, did not take into account Mancos shale play development, because at the time of the White River RMPA's adoption, BLM considered Mancos shale play development to be too speculative. New information, however, indicates that vast technically recoverable Mancos shale play reserves are present throughout the Piceance Basin, including within the White River Field Office, and could lead to the development of many more wells and well pads than projected in the RMPA-EIS. The White River RMPA-EIS's and EA's failure to consider this potentially huge expansion in Piceance Basin development resulting infects BLM's entire analysis of direct, indirect, and cumulative impacts of new leasing and oil and gas development on soils and surface disturbance, water quality, air quality, land use, wildlife and habitat fragmentation, noise, and greenhouse gas emissions, among other impacts.

In June 2016, the U.S. Geological Survey ("USGS") published a report re-assessing the total technically recoverable reserves in the Mancos shale play in the Piceance Basin, including the Niobrara strata of the play.[80] According to the report, the Mancos shale play's total technically recoverable natural gas reserves are over 40 times greater than the USGS's 2003 estimate and is the second-largest in the U.S., behind the Marcellus shale.[81] Specifically, 66.3 trillion cubic feet of natural gas, 74 million barrels of oil and 45 million barrels of natural gas liquids are potentially recoverable.[82] While tight gas in the younger, shallower Mancos shale intervals is produced primarily from vertical and directional wells in which the reservoirs have been hydraulically fractured, the tight gas and continuous oil and gas in the older and deeper intervals of the Mancos shale are produced mostly from horizontal wells that have been hydraulically fractured.[83] These reserves underlie large areas of the Grand Junction, White River, Royal Gorge, Colorado River Valley, Uncompahgre, and Gunnison Field Offices.[84]

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[80] Assessment of Continuous (Unconventional) Oil and Gas Resources in the Late Cretaceous Mancos Shale of the Piceance Basin, Uinta-Piceance Province, Colorado and Utah (2016) ("USGS 2016"), available at http://pubs.usgs.gov/fs/2016/3030/fs20163030.pdf.
[81] *See id*.
[82] *Id*.
[83] *Id*.
[84] Center for Biological Diversity, Map of Mancos Shale relative to BLM Field Offices (2016) (Attached as Exh. G).

Increasing interest in the Mancos Shale Play should therefore be expected given its enormous production potential. Indeed, since the 2003 USGS assessment, more than 2,000 wells have already been drilled and completed in one or more intervals of the study area.[85] A review of BLM oil and gas projects in western Colorado indicates that operators are planning a number of projects involving horizontal drilling, which would most likely target the Mancos shale.[86]

Because the White River RMPA-EIS did not consider Mancos shale play development as reasonably foreseeable, BLM must prepare a new EIS that takes into account the impacts of Mancos shale play development on the various resources of the White River planning area, or at minimum, do so in a revised EA. Moreover, because the Mancos shale play underlies many of the field offices in western Colorado, it must also take into account cumulative impacts from both private and federal Mancos shale development in neighboring areas throughout the Piceance Basin.

D. The EA Fails to Disclose or Analyze Significant Impacts to Wildlife, Including Sensitive Species and Species of Concern

a. Mule Deer (All Parcels)

Many of the proposed lease sale parcels overlap mule deer severe winter range and/or winter concentration areas. *See* EA at 141 (North Park Leases), 144 (North Park Leases), 151-154 (White River Leases). The EA acknowledges that disturbance to mule deer habitat from energy development can pose significant adverse effects on habitat use, survival, and recruitment:

> While deer are simultaneously contending with the nutritional challenges (declining quality and access to forage) and elevated energy requirements of winter (maintaining homeothermy, reducing energy expenditures to extend fat stores), human disturbance and displacement to unfamiliar grounds divert from time and energy that would otherwise be expended in more efficient procurement of forage and managing energy expenditures (e.g., reducing heat loss, reducing travel across steep slopes or heavy snowpack). Deer exist in a negative energy balance for 4 to 6 months of the year (Garrott et al. 1987) and it is important to minimize energy expenditures and use available forage efficiently to stave off excessive weight loss which ultimately reduces prospects for winter survival or successful birthing and rearing of young. It would follow that extraneous

[85] *Id.*
[86] *See* Center for Biological Diversity, Spreadsheet of Horizontal Well Projects in Colorado (listing horizontal well projects listed in BLM's NEPA register and projected water use) (Attached as Exh. H).

> energetic demands placed on deer, particularly during late gestation, lactation, and the winter season would contribute to chronically suppressed reproductive performance, recruitment, or animal fitness that, at expansive scales, could manifest population-level effects (Sawyer 2009b).[87]

The EA, however, then goes on to dismiss these impacts by selectively citing research to argue that its "widely criticized" use of timing limitation stipulations on certain winter activity will "reduce" (to an unquantified extent) the adverse impacts of development:

> As a means of reducing big game avoidance response, RMP-authorized timing limitation stipulations would be applied to the summer ranges and important deer winter ranges (i.e., severe winter ranges) during the core periods of occupation on those leases in the KFO and LSFO. Timing limitations are applied to all big game ranges in the WRFO. Although BLM's use of traditional stipulations (e.g., timing limitations and no surface occupancy) have been widely criticized, recent research (Sawyer et al. 2009a; Sawyer et al. 2009b) implies that measures that substantially reduce human activity during the period of winter occupation are capable of reducing impacts associated with avoidance, in this case, where reductions in human activity on producing pads reduced the area avoided by deer by 43-65% compared to winter drilling activity.[88]

This selective citation of Sawyer's mule deer research ignores significant new and additional research, by Sawyer and others, showing adverse effects to mule deer migrations and population from energy development, including in Colorado's Piceance Basin. It further fails to justify BLM's refusal to engage in actual site-specific assessment of effects on particular deer subpopulations, winter use areas, and/or migration corridors. Merely describing the "the *category* of impacts anticipated from oil and gas development" fails to meet NEPA's hard look requirement when it is reasonable for BLM to do more. *See New Mexico*, 565 F.3d at 707 (emphasis original). "NEPA does not permit an agency to remain oblivious to differing environmental impacts, or hide these from the public, simply because it understands the general type of impact likely to occur. Such a state of affairs would be anathema to NEPA's 'twin aims' of informed agency decisionmaking and public access to information." *Id.*

Research shows that residential and energy development has reduced all ungulates across the West. The low-elevation valleys and mountain foothills, once important habitat for ungulates,

[87] EA 175.
[88] *Id.*

are filled with cities and towns.[89] The same is true in Colorado, according to CPW's research, particularly on winter ranges.[90] Between 1980 and 2010, western Colorado saw a 37% increase in residential land-use in mule deer habitat, primarily on their winter range.[91] The resulting lack of high-quality winter range is limiting robust mule deer population growth in Colorado.[92]

A dearth of high-quality, long-term, and controlled studies makes it difficult to evaluate with precision the role of oil and gas development in mule deer habitat and population decline.[93] Clearly, mule deer demonstrate avoidance of roads and oil and gas infrastructure, with as-yet inadequately-understood consequences for migration, energy budgets, adult and fawn survival, and population.[94]

Some of the best available long-term, controlled studies evaluate mule deer population density before and after oil and gas development in the Sublette mule deer heard near Pinedale, Wyoming.[95] The Sublette mule deer study compared mule deer density in control and development zones, and found mule deer densities declined 30% in the development area, as opposed to 10% in the control area.[96] Sawyer and Strickladn found that "the observed decline of mule deer in the treatment area was likely due to gas development, rather than drought or other environmental factors that have affected the entire Sublette Herd unit."[97]

The Sublette example is particularly important when considering energy development's effects on mule deer populations, their winter range, and their migration patterns in western Colorado. Even in its relatively early stages compared to Wyoming, the most recent spatial analysis of already-occurring effects on mule deer in western Colorado finds energy

[89] Polfus, J. L., and P. R. Krausman. 2012. Impacts of residential development on ungulates in the Rocky Mountain West. Wildlife Society Bulletin 36:647-657.
[90] Johnson, H.E., et al. 2016. Increases in residential and energy development are associated with reductions in recruitment for a large ungulate. Global Change Biology, doi: 10.1111/gcb.13385 ("Johnson et al. 2016").
[91] Johnson et al. 2016.
[92] Bergman, E. J.,et al. 2015. Density dependence in mule deer: a review of evidence. Wildlife Biology 21:18-29; Johnson et al. 2016.
[93] Hebblewhite, Mark. 2011. Effects of Energy Development on Ungulates. Energy Development and Wildlife Conservation in Western North America 71-94. Island Press, Washington D.C.
[94] Hebblewhite 2011; Sawyer, H., et al. 2013. A framework for understanding semi-permeable barrier effects on migratory ungulates. Journal of Applied Ecology 2013:50, doi:10.1111/1365-2664.12013; Lendrum, P.E. et al.. 2012. Habitat selection by mule deer during migration: effects of landscape structure and natural-gas development. Ecosphere 3(9):82.
[95] Sawyer, H., R. Nielson, and D. Strickland. 2009. Sublette Mule Deer Study (Phase II): Final Report 2007. Western Ecosystems Technology, Inc. Cheyenne, Wyoming, USA.
[96] *Id.*
[97] *Id.*

development has the second-largest effect on deer recruitment, exceeded only by residential development.[98]

Although the precise connections between energy development and population-level effects are still imperfectly understood, it is demonstrated that oil and gas development affects mule deer habitat use and migration patterns by causing site avoidance, particularly in daytime,[99] and creating "semi-permeable" barriers to migration routes.[100] CPW is currently engaged in multiple research efforts to evaluate energy development effects on migration, deer response to energy development, and fawn survival in developed and undeveloped areas.[101] Those studies have thus far documented how individual deer alter their migration speed and timing in response to development.[102] A 2015 Wildlife Research Report published by CPW found that, during an active drilling phase in the Piceance Basin, deer behavior was compromised by 25% (at nighttime) and by 50% (during day time) in critical mule deer winter range.[103]

CPW has also collected data, from 2012 through 2014, in order to evaluate mule deer fawn survival in developed and undeveloped landscapes.[104] This data has not yet been published, but CPW has disclosed preliminary data to Garfield County a strong increase in fawn predation and mortality associated with oil and gas development.[105] The preliminary data disclosed to Garfield County shows 39% predation mortality and 53% total mortality in the undeveloped study area, versus 49% predation mortality and 63% total mortality in the developed study area.

In addition, it is well-documented that human development causes direct habitat loss and fragmentation through the construction of infrastructure, and indirect habitat loss through deer avoidance of infrastructure and related activities; these consequences likely reduce the carrying

[98] Johnson et al. 2016.
[99] Lendrum 2012.
[100] Sawyer et al 2013.
[101] Anderson, C. R. 2015. Population Performance of Piceance Basin Mule Deer in Response to Natural Gas Resource Extraction and Mitigation Efforts to Address Human Activity and Habitat Degradation.in C. D. o. P. a. Wildlife, editor., Colorado ("Anderson 2015"); Anderson, C.R. 2016. Piceance Mule Deer & Energy Development: Demographic influences and mitigation. Colorado Parks and Wildlife, presentation to Garfield County, Colorado. http://www.garfield-county.com/oil-gas/documents/energy-advisory-board/2016/F-D-EAB%20Chuck%20Anderson_Piceance%20deer-energy%20development_Oct%202016.pdf ("Anderson 2016"); Anderson, C.R. and Bishop, C.J. 2014. Migration Patterns of Adult Female Mule Deer in Response to Energy Development. Transactions of the 79th North American Wildlife and Natural Resources Conference 47-50; Lendrum, P.E., et al. 2013. Migrating Mule Deer: Effects of Anthropogenically Altered Landscapes. PlosOne, 8:5:e64548.
[102] Lendrum 2012; Lendrum et al. 2013.
[103] Anderson 2015.
[104] Anderson 2015.
[105] Anderson 2016.

capacity of the landscape.[106] A recent study shows that oil and gas development causes significant habitat loss in the Piceance Basin of Colorado:

> Energy development drove considerable alterations to deer habitat selection patterns, with the most substantial impacts manifested as avoidance of well pads with active drilling to a distance of at least 800 m. Deer displayed more nuanced responses to other infrastructure, avoiding pads with active production and roads to a greater degree during the day than night. In aggregate, these responses equate to alteration of behavior by human development in over 50% of the critical winter range in our study area during the day and over 25% at night.[107]

Additionally, mule deer may suffer higher mortality rates in developed landscapes because of increased vehicle collisions and accidents (i.e., entrapment in fences); moreover, increased road densities expose mule deer to more hunters, poachers and predatory domestic pets.[108]

Mule deer also need migration corridors that are protected from human development. An ongoing mule deer study by members of the Wyoming Migration Initiative has found that mule deer migration patterns are altered by human development – herds will move faster, stop less to feed, and detour around developed portions of their route.[109] Moreover, herds that can't migrate in search of the most nutritious grasses just end up smaller in number, plain and simple.[110] As a result, Wyoming Game and Fish Department is working to further protect migration routes in the state, for instance, no more than four oil and gas well pads allowed in a migration corridor and no development allowed in corridors narrower than a quarter mile. Although initial CPW research suggests that existing Piceance development levels are largely influencing the timing (not the fact) of deer migration,[111] CPW acknowledges that a "threshold in development intensity" may have greater effects on migration behavior.[112]

Despite the substantial evidence and concern regarding development effects on mule deer migration and behavior, the EA fails to provide <u>any</u> disclosure or analysis whatsoever of migration routes that may be affected by development on the proposed leases.

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[106] Johnson et al. 2016.
[107] Northrup, J. M. et al. Quantifying spatial habitat loss from hydrocarbon development through assessing habitat selection patterns of mule deer, Global Change Biology (Aug. 2015), available at http://onlinelibrary.wiley.com/doi/10.1111/gcb.13037/epdf.
[108] Johnson et al. 2016.
[109] Sawyer 2013.
[110] Edwards, M., Mule Deer Struggling To "Surf The Green Wave" Of Migration (Nov. 20, 2015) available at http://wyomingpublicmedia.org/post/mule-deer-struggling-surf-green-wave-migration.
[111] Anderson & Bishop 2014.
[112] Anderson 2016; Sawyer 2013.

None of the proposed White River lease parcel stipulations for protecting big game habitat, however, limit the density of development, but only limit timing. *See* EA, Attachment D at Exhibit WR-TL-14, Exhibit WR-TL-12. The Tres Rios RMP-EIS, in contrast, provides for controlled surface use stipulations that allow BLM to control development density. Stipulation Exhibit 3.10.2 of the most recent Tres Rios Lease Sale Notice provides:

> In order to provide for healthy ungulate populations capable of meeting state population objectives, anthropomorphic activity and improvements should be designed to maintain and continue to provide effective habitat components that support critical life functions. This includes components of size and quality on the landscape providing connectivity to seasonal habitats (wildlife travel corridors), production areas, severe winter range, and winter concentration areas, along with other habitat components necessary to support herd viability.
>
> …
>
> Justification: *There is a growing body of evidence that TL stipulations on oil and gas development activities are not adequate to protect critical winter habitat and migratory corridors for big game.Managing the concentration and development such as drilling, construction, and the density of surface facilities may be necessary to maintain big game populations in developing areas.* Examples may include surface disturbance caps, collocation of facilities, and central gathering facilities, noise reduction, and efforts to minimize traffic and road densities. Routine production activities would be allowed, however workover activities should be handled on a case by case basis.[113]

Similarly, the Little Snake Field Office imposes a controlled surface use stipulation on parcels overlying medium priority sagebrush habitats, which requires a 5 percent disturbance limitation.[114]

While the Kremmling Field Office also provides a lease sale notice alerting lessees that "[s]pecial design and construction measures" may be imposed via conditions of approval on an APD, including "relocation of roads, well pads, pipelines, and other facilities," *see* Exhibit KFO-LN-8, such conditions may still be insufficient, given the large distances at which mule deer can avoid development within suitable habitat. *See* 43 C.F.R. § 3101.1-2 (providing "measures shall

[113] U.S. Bureau of Land Management, Colorado State Office February 2017 Tres Rios Field Office Sale Notice at 65.
[114] EA at 178.

be deemed consistent with lease rights granted provided that they do not: require relocation of proposed operations by more than 200 meters").

