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October 17, 2008

Gene Terland, State Director  
U.S. Bureau of Land Management, Montana State Office  
5001 Southgate Drive  
Billings, Montana 59101-4669

**Re: PROTEST OF BLM's NOVEMBER 4, 2008 OIL & GAS LEASE SALE**

Dear State Director Terland:

Common Ground United, Defenders of Wildlife, Oil and Gas Accountability Project, and WildEarth Guardians ("Coalition") hereby protest the U.S. Bureau of Land Management's ("BLM") entire November 4, 2008 lease sale for the states of Montana, North Dakota, and South Dakota. *See* Exhibit 1 (maps detailing protested parcels based on BLM's Competitive Oil & Gas Lease Sale Notice).<sup>12</sup> Based on BLM's Competitive Oil and Gas Lease Sale Notice, 78 parcels are being offered for sale in Montana, North Dakota, and South Dakota totaling 62,728.023 acres.

This Protest is predicated on BLM's failure to address global warming and climate change and the adverse consequences of this failure to the Coalition's interests (detailed below).<sup>3</sup> Of note, in March, June, and again in August, several of the Coalition members identified and raised identical concerns regarding BLM's April 8, 2008, June 17, 2008, and August 26, 2008 lease sales for Montana and North Dakota. However, BLM proceeded with those lease sales and has yet to reach a decision. Nevertheless, BLM is moving

<sup>1</sup> These maps were created using BLM's lease sale data in the Lease Sale Notice.

<sup>2</sup> All of the exhibits referenced in this Protest are provided as electronic PDFs on the attached CD. Of note, most of the exhibits in this Protest were provided to BLM in hard copy in protests submitted March 21, 2008, May 31, 2008, and August 8, 2008. As hard copies of these exhibits are already available to BLM, we have only included hard copies of documents that were not previously provided to BLM with the March, May, and August protests.

<sup>3</sup> Global warming is a product of the greenhouse effect whereby greenhouse gases in the atmosphere trap the sun's heat and prevent it from being released into space. While the greenhouse effect is essential to life on earth, the marked increased in greenhouse gases from human activities has warmed the Earth's climate and thus set in motion a chain of impacts to the climate and the life systems that rely upon the climate.

forward, without any meaningful effort to address climate change concerns, with the November 4, 2008 lease sale.

We are thus compelled to emphasize, once again, that oil and gas production, processing, transmission, and distribution activities emit greenhouse gas pollution (“GHG”) into the atmosphere, contributing to global warming and climate change.<sup>4</sup> Global warming and climate change also impacts the environment, stressing if not overcoming even strong, resilient ecological systems, in particular given the cumulative surface impacts caused by the spiderweb of oil and gas infrastructure on the landscape when coupled with impacts caused by other activities and events on the landscape. These impacts must therefore be addressed by BLM as it plans and implements management decisions.

Before surrendering lease rights, we therefore ask BLM to prepare an environmental analysis pursuant to the National Environmental Policy Act (“NEPA”) to address the global warming and climate change issues and concerns identified by this Protest. We emphasize that this analysis must be prepared *before* lease rights are sold and issued. This is for the simple reason that lease rights convey a right to develop the leasehold. 40 C.F.R. § 3101.1-2. On this point, BLM too often tries to shield its actions from scrutiny by playing a misleading shell-game. The game is begun by BLM pointing to broad, often outdated management plans and environmental analyses as a basis for lease decisions. These plans and analyses, however, do not address climate change. To obfuscate and distract from these deficiencies, BLM next promises future environmental analyses which will supposedly be prepared at the drilling stage to address environmental concerns. Such post-lease sale analyses are, however, untenable as a matter of law as they would be prepared – if at all – *after* lease rights are conveyed. Thus, BLM breaches the legal point of commitment without first preparing the requisite front-end NEPA analysis. BLM’s shell-game is not merely unlawful but, also, an affront to the public’s right to be meaningfully involved in oil and gas management decisions.