Finally, the BLM should take into account new information indicating that sagebrush—which wintering mule deer are highly dependent on—is nearly impossible to restore, such that fragmentation of sagebrush communities from oil and gas development is likely to be permanent and reclamation ineffective. Recent studies show that sagebrush communities, such as those found within the areas to be leased, are nearly impossible to restore. Drilling sites have not been restored to pre-drilling conditions even after having 20 or 50 years to recover.[115] A recent study postdating the RMP-EIS found that 50 years or more would be required to recover sagebrush on disturbed sites, and that restoring heterogeneous soil conditions with patchy nutrient conditions, was necessary for recovery of large sagebrush and ecosystem resiliency.[116] There is no evidence, however, that any measures required by the RMP-EISs here ensure attainment of these conditions. Thus, oil and gas development could have more significant effects on mule deer and other big game than previously anticipated in the RMP-EISs, but those impacts have not been analyzed in the EA. *See* IM 2010-117 (directing site-specific analysis of whether "[t]he topographic, soils, and hydrologic properties of the surface will not allow successful final landform restoration and revegetation in conformance with the standards found in Chapter 6 of the Gold Book, as revised").

b. Greater Sage-Grouse [Parcels COC-78272, -78282, -78291, -78293, -78301, -78303, -78304, -78310 -78311, -78323, -78324, -78325, -78328 -78338, -78340,-78342, -78361, -78362, -78363, and -78369]

The EA acknowledges that twenty-two parcels intersect designated Greater Sage-Grouse Priority and/or General Habitat Management Areas, EA at 13 & Table 2-1, yet declines to even consider an alternative that would defer those parcels from leasing. This refusal to even consider prioritizing leases outside greater sage-grouse habitat fails to conform to either BLM's Northwest Colorado Greater Sage-Grouse Resource Management Plan Amendments, or to recent BLM guidance on implementation of those Amendments.

On September 1, 2016, BLM's Washington, D.C. office issued Instruction Memorandum 2016-143, *Implementation of Greater Sage-Grouse Resource Management Plan Revisions or Amendments -Oil & Gas Leasing and Development Sequential Prioritization* (September 1,

[115] Lester, Liza, Sagebrush Ecosystem Recovery Hobbled By Loss Of Soil Complexity At Development Sites, Ecological Society of America (Jan. 26, 2015), available at http://www.esa.org/esa/sagebrush-ecosystem-recovery-hobbled-by-loss-of-soil-complexity-at-development-sites/.

[116] *Id*.; Minnick, Tamara J., Plant–soil feedbacks and the partial recovery of soil spatial patterns on abandoned well pads in a sagebrush shrubland. Ecological Applications, 25(1), 2015, pp. 3–10, available at http://onlinelibrary.wiley.com/doi/10.1890/13-1698.1/full.

2016) ("IM 2016-143"), to the BLM's State Directors, providing "guidance on prioritizing implementation decisions for . . . BLM oil and gas leasing and development" to be consistent with the Greater Sage-Grouse plan amendments. The IM, which does not amend the plans but provides implementation guidance, is "effective immediately," IM 2016-143 at 11, BLM's proposed decision to lease the parcels listed above does not conform to the agency's IM 2016-143 because the leasing EA does not consider site-specific impacts to Greater Sage-Grouse and does not prioritize leasing outside of Priority and General Habitat Management Areas (PHMAs and GHMAs). IM 2016-143's purpose is to provide consistency across the agency when leasing decisions impact Greater Sage-Grouse habitat. It provides a "prioritization sequence" for BLM state offices to follow when choosing to lease areas near or in Greater Sage-Grouse habitats. The IM prioritization sequence is as follows:

1. Lands outside of GHMAs and PHMAs: BLM State Offices will first consider leasing EOIs for lands outside of PHMAs and GHMAs. These lands should be the first priority for leasing in any given lease sale.

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

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

IM 2016-143 at 4. The EA, however, dismisses consideration of deferring Greater Sage-Grouse habitat from leasing with the conclusion that "the remaining sage-grouse habitat within the lease parcels are represented, particularly in KFO and LSFO, by diminutive slivers of habitat that lie on the extreme periphery of mapped range."). The EA contains, however, no required site-specific consideration or analysis of the proximity of the proposed leases to "important life-history habitat features (for example, distance from any active sage-grouse leks)." IM 2016-143 at 4.

IM 2016-143 further instructs BLM that "[a]t the time the leasing priority is determined, when leasing within GHMA or PHMA is considered, BLM should consider, first, areas

determined to be non-sage-grouse habitat and then consider areas of lower value habitat." *Id.* The EA does not provide either the BLM or the public with sufficient information to permit a reasonable determination of whether the proposed leasing action could be limited to areas of either non-sage-grouse habitat or areas of lower value habitat.

Finally, IM 2016-143 mandates that "BLM State Offices will use the following prioritization sequence for considering leasing *in or near GRSG habitat*, while also considering the 'Factors to Consider While Evaluating EOIs in Each Category.'" Thus, BLM's own guidance is clear that the prioritization sequence and relevant factors must be considered for parcels both within and adjacent to Greater Sage-Grouse Habitat. The EA fails to consider any of these parcel-specific factors, save for a conclusory assertion that "Under the circumstances at hand, adjoining habitat often has close geographic proximity, but with few exceptions, it is functionally disconnected from legitimate sage-grouse habitat."[117] The EA provides no discussion, analysis, or explanation for the basis for that conclusion, and fails to disclose the nature of the acknowledged "exceptions" where proposed leases are admittedly functionally connected to "legitimate" sage-grouse habitat. To the extent that BLM has somehow classified, for purposes of lease sale, sage-grouse habitat under the RMP Amendments as "legitimate" or "illegitimate," the EA fails to provide any basis for this classification.

c. Graham's and White River Beardtongues[Parcels COC-78361, -78363]

Graham's and White River beardtongues, a BLM sensitive species, are present, occurring to U.S. Fish and Wildlife Service ("FWS") data, on at least parcels COC-78361 and -78363.[118] Oil and gas development in the Rangeley area threatens the Colorado populations of these sensitive beardtongues.[119] As of July 2014, 27% and 13% of all known Graham's and White River beardtongue habitat, respectively, occurred on lands that already had been leased by BLM or the States of Colorado and Utah for oil and gas development.[120] Given rapidly increasing oil and gas production in the region over the past two decades and current exploration occurring in beardtongue habitat, FWS expects oil and gas activity to pose an increasing threat.[121] Although

[117] *See* EA at 122.
[118] 2017 Map of Proposed Leases and Graham's and White River Beardtongues (Attached as Exh. I)
[119] U.S. Fish and Wildlife Service, Threatened Species Status for Graham's Beardtongue (Penstemon grahamii) and White River Beardtongue (Penstemon scariosus var. albifluvis), proposed rule (Aug. 6, 2013), 78 Fed. Reg. 47,590; USFWS, Withdrawal of the proposed rules to list Graham's beardtongue (*Penstemon grahamii*) and White River beardtongue (*Penstemon scariosus var. albifluvis*) and designate critical habitat; proposed rules (Aug. 6, 2014), 79 Fed. Reg. 46,042, 46,077.
[120] 79 Fed. Reg. at 46,077.
[121] 79 Fed. Reg. at 46,077 ("substantial numbers of Graham's and White River beardtongue individuals (and their habitat) occur in areas that are leased for oil and gas development (Tables 5 and 6), and thus it is reasonable to conclude that the impacts of oil and gas activity will increase in the future as additional areas are

the Fish and Wildlife Service withdrew these beardtongues from proposed ESA listing largely in reliance on a conservation agreement, the BLM still has the duty under its Manual and sensitive species policy to conserve the species.

The Fish and Wildlife Service previously proposed these two beardtongues for listing under the Endangered Species Act, then withdrew the proposed leasing largely in reliance on a conservation agreement among various state and federal entities. Last month, however, the U.S. District Court vacated the Service's decision to withdraw listing, based on improper reliance on uncertain and/or ineffective conservation measures. Therefore, the BLM should defer from leasing parcels 32, 121, and 122, each of which overlaps Graham's beardtongue and/or White River beardtongue habitat. The Conservation Agreement for those species relied on in the Lease Sale EA was recently invalidated by the United States District Court for the District of Colorado. *See Rocky Mountain Wild, et al. v. Walsh, et al.*, Case 1:15-cv-00615-WJM (Oct. 25, 2016) (attached as Ex. 4), which held that the United States Fish and Wildlife Service ("FWS") violated the Endangered Species Act by:

> 1) "[C]oncluding that yet-to-be-enacted regulatory and non-regulatory measures mandated by the Conservation Agreement were 'existing regulatory mechanisms';
>
> 2) "[F]ailing to account for the [Conservation] Agreement's expiration when determining whether the beardtongues face material threats in the 'foreseeable future'"; and
>
> 3) Failing to take "into account economic considerations when imposing a 300-foot buffer zone around each beardtongue."

Rocky Mountain Wild, Case 1:15-cv-00615-WJM at *2-3.

Rather than immediately set-aside the Conservation Agreement and order FWS to re-consider listing the species as threatened or endangered under the ESA, the court ordered the parties "to meet in person and discuss whether the Conservation Agreement may be modified in a manner satisfactory to Plaintiffs."[122] Id. at *3. However, the court's decision had an immediate effect on BLM's leasing decision at issue which, at least in part, is based on management decisions made in the Conservation Agreement for Graham's and White River beardtongues. See, e.g., Lease Sale EA at 25 (Graham's beardtongue is present on lease parcels 32, 121, and 122); *id.* at 26 (noting that parcels subject to the Conservation Agreement "will

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developed.")

[122] These meetings are still ongoing.

require additional mitigation measures if developed"); *id.* at 80, 86 (lease stipulations and notices for parcels 32, 121, and 122).

Therefore, BLM should defer from leasing all parcels in Graham's and White River beardtongue habitat until either a modified Conservation Agreement is prepared or FWS reexamines whether the species should be listed as threatened or endangered under the ESA.

The existing Conservation Agreement seeks "to identify, avoid, minimize, and mitigate potential threats to Graham's and White River beardtongues and their habitats, and to promote the species' long-term persistence, thereby preventing the need for listing either species." Conservation Agreement at 1. To achieve this goal, the Conservation Agreement establishes the following objectives:

- Minimize and mitigate direct, indirect, and cumulative threats to both species.
- Establish conservation areas that protect occupied and unoccupied habitat.
- Promote stable or increasing populations within identified conservation areas and across the range of the two species.
- Investigate and demonstrate successful ecological restoration methods for transplanting and repopulating self-sustaining Graham's and White River beardtongue plant populations and community associates . . . and pollinators following surface disturbance. [123]

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

- A maximum of 5% new surface disturbance for Graham's beardtongue and 2.5% new surface disturbance for White River beardtongue will be allowed per conservation unit from the date this Agreement is signed.
- Ground-disturbing activities will avoid Graham's and White River plants by 300 feet both inside and outside designated conservation areas. [124]

[123] U.S. Fish and Wildlife Service et al., Conservation agreement and strategy for Graham's beardtongue (*Penstemon grahamii*) and White River Beardtongue (*P. scariosus* var. *albifluvis*) 2 (July 2014) https://www.fws.gov/mountain-prairie/species/plants/2utahbeardtongues/Penstemon_Conservation_Agreement_2014Jul22_final_signed.pdf.
[124] Conservation Agreement at 18; *see also id.* at 19-25.

The EA makes cursory acknowledgment that parcels contain Graham's and White River beardtongues,[125] but does not meet the Agreement's management strategy. It does not minimize or mitigate the direct, indirect, and cumulative impacts to the species. Instead, it postpones any and all meaningful analysis to some unknown date and applies questionably-enforceable Lease Notices to lease parcels which are found to contain either species' habitat.[126]

BLM cannot assure that the leasing of additional land in beardtongue habitat will not violate the 5% or 2.5% maximum new surface disturbance threshold. Moreover, leasing these parcels is a direct violation of the Conservation Agreement's stated objective to "[p]romote stable or increasing populations within identified conservation areas and across the range of the two species." In proposing both species' for listing under the ESA, FWS stated that "Graham's and White River beardtongues are particularly vulnerable to the effects of energy development because their ranges overlap almost entirely with oil shale and tar sands development areas, as well as ongoing traditional oil and gas drilling."[127]

The Conservation Agreement also identified oil and gas exploration and development as a serious threat to Graham's and White River beardtongue habitat and long-term viability.[128] Moreover, road construction and maintenance, invasive weeds, off-road vehicles, habitat fragmentation, and climate change – all factors exacerbated by the leasing of parcels in these areas – also threaten both species' habitat and ability to survive in the long-term. *Id.* The EA does not discuss or analyze any of these issues, and thus fails either to take a hard look at impacts under NEPA or to meet BLM's conservation obligations under the Sensitive Species Policy and the Conservation Agreement.

The BLM asserts:

> Threatened, endangered and proposed SSPS have the full protection of ESA. BLM sensitive plant species are not protected under the ESA, however their rarity and potential for ESA listing has resulted in recognition by the BLM Colorado that proactive conservation measures are necessary to reduce or eliminate threats, minimizing the likelihood of and need for listing of these species under the ESA. For the purpose of this Environmental Assessment WRFO, has two plant species (White River beardtongue and Grahams penstemon) that are currently being

[125] EA at 133.
[126] *See Sierra Club v. Peterson*, 717 F.2d 1409, 1413 (D.C. Cir. 1983) (federal agencies cannot "foreshorten[] [their] view of the impacts which could result from the act of *leasing*"); *New Mexico ex rel. Richardson v. BLM*, 565 F.3d 683, 717-19 (issuing leases without Non-Surface Occupancy stipulations constitutes an irretrievable commitment of resources).
[127] 78 Fed. Reg. at 47598; *see also id.* at 47600 ("The impacts of traditional oil and gas development on Graham's and White River beardtongues are expected to be high.").
[128] *See* Conservation Agreement at 19.

> protected as BLM sensitives. On October 25, 2016, a federal judge ruled that the U.S. Fish and Wildlife Service (USFWS) improperly denied ESA protection to the two penstemon species.USFWS in 2013 had proposed listing the two plants as threatened, but later decided not to proceed with the listing due to a 15-year conservation agreement it had reached with the Bureau of Land Management in Colorado and Utah, Rio Blanco County, Uintah County in Utah and several state-level agencies in Utah. Members of the conservation agreement will meet before Feb. 21, 2017, to discuss whether the conservation agreement can be modified to help protect the two penstemons adequately to prevent listing the two species. At this time it is unclear what the status of the two penstemons will be and listing the species could take up to a year, so until an official status is determined by USFWS the WRFO will protect the two species as BLM sensitives with Exhibit WR-NSO-26. However, parcels that provide mapped occupied or suitable habitat for the two species will also have Exhibit CO-34 stipulation to notify the lessee that section 7 consultation with USFWS might occur if White River or Grahams penstemon are listed and additional mitigation measures might be applied at the APD stage.

EA at 133. This analysis, and the resulting stipulations, however, appears to erroneously assume only two possible outcomes from the beardtongue listing litigation and ensuing proceedings—either treatment as a BLM sensitive species status or ESA listing. This assumption fails to account for the reasonable possibility of a new conservation agreement—that could have more protective buffers and/or surface disturbance caps in conservation areas, and could potentially expand the scope of conservation areas on BLM-managed lands. By declining to provide for stipulations that could account for such a possibility (increased protections for conservation areas without ESA listing), BLM is improperly foreclosing its own possible range of alternatives to conserve the Graham's and/or White River beardtongues.[129]

d. White-Tailed Prairie Dog and Black-Footed Ferret [Parcels COC-78361, -78369, -38370, -78372]

The BLM has failed to take a hard look at impacts to white-tailed prairie dog colonies, and, in particular, the Coyote Basin Management Area for reintroduction and study of endangered black-footed ferrets. Parcels COC-78361, -78369, -38370, and -78372 all immediately abut the Coyote Basin Black-Footed Ferret Management Area.[130]

The black-footed ferret, one of the most critically endangered mammals in North America, was reintroduced to northwest Colorado following near-extirpation in the wild.[131] The

[129] *See Sierra Club v. Peterson*, 717 F.2d 1409, 1413 (D.C. Cir. 1983)
[130] EA at 120 & Map 3-9.
[131] U.S. Fish and Wildlife Service, Revised Black-Footed Ferret Recovery Plan 20 (2013).

species was reintroduced to Colorado as a nonessential, experimental population pursuant to a rule promulgated under Section 10(j) of the ESA.[132] Although nonessential experimental populations are not subject to the consultation requirement of ESA 7(a)(2), two provisions of ESA Section 7 still apply: (1) section 7(a)(1)—which requires all Federal agencies to use their authority to conserve listed species; and (2) section 7(a)(4)—which requires Federal agencies to confer with the Service on actions that are likely to jeopardize the continued existence of a proposed species throughout its range."[133] Under the requirements of Section 7(a)(1) and 7(a)(4), BLM must still ensure that it is using its authority to conserve the black-footed ferret, and must confer with the Fish and Wildlife Service to determine whether its actions will jeopardize the continued existence of the species.[134]

Importantly, the Section 10(j) rule for the Coyote Basin black-footed ferret production prohibits the "take" of black-footed ferrets under Section 9 of the ESA.[135] Allowing activities that harm federally-protected species, such as oil and gas drilling and associated ferret habitat destruction and mortality, opens up state and private actors to liability under section 9 of the ESA. Under section 9(a)(1)(B) of the ESA, it is illegal to engage in any activity that "takes" an endangered species.[136] The term "take" is defined in the "broadest possible manner to include every conceivable way" in which a person could harm or kill wildlife.[137] The term "take" is defined in the statute to include "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."[138]

The ESA's implementing regulations define "harm" to mean "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering."[139] The term "harass" is defined to mean "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering."[140]

Persons subject to the prohibition on take include individuals and corporations, as well as "any officer, employee, agent, department, or instrumentality of the Federal Government."[141]

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[132] U.S. Fish and Wildlife Service, Establishment of a Nonessential Experimental Population of Black-footed Ferrets in Northwestern Colorado and Northeastern Utah, 63 Fed. Reg. 52,824 (Oct. 1, 1998).
[133] 63 Fed. Reg. at 52,824.
[134] 63 Fed. Reg. at 58,835.
[135] 50 C.F.R. § 17.84(g).
[136] 16 U.S.C. § 1538(a)(1)(B).
[137] S. Rep. No. 93-307, 93d Cong., 1st Sess. 1, reprinted in 1973 USCAAN 2989, 2995.
[138] 16 U.S.C. § 1532(18).
[139] 50 C.F.R. § 17.3.
[140] *Id.*
[141] 16 U.S.C. § 1532(13).

Further, "[t]he ESA prohibitions apply to actions by [governmental] agencies where their regulatory programs approve actions by third parties that contribute to causing the take."[142] To the extent that exploration and development resulting from oil and gas leasing will foreseeably cause ESA "take" of ferrets, BLM may not authorize such leasing without a valid permit issued by the U.S. Fish and Wildlife Service.[143]

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

> The minerals development proposed in the Proposed RMP would have multiple short-term and long-term direct and indirect adverse impacts on white-tailed prairie dog and black-footed ferret populations in the VPA. For this analysis it was assumed that black-footed ferrets are completely dependent upon white-tailed prairie dog towns for survival in those areas where they have been reintroduced into the VPA. Therefore, the impacts of minerals development on white-tailed prairie dog populations would be similar to the impacts on black-footed ferret populations. Minerals development would likely lead to an increase in road densities, a reduction in habitat from the installation of mineral development infrastructure, and an increase in habitat fragmentation.[144]

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

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

[142] *Strahan v. Coxe*, 127 F.3d 155 (1st Cir. 1997); *Animal Welfare Inst. v. Martin*, 623 F.3d 19 (1st Cir. 2010); *Defenders of Wildlife v. EPA*, 882 F.2d 1294 (8th Cir. 1988); *Loggerhead Turtle v. County Council of Volusia County*, 148 F.3d 1231 (11th Cir. 1998); *Seattle Audubon Soc'y v. Sutherland*, 2007 U.S. Dist. LEXIS 31880, 2007 WL 1300964 (W.D. Wash. May 2, 2007).
[143] 50 C.F.R. § 17.84(g)(2).
[144] U.S. Bureau of Land Management, Vernal RMP EIS 4-459 (2008).

activities result in the crushing of burrows. Increased vehicle traffic could also result in mortality from vehicle collisions.[145]

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

> Petroleum development and agriculture are the most frequently cited as being of immediate conservation concern, and there is ample evidence to support this assertion (Seglund et al. 2004). Oil and gas development is currently occurring at unprecedented levels, with substantial expansion expected in the future, making it an ever increasing threat. In Wyoming, 77% of the white-tailed prairie-dog predicted range is being developed at some level for oil and gas, Colorado has 4,953 wells and Utah has 8,835 wells in the predicted distribution of white-tailed prairie dogs (Seglund et al. 2004). Even when petroleum activity does not directly eliminate active burrows, it has been shown to be detrimental to prairie dog populations.[146]

The EA, however, improperly disregards the effects of leasing immediately adjacent to the Coyote Basin management area due to post-reintroduction plague outbreaks that have affected the recovery program:

> A black-footed ferret reintroduction efforts was begun in northeast Utah and northwest Colorado (WRFO) in 2000-2001 under the auspices of an Experimental Non-Essential Population Rule and through a cooperatively developed Black-Footed Ferret Reintroduction and Management Plan (2001). Successful establishment and reproduction was gained in Utah and Colorado over the next 8-9 years, but beginning in 2009, a widespread plague epizootic eliminated much of the prairie dog habitat base and all known ferrets in the WRFO. A few remnant ferrets survived the epizootic along the Highway 40 corridor in Utah. Due to the recurrent history and threat of plague along the Highway 40 corridor, no reintroduction efforts have been pursued since that time. Although the management areas and ferret/prairie dog management adopted in the respective State plans remain active, it is unlikely that ferrets will be released in this area until effective disease control can be developed and deployed in the field.[147]

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[145] U.S. Fish and Wildlife Service, Vernal RMP Biological Opinion at 38.
[146] Douglas E. Keinath, Species Assessment for White-Tailed Prairie Dog (*cynomus leucurus*) in Wyoming 26 (2004) (citing A.E. Seglund *et al.*, White-Tailed Prairie Dog Conservation Assessment (2004)).
[147] EA at 119-121.

BLM may not ignore the effects of its leasing decisions on the ferret reintroduction and research program simply due to the uncertainties regarding disease control and/or future reintroduction efforts. BLM must disclose, and consider, the extent to which its leasing decisions, by allowing for expansion of oil and gas development to the southwest of the existing developed Rangeley field, may foreclose the possibility for future prairie dog and ferret research, disease control, and/or reintroduction efforts.

e. Colorado River Cutthroat Trout [Parcels 78296, 78300, 78272]

BLM acknowledges that the proposed leases may have indirect and/or cumulative effects on Conservation Populations of multiple lineages of genetically pure Colorado River Cutthroat Trout – including populations in Trail Creek (COC-78296), Kinney Creek (COC-78300), and Black Sulphur Creek (COC-78272). EA at 145-46. The BLM acknowledges that "Unintentional releases of oil, condensate, or produced water from pipelines or well pads that eventually enter perennial or intermittent systems would have the potential to adversely affect all components of downstream aquatic communities," EA at 153, but dismisses this potential impact because "BLM is aware of no releases from pads or pipelines over the past 35 years that have resulted in chronic or acutely toxic effects on aquatic vertebrates." *Id.* This dismissal of the potential for discharges to affect Colorado River Cutthroat Trout and other aquatic species of concern ignores substantial evidence of risk and numerous publicly-reported instances of pad or pipeline releases harming aquatic vertebrates.

Contrary to BLM's assertion, EA at 153, fish kills from and oil gas pipeline releases and spills are well documented, including the widely-reported 2010 release of crude oil from an Enbridge pipeline into the Kalamazoo River,[148] and the 2011 release of oil from an Exxon pipeline into the Yellowstone River.[149]

Oil and gas developments affect aquatic ecosystems. The overall health of an aquatic habitat derives from the condition of the entire watershed including the uplands, riparian corridor and the stream channel.[150] The decline of native trout is caused primarily by habitat damage (much of it associated with roads, dust, and sedimentation), and the effects of introduced, non-native fish. Roads are a significant cause of trout habitat damage and water quality degradation. In streams where cutthroat share habitat with other non-native salmonids, any habitat

[148] U.S. Fish and Wildlife Service, Final Damage Assessment and Restoration Plan/Environmental Assessment for the July 25-26, 2010 Enbridge Line 6B Oil Discharges near Marshall, MI (Oct. 2015), https://www.fws.gov/midwest/es/ec/nrda/MichiganEnbridge/pdf/FinalDARP_EA_EnbridgeOct2015.pdf.
[149] Brown, Matthew, *Exxon Agrees to Pay Millions for Yellowstone River Spill*, U.S. NEWS AND WORLD REPORT, Sept. 21, 2016, https://www.usnews.com/news/business/articles/2016-09-21/ap-newsbreak-settlement-reached-in-exxon-yellowstone-spill.
[150] WY Game and Fish Dep't, *Recommendations for Development of Oil and Gas Resources Within Important Wildlife Habitats* (Apr. 2010) at 11.

degradation is likely to shift the balance to dominance by non-native salmonids.[151] Once non-native trout displace native trout, the situation is almost impossible to reverse.[152]

More specifically, recent research has specifically demonstrated that exposure to flowback and produced water resulting from hydraulic fracturing results in multiple adverse biological effects on freshwater fish, specifically rainbow trout.[153] The study was one of the first to directly evaluate the effects of materials used in hydraulic fracturing on aquatic life:

> The lack of available hazard assessment for HF-FPW spills in Canada and the United States hinders environmental impact and risk assessment of hydraulic fracturing activities. Mandatory disclosure of the chemical constituents of fracturing fluids for example, through the chemical disclosure registry, FracFocus, has somewhat improved our understanding but the toxicity data of many chemicals is often missing.The environmental fates of those chemicals are further complicated by potential down-hole reactions and generation of secondary products.Therefore, there exists an obvious need to investigate the toxicity on aquatic organisms. In this study, juvenile rainbow trout (Oncorhynchus mykiss), commonly used as a biologically relevant freshwater model for regulatory science, were used to determine responses to potential spills and leaks of HF-FPW in the aquatic environment. Acute exposures (48 h) were conducted followed by measurements of a variety of endpoints including hepatic and ranchial ethoxyresorufin-O-deethylase (EROD) activity, thiobarbituric acid reactive substance (TBARS) formation in various tissues, and mRNA abundance of a battery of genes related to biotransformation, oxidative stress, and endocrine disruption by quantitative real-time polymerase chain reaction (Q-RT-PCR). This is one of the first studies to investigate the physiological responses to HF-FPW exposure in a whole organism.[154]

The results of exposure to flowback and produced water ("HF-FPW") on rainbow trout revealed multiple pathways with potential for adverse effects, including endocrine disruption:

> Adverse effects were observed at high dilutions in both SF and/or S fractions exposure groups, rather than AC fractions exposure groups. This indicates that the

[151] Western Native Trout Campaign, *Imperiled Western Trout and the Importance of Roadless Areas* (Nov. 2001) at 12.
[152] *Id.*
[153] Yuhe He et al., *Effects on Biotransformation, Oxidative Stress, and Endocrine Disruption in Rainbow Trout (Oncorhynchus mykiss) Exposed to Hydraulic Fracturing Flowback and Produced Water*, 51 Environ. Sci. Technol. 940-947 (2017), DOI: 10.1021/acs.est.6b04695.
[154] *Id.* at 941.

> organic contaminants rather than the salts per se were the major contributor in acute exposure of diluted HF-FPW in fish. Analysis of multiple biomarkers and gene expression for key markers of adverse effects reveal HFFPW exposure in a biologically relevant fish elicits responses in a variety of pathways, including biotransformation, oxidative stress, and endocrine disruption. Our results further suggest that sediment found in HF-FPW is an important component in causing adverse effects related to biotransformation and oxidative stress pathways, in agreement with our earlier studies. An alternative hypothesis is that the exposure concentration of various contaminants present in HF-FPW was elevated by chemical desorption from sediment particles, thus enhancing the exposure rate. Future study is needed to address the potential adverse effects derived from sediments of HF-FPW, and special attention should be paid to the sediment residues in spill response and the remediation process.[155]

In addition to direct toxicity from hydraulic fracturing fluids and road development facilitated by oil and gas expansion, lack of connectivity to other populations renders Colorado River cutthroat trout vulnerable in the short term to extirpation from natural disturbances such as fire, post-fire debris torrents, or floods and in the long term to loss of genetic variability and the potential for evolving in response to changing environmental conditions.[156] This lack of connectivity also contributes to the greatest future threat to the persistence of this subspecies—climate change—because model projections suggest some suitable habitats may shift to higher elevations and precipitation patterns imply there may be large declines in late summer flows.[157] the predicted truncation of suitable habitat for cutthroat trout in streams and rivers owing to climate warming, changes in precipitation, and shifts in disturbance regimes must be incorporated into management strategies to maximize their effectiveness.[158] The BLM must consider the impacts of this project on native cutthroat trout, including consultation with FWS regarding Greenback lineage Colorado River Cutthroat Trout.

E. The EA Fails to Consider the Direct, Indirect and Cumulative Impacts from Colorado River Withdrawals for Fracking and Other Unconventional Drilling Methods on Endangered Fish Populations, Water Supply, and Water Quality

[155] *Id.* at 945-46.
[156] Michael K. Young, *Greenback Cutthroat Trout: a Technical Conservation Assessment* (Feb. 2009) at 3.
[157] *Id.*
[158] James Roberts et al., *Consequences of Climate Change for Mountain Lakes and Native Cutthroat Trout* (Jan. 2015) at 3.

As stated in our previous comments, BLM has failed to perform an adequate environmental review of the significant impacts that oil and gas development is likely to have on the Colorado pikeminnow, razorback sucker, bonytail, and humpback chub (collectively "endangered fish") and the Colorado River ecosystem. Significant new information has arisen since the adoption of the White River and Little Snake RMP-EISs and the 2008 Programmatic Biological Opinion for Water Depletions Associated with Bureau of Land Management's Fluid Mineral Program within the Upper Colorado River Basin in Colorado ("PBO"),[159] which is designed to address any depletions resulting from oil and gas development within the White River, Little Snake, and other western Colorado field offices (excluding areas within the San Juan River Basin). BLM's approval of the RMP-EISs relied on the PBO. However, as discussed further in Section __ below, the PBO and the RMP-EISs did not consider several important factors that may affect the endangered fish in a manner or to an extent not previously considered, including new water-intensive techniques such as horizontal drilling which will enable increased drilling of the Mancos shale play; climate change effects on stream flows; a prolonged drought since 2000 and increasing water scarcity in the Colorado River Basin; declining Colorado pikeminnow and humpback chub populations; increasing mercury and selenium contamination within the Upper Coloardo River Basin and their effects on the endangered fish; and the failure of the Endangered Fish Recovery Program to meet recommended stream flows within critical habitat in the Colorado River sub-basin.

Cumulative impacts are those impacts on the environment resulting from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency . . . or person undertakes such other actions." 40 C.F.R. § 1508.7. By all accounts, the impacts stemming from future oil and gas leasing and development of the parcels at issue are cumulative with the impacts from development of neighboring planning areas. *Thomas v. Peterson*, 753 F.2d 754, 759 (9th Cir. 1985) (reasoning that effects of proposed road and of timber sales that road was designed to facilitate were cumulative actions for which comprehensive analysis was required). Indeed, under NEPA, BLM has an obligation to consider the effects of neighboring lease sales and oil and gas development projects as cumulative impacts of any future development stemming from leasing in the neighboring vicinity of these parcels. 40 C.F.R. §§ 1508.7, 1508.8.