In preparing the requisite environmental analyses, we surmise that an Environmental Impact Statement, rather than an Environmental Assessment, will be necessary given the potential for significant impacts. We further surmise the BLM will need to coordinate the NEPA process with Resource Management Plan (“RMP”) revisions or amendments. 43 C.F.R. §§ 1610.5-5, 1610.5-6. Like NEPA analyses, RMP-level planning processes should be completed before BLM breaches the legal point of commitment. RMP-level planning processes will also best enable BLM to ensure compliance with its obligations pursuant to other federal laws, in

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<sup>4</sup> The IPCC ([www.ipcc.ch/pdf/glossary/tar-ipcc-terms-en.pdf](http://www.ipcc.ch/pdf/glossary/tar-ipcc-terms-en.pdf)) defines GHGs as follows:

Greenhouse gases are those gaseous constituents of the *atmosphere*, both natural and *anthropogenic*, that absorb and emit radiation at specific wavelengths within the spectrum of *infrared radiation* emitted by the Earth’s surface, the atmosphere, and clouds. This property causes the *greenhouse effect*. Water vapor (H<sub>2</sub>O), *carbon dioxide* (CO<sub>2</sub>), *nitrous oxide* (N<sub>2</sub>O), *methane* (CH<sub>4</sub>), and *ozone* (O<sub>3</sub>) are the primary greenhouse gases in the Earth’s atmosphere. Moreover there are a number of entirely human-made greenhouse gases in the atmosphere, such as the *halocarbons* and other chlorine- and bromine-containing substances, dealt with under the *Montreal Protocol*. Besides CO<sub>2</sub>, N<sub>2</sub>O, and CH<sub>4</sub>, the *Kyoto Protocol* deals with the greenhouse gases *sulfur hexafluoride* (SF<sub>6</sub>), *hydrofluorocarbons* (HFCs), and *perfluorocarbons* (PFCs).

particular section 7 of the Endangered Species Act (“ESA”). Many ESA-listed species will obviously be impacted by climate change and, given their predicament, may be exceptionally vulnerable to climate change. Such vulnerabilities only accentuate BLM’s obligations to address climate change. In any event, *before* any lease parcels are offered for sale, we specifically ask BLM to:

- (1) Quantify past, present, and reasonably foreseeable emissions of GHG pollution from BLM-authorized oil and gas development to address the direct, indirect, and cumulative impacts of these GHG emissions to the environment;
- (2) Identify, consider, and adopt an emissions limit for GHG pollution or a GHG emissions reduction objective for BLM-authorized oil and gas activities;
- (3) Identify, consider, and adopt management measures – such as pre-commitment lease stipulations and post-commitment conditions of approval<sup>5</sup> – to reduce emissions of GHG pollution from BLM-authorized oil and gas management activities;
- (4) Track and monitor emissions of GHG pollution from BLM-authorized oil and gas operations through time;
- (5) Consider how global warming and climate change impacts the environment, including threatened and endangered species, and whether such impacts warrant additional environmental protections;
- (6) Provide for formal public review and comment at the scoping and draft NEPA analysis stages, providing, if EAs are prepared, at least a 30-day scoping period, and a 30-day public review and comment period on draft EAs before the EAs are completed and, if EISs are prepared, at least a 60-day scoping period, and a 120-day public review and comment period on draft EISs before the EISs are completed.

At the outset, it is important to emphasize that this Protest is not intended to prohibit oil and gas development. Rather, this Protest is designed to ensure that federally-authorized oil and gas development is held to the highest science-based standards, facilitate responsible domestic energy production, and protect the resiliency and integrity of our natural heritage. In some instances, this may require BLM to withdraw certain parcels from sale. Fundamentally, BLM lease sale decisions must not exacerbate already daunting problems implicated by climate change.

The following sections constitute the statement of reasons in support of this Protest.

- **Section I** identifies the Protestors’ interests;

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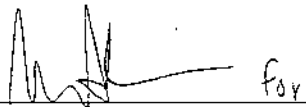
<sup>5</sup> There are critical legal distinctions between BLM’s expansive pre-commitment authority to subject a lease to stipulations at the lease stage, and BLM’s far more limited post-commitment authority to subject a lessee’s exercise of its contractually-enforceable lease rights to conditions of approval at the Application for Permit to Drill stage.

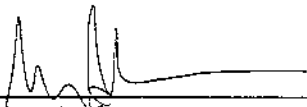
- **Section II** articulates the core reasons compelling BLM's urgent need to address global warming and climate change;
- **Section III** explains the legal basis mandating BLM action;
- **Section IV** details the specific actions, (1) – (6), identified above, that BLM must take;
- **Section V** demonstrates the failures of the RMPs, RMP-stage NEPA analyses, and other analyses that BLM is presumably using to justify the lease sale (Section V).