A foreseeable cumulative impact from oil and gas development occurring throughout the Colorado River Basin is water withdrawals from the Colorado River necessary for fracking and horizontal drilling techniques. Indeed, millions of gallons of water are withdrawn from the Colorado River for oil and gas extraction, potentially impacting endangered fish in the Colorado

[159] USFWS, Programmatic Biological Opinion for Water Depletions Associated with Bureau of Land Management's Fluid Mineral Program within the Upper Colorado River Basin in Colorado (2008).

River. The loss of adequate flows in the endangered fishes' habitat within the Upper Colorado River Basin is so serious that the Fish and Wildlife Service has determined that any depletion of Upper Basin stream flows adversely affects and jeopardizes the endangered fish.[160] Any depletion should therefore also be deemed significant under NEPA.

BLM must analyze under NEPA the effects of the massive water demand resulting from relatively new horizontal drilling techniques in the Upper Colorado River Basin (the "Upper Basin") which would impact watersheds affected by future development of the parcels at issue here. Specifically, this analysis should address the water depletion effects of new leasing on specific water supplies and watersheds. In addition, it must address significant cumulative impacts from drilling throughout the Upper Basin on local water supplies and on the Colorado River endangered fish. Section II.G below discusses significant water depletion effects that have not been addressed in the PBO or RMP-EIS.

In addition, BLM must analyze in the EA the increased risk of spills from new leasing, including cumulative effects, and the adequacy of mitigation measures, which were not properly analyzed in the White River RMPA-EIS. As noted in the attached protest of the White River RMPA-EIS, incorporated here by reference and attached as Exhibit J, BLM has not properly acknowledged the increased spill effects of oil and gas development from new development throughout the entire White River planning and from increased transport and storage of fracking chemicals and wastewaters, which will vastly increase with increased fracking activities. Exh. J at 10-15, 22-24. Moreover, as further explained in that comment, stipulations, setbacks, and other measures to reduce the risk of contamination from pipelines and other facilities are not adequate. Exh. J at 16-18, 23-24. The EA has also failed to analyze site-specific spills risks, including the risk of contamination and degradation of endangered fish critical habitat underlying several lease parcels on the Colorado River, and of numerous parcels upstream from tributaries of critical habitat. According to the RMP EIS for the neighboring Grand Junction field office, COGCC studies indicate that "surface and groundwater contamination, due to oil and gas development…occurred between 1,000 to 1,800 feet from the drilling."[161] NSO setbacks

[160] U.S. Bureau of Land Management, Ch. 3: Affected Environment, White River FEIS at 3-71 (2015) ("The FWS has determined that any federally authorized depletion from the Upper Colorado River Basin has an adverse effect on listed Colorado River fishes.") (Chapter 3); Biological Opinion for BLM Resource Management Plan (RMP), Price Field Office (PFO), 138 (Oct. 27, 2008), available at: http://www.blm.gov/style/medialib/blm/ut/price_fo/Planning/rod_approved_rmp.Par.2742.File.dat/Price%20Biological%20Opinion.pdf. ("The USFWS determined that any depletion will jeopardize their continued existence and will likely contribute to the destruction or adverse modification of their critical habitat") (citing USDI, Fish and Wildlife Service, Region 6 Memorandum, dated July 8, 1997); Biological Opinion for BLM Resource Management Plan (RMP), Vernal Field Office (VFO), 113 (Oct. 23, 2008), available at: http://www.blm.gov/style/medialib/blm/ut/vernal_fo/planning/rod_approved_rmp.Par.4719.File.dat/VernalBiologicalOpinion.pdf. (same).

[161] Grand Junction Field Office RMP FEIS 6-271.

provided in the White River RMPA and Little Snake RMPM are in some cases significantly less than these distances and thus inadequate to protect streams and other water bodies.

F. BLM's Finding of No Significant Impact is Arbitrary and Capricious

NEPA demands that a federal agency prepare an EIS before taking a "'major [f]ederal action[] *significantly* affecting the quality' of the environment."[162] In order to determine whether a project's impacts may be "significant," an agency may first prepare an Environmental Assessment ("EA").[163] If the EA reveals that "the agency's action may have a significant effect upon the . . . environment, an EIS must be prepared."[164]

The issues discussed above show that the potential impacts that the proposed action could have on the environment are indeed significant, which compels the preparation of an EIS. These factors include:

- the potential changes that climate change may cause as a result of oil and gas operations;
- the speculative nature of the quantity of drilling activity that could possibly occur in the next twenty years on federal, state, and private lands;
- the threat well-development poses to public health and safety; and
- the potentially devastating impacts of increased oil and gas development on endangered, threatened, and BLM-sensitive species

An EIS must be prepared if substantial "questions are raised as to whether a project . . . may cause significant degradation of some human environmental factor."[165] It is not necessary to show that significant effects will in fact occur; raising substantial questions about whether a project *may* have a significant effect is enough to trigger BLM's obligation to prepare an EIS.[166] Because the aforementioned impacts are likely to have a significant effect on the environment, BLM is legally required under NEPA to prepare an EIS. This is especially true in light of the likelihood that fracking would occur on the leases.

In considering whether the proposed oil and gas leasing would have significant effects on the environment, NEPA's regulations require BLM to evaluate ten factors regarding the "intensity"

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[162] *Kern v. U.S. Bureau of Land Mgmt.*, 284 F.3d 1062, 1067 (9th Cir. 2002) (emphasis added).
[163] 40 C.F.R. §§ 1501.4, 1508.9.
[164] *Nat'l Parks & Conservation Ass'n v. Babbitt*, 241 F.3d 722, 730 (9th Cir. 2001) (internal quotations omitted).
[165] *Ocean Advocates v. United States Army Corps of Eng'rs*, 402 F.3d 846, 864-65 (9th Cir. 2005) (internal quotes omitted).
[166] *Id*.

of the impacts.[167] The existence of any "one of these factors may be sufficient to require preparation of an EIS."[168] Several of these "significance factors" are implicated in this proposed action and clearly warrant the preparation of an EIS:

- The degree to which the effects on the quality of the human environment are likely to be highly controversial.
- The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
- The degree to which the proposed action affects public health or safety.
- The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.[169]

Here, individually and considered as a whole, there is no doubt that significant effects may result from this proposal; thus, NEPA requires that BLM must prepared an EIS for the action.

1. The Effects On The Human Environment Will Be Highly Controversial

A proposal is highly controversial when "substantial questions are raised as to whether a project . . . may cause significant degradation" of a resource, *Nw. Envtl. Def. Ctr. v. Bonneville Power Admin.*, 117 F.3d 1520, 1536 (9th Cir. 1997), or when there is a "substantial dispute [about] the size, nature, or effect of the" action. *Blue Mtns. Biodiversity*, 161 F.3d at 1212. A "substantial dispute exists when evidence, raised prior to the preparation of [a] . . . FONSI, casts serious doubt upon the reasonableness of an agency's conclusions." *Nat'l Parks & Conserv. Ass'n*, 241 F.3d at 736. When such a doubt is raised, "NEPA then places the burden on the agency to come forward with a 'well-reasoned explanation' demonstrating why those responses disputing the EA's conclusions 'do not . . . create a public controversy.'" *Id.* See *Ctr. for Biological Diversity*, 937 F. Supp. 2d 1140.

[167] 40 C.F.R. § 1508.27(b); *see also Center for Biological Diversity, et al. v. Bureau of Land Management, et al.*, 937 F. Supp. 2d 1140, 1155-59 (holding that oil and gas leases were issued in violation of NEPA where BLM failed to prepare an EIS and failed to properly address the significance factors for context and intensity in 40 C.F.R. § 1508.27).
[168] *Ocean Advocates*, 402 F.3d at 865; *Nat'l Parks & Conservation Ass'n*, 241 F.3d at 731.
[169] 40 C.F.R. § 1508.27(b)(4), (5), (2) & (9); *See Center for Biological Diversity*, 937 F. Supp. 2d at 1158-59 (holding that BLM failed to properly address the significance factors regarding controversy and uncertainty that may have been resolved by further data collection (citing *Native Ecosystems Council v. U.S. Forest Serv.*, 428 F.3d 1233, 1240 (9th Cir. 2005)).

BLM's EA provides abundant evidence that oil and gas operations can cause significant impacts to human health, water resources, air quality, imperiled species, and recreation. In addition, the EA states, "[t]here is broad scientific consensus that human actions are changing the chemical composition of Earth's atmosphere." EA at 31. It goes on to say that climate change may lead to changes, such as increased drought and wildland fire potential, in the Great Plains and Mountain West in the coming decades. EA at 37. BLM itself explains how

> This lease sale, when combined with the past, present, and reasonably foreseeable future actions may have the potential (during future development) to contribute incrementally to the deterioration of air quality in the region – development of fluid minerals on these leases would result in additional surface and subsurface disturbances and emissions during drilling, completion, and production activities. The severity of these incremental impacts could be elevated based on the amount of contemporaneous development (either federal or private) in surrounding areas.[170]

While offering the parcels for lease would not result in direct emissions of air pollutants, the future development of said leases would result in emissions of GHG, criteria, and HAP pollutants. EA at 37-42. Later development of any sold leases would result in both short- and long-term emissions of pollutants, including GHGs. EA at 38.

The EA also addresses the extensive and scientifically-controversial impacts of hydraulic fracturing, *see* Center for Biological Diversity Scoping Comment, Exh. A at 22-41, by stating that it "would change the physical properties of the oil and gas producing formations by increasing the flow of water, gas, and/or oil around the well bore in the producing formation. There also could be the potential for migration of oil, gas, and water from one formation to another." EA at 55. The level of controversy associated with climate change and hydraulic fracturing in association with the lease sale is sufficient to trigger the need for an EIS. 40 C.F.R. § 1508.27(b)(4).

2. **The Lease Sale Presents Highly Uncertain Or Unknown Risks**

An EIS must also be prepared when an action's effects are "highly uncertain or involve unique or unknown risks." 40 C.F.R. § 1508.27(b)(5). Preparation of an EIS is "mandated where uncertainty may be resolved by further collection of data, or where the collection of such data may prevent speculation on potential . . . effects."[171] According to BLM's EA, "[p]redicting the quantity of drilling activity that could possibly occur in the next twenty years on federal, state

[170] EA at 38.
[171] *Native Ecosystems Council v. U.S. Forest Serv.*, 428 F.3d 1233, 1240 (9th Cir. 2005) (internal citations omitted).

and private lands within WRFO boundaries is largely speculative," EA at 20; however, "it is predicted that there will be substantial increases in oil and gas drilling activity in the WRFO through the twenty year life of this RFD forecast scenario." EA at 20-21. NEPA dictates that the way to address such uncertainties is through the preparation of an EIS.

3. The Lease Sale Poses Threats To Public Health And Safety

The oil and gas activities that may occur as a result of the lease sale could cause significant impacts to public health and safety. 40 C.F.R. § 1508.27(b)(2). Drilling would pose a grave threat to the region's water resources, harm air quality, fuel climate change, and negatively affect wildlife. BLM's EA states that "[s]everal parcels for this Lease Sale have been identified to exist near relatively high human populated rural areas of Colorado where little oil and gas development/operations currently exist," and that "[d]ue to the proximity of these lease parcels to the nearby towns, at a minimum, near-field screening-level air quality impacts analyses would be conducted for future proposed oil and gas development on these parcels." EA at 37. If exploration and development were to occur, a variety of chemicals and other materials would be used, some of which could be classified as hazardous under various authorities. (page 169). If not managed properly, these materials, which could contain various contaminants, could be released into the environment and affect public health. EA at 186-87. The EA explains how "[p]otential impacts associated with hazardous materials could include the potential for human contact by public users and occupational exposures (e.g. inhalation or ingestion), accidental fires, surface and groundwater contamination, and impacts to vegetation and wildlife." EA at 187.

The BLM claims, contrary to its own RFD scenario and practice in other lease sale EAs, that it cannot predict the number of wells that would be developed on any particular parcel. Additionally, it cannot confidently estimate what methods of well development may or may not be employed by any successful bidder of a nominated parcel. EA at 77. Yet numerous readily-foreseeable methods of well development pose a major and inadequately disclsoed risk to public health and safety, *see* Exhibit A at 22-41, and therefore constitutes a significant impact. BLM therefore must evaluate such impacts in an EIS.

4. The Action May Adversely Affect Candidate And Agency Sensitive Species And Their Habitat

An EIS may also be required when an action "may adversely affect an endangered or threatened species or its habitat." 40 C.F.R. § 1508.27(b)(9). Although a finding that a project has "some negative effects does not mandate a finding of significant impact," an agency must nonetheless fully and closely evaluate the effects on listed species and issue an EIS if those impacts are significant. *Klamath-Siskiyou Wildlands Ctr. v. U.S. Forest Serv.*, 373 F. Supp. 2d

1069, 1081 (E.D. Cal. 2004) (finding agency's conclusion that action "may affect, is likely to adversely affect" species due to "disturbance and disruption of breeding" and "degradation" of habitat is "[a]t a minimum, . . . an important factor supporting the need for an EIS").

The Preferred Alternative of this EA states that "BLM would offer 106 parcels totaling 100,815.97 acres for lease." EA at 10. Within that expansive area live many endangered, threatened, and BLM-sensitive species that must be taken into account. The EA states that

> Development of these leases would represent incremental additions to the extent and intensity of oil and gas development activity and modification of shrubland and woodland habitats important in the support of [special status animals]. . . . Water depletions attributable to oil and gas development contribute cumulatively to the deterioration of critical habitat for the endangered Colorado River fishes and animals associated with the central Platte River system, but these effects have been evaluated and appropriately mitigated by BLM through programmatic consultation and ongoing oversight with the FWS.[172]

As discussed in detail below, endangered Colorado River fishes include the Colorado pikeminnow, razorback sucker, humpback chub, and bonytail. EA at 118. The EA states that BLM's Programmatic Biological Assessment concluded that BLM-authorize water depletions for its fluid mineral program were likely to result in adverse modification of critical habitat for these fish. EA at 126-27. Water would be affected by the further reduction of flows in critical habitat needed for endangered fishes feeding, breeding, and sheltering; physical habitat would be affected by the reduction in flows by decreasing important habitat such as backwaters, spawning bars, and inundated flood plains; and the biological environment would be affected by the increase in nonnative fishes due to altered flow regimes. *Id.* As discussed below, the 2008 Western Colorado Programmatic Biological Opinion no longer adequately addresses the known impacts to Colorado River endangered fish from oil and gas-related water depletions, and BLM cannot rely on it to meet its consultation obligations or mitigate impacts to the four endangered fish.

In addition, multiple species listed as threatened rely on appropriate flow patterns in the Platte River and its floodplain habitats and include whooping crane, northern Great Plains population of piping plover, interior least tern, pallid sturgeon, and western prairie fringed orchid. These Platte River dependent species may be affected by water depletions resulting from foreseeable development of the proposed Jackson County parcels. EA at 127-28.

[172] EA at 130.

In addition to endangered and threatened species, many migratory birds fulfill nesting functions in those shrubland, woodland, and forest habitats encompassed by the proposed leases. EA at 98-99. Those migratory birds within the proposed lease tracts and identified as being of conservation concern by BLM and FWS include the gray vireo, pinyon jay and juniper titmouse, Brewer's sparrow, flammulated owl, Williamson's sapsucker, Lewis' woodpecker, and Cassin's finch in aspen. *Id.* The EA states that "[t]hese birds are either BLM-sensitive (i.e., Brewer's sparrow) or associated with the most recent FWS list of Birds of Conservation Concern (BCC) for Bird Conservation Region 16, Southern Rocky Mountains/Colorado Plateau, all of which are birds that without conservation actions may become candidates for listing under the Endangered Species Act." EA at 98.