We acknowledge that global warming and climate change present BLM with complicated issues. Our immediate intent in submitting this Protest is to ensure that BLM complies with existing legal duties to address global warming and climate change and thereby ensure that lease sale decisions are properly authorized. Ultimately, we hope that BLM can pivot from its current failure to address global warming and climate change to lead an effort that engages federal and state partners, the public, and the oil and gas industry in a constructive, transparent dialogue.

If you have any questions, or would like to discuss this Protest in person, please do not hesitate to contact the Coalition's undersigned counsel at 575.751.0351.

Sincerely,

 for  
 Erik Schlenker-Goodrich  
 Western Environmental Law Center  
 Attorney and Director, Southwest Office  
 P.O. Box 1507  
 Taos, New Mexico 87571  
 Counsel for Protestors/Coalition

  
 Megan Anderson  
 Western Environmental Law Center  
 Attorney, Southwest Office  
 P.O. Box 1507  
 Taos, New Mexico 87571  
 Counsel for Protestors/Coalition

*On behalf of:*

Johnny Micou  
 Common Ground United

Peter Nelson  
 Defenders of Wildlife

Bruce Baizel  
 Oil and Gas Accountability Project, a program of EARTHWORKS

Jeremy Nichols  
 WildEarth Guardians

**STATEMENT OF REASONS IN SUPPORT OF CGU, *et al.*'s PROTEST OF THE U.S. BUREAU OF LAND MANAGEMENT'S NOVEMBER 4, 2008 LEASE SALE FOR MONTANA, NORTH DAKOTA, AND SOUTH DAKOTA**

**TABLE OF CONTENTS**

I.	<u>ORGANIZATIONAL INTERESTS</u> .....	7
II.	<u>THE THREAT OF GLOBAL WARMING AND CLIMATE CHANGE DEMANDS IMMEDIATE ACTION BY BLM.</u> .....	7
III.	<u>BLM IS LEGALLY OBLIGATED TO ADDRESS GLOBAL WARMING AND CLIMATE CHANGE.</u> .....	10
	1. Secretarial Order 3226 Requires that BLM Consider and Analyze Potential Climate Change Impacts. ....	10
	2. The Federal Land Policy and Management Act Requires that BLM Consider and Analyze Potential Climate Change Impacts. ....	11
	3. The National Environmental Policy Act Requires that BLM Consider and Analyze Potential Climate Change Impacts. ....	13
	4. The Public Trust Duty Requires that BLM Consider and Analyze Potential Climate Change Impacts. ....	24
	5. The Endangered Species Act Requires that BLM Engage in Section 7 Consultation with the Fish & Wildlife Service. ....	25
IV.	<u>BLM MUST ADDRESS GLOBAL WARMING, CLIMATE CHANGE, AND GREENHOUSE GAS EMISSIONS FROM FEDERAL ONSHORE OIL AND GAS DECISIONMAKING ACTIONS BEFORE LEASE RIGHTS ARE SOLD.</u> .....	27
	1. BLM Must Quantify Past, Present, and Reasonably Foreseeable GHG Emissions from Oil and Gas Development to Address the Direct, Indirect, and Cumulative Impacts of these GHG Emissions to the Environment. ....	27
	2. BLM Must Identify, Consider, and Adopt a GHG Emissions Limit or GHG Reduction Objective for BLM-authorized Oil and Gas Activities. ....	35

3.	BLM Must Identify, Consider, and Adopt Management Measures to Reduce GHG Emissions from BLM-authorized Oil and Gas Management Activities. ....	37
4.	BLM Must Track and Monitor GHG emissions from BLM-authorized Oil and Gas Operations through Time. ....	44
5.	BLM Must Consider How Global Warming and Climate Change Impact the Environment, and Whether Such Impacts Warrant Additional Environmental Protections. ....	44
	a. Climate Change Impacts – Summary Information.....	44
	b. Climate Change Impacts to Water.....	49
	c. Climate Change Impacts to Ecosystems.....	56
	d. Climate Change Impacts to Socioeconomic Conditions.....	63
V.	<u>BLM HAS FAILED TO ADDRESS GLOBAL WARMING, CLIMATE CHANGE, AND GREENHOUSE GAS EMISSIONS FROM FEDERAL ONSHORE OIL AND GAS DECISIONMAKING ACTIONS.</u> .....	66