Other BLM-sensitive species that would be impacted by the lease sale include the midget faded rattlesnake (which has limited distribution, narrow habitat preference, low reproductive potential, low abundance, and modification of ground cover near their dens can disrupt their ability to forage effectively) (EA at 121); the Canada Lynx (whose winter foraging habitat will be impacted by leases and "[a]ny project proposal within a [Lynx Analyses Unit] would be subject to increased scrutiny through the section 7 consultation process") (EA at 125-26); and the white-tailed prairie dogs (which occupy proposed lease holdings in the WRFO and whose burrow systems provide habitat for multiple species including the burrowing owl and "in the WRFO, the potential for use by an experimental non-essential population of endangered black-footed ferret") (EA at 119-121). Because the Endangered Species Act would determine the degree to which this lease sale may adversely affect an endangered or threatened species or its habitat to be critical, the BLM must prepare an EIS.

As discussed in greater detail in Section II.G below, BLM cannot legally avoid its obligation to consider effects on these listed species by deferring Endangered Species Act consultation until after lease rights have already been conveyed. Waiting until the APD stage to consult violates BLM's duty to initiate consultation "at the earliest possible time," when meaningful consultation is possible now. *See* 50 C.F.R. § 402.14(a) ("Each Federal agency shall review its actions at the earliest possible time to determine whether any action may affect listed species or critical habitat."); *The Wilderness Society v. Wisely*, 524 F. Supp. 2d 1285, 1302 (D. Colo. 2007) (requiring Section 7 consultation before BLM's decision to resume oil and gas leasing where it was "possible… to engage in meaningful conference"); *Colorado Envtl. Coal. v. Office of Legacy Mgmt.*, 819 F. Supp. 2d 1193, 1223 (D. Colo. 2011) (requiring same for uranium leasing decision). The number of listed species affected by the proposed sale and the numerous risks posed by foreseeable development weigh heavily in favor of a determination of significant environmental effects.

G. BLM and Fish and Wildlife Service's Must Consult Over the Impacts of the Proposed Oil and Gas Leasing on Threatened and Endangered Species Pursuant to ESA Section 7

Because all of the parcels proposed for lease within the White River and Little Snake Fields Offices, and the Grand County parcels in the Kremmling Field office, fall within the Upper Colorado River Basin (including the main-stem Colorado River the White, Yampa, and Little Snake sub-basins), *see* EA at 126-27, leasing is reasonably certain to result in water depletion and water contamination impacts on the endangered fish, compelling consultation under Section 7. Moreover, to the extent BLM relies on existing programmatic consultations for the Fluid Mineral Program to comply with its Section 7 duties--i.e., the BLM's Programmatic Biological Opinion for the Fluid Mineral program in western Colorado, *see* EA at 111--such reliance is misplaced in light of new information revealing that water depletions from oil and gas development may affect listed species and their critical habitat in a manner or to an extent that was not considered in the PBOs.

A foreseeable cumulative impact from oil and gas development occurring within the project area is Colorado River water withdrawals necessary for fracking and horizontal drilling techniques. Indeed, millions of gallons of water are withdrawn from the Colorado River for oil and gas extraction. BLM must analyze the effects of the massive water demand resulting from relatively new horizontal drilling techniques in the Upper Colorado River Basin which would impact watersheds in the White River and Little Snake planning areas and the Grand County portion of the Kremmling planning area, including (1) the significant cumulative impacts on local water supplies and the Colorado River endangered fish under NEPA and (2) the cumulative impacts of water depletion effects on the Colorado River endangered fish under Section 7 of the Endangered Species Act.

The project would have significant effects on survival and recovery of the endangered Colorado pikeminnow, razorback sucker, humpback chub, and bonytail (collectively, "endangered fish"). The loss of adequate flows in the endangered fishes' habitat within the Upper Colorado River Basin is so serious that the Service has determined that *any* depletion of Upper Basin stream flows adversely affects and jeopardizes the endangered fish.[173] Because the

[173] U.S. Bureau of Land Management, White River FEIS at 3-71 (2015) ("The FWS has determined that any federally authorized depletion from the Upper Colorado River Basin has an adverse effect on listed Colorado River fishes."); Biological Opinion for BLM Resource Management Plan (RMP), Price Field Office (PFO), 138 (Oct. 27, 2008) ("The USFWS determined that any depletion will jeopardize their continued existence and will likely contribute to the destruction or adverse modification of their critical habitat (citing USDI, Fish and Wildlife Service, Region 6 Memorandum, dated July 8, 1997), available at http://www.blm.gov/style/medialib/blm/ut/price_fo/Planning/rod_approved_rmp.Par.2742.File.dat/Price%20Biological%20Opinion.pdf; Biological Opinion for BLM Resource Management Plan (RMP), Vernal Field Office (VFO),

project is within the Upper Colorado River Basin and will involve horizontal drilling of an estimated 146 wells per year within the Little Snake and White River planning areas, *see* EA 39 & Table 3-6, the project is reasonably certain to result in water depletion and water contamination impacts on the endangered fish, compelling consultation under Section 7. BLM cannot proceed with the leasing decision at issue until it has analyzed the resulting wells' water depletion and water pollution impacts on the endangered fish, and consulted with Fish and Wildlife Service regarding the project's impacts on the endangered fish. To the extent BLM intends to rely on the Programmatic Biological Opinion for the Fluid Mineral Program's water depletions[174] (PBO) to comply with its Section 7 duties, *see* EA at 111, such reliance is misplaced in light of new information revealing that water depletions from oil and gas development may affect listed species and their critical habitat in a manner or to an extent that was not considered in the PBO.

1. Background on ESA Section 7

Congress enacted the ESA to provide "a program for the conservation of . . . endangered species and threatened species." 16 U.S.C. § 1531(b). Section 2(c) of the ESA establishes that it is "the policy of Congress that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act." 16 U.S.C. § 1531(c)(1). The ESA defines "conservation" to mean "the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this [Act] are no longer necessary." 16 U.S.C. § 1532(3). Section 7(a)(1) of the ESA explicitly directs that all federal agencies "utilize their authorities in furtherance of the [aforesaid] purposes" of the ESA. 16 U.S.C. § 1536(a)(1).

Section 7 of the ESA requires BLM, in consultation with the Fish and Wildlife Service ("FWS"), to insure that any action authorized, funded, or carried out by the agency is not likely to (1) jeopardize the continued existence of any threatened or endangered species, or (2) result in the destruction or adverse modification of the critical habitat of such species. 16 U.S.C. § 1536(a)(2). For each proposed federal action, BLM must request from FWS whether any listed or proposed species may be present in the area of the agency action. 16 U.S.C. § 1536(c)(1); 50 C.F.R. § 402.12. If listed or proposed species may be present in such area, BLM must prepare a

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113 (Oct. 23, 2008)(same), available at http://www.blm.gov/style/medialib/blm/ut/vernal_fo/planning/rod_approved_rmp.Par.4719.File.dat/VernalBiologicalOpinion.pdf.

[174] U.S. Fish and Wildlife Service, Programmatic Biological Opinion for Water Depletions Associated with Bureau of Land Management's Fluid Mineral Program within the Upper Colorado River Basin in Colorado (Dec. 19, 2008) ("PBO").

"biological assessment" to determine whether the listed species may be affected by the proposed action. Id.

If BLM determines that its proposed action may affect any listed species or critical habitat, the agency must engage in formal consultation with FWS. 50 C.F.R. § 402.14. To complete formal consultation, FWS must provide BLM with a "biological opinion" explaining how the proposed action will affect the listed species or habitat. 16 U.S.C. § 1536(b); 50 C.F.R. § 402.14. If FWS concludes that the proposed action will jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of critical habitat, the biological opinion must outline "reasonable and prudent alternatives." 16 U.S.C. § 1536(b)(3)(A).

BLM's oil and gas leasing proposal is an agency action under the ESA. Action is broadly defined under the ESA to include all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies, including the granting of leases, and actions that will directly or indirectly cause modifications to the land, water, or air. 50 C.F.R. § 402.02

Agencies are required to reinitiate ESA consultation if (1) the amount or extent of taking specified in the incidental take statement is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the action is modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. 50 C.F.R. § 402.16.

2. BLM and FWS Must Reinitate Consultation over the Programmatic Biological Opinion Governing Fluid Mineral Development Water Depletions (All Parcels Except Jackson County)

Leasing of the parcels at issue would foreseeably entail significant water depletions within the Upper Colorado River Basin, increased surface disturbance, and toxic spills from hydraulic fracturing and horizontal drilling, all of which can adversely affect endangered fish that inhabit areas within and downstream of the lease areas. All of the parcels except Jackson County parcels (COC -78279, -78305, -78306, -78310, -78311, -78312, -78307, -78308, -78298, -78299 and -78313) fall within the Upper Basin and therefore fall under the PBO. While the PBO is designed to address any depletions resulting from oil and gas development within the Little Snake, White River and other western Colorado field offices, BLM cannot rely on that consultation for its Section 7 compliance for the reasons discussed below. To the extent that approval of the lease sale would rely on the Western Colorado PBO, such reliance is arbitrary

and cannot constitute BLM's Section 7 compliance. BLM must either reinitiate consultation on the PBO or initiate section 7 consultation on the lease sale.

The Western Colorado PBO does not take into account the enormous water depletion effects of horizontal drilling and other unconventional well development techniques. The PBO is also unreliable in numerous other respects due to significant new information revealing that the Fluid Mineral Program may have effects on the endangered fish in a manner or to an extent not previously considered. This includes new information about (a) the potential for increased oil and gas development and horizontal drilling within emerging shale plays, including the Mancos shale play in the Piceance Basin; (b) climate change effects on Upper Colorado River Basin stream flows; (c) long-term drought and increased water demand which have drastically reduced water supplies; (d) mercury and selenium pollution effects on the endangered fish; (e) declining humpback chub and Colorado pikeminnow populations and failure to meet these populations' recovery targets; (f) the Recovery Program's failure to meet recommended stream flows necessary for recovery of the endangered fish; and (f) BLM's failure to adequately monitor and track actual water use and depletions in the Upper Colorado River Basin, which could result in higher water use and greater depletions in the RMP and leasing area than anticipated in the Western Colorado PBO.

a. New Drilling, Fracking, and Horizontal Drilling Will Require Greater Water Depletions Than Previously Anticipated.

Although the 2008 PBO is designed to address any depletions resulting from oil and gas development within western Colorado field offices, it did not consider the likely increase in horizontal drilling and other unconventional drilling practices that deplete enormous amounts of water to develop the Mancos shale play. Nor did it consider the use of these water-intensive practices throughout the rest of the programmatic action area, including the Grand Junction, Little Snake, Uncompahgre, White River, Gunnison, Colorado River Valley, and Kremmling Field Offices.[175]

The PBO Fails to Consider Increased Horizontal Drilling Within the Piceance Basin

Water use within the Upper Colorado River Basin has been grossly underestimated in the PBO, because it fails to take into account increased horizontal drilling that could be used to develop the Mancos/Mowry and Niobrara shale plays. These increased water depletion impacts throughout the entire Upper Basin could alter the Service's analysis of the Fluid Mineral Program's depletion effects on the endangered fish, as all BLM-authorized fluid mineral

[175] BLM Instruction Memorandum CO-2011-022 (April 11, 2011) ("All of the estimates in the PBO were based on using conventional vertical drilling technology.").

development activity within the Basin is part of a single programmatic action that impacts the endangered fish.

For example, in the White River planning area, the PBO projects that new vertical wells would consume 2.62 acre-feet per well, while in the Grand Junction planning area, vertical wells would require require 0.77 acre-feet of water per well. But BLM water depletion logs indicate that between FY2011 and FY2015, the average depletion for horizontal wells in BLM's western Colorado field offices was 26.45 acre-feet of water per well in the field offices covered by the PBO.[176] Indeed, in FY2015 horizontal drilling in the Grand Junction Field Office resulted in a violation of the PBO's Incidental Take Statement (ITS) water depletion limit in the Colorado River sub-basin—under the ITS, water depletions are a surrogate for take. In FY2015, an operator drilled eight horizontal wells in the Grand Junction Field Office, which consumed a total of 620.87 acre-feet of water.[177] The total amount of water depleted in the Colorado River sub-basin by all horizontal and vertical wells was 691.09 acre-feet of water, which exceeds the 379 acre-feet annual projection for this sub-basin by 1.8 times.[178]

This drastic increase in the use of water-intensive horizontal drilling techniques was not considered in the PBO, nor in BLM's consultations over the recent White River, Kremmling, and Little Snake RMP amendments or revisions, which only relied on the PBO regarding the RMPs' water depletion effects.

Moreover, recently, on June 8, 2016, the U.S. Geological Survey published a report re-assessing the total technically recoverable reserves in the Mancos shale play in the Piceance Basin, including the Niobrara strata of the play.[179] According to the report, the Mancos shale play's total technically recoverable natural gas reserves are over 40 times greater than the USGS's 2003 estimate and is the second-largest in the U.S., behind the Marcellus shale.[180] Specifically, 66.3 trillion cubic feet of natural gas, 74 million barrels of oil and 45 million barrels of natural gas liquids are potentially recoverable.[181] While tight gas in the younger, shallower Mancos shale intervals is produced primarily from vertical and directional wells in which the reservoirs have been hydraulically fractured, the tight gas and continuous oil and gas in the older and deeper intervals of the Mancos shale are produced mostly from horizontal wells that have

[176] *See* Water Depletion Logs which are completed, pursuant to requirements within the PBO, on an annual basis by the BLM to estimate water depletion resulting from fluid minerals development on BLM lands in western Colorado.
[177] *Id.*
[178] *Id.*
[179] Assessment of Continuous (Unconventional) Oil and Gas Resources in the Late Cretaceous Mancos Shale of the Piceance Basin, Uinta-Piceance Province, Colorado and Utah (2016) ("USGS 2016"), available at http://pubs.usgs.gov/fs/2016/3030/fs20163030.pdf.
[180] *See id.*
[181] *Id.*

been hydraulically fractured.[182] These reserves underlie large areas of the Grand Junction, White River, Royal Gorge, Colorado River Valley, Uncompahgre, and Gunnison Field Offices, all of which fall under the PBO.[183]

Increasing interest in the Mancos Shale Play should therefore be expected given its enormous production potential. Water depletions throughout the entire Upper Colorado River Basin could therefore exceed projected water use estimates in the Western Colorado PBO. Indeed, since the 2003 USGS assessment, more than 2,000 wells have already been drilled and completed in one or more intervals of the study area.[184] A review of BLM oil and gas projects in western Colorado indicates that operators are planning a number of projects involving horizontal drilling, which would most likely target the Mancos shale.[185]

For example, the proposed Bull Mountain Unit Master Development Plan anticipates the development of 146 new gas wells, including horizontal gas wells, which would require the depletion of 744.1 acre-feet of fresh water.[186] Per well fresh water use would amount to just over five acre-feet, nearly five times greater than the PBO's projections for vertical well depletions in the Gunnison River sub-basin.[187] The anticipated life of the project is six years, with an average of 27 wells drilled per year.[188] Total fresh water depletions divided by the six year duration of the project amounts to 124 acre feet of fresh water depleted annually. The PBO's estimated total *annual* water depletions from the Gunnison sub-basin at 16 acre-feet.[189] The preferred alternative, then, would likely lead to annual water depletions from the Gunnison River sub-basin of over seven times greater than projected in the PBO.