## **I. ORGANIZATIONAL INTERESTS.**

Common Ground United (“CGU”) is a nonprofit organization dedicated to providing a platform to allow diverse organizations, from local to national, to express a united voice concerning the protection of our water, cultural, ecological, and economic resources and the health and safety of our citizens from the adverse impacts of all extractive resource developments. CGU’s governing principles include collaboration, and ensuring that local citizens must have a meaningful role in developing extractive resource development policies and the determining voice in their communities. With roots in New Mexico, CGU understands that climate change is an interconnected global, national, regional, and local scale problem.

Defenders of Wildlife (“Defenders”) is a non-profit conservation organization founded in 1947 and based in Washington, D.C., with offices across the country, including Montana. Defenders is dedicated to protecting and restoring all native wild animals and plants in their natural communities. As global warming is perhaps the greatest threat facing wildlife and their habitats today, Defenders is committed both to addressing the causes of global warming and to helping wildlife adapt to the significant climate change impacts we are already witnessing.

The Oil and Gas Accountability Project (“OGAP”) is a program of Earthworks, a 501(c)(3) nonprofit dedicated to working with communities to reduce and prevent the devastating impacts of drilling, digging and mining. OGAP/Earthworks works with community groups, landowners, organizations, and individuals to protect our environment, public health, and communities. OGAP provides technical, policy, and organizing assistance, and serves as a clearinghouse of information for organizations and individuals concerned with oil and gas development throughout the United States. As a nonprofit organization dedicated to supporting the public interest on a number of issues associated with oil and gas development, OGAP’s interests in this process are based solely on our interest in participating in, and informing the public at large about, energy policy in the United States.

WildEarth Guardians is a non-profit corporation with approximately 9,000 members and supporters throughout the United States. WildEarth Guardians protects and restores wildlife, wild rivers and wild places in the American West. WildEarth Guardians is dedicated to protecting the greater Southwest and neighboring regions from the dangers it faces from the climate crisis. WildEarth Guardians members and staff have recreational, aesthetic, scientific, professional, and spiritual interests in the areas at issue in this protest and in areas that would be impacted if the proposed actions go forward.

## **II. THE THREAT OF GLOBAL WARMING AND CLIMATE CHANGE DEMANDS IMMEDIATE ACTION BY BLM.**

In its November 2007 Synthesis Report, Summary for Policymakers, the Nobel-prize winning Intergovernmental Panel on Climate Change (“IPCC”) determined that “[w]arming of the climate system is unequivocal” and, further, that “[o]bservational evidence from all continents and most oceans shows that many natural systems are being affected by regional

climate changes, particularly temperature increases.”<sup>6</sup> According to Rajendra Pachauri, the IPCC’s Chairman, “If there’s no action before 2012, that’s too late ... What we do in the next two to three years will determine our future. *This is the defining moment.*”<sup>7</sup>

Simply put, BLM is part of this defining moment. BLM itself has explained that the intersection of global warming and climate change with BLM’s management of the public lands “requires public engagement, science drawn from many disciplines, and careful balancing of multiple goals.” Government Accountability Office, *Climate Change: Agencies Should Develop Guidance for Addressing the Effects on Federal Land and Water Resources* at 174 (Aug. 2007) (“2007 GAO Report”) (attached as Exhibit 4). The Protestors could not agree more. Fortunately, as detailed below, Congress has provided BLM with the legal tools to address the two distinct, though intertwined, land protection and management elements implicated by this intersection: mitigation and adaptation.