Accordingly, Mancos shale drilling projects could increase within the Upper Basin, but the PBO does not take into account this expansion in new development potential. Because the RMPs for the Piceance Basin field offices overlapping the Mancos shale play do not limit total new wells that may be drilled, the greater amount and availability of technically recoverable oil and gas reserves could result in the development of many more new wells in the Upper Basin than assumed in the RMPs and the PBO. For example, the RFDs for the Colorado River Valley and White River RMPs did not take into account Mancos shale drilling (other than exploratory

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[182] *Id.*
[183] Center for Biological Diversity, Map of Mancos Shale, Exh. G..
[184] *Id.*
[185] *See* Center for Biological Diversity, Spreadsheet of Horizontal Well Projects in Colorado, Exh. H.
[186] Bull Mountain Unit Master Development Plan Final Environmental Impact Statement (FEIS) (January 2015), DOI -BLM-CO-S050-201 3-0022-EIS, at ES-1, ES-8, ES-10-11, available at http://www.blm.gov/style/medialib/blm/co/information/nepa/uncompahgre_field/13-22_bull_mountain.Par.23863.File.dat/Bull_Mtn_DEIS_Jan2015_508_reduced.pdf.
[187] *Id.*
[188] *Id.* at, ES—7.
[189] Bull Mountain FEIS at 3-31, Figure 3-4.

wells) and thus such drilling is not considered in the PBO.[190] Further, a substantial portion of new wells would be horizontal wells, as the lower strata of the Mancos formation would likely be accessed via horizontal drilling, but again, the PBO does not take into account the extraordinarily higher water use of horizontal wells. Water depletions throughout the entire Upper Colorado River Basin could therefore exceed projected water use estimates in the PBO, both at the basin-wide and sub-basin levels.

b. Climate Change Is Reducing Stream Flows in the Upper Colorado River Basin.

The PBO does not analyze or even mention climate change and its potential to reduce stream flows in the Upper Basin, which could amplify the effects of water depletions on the endangered fish and reduce the effectiveness of the Endangered Fish Recovery Program (e.g., by reducing the availability of water to supplement natural flows in dry years). The best available scientific data indicate that climate change is resulting in higher temperatures in the Colorado River Basin, reduced snowpack, diminished runoff, and more frequent and intense droughts, which have already reduced and will continue to reduce stream flows in the Basin. As shown in the Center's attached literature review (Exh. K), ample studies document these effects and predict continuing flow declines.[191]

In the Colorado River basin, temperatures have increased roughly by 2° F, and "additional decades of warming are 'locked in' regardless of any behavioral changes that may or may not be implemented by the world's governments"—roughly an additional 5° F of warming can be expected in the basin by 2050.[192] Recently, researchers for the first time used historical data to show temperature-driven stream flow declines in the Upper Basin. As described in the Center's attached literature review (Exh. K):

An empirical study of the influence of precipitation, temperature, and soil moisture on upper Colorado River basin streamflow over the past century found that warmer temperatures have already resulted in flows less than expected based on precipitation levels (Woodhouse et al. 2016). Consistent with past research, the study found that cool season precipitation explains most of the variability in annual streamflow. However, temperature was highly influential in

[190] *See* White River RMP FEIS at K-358 ("Development of the Mancos and Niobrara outside the Rangely Field in Rio Blanco County in the WRFO are not [] currently well defined and are exploratory in nature. This development is in the initial stages of the exploration phase to determine of the maturity of the reservoir and the potential viability of the Niobrara within the WRFO.").
[191] Wolf, Shaye Ph.D. Impacts of Climate Change on the Colorado River Basin, Center for Biological Diversity (March 10, 2016) (Exhibit K).
[192] Colorado River Research Group, Climate Change and the Colorado River: What We Already Know (Oct. 2016), available at http://www.coloradoriverresearchgroup.org/uploads/4/2/3/6/42362959/crrg_climate_change.pdf.

determining streamflow under certain conditions. The study concluded that "[s]ince 1988, a marked increase in the frequency of warm years with lower flows than expected, given precipitation, suggests continued warming temperatures will be an increasingly important influence in reducing future UCRB water supplies." The researchers warned that "streamflow forecasts run the risk of overprediction if warming spring and early summer temperatures are not adequately considered."[193]

According to the study's press release it is the "first to examine the instrumental historical record to see if a temperature effect [on stream flows] could be detected."[194] The study's lead author highlighted its significance: "If we have a warmer spring, we can anticipate that the flows will be less relative to the amount of snowpack[.]….What we're seeing is not just the future – it's actually now. That's not something I say lightly."[195]

Another recent study has formally linked the Upper Colorado River system's declining flows to warming temperatures in the region.[196] The 2017 study examined historical and recent temperatures, precipitation, and river flows, and concluded that temperatures averaging 1.6ºF above normal in the Upper Basin contributed to one-third or more of the river's 19%/year decline in flow from 2000 to 2014: "Fifteen years into the 21st century, the emerging reality is that climate change is already depleting Colorado River water supplies at the upper end of the range suggested by previously published projections.[197] Projecting these results into the future based on current greenhouse gas emissions and trends, the authors concluded that "Unabated greenhouse gas emissions will lead to continued substantial warming, translating to 21st century flow reductions of 35% or more."[198]

In addition to reducing the overall amount of water in the Upper Colorado River Basin by 35% or more, these climate change effects would worsen effects from toxic spills by increasing the concentration of pollutants and toxic contaminants. Climate change is also likely to exacerbate mercury and selenium pollution effects on the Colorado pikeminnow. Mercury deposited into soil from coal burning and selenium will increasingly run off into streams with increased heavy rainfall events.[199] More frequent and severe wildfire events will result in

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[193] *Id*. at 2.
[194] American Geophysical Union, Colorado River Flows Reduced by Warmer Spring Temperatures (March 9, 2016), available at http://news.agu.org/press-release/colorado-river-flows-reduced-by-warmer-spring-temperatures/.
[195] *Id*.
[196] Bradley Udall and Jonathan Overpeck, The 21st Century Colorado River Hot Drought and Implications for the Future, Water Resources Research 53 (2017), doi:10.1002/2016WR019638.
[197] *Id*.
[198] *Id*.
[199] National Wildlife Federation, Swimming Upstream: Freshwater Fish in a Warming World, 19 (2013), available at http://www.nwf.org/~/media/PDFs/Global-Warming/Reports/NWF-Swimming%20Upstream-082813-B.ashx.

increased charring of soil, releasing mercury and selenium that can wash off into streams.[200] Warmer water conditions will hasten the conversion of mercury into toxic methylmercury.[201]

BLM and the Service must reinitiate consultation on the Fluid Mineral Program in light of new evidence that climate change and warming temperatures are reducing Colorado River stream flows and may affect the endangered fish and its critical habitat in a manner and to an extent not previously considered.

c. Persistent Drought Conditions and Increasing Water Demand Have Reduced Water Supply

Compounding this threat to the endangered fish are persistent drought conditions that have diminished natural flows in the Colorado River Basin and reduced water storage that is needed to supplement Upper Basin flows. The period from 2000 to 2015 was the lowest 16-year period for natural flow in the last century, and one of the lowest 16-year periods for natural flow in the past 1,200 years, according to paleorecords.[202] As a result, water storage in the Colorado River system reservoirs have declined "from nearly full to about half of capacity," and led to local shortages in the Upper Colorado's sub-basins.[203] The cause of this drought is only partially due to low precipitation: "In contrast to the more precipitation-driven current California drought, lack of precipitation is only partially to blame for the Colorado River runoff declines during the last 15 years. Instead, approximately a third, or more, of the recent Colorado River flow reduction is most likely a result of record-setting warmth."[204]

Further, population growth will increase water demand for agriculture and municipal uses, making it increasingly difficult to ensure sufficient water availability for the endangered fish, which rely on the release of stored water, especially in dry years.[205] An ever widening gap between water supply and water demand is weakening the Colorado River water supply system's reliability and ability to buffer the system in dry years.[206] According to the U.S. Geological Survey, "increased water demand and declining water availability make the restoration of endangered fish habitat extremely challenging."[207] This growing gap between supply and

[200] *Id*.
[201] *Id*.
[202] Bureau of Reclamation, Managing Water in the West: SECURE Water Act Section 9503(c) Report to Congress, Chapter 3, Colorado River Basin at 3-64 (2016) (Chapter 3)
[203] *Id*.
[204] Udall and Overpeck at 5-6.
[205] *See* Bureau of Reclamation 2016 at 3-7, 3-8.
[206] *Id*. at 3-10, 3-12.
[207] USGS, Effects of Climate Change and Land Use on Water Resources in the Upper Colorado River Basin, 5 (2010), available at https://pubs.usgs.gov/fs/2010/3123/pdf/FS10-3123.pdf.

demand in the Upper Colorado River Basin must be taken into account in a reinitiated consultation.

d. Mercury and Selenium Are Adversely Impacting the Endangered Fish

New scientific information regarding (a) mercury and selenium effects on fish reproduction and population viability, (b) mercury and selenium concentrations in Upper Colorado and White River fish, (c) the potential role of oil and gas development in mercury contamination levels in the White River, (d) the potential for development of the Mancos shale play to increase selenium pollution, and (e) the relationship between climate change and mercury and selenium toxicity constitutes new information revealing that the Fluid Mineral Program may have effects on the endangered fish to an extent that was not considered in the PBO, and requires reinitiation of consultation over the Fluid Mineral Program.[208]

Mercury contamination is harming Colorado pikeminnow populations

The PBO's discussion of the environmental baseline for, and threats to, the Colorado pikeminnow and razorback sucker contains no discussion whatsoever of environmental and tissue mercury contamination or the resulting toxicity and reproductive impairment to the endangered fish. Significant new research since the 2008 PBO has demonstrated that elevated levels of mercury in Colorado pikeminnow muscle tissue, including within the Upper Colorado River Basin, are at concentrations likely to cause reproductive and behavioral impairment to the fish.[209]

Mercury is a potent neurotoxin shown to cause numerous reproductive and endocrine impairments in fish in laboratory experiments, including effects on production of sex hormones, gonadal development, egg production, spawning behavior, and spawning success.[210] Concentrations of mercury in Colorado pikeminnow in the Upper Basin are documented to be

[208] 50 C.F.R. § 402.16(b).
[209] USFWS, Upper Colorado River Endangered Fish Recovery Program, Colorado pikeminnow (*Ptychocheilus lucius*), 5-Year Review: Summary and Evaluation 21 (2011) ("[T]he recovery goal revision needs to consider the impacts of mercury. . . the majority (64 %) of Colorado pikeminnow may be experiencing some reproductive impairment through mercury exposure.") ("Colorado Pikeminnow 5-year Review"); USFWS, Biological Opinion for the Four Corners Power Plant and Navajo Mine Energy Project at 76 & Table 3 (April 8, 2015) ("Four Corners Biological Opinion")
[210] USFWS, 2014-2015 Assessment of Sufficient Progress Under the Upper ColoradoRiver Endangered Fish Recovery Program in the Upper Colorado River Basin, and of Implementation of Action Items in the December 20, 1999, 15-Mile Reach Programmatic Biological Opinion and December 4, 2009, Gunnison River Basin Programmatic Biological Opinion, 10 (Oct. 7, 2015) ("2015 Sufficient Progress Assessment")

well in excess of the thresholds for reproductive impairment and population-level impacts.[211] 2008-2009 muscle tissue averages were 0.60 mg/Kg Hg for Colorado pikeminnow in the Upper Colorado basin and 0.95 mg/Kg Hg for Colorado pikeminnow in the White River – well above the 0.2 mg/kg threshold of concern.[212]

Mercury deposition and accumulation in critical habitat is attributable to a number of local and global factors, including air emissions from coal-fired power plants both in the immediate region and around the world.[213] In addition, because of discrepancies in mercury concentrations between pikeminnow in the Yampa and White Rivers, research suggests that "[i]t is possible that there is some localized sources of mercury contamination into the White River drainage connected with oil and gas exploration and development."[214]

Once mercury is deposited on land or water, it is converted into a biologically available form, methylmercury (MeHg) by bacteria. Methylmercury "bioaccumulates in food chains, and particularly in aquatic food chains, meaning that organisms exposed to MeHg in their food can build up concentrations that are many times higher than ambient concentrations in the environment."[215] Once it accumulates, mercury is a potent neurotoxin, affecting fish in many ways, including brain lesions, reduced gonadal secretions, reproductive timing failures, reduced ability to feed, suppressed reproductive hormones, reduced egg production, reduced reproductive success, and transfer of mercury into developing eggs.[216] Although the precise effects vary with relative concentrations, mercury and selenium may have synergistic toxic effects at certain ratios.[217]

The Service has acknowledged that its recovery planning for the Colorado pikeminnow needs updating to reflect this new information regarding mercury:

> In addition, the recovery goal revision needs to consider the impacts of mercury. Beckvar et al. (2005) associated studies involving survival, growth, reproduction, and behavior and recommended that 0.2 mg/kg in whole fish be viewed as

[211] *See* Barb Osmundson and Joel Lusk, Field assessment of mercury exposure to Colorado pikeminnow within designated critical habitat (May 5, 2011) ("Osmundson & Lusk 2011")
[212] *See* Four Corners Biological Opinion at 76 & Table 3; *see generally* Beckvar, N., T.M. Dillon, and L.B. Reads, Approaches for linking whole-body fish tissue residues of mercury or DDT to biological effects threshold, Environmental Toxicology and Chemistry 24:2094-2105 (2005)
[213] *See* Four Corners Biological Opinion at 73-74; Osmundson & Lusk 2011 at 9-10.
[214] *Id*. at 29.
[215] Four Corners Biological Opinion at 73.
[216] *See* Lusk, Joel D., USFWS, Mercury (Hg) and Selenium (Se) in Colorado Pikeminnow and in Razorback Sucker from the San Juan River, 17 (2010), available at https://www.fws.gov/southwest/sjrip/pdf/DOC_Evaluation_Hg_Se_SJR_pikeminnow%20or_razorback_SJRIP_BC_2010.pdf.
[217] Four Corners Biological Opinion at 103.

> protective, while adverse biological effects are more likely at higher concentrations. Based on this threshold, the majority (64 %) of Colorado pikeminnow may be experiencing some reproductive impairment through mercury exposure. Management strategies for controlling anthropogenic mercury emissions are necessary as atmospheric pollution can indirectly affect this endangered species, its critical habitat, and its recovery by ambient air exposure, deposition into aquatic habitat and bioaccumulation in diet and in fish tissues.[218]

Moreover, the Service's 2015 Sufficient Progress Assessment for the Recovery Program acknowledges that population viability studies show that mercury- and selenium-related reproductive impairment is likely to influence population levels in the San Juan Basin,[219] but no comparable analysis has yet been done for the higher levels of contamination present in Upper Colorado River Basin fish.

The significant difference in mercury concentrations in fish found in the neighboring Yampa and White Rivers also offers significant new information potentially relevant to the effect of BLM-authorized oil and gas development. Osmundson and Lusk found very high (average 0.95 mg/Kg WW) mercury concentrations in Colorado pikeminnow and in the White River, and lower (0.49 mg/Kg) concentrations in the neighboring Yampa.[220] Based on this discrepancy, they noted:

The Yampa and White rivers are relatively close geographically in northwestern Colorado. Because of this proximity, it is interesting that the Yampa River had the lowest mercury concentrations in Colorado pikeminnow while the White River had the highest mercury concentrations. If most of the mercury was from aerial wet and dry deposition, the two drainages should be similar. This difference may indicate a localized source/s of mercury contamination into the White River drainage. There are currently >2,600 gas and oil wells in Rio Blanco county. It is possible that there is some localized sources of mercury contamination into the White River drainage connected with oil and gas exploration and development.[221]

Although site-specific information for the Upper Basin planning areas appears scarce, there is scientific as well as circumstantial evidence that oil and gas operations can contribute to mercury contamination.[222] The Western Colorado PBO does not consider the effect of oil and

[218] Colorado Pikeminnow 5-year Review at 21; *see also* Significant Progress Assessment at 10-11.
[219] 2015 Sufficient Progress Assessment at 10-11.
[220] Osmundson & Lusk 2011 at 21 & Table 2.
[221] *Id.* at 29 (citations omitted).
[222] *See* U.S. EPA, National Risk Management Research Laboratory, Mercury in Petroleum and Natural Gas: Estimation of Emissions from Production, Processing, and Combustion, EPA/600/SR-01/066 (Oct. 2001);

gas development within the White, Yampa and Little Snake River watersheds on the threat to Colorado pikeminnow and razorback sucker from mercury toxicity.

Nor does the PBO give any consideration to the multiple ways in which climate change will exacerbate mercury and selenium contamination and toxicity. Climate change can foreseeably be predicted to increase heavy rainfall events and ensuing runoff, increase pollutant concentrations due to reduced flows during low-flow periods, and contribute to increased methylmercury conversion due to higher temperatures.

Selenium pollution is harming the endangered fish

Selenium harms the endangered fish and other aquatic species through bioaccumulation in the food chain. Concentrations of 3µg/g in the food chain have been found to cause gill and organ damage in certain fish and may lead to death.[223] These bioaccumulative effects resulting in direct toxicity to juvenile and adults are known as "Type 1" effects. Moreover, selenium bioaccumulation can result in maternal transfer of selenium to fish egg yolks and lead to developmental abnormalities, known as "Type 2 effects."[224] Waterborne concentrations of selenium in the 1-5 µg/L range can bioaccumulate and lead to Type 1 and/or Type 2 effects.[225]

Recent studies reveal significant exposures of the endangered fish to selenium. In one study analyzing selenium concentrations of 26 fish specimens collected from designated critical habitat in the Gunnison River, one Colorado pikeminnow specimen exhibited concentrations in muscle plugs that exceeded the 8 micrograms per gram dry weight toxicity guideline for selenium in fish muscle tissue.[226] Several species, including the razorback sucker and Colorado pikeminnow, exhibited selenium exposures in excess of the critical concentration at which Type 1 health effects begin to occur.[227]

In the Lower Gunnison River Basin, 2014 data indicated a range of dissolved selenium (chronic values) from 0.97 µg/L to 16.7 µg/L along the Uncompahgre River. Out of 18 sites in the lower Gunnison that were considered, the Colorado water-quality standard for chronic

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Visvanathan, C., Treatment and Disposal of Mercury Contaminated Waste from Oil and Gas Exploration Facilities (1993) available at http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.549.9515&rep=rep1&type=pdf

[223] Lemly, A.D., Appalachian Center for the Economy & the Environment and Sierra Club, Aquatic hazard of selenium pollution from mountaintop removal coal mining, 3 (2009) ("Lemly 2009").

[224] Lemly 2009 at 3 ; Hamilton, S.J., Review of residue-based selenium toxicity thresholds for freshwater fish, Ecotox. Environ. Saf. 56: 201-210 (2003).

[225] *See id.*

[226] May, Thomas W. and Michael J. Walther, USGS, Determination of selenium in fish from designated critical habitat in the Gunnison River, Colorado, March through October, 2012, Open-File Report 2013-1104, 2 (2013)

[227] *Id*.

dissolved selenium of 4.6 µg/L was exceeded at two sites.[228] In regards to acute values, the range measured was from 1.1 µg/L for a portion of the Uncompahgre River to 125 µg/L along a portion of Loutzenhizer Arroyo, with 125 µg/L being well in excess of any criteria for instantaneous selenium measurements.[229] In another 2015 study, mean concentrations of selenium in various fish species in the lower Colorado River Basin exceeded the risk for maternal transfer to eggs, while selenium concentrations in various species of macroinvertebrate prey exceeded the risk value for larval fishes.[230] Average selenium concentrations in the studied fish species were found to be 2- to 4-fold higher than the risk threshold for piscivorous (fish-eating) wildlife, with samples exceeding this threshold in 81-100% of cases depending on the species. The risk value for larval fishes, who either absorb selenium via maternal transfer to eggs or through invertebrate diet, was exceeded in 56-100% of cases depending on the adult species (with risk posed to larvae due to maternal transfer), and 86-100% of cases among invertebrates (with risk posed to larval fishes through diet). Thus, the transfer of selenium toxicity from invertebrates to fish to piscivores is readily observable.[231]

Natural erosion and runoff, as well as selenium leaching into irrigation runoff, are the primary sources of this toxic pollutant. The weathering of Cretaceous marine shales can produce high selenium soils, which are present in many areas of the western U.S.[232] Most notable of these Cretaceous shales is the Mancos Shale, which is found in Colorado, Utah, Wyoming, New Mexico, and Arizona. Irrigation of selenium-rich soils for crop production in arid and semi-arid regions can mobilize selenium and move it off-site in surface water runoff or via leaching into groundwater.

In addition, neither the EA nor the PBO consider the potential for increased development of the Mancos shale play to increase selenium pollution of surface waters. Underground fractures induced by hydraulic fracturing may create a pathway for selenium-laced produced waters to reach surface waters. Moreover, surface spills of produced waters from the Mancos Formation would put endangered fish at risk.

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[228] Henneberg, M.F., 2014 annual summary of the lower Gunnison River Basin Selenium Management Program water-quality monitoring, Colorado: U.S. Geological Survey Open-File Report 2016–1129, 25 p. (2016), http://dx.doi.org/10.3133/ofr20161129.

[229] *Id.*

[230] Walters, David M., et al. Mercury and selenium accumulation in the Colorado River food web, Grand Canyon, USA. Environmental Toxicology and Chemistry, 34(10):2385-2394, 2390 (2015).

[231] *Id.*

[232] Lemly, A.D., Guidelines for evaluating selenium data from aquatic monitoring and assessment studies. Environ. Monitor. Assess. 28(1):83-100 (1993).

e. Population Numbers of the Endangered Fish Are Declining

Colorado pikeminnow populations are in decline throughout the Upper Colorado River Basin, indicating that the Recovery Plan for the endangered fish has not been effective and that the impacts of water depletions could be more severe than previously anticipated.

According to the Fish and Wildlife Service, the latest 2014 Colorado River sub-basin population number of 501 is "cause for great concern," and catch of sub-adults and adults in 2013 and 2014 "were near lowest observed in the history of the project."[233] 2015 catch numbers are within the same range, which suggests that the population estimate for 2015 will be similar to the 2014 estimate.[234] FWS's latest Sufficient Progress Assessment for the Endangered Fish Recovery Program, which includes the latest population estimates for 2015, show endangered fish populations have continued to decline.[235] In the Colorado River sub-basin, Colorado pikeminnow populations have steadily declined since 2005.[236] The long-term and short-term population estimates of 596 and 446 adults fall far short of the downlisting criteria of 700 adults.[237] Recruitment rates "may not be frequent enough to support stability in the adult populations in the long term."[238] Data from 2015 showing the absence of pikeminnow smaller than 300 mm "suggests spawning success and/or recruitment has been poor the previous three years."[239] Nonnative predation and competition are a major threat to the Colorado pikeminnow population in this sub-basin.[240]

The Recovery Program has also failed to meet the downlisting criteria that recruitment of age-6, naturally-produced fish equal or exceed mean annual adult mortality. The abundance of adult recruits has failed to exceed annual adult mortality "in most years" and "appears insufficient to offset overall adult mortality since 2000."[241] Compounding this problem, population densities of age-0 fish in the middle Green River from 1994 to 2008 were

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[233] 2015 Sufficient Progress Assessment at 23, 36 (noting average monthly flows significantly below 810 cfs in 15-mile reach in 2012 and 2013).
[234] *See* USFWS, Monitoring the Colorado Pikeminnow Population in the Mainstem Colorado River via Periodic Population Estimates, p. 3 (Nov. 2015), available at http://www.coloradoriverrecovery.org/documents-publications/work-plan-documents/arpts/2015/rsch/127.pdf (showing similar capture rates of pikeminnow in 2014 and 2015).
[235] USFWS, 2015-2016 Assessment of Sufficient Progress Under the Colorado River Endangered Fish Recovery Program in the Upper Colorado River Basin, and Implementation of Action Items in the January 10, 20015, Final Programmatic Biological Opinion on the Management Plan for Endnagered Fishes in the Yampa River Basin, 4-14 (Dec. 20, 2016) ("2016 Sufficient Progress Assessment")
[236] *Id*. at 4.
[237] *Id*. at 4, 6.
[238] *Id*. at 4.
[239] *Id*. at 8.
[240] *See id*. at 7.
[241] 2016 Sufficient Progress memo at 4.

"precariously low."[242] New research reveals that the "mechanisms driving frequency and strength of recruitment events was likely the strength of age-0 Colorado pikeminnow production in backwater nursery habitats.[243] Further, "multiple consecutive years of age-0 densities" are important to the strength of adult populations seven to ten years later.[244] Research by Bestgen and Hill (2015) shows that declines in summer base flows in August and September were correlated with declining densities of age-0 Colorado pikeminnow in the lower and middle reaches of the Green River.[245] The researchers recommended increased base flow magnitudes to support increased age-0 production (1,700 and 3,000 cfs in the middle Green River and 1,700 and 3,800 cfs in the lower Green River).

In 2015, releases from Flaming Gorge Dam resulted in base flow levels within these ranges, and "a significant increase in fall recruitment was observed, underscoring the value of manipulating Flaming Gorge Dam releases as a main recovery action to benefit Colorado pikeminnow recruitment in the Green River."[246] However, it is unclear to what extent Bureau of Reclamation or other water users have committed to these base flow increases, and whether they will be sustained as water supplies dwindle with increased water demand and climate change effects on stream flows. The Sufficient Progress Assessment only notes that "Reclamation's summer base flow releases [from Flaming Gorge Dam] now target a preferred flow range to improve survival of young Colorado pikeminnow."[247]

The Yampa River portion of the Green River sub-basin population also "remains low and may be in further decline."[248] Recent studies show that Colorado pikeminnow declines in the Yampa River are linked to "persistent high densities of nonnative predators (e.g., smallmouth bass and northern pike [])," and that northern pike are outnumbering Colorado pikeminnow by three to one.[249] The weakening of the Yampa River portion of the sub-basin population makes it even more critical to ensure that habitat for the Green River portion of the Green River sub-basin population is not degraded and remains a stronghold for the species. Bestgen et al. 2016 (in review), however, "now report that the decline in adult and subadult Colorado pikminnow has spread though the entire Green River Subbasin."[250]

[242] *Id*.
[243] *Id*. at 11.
[244] *Id*.
[245] *Id*.
[246] *Id*. at 11-12.
[247] *Id*. at 41.
[248] 2015 Sufficient Progress Memo at 7.
[249] *Id*. at 8; 2016 Sufficient Progress Memo at 12.
[250] *Id*. at 12.

Humpback chub numbers are also low. The U.S. Fish and Wildlife Service is "concerned that wild populations of humpback chub in Black Rocks and Westwater Canyon of the Colorado River (near the Colorado-Utah state line) have not recovered from declines detected in the late 1990's. The reason for those population declines is uncertain."[251] After this steep reduction, the Black Rocks/Westwater population continued to decline.[252] In 2008, the population "dropped below the population size downlist criterion (MVP = 2,100 adults) for the first time."[253] In 2011 and 2012, the core population estimates were 1,846 and 1,718, respectively.[254] "Colorado State University's recent robust population analysis more clearly indicated that declines in the Westwater and Black Rock humpback chub populations are due to lapses in recruitment."[255]

These declining population numbers are new baseline conditions, such that the endangered fish could be more vulnerable to water depletion and other oil and gas development effects than previously assumed. These downward trends also strongly suggest that the Endangered Fish Recovery Program is not achieving recovery targets nor adequately offsetting water depletion effects as intended.

f. The Recovery Program Is Failing to Meet Recommended Flows

A consistent pattern of failing to meet recommended flows in the Colorado River's 15-Mile Reach requires BLM and the Service to reinitiate consultation over the Fluid Mineral Program.

The Recovery Program establishes minimum recommended flows within various segments of the Upper Colorado River Basin that should be maintained to ensure recovery of the endangered fish.[256] The Western Colorado PBO's effects analysis assumes that, at the very least, the minimum recommended flow of 810 cubic feet per second (cfs) for dry years will be maintained within the 15-Mile Reach of the Colorado River within Colorado's Grand Valley in the Grand Junction Field Office.[257] The 15-Mile Reach extends from the confluence of the Gunnison River in Grand Junction to Palisade, Colorado, fifteen miles upstream.[258] According to

[251] 2015 Sufficient Progress Memo at 36.

[252] *Id*. at 13.
[253] *Id*.
[254] *Id*. at 13-14; *see also* 2016 Sufficient Progress Memo at 15 (confirming numbers remain "below core criteria level" and average of 5 estimates since 2004 is 1,426 adults compared to average of 2,490 adults since 1998).
[255] *Id*. at 20.
[256] *See id*. at 41; USFWS, Final Programmatic Biological Opinion for Bureau of Reclamation's Operations and Depletions, Other Depletions, and Funding and Implementation of Recovery Program Actions in the Upper Colorado River above the Confluence with the Gunnison River, 54 (Dec. 1999) ("Colorado River PBO"), available at http://www.coloradoriverrecovery.org/documents-publications/section-7-consultation/15mile/FinalPBO.pdf .
[257] PBO at 42, 48.
[258] PBO at 4.

the Service, when flows drop below 810 cfs, "habitat becomes compromised to the point that adult pikeminnow likely vacate the 15-Mile Reach to points downstream where flows increase either due to tributary input from the Gunnison River or irrigation return flow."[259] The 15-Mile Reach is one of the most important habitats to the Colorado pikeminnow and razorback sucker,[260] providing important spawning grounds for both species and year-round habitat for the Colorado pikeminnow.[261]

In its discussion of the environmental baseline, the Western Colorado PBO notes various recommended flows for the Colorado River sub-basins, including minimum flows for wet years, wet-average years, dry-average years, and dry years.[262] The PBO notes that in some recent years, recommended flows have not been met in the 15-Mile Reach.[263] However, the PBO's effects analysis assumes that the lowest recommended flow for dry years (810 cfs) will be maintained; this minimum flow is the baseline by which the PBO determined the Fluid Mineral Program's depletion effects on the Colorado pikeminnow.[264]

The Endangered Fish Recovery Program's 2015 Sufficient Progress Assessment indicates that recommended flows for dry years in the 15-Mile Reach of the Colorado River were not met in 2012 and 2013.[265] Flows also fell short of recommended levels in 2015, despite it being a dry-average precipitation year. In April, May, August and October 2015, the 15-Mile Reach missed the recommended minimum average flows for those months for dry-average precipitation years.[266] This average year shortfall (following a "wet-average" year) strongly suggests that minimum recommended flows for later dry years will almost certainly not be met when water will be scarcer, and as declining stream flows overall due to climate change weaken the

[259] *See* 2015 Sufficient Progress Assessment at 34-35; Osmundson, Douglas B. & Patrick Nelson, USFWS, Relationships Between Flow and Rare Fish Habitat in the '15 Mile Reach' of the Upper Colorado River Final Report, 6 (1995), available at http://www.coloradoriverrecovery.org/documents-publications/technical-reports/isf/OsmundsonNelson1995.pdf ("Osmundson 1995").
[260] PBO at 36, 42; Colorado River PBO at 25, 32, 45; Osmundson 1995 at 6.
[261] PBO at 36; Colorado River PBO at 31-32.
[262] PBO at 41-44.
[263] *See id*. at 42-44 (e.g., "Since the publication of the spring flow recommendations in 1991, peak 1-day average flows through the 15-mile reach have been below 12,900 cfs approximately one-third of the years through 2006 and these targets have not been met."); *id*. at 42 ("Mean monthly flows have…dropped below 810 cfs [the minimum flow for drought years] for at least one of the summer-time months during 7 of the last 17 years (1991-2007).").
[264] *Id*. at 48.
[265] *See* 2015 Sufficient Progress Assessment at 34 (noting average monthly flows significantly below 810 cfs in 15-mile reach in 2012 and 2013); *id*. at 31 (recognizing need to reduce the amount of time flows drop below 810 cfs in the 15-Mile Reach).
[266] *Compare* Colorado River PBO at 40-41 (recommended mean monthly stream flows for 15-Mile Reach) *with* U.S. Geological Survey, Surface Water Monthly Statistics (1991 - 2016.