Through *mitigation*, BLM must quantify and reduce GHG emissions from oil and gas management activities. Through *adaptation*, BLM must address how global warming and climate change will impact our public lands and the environment and ensure that they are sufficiently resilient to withstand or adapt to climate change. Given the time lag between the point a problem is acknowledged, and the point it is actually addressed – for example, through NEPA analysis or regulatory guidance – BLM must begin to act, *now*, to ensure that meaningful global warming and climate change management measures can be implemented well before 2012. Our concern over time lags is underscored by the 2007 GAO Report’s statement that:

Some resource managers identified potential complications with issuing guidance related to climate change. In our workshop, resource managers discussing the grasslands and shrublands ecosystem said that policy development can take years; therefore, in their view, *the agencies may not be able to respond to climate change in an appropriate time frame.*

2007 GAO Report at 40 (emphasis added). As compellingly stated in a recent paper on global warming and climate change, whose lead author is Dr. James Hansen, who directs the NASA Goddard Institute for Space Studies at Columbia University:

Humanity today, collectively, must face the uncomfortable fact that industrial civilization itself has become the principal driver of global climate. If we stay our present course, using fossil fuels to feed a growing appetite for energy-intensive life styles, we will soon leave the climate of the Holocene, the world of human history ... *Humanity’s task of moderating human-caused global climate change is urgent.*<sup>8</sup>

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<sup>6</sup> 2007 IPCC Synthesis Report, Summary for Policymakers, at 2 ([www.ipcc.ch/pdf/assessment-report/ar4/svr/ar4\\_syr\\_spm.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/svr/ar4_syr_spm.pdf)) (“IPCC Synthesis Report”) (attached as Exhibit 2).

<sup>7</sup> [www.nytimes.com/2007/11/18/science/earth/18climatenew.html](http://www.nytimes.com/2007/11/18/science/earth/18climatenew.html) (emphasis added) (attached as Exhibit 3).

<sup>8</sup> Hansen, J., *et al.*, *Target Atmospheric CO<sub>2</sub>: Where Should Humanity Aim?* (2008) (emphasis added) (attached as Exhibit 5).



Dr. Hansen also individually published an article in *State of the Wild 2008-2009* entitled *Tipping Point: Perspective of a Climatologist* (attached as Exhibit 6) in which he states on page 8 that:

Our home planet is dangerously near a tipping point at which human-made greenhouse gases reach a level where major climate changes can proceed mostly under their own momentum ... The implications are profound and the only resolution is for humans to move to a fundamentally different energy pathway within a decade. Otherwise, it will be too late for one-third of the world's animal and plant species and millions of the most vulnerable members of our own species.

As Dr. Hansen explains, "the best chance for all species is a conscious choice by humans to pursue an alternative energy scenario to stabilize the climate." *Id.* at 11. Critically, such an "alternative energy scenario" must be proactive. Again, Dr. Hansen:

[A] wait and see and clean up the mess post facto, will not work in the case of carbon dioxide and climate change because of inertial effects, warming already in the pipeline, and tipping points. On the contrary, *ignoring emissions would lock in catastrophic climate change.*

Instead, we must resolve to move rapidly to the next phase of the industrial revolution – expanding the benefits of advanced technology to help maintain the atmosphere, and consequently the wonders of the natural world. A review of basic fossil fuel facts reveals why the shift must be made soon. Based on the estimated amount of carbon dioxide locked in each remaining fossil fuel reservoir – including oil, gas, coal, and unconventional fossil fuels (tar sands, tar shale, heavy oil, methane hydrates) – burning readily available oil and gas resources alone will take atmospheric carbon dioxide to levels near 450 ppm.

*Id.* at 12. More recently, Dr. Hansen authored a statement prepared for his briefing to the House Select Committee on Energy Independence & Global Warming.<sup>9</sup> Dr. Hansen's statement is a further call-to-arms regarding climate change, demonstrating that further global warming is already in the pipeline and that we are nearing critical tipping points that, if surpassed, would prove devastating for our world, our country, and Montana. BLM should thus heed Dr. Hansen's call to arms by, at the very least, ensuring that fossil fuel development releases as little greenhouse gas pollution as possible and, accordingly, is as efficient as possible. As demonstrated below, reducing GHG pollution often results in increased energy resources for use by consumers.