Recovery Program's ability to supplement natural flows in dry years.[267] Indeed, in the period since the Western Colorado PBO was adopted, between 2009 and 2015, the Recovery Program has failed to meet mean monthly recommended flows in the 15-Mile Reach in over half of all months.[268] According to the 2016 Sufficient Progress Assessment, "[t]he Recovery Program still struggles to meet flow recommendations in drought years. The Service emphasizes the importance of meeting the flow recommendation. Some of these recommendations have not been met historically and may be unattainable."[269] This new information strongly suggests that critical habitat within the 15-Mile Reach is likely to be unsuitable for the Colorado pikeminnow and razorback sucker in dry years, and that flow depletions from oil and gas development will only exacerbate these unsuitable conditions and reduce these species' chances of recovery.

The Recovery Program's continuing pattern of failing to meet recommended flows is new information revealing that the Fluid Mineral Program may have effects on the endangered fish to an extent that was not considered in the Western Colorado PBO or any of the RMPs that rely on the PBO in this leasing decision.

3. Allowing New Leasing While BLM Evaluates New Information Concerning the Endangered Fish Violates BLM's Consultation Duties and Risks Violation of ESA Section 7(d)

Recently, in BLM's response to the Center and Sierra Club's protest of the Colorado State Office's Grand Junction Field Office December 8, 2016 lease sale, BLM stated its intent to prepare a new programmatic biological assessment on the Fluid Mineral Program, while at the same time allowing the December lease sale to go forward. BLM, however, cannot have it both ways—relying on the PBO to support new leasing, while also revising its analysis. Under these circumstances, proceeding with new leasing violates BLM's obligations to consult before its proposed action and insure against jeopardy.

As an initial matter, BLM's December 2016 protest response asserts that the "2008 PBO is still suitable to support the decision to lease parcels in the Upper Colorado River Basin area," on the flawed basis that the PBO's overall basin-wide depletion threshold had not been exceeded.[270] This ignores the fact that the PBO's Colorado River sub-basin depletion threshold was exceeded in FY2015, in violation of the PBO. BLM's implicit position that the PBO does

[267] *See* n. 259 above & accompanying text (noting ability to buffer Colorado River system will become more difficult as streamflows decrease).
[268] *See* Center for Biological Diversity's comparison of USGS monthly mean flow data to recommended flow (spreadsheet showing 15-Mile Reach flows and months with shortfall) (Attached as Exh. L).
[269] 2016 Sufficient Progress Assessment at 38.
[270] BLM Colorado, Protest Decision on December 2016 Oil and Gas Competitive Lease Sale, 13 (Dec. 7, 2016) ("December 2016 Protest Decision").

not establish sub-basin depletion limits (in contrast to its prior suggestion)[271] is contrary to common sense and the PBO. Depletions in a particular sub-basin may significantly affect local endangered fish populations; otherwise, there would be no reason for the PBO to analyze the effects of depletions at the sub-basin level, or to require BLM to track and report depletions to FWS by sub-basin, as it does.

More troublingly, BLM's assertion, EA at 127, that the 2008 PBO still validly supports its leasing decision does not square with BLM's recognition, in the same decision, of "the need to consider new information and re-evaluate changing conditions on the Upper Colorado River" and to "prepar[e] an updated Programmatic Biological Assessment (PBA)."[272] The PBA, BLM notes, "may consider information about new drilling techniques and re-examine the extent and location of fluid mineral reserves by river basin. The PBA will also evaluate how climate change and contaminants (specifically selenium and mercury) are affected by water depletions associated with BLM's fluid mineral program."[273] As the foregoing section shows, all of these factors are important considerations on the long-term viability of the endangered fish, which must be considered *before* any new depletions are allowed. And given FWS's finding that any water depletion is likely to jeopardize the endangered fish, BLM cannot dismiss the effects of any depletions resulting from its leasing decision. New depletions could result in significant adverse effects on the fish before BLM and FWS have had a chance to evaluate their potential effects in light of these significant new circumstances. In addition, BLM has never consulted over the depletion and spill effects of new leasing in the particular areas at issue. Leasing of the parcels here could have localized effects on endangered fish downstream which have not been considered in any prior consultation, given the much higher water depletion effects and increased surface water contamination risks that could result from increased fracking, horizontal drilling, and wastewater and frack fluid transport and storage in the leasing areas.

In the absence of a valid Section 7 consultation covering the Fluid Mineral Program and BLM's leasing decision, BLM is in violation of its Section 7 duties to both consult over the lease sale's depletion effects on the endangered fish and to insure against jeopardy to the species, before auctioning new leases. 16 U.S.C. § 1536(b). Waiting until the APD stage to consult violates BLM's duty to initiate consultation "at the earliest possible time," when meaningful consultation is possible now. *See* 50 C.F.R. § 402.14(a) ("Each Federal agency shall review its

[271] *See* BLM, Protest Decision on Center for Biological Diversity's Protest of May 12, 2016 Competitive Oil & Gas Lease Sale (May 12, 2016) ("Moreover, consistent with the 2008 PBO, average annual depletions, regardless of the drilling technology employed, would not be allowed to exceed 369 acre-feet [i.e., Little Snake Field Office's projected water depletion] without further BLM and Fish and Wildlife Service analysis and reinitiated Section 7 consultation.").
[272] December 2016 Protest Decision at 13.
[273] *Id*.

actions at the earliest possible time to determine whether any action may affect listed species or critical habitat."); *The Wilderness Society v. Wisely*, 524 F. Supp. 2d 1285, 1302 (D. Colo. 2007) (requiring Section 7 consultation before BLM's decision to resume oil and gas leasing where it was "possible… to engage in meaningful conference"); *Colorado Envtl. Coal. v. Office of Legacy Mgmt*., 819 F. Supp. 2d 1193, 1223 (D. Colo. 2011) (requiring same for uranium leasing decision).

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

> we hold that agency action in this case entails not only leasing but leasing and all post-leasing activities through production and abandonment. Thus, section 7 of the ESA on its face requires the FWS in this case to consider all phases of the agency action, which includes postleasing activities, in its biological opinion. Therefore the FWS was required to prepare, at the leasing stage, a comprehensive biological opinion assessing whether or not the agency action was likely to jeopardize the continued existence of protected species, based on "the best scientific and commercial data available." 16 U.S.C. § 1536(a)(2).

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

The Ninth Circuit's decision in *Conner v. Burford* is similarly clear that the consultation requirement is not obviated by uncertainty about the precise location and extent of future drilling: "Although we recognize that the precise location and extent of future oil and gas activities were unknown at the time, extensive information about the behavior and habitat of the species in the areas covered by the leases was available."[274] Similarly, the inclusion of a general Threatened and Endangered Species stipulation in the standard lease terms cannot substitute for the ESA Section 7 obligation to prepare a comprehensive biological opinion at the initial leasing stage:

> Appellants ask us, in essence, to carve out a judicial exception to ESA's clear mandate that a comprehensive biological opinion -- in this case one addressing the effects of leasing and all post-leasing activities -- be completed before initiation of the agency action. They would have us read into the ESA language to the effect that a federal agency may be excused from this requirement if, in its judgment, there is insufficient information available to complete a comprehensive opinion and it take upon itself incremental step consultation such as that embodied in the

[274] *Id.* at 1453.

> T & E stipulations. We reject this invitation to amend the ESA. That it is the role of Congress, not the courts.

Id. at 1455.

The BLM's refusal to consult at the lease stage, and proposal to defer consultation to the APD stage, is precisely the sort of incremental step consultation decisively rejected as inconsistent with the ESA in *Conner v. Burford*.[275] BLM must cancel the lease sale and halt all new leasing within the Upper Colorado River Basin until adequate consultation on the Fluid Mineral Program and proposed lease sale has been completed.

4. BLM Must Analyze And Consult Over The Project's Water Pollution And Contamination Effects On The Endangered Fish

The risk of spills, leaks, and sedimentation contaminating and degrading endangered fish critical habitat will increase with new leasing. Contamination of surface and groundwater from oil and gas activities commonly occurs within the Upper Basin. Between January 2008 and July 2014, operators reported at least 135 spills or leaks that resulted in releases to surface or groundwater in the Upper Basin – many of these from facilities under BLM's jurisdiction.[276] The contamination of streams from oil and gas activities is therefore real and not hypothetical.

The potential for spills to move from tributaries into endangered fish critical habitat within main-stem rivers was shown by a 2014 spill into the Green River. On the night of May 20, 2014 an oil well operated by SW Energy on lands administered by BLM "blew out," leaking an estimated 100 barrels per hour of crude oil and production water into Salt Wash which leads to the Green River. SW Energy did not shut-in the well until 1:20 p.m. on May 22, at least 36 hours later. On May 24, flooding from a thunderstorm "overcame prevention measures" washing an unknown quantity of oil and produced water 1.5 miles from Salt Wash into the Green River and critical habitat for endangered fish.[277] The U.S. Fish and Wildlife Service's recent Biological Opinion for the Gasco Energy Inc. Field Development Project anticipates these events and the potential for more frequent spills given expanded drilling:

> There is a greater potential for impacts from pollutants, if a pipeline, well pit, or other source were to inadvertently release contaminated fluids into waterways at

[275] Further, there is no assurance that BLM would even consult under Section 7 at the APD or site-specific stage. Instruction Memorandum 2010-023 allows projects to go forward without Section 7 consultation if (1) the project or well operator has signed a Recovery Agreement under terms set forth by the PBO, if the project or APD is located in the Yampa or Colorado river sub-basins; or (2) if the project is located in the White, Dolores, or Gunnison river sub-basins. Accordingly, BLM typically does not perform Section 7 consultation for water depletions at the APD stage.
[276] Spills Data (all Upper Basin tab) (Attached as Exh. M).
[277] BLM. 2014. Update: Salt Wash Oil Spill, available at http://www.blm.gov/ut/st/en/fo/moab/SaltWashSpill.html.

> points near the Green and White Rivers. Through direct or indirect discharge, these pollutants could reach the Green River and negatively impact water quality to the point of affecting native fish populations. Direct impacts will result from a discharge from a pipeline or well pit reaching the Green River in its original form or within a single release event. Indirect effects occur when discharges are released to the ground and are later released to the river after being carried by an erosion event or carried by rain or snowmelt runoff. As more well and pipeline development occurs in the project area the chance of pollutants reaching the Green River increases, thus increasing the potential of harm to native fish populations.[278]

Like the above Green River incident, some spills or leaks are not detected until long after they have started.[279]

At least four parcels within the White River Field Office portion of the proposed lease sale physically encompass designated critical habitat on portions of the White River occupied by Colorado pikeminnow.[280] Spills occurring in close proximity to critical habitat the White River, could expose endangered fish fish to potentially lethal levels of toxic substances Given this risk and declining populations of endangered fish, which could be severely crippled by a single catastrophic event, it would only take one spill in the lease areas to detrimentally harm the endangered fish. The potential for a blowout to result in a large spill like the Salt Wash incident, and harm critical habitat, should be addressed.

It is also possible that large volumes of chemical substances escape undetected until reaching surface sediments or waters, which could result in chronic sub-lethal effects. The Gasco Biological Opinion explains that this is especially possible with smaller leaks:

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[278] Fish and Wildlife Service, Biological Opinion for the Gasco Energy Inc. Field Development Project ("Gasco BO"), Dec. 2011, p. 26, available at http://www.blm.gov/style/medialib/blm/ut/vernal_fo/planning/gasco_eis/gasco_rod.Par.56176.File.dat/Gasco%20ROD%20Attachment%205%20BO.pdf.

[279] *See* MacPherson, James, "ND wants answers on ruptured pipeline inspections," AP, Oct. 16, 2013, available at http://bigstory.ap.org/article/experts-question-north-dakota-oil-spill-estimates (spill released from quarter-inch pipeline hole contaminated wheat field the size of seven football fields); Vanderklippe, Nathan. "Spill sends 22,000 barrels of oil mix into Alberta muskeg," *The Globe and Mail*, May 30, 2012, available at http://www.theglobeandmail.com/globe-investor/spill-sends-22000-barrels-of-oil-mix-into-alberta-muskeg/article4219809/ (22,000-barrel wastewater pipeline spill not detected until after it had reached surface waters and was spotted by aircraft); Vanderklippe, "Toxic waste spill in northern Alberta biggest of recent disasters in North America," *The Globe and Mail*, June 12, 2013, available at http://www.theglobeandmail.com/report-on-business/industry-news/energy-and-resources/apache-pipeline-leaks-60000-barrels-of-salty-water-in-northwest-alberta/article12494371/ (9.5 million liter spill of produced water from pipeline suspected to be "longstanding" given the extent of damage over 42 hectares).

[280] EA at 118.

> The effects of smaller leaks that may cause chronic, sub-lethal effects to fish populations may be more prevalent. While the oil and gas industry has a wide variety of methods available to detect substantial leaks or integrity breeches, the technology for detection of small "pinhole" leaks is not as advanced. This creates a significant problem in that the current available methodology may allow small leaks to go undetected for extended periods of time often evading detection until they are manifested on the surface sediments or water.[281]

The potential for leaks and spills of condensate, crude oil, fracking chemicals, and produced water must be analyzed in an EIS. Produced waters are essentially highly saline waters that rise to the surface from deep underground after completion of a well, and must be disposed. Many recent spills in the Upper Basin involve spillage of produced water. If spilled, the effects of produced water or brine can be more severe and longer-lasting than oil spills, because salts do not biodegrade or break down over time. The only way to deal with them is to remove them.[282] Increased levels of total dissolved solids in surface waters are associated with higher rates of fish mortality.[283] Further, produced waters can contain copper, iron, lead, manganese, arsenic, cadmium, nickel, zinc, chromium, selenium, and sodium bicarbonate at levels above thresholds that are harmful to aquatic organisms, including fish.[284] The project may result in the spillage of large volumes of produced waters, wastewaters, fracking fluids, or other chemicals which may be transported to or from the project site via trucks and pipelines, or stored onsite in tanks and pits.

The EIS must discuss baseline environmental conditions regarding the existing risk of spills from all past and present projects, as well as any foreseeable risks of spills from state and private future projects. According to BLM's analysis of oil and gas spills in Colorado, spills can travel as far as 1,800 feet before contaminating surface water.[285]

BLM and FWS must formally consult over the risk of spills and leaks from oil and gas activities on the endangered fish. BLM must also formally consult regarding the project's sedimentation impacts on the endangered fish.

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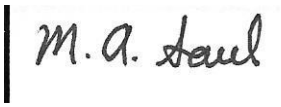
[281] Gasco BO, p. 27.
[282] King, Pamela, Limited study supports findings on bigger brine spill risks, E&E News (Nov. 4, 2015).
[283] Tuckwiller, Ross, Annotated Bibliography: Potential Impacts of Energy Development on Fisheries in the Rocky Mountain West Prepared for Theodore Roosevelt Conservation Partnership Fish, Wildlife, & Energy Working Group at 17, available at http://www.trcp.org/documents/ANNOTATED_BIB.pdf.
[284] *Id*. at 21-22 (extremely elevated chromium concentrations in fish exposed to produced waters), p. 23 (fish showing lesions and kidney damage after exposure to sodium bicarbonate).
[285] BLM, Grand Junction Resource Management Plan Final EIS at 6-271 (2015), available at http://www.blm.gov/co/st/en/fo/gjfo/rmp/rmp/docs.html.

III. Conclusion

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. Unconventional oil and gas development not only fuel the climate crisis but entail significant public health risks and harms to the environment. Accordingly, BLM should end all new leasing 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.

For the reasons set forth above, BLM must defer the inclusion of all parcels in the the proposed lease sale, and 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

Sincerely,



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List of Exhibits

A. Center for Biological Diversity, Scoping Comments on the May 2017 Competitive Oil and Gas Lease Sale (Sept. 7, 2016)

B. WildEarth Guardians & Save the Colorado, Scoping Comments, May 2017 Oil and Gas Lease Sale (Sept. 7, 2016)

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