The Department of the Interior has rhetorically stated that global warming and climate change is a "high priority." 2007 GAO Report at 175. Unfortunately, despite this representation, we have yet to see this "high priority" reflected in BLM decisions. This suggests serious,

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<sup>9</sup> Hansen, *Global Warming Twenty Years Later: Tipping Points Near*, Statement to the House Select Committee on Energy Independence & Global Warming (June 2008) ([www.columbia.edu/cu/news/08/06/hansen.html](http://www.columbia.edu/cu/news/08/06/hansen.html)) (attached as Exhibit 7).

troubling merit in Dr. James Hansen's statement that "special interests have undue sway with our governments and have effectively promoted minimalist actions and growth in fossil fuels, rather than making the scale of investments [in climate change policies] necessary." Exhibit 6 at 15. If indeed global warming and climate is a "high priority," then it is surely the case that BLM's lease sales should be scrutinized in this context *before* BLM commits public resources to long-term oil and gas development. The time for action is now.

### **III. BLM IS LEGALLY OBLIGATED TO ADDRESS GLOBAL WARMING AND CLIMATE CHANGE.**

#### **1. Secretarial Order 3226 Requires that BLM Consider and Analyze Potential Climate Change Impacts.**

The starting point underscoring BLM's legal obligation to address global warming and climate change is an Order issued by the Secretary of the Interior in 2001: Secretarial Order 3226, *Evaluating Climate Change Impacts in Management Planning* (January 19, 2001) (attached as Exhibit 8). This Order, in Section 1, explains that "[t]here is a consensus in the international community that global climate change is occurring and that it should be addressed in governmental decision making." Secretarial Order 3226 is action-forcing, mandating, in Section 3 (with emphases added), the following:

Each bureau and office of the Department will consider and analyze potential climate change impacts when undertaking long-range planning exercises, when setting priorities for scientific research and investigations, when developing multi-year management plans, and/or *when making major decisions regarding the potential utilization of resources under the Department's purview*. Departmental activities covered by this Order include, but are not limited to, programmatic and long-term environmental reviews undertaken by the Department, management plans and activities developed for public lands, *planning and management activities associated with oil, gas and mineral development on public lands*, and planning and management activities for water projects and water resources.

Section 3's action-forcing mechanisms are self-executing; Section 4 provides that Secretarial Order 3226 "is effective immediately and will remain in effect until its provisions are converted to the Departmental Manual or until it is amended, superseded or revoked, whichever comes first." Thus, while the Department of the Interior, since 2001, has not yet developed climate change-related guidance for BLM and BLM's field offices, this fact does not excuse BLM's duties, here, to comply with Secretarial Order 3226. *See* 2007 GAO Report at 8. This is particularly so given Section 3's express reference to resource utilization – which, clearly, includes oil and gas leasing and development – and, even more clearly, "planning *and* management activities associated with oil, gas and mineral development on public lands . . . ." Accordingly, Secretarial Order 3226 subjects BLM to legally-enforceable climate change responsibilities at all levels of planning and decision-making.

To a degree, BLM's failure to comply with Secretarial Order 3226 appears political. As the GAO noted, "[o]fficials at BLM headquarters stated that the order was signed during the prior administration, and that the order has not been emphasized because it was not consistent with the current administration's previous position on climate change." *Id.* at 37. This seems to undercut BLM's representation that climate change is a "high priority." *Id.* at 175. Further undercutting BLM's representation is the view of federal land managers that "efforts to address the effects of climate change are *ad hoc* and piecemeal." *Id.* at 37. Regardless, as set forth in this protest, climate change implicates legal obligations that cannot be excused on the basis of top-down political emphases or, as the case may be, de-emphases.

## **2. The Federal Land Policy and Management Act Requires that BLM Consider and Analyze Potential Climate Change Impacts.**

Secretarial Order 3226 is complemented by the Federal Land Policy and Management Act ("FLPMA"). FLPMA provides BLM with the authority and responsibility to address global warming and climate change. This should be done through inventories, land use planning, and actual land use protection and management. As FLPMA states:

[T]he national interest will be best realized if the public lands and their resources are periodically and systematically inventoried and their present and future use is projected through a land use planning process coordinated with other Federal and State planning efforts.

43 U.S.C. § 1701(a)(2). This provision is reflected in an action-forcing mandate whereby BLM "shall prepare and maintain on a continuing basis an inventory of all public lands and their resource and other values ..." 43 U.S.C. § 1711(a). These inventories are used in the development and implementation of Resource Management Plans ("RMPs"). 43 U.S.C. § 1712. Pursuant to these mandates, BLM must prepare an inventory of past, present, and reasonably foreseeable GHG pollution from oil and gas development and use that inventory to inform RMP-level planning and decision-making designed to account for greenhouse gas pollution through, e.g., the establishment of GHG pollution limits or GHG pollution reduction objectives, and to account, generally, for climate change impacts to public lands and the broader environment.

By law, the BLM, in developing and revising RMPs, must adhere to a series of planning principles. 43 U.S.C. § 1712(c). In particular, BLM must "weigh long-term benefits to the public against short-term benefits" and "coordinate the land use inventory, planning, and management activities of or for such lands with the land use planning and management programs of other Federal departments and agencies and of the States and local governments within which the lands are located." 43 U.S.C. § 1712(c)(7), (9). Of note, and as discussed below in Section V, BLM has incorporated climate change into the planning criteria prepared for geothermal and solar programmatic planning and NEPA processes and we see no reason why analogous planning criteria could not drive planning and NEPA processes for oil and gas leasing and development. Climate change presents a game-changing issue for BLM and these planning principles ensure that RMPs provide for affirmative land protection and management, without RMP-stage

decisions and guidance, BLM is reduced to a reactive posture which violates FLPMA, would ultimately be ineffective, and would lead to arbitrary and capricious decisions.

The RMP planning process is intended to set a stage for BLM compliance with FLPMA's affirmative environmental protection responsibilities. FLPMA requires that:

[T]he public lands be managed in a manner that will protect the quality of the scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use.

43 U.S.C. § 1701(a)(8). Generally managed for multiple use and sustained yield (43 U.S.C. § 1701(a)(7)), BLM is duty bound to manage the public lands for the broad public interest:

The term "multiple use" means the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resources uses that takes into account the long-term needs of future generations for renewable and non-renewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources *without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output.*

43 U.S.C. § 1702(c) (emphasis added). These provisions are reinforced by affirmative mandates requiring that BLM: (1) "take any action necessary to prevent unnecessary or undue degradation of the lands" (43 U.S.C. § 1732(b)); and (2) "minimize adverse impacts on the natural, environmental, scientific, cultural, and other resources and values (including fish and wildlife habitat) of the public lands involved" (43 U.S.C. § 1732(d)(2)(A)). Individually and in total, these broad, strong mandates obligate BLM to account for and reduce GHG pollution from oil and gas management activities and ensure that public lands and the broader environment are managed to protect against climate change impacts.

We reject any assertion that BLM can blindly rely on existing land use planning decisions to justify oil and gas leasing decisions. The climate change issues, concerns, and solutions identified within this Protest – as well as our prior lease sale protests – demonstrate that BLM's land use plans contain serious gaps and limitations. These gaps and limitations must be addressed prior to the point BLM commits further public mineral resources to oil and gas

development, whether through targeted land use plan amendments or more expansive land use plan revisions. See 43 C.F.R. §§ 1610.5-5, 1610.5-6. BLM cannot punt these serious, significant issues into future planning processes while proceeding on a business-as-usual approach in the near term.

As demonstrated in this lease sale protest, millions of acres of federal public land are already leased and available for development in the Rocky Mountain West and in Montana. Thus, there is no compelling reason why further leasing of federal public lands without first addressing the climate change issues and concerns identified within this Protest is necessary. Any suggestion that leasing would somehow alleviate consumer prices is unsupportable. Prices can be alleviated through a combination of long-range policies that emphasize energy efficiency, diversification of our country's energy portfolio which embraces and expands clean energy, and increased production. But the leasing of the challenged parcels, given the millions of acres of lands already leased and thus available for production, has a tenuous connection, at best, to increased production and any significant short-term reduction in prices. Fundamentally, climate issues are energy issues, and energy issues are climate issues, and these issues can only be resolved through proper long-range planning and analysis.

### **3. The National Environmental Policy Act Requires that BLM Consider and Analyze Potential Climate Change Impacts.**

In addition to Secretarial Order 3226 and FLPMA, implementation of our Nation's mineral leasing program must also comply with the National Environmental Policy Act ("NEPA"). Through the NEPA process, BLM must address global warming and climate change. See e.g., *Ctr. for Biological Diversity v. Nat'l. Highway Traffic Safety Admin.*, 508 F.3d 508, 550 (9<sup>th</sup> Cir. 2007) (NHTSA failed to evaluate adequately global warming impacts of changes to fuel efficiency standards for vehicles); *Mid States Coalition for Progress v. Surface Transp. Bd.*, 345 F.3d 520 (8<sup>th</sup> Cir. 2003) (increased coal consumption and global warming pollution was reasonably foreseeable effect of railroad expansion to transport coal).

NEPA provides an overlay on all BLM authorities and responsibilities; "the policies, regulations, and public laws of the United States *shall* be interpreted and administered in accordance with the policies set forth in [NEPA]...." 42 U.S.C. § 4332(1) (emphasis added). NEPA thus functions as "our basic national charter for protection of the environment." 40 C.F.R. § 1500.1(a). As our national charter, NEPA is designed to:

encourage productive and enjoyable harmony between man and his environment;  
to promote efforts which will prevent or eliminate damage to the environment and  
biosphere and stimulate the health and welfare of man; [and] to enrich the  
understanding of the ecological systems and natural resources important to the  
Nation...

42 U.S.C. § 4321; see also *id.* § 4331.

Given NEPA's design, it should be no surprise that public involvement is a critical component of the process. CEQ regulations provide that "NEPA procedures must ensure that environmental information is available to the public officials and citizens before decisions are made and before actions are taken," and, further, that "public scrutiny [is] essential to implementing NEPA." 40 C.F.R. § 1500.1(b) (emphasis added). The CEQ regulations mandate that "Federal agencies shall to the fullest extent possible...encourage and facilitate public involvement in decisions which affect the quality of the human environment." *Id.* at § 1500.2(d) (emphasis added). "Agencies shall (a) make diligent efforts to involve the public in preparing and implementing their NEPA procedures"; and "(d) solicit appropriate information from the public." 40 C.F.R. § 1506.6(a), (d). Where an EA is prepared, CEQ regulations require agencies to "involve...the public, to the extent practicable...." 40 C.F.R. § 1501.4(b). As the Ninth Circuit Court of Appeals recently explained, reflecting CEQ's mandates:

An agency, when preparing an EA, must provide the public with sufficient environmental information, considered in the totality of circumstances, to permit members of the public to weigh in with their views and thus inform the agency decision-making process.

*Bering Strait Citizens for Responsible Resource Devlpmt. v. U.S. Corps of Engs.*, 511 F.3d 1011, 1026 (9<sup>th</sup> Cir. 2008). These provisions demonstrate that BLM must provide for public involvement in agency planning, leasing, and development decisions.

In any event, all federal agencies, when they articulate "proposals for ... major federal actions significantly affecting the quality of the human environment," must prepare a hard look NEPA analysis prepared with meaningful public involvement *prior to* "any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented." 42 U.S.C. § 4332(2)(C)(v). As federal courts have explained:

Agencies are to perform this hard look *before* committing themselves irretrievably to a given course of action so that the action can be shaped to account for environmental values.

*Sierra Club v. Hodel*, 848 F.2d 1068, 1093 (10<sup>th</sup> Cir. 1988) (emphasis added). The lease sale, as the point of commitment, must therefore be justified through completion of NEPA analysis before the leases are sold and issued. Pre-commitment NEPA analysis is irreplaceable because:

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 [an] understanding of environmental consequences, and take actions that protect, restore, and enhance the environment.

40 C.F.R. § 1500.1(c) (emphasis added); *see also* 40 C.F.R. §§ 1500.2(e), 1506.1.

To "foster excellent action," NEPA's implementing regulations provide that "[a]gencies shall not commit resources prejudicing selection of alternatives before making a final decision

([40 C.F.R. §] 1506.1).” *Id.*; 40 C.F.R. § 1502.2(f). The regulations further provide that the NEPA analysis “shall serve as the means of assessing the environmental impact of proposed agency actions, rather than justifying decisions already made.” 40 C.F.R. § 1502.2(g). Thus, BLM cannot merely promise to address global warming and climate change issues in the future; BLM has an immediate duty to address these issues now, before BLM sells lease rights.

Through the NEPA process, BLM must address a proposal’s “environmental impact” and the “adverse environmental effects which cannot be avoided should the proposal be implemented.” 42 U.S.C. §§ 4332(2)(C)(i), (ii); 40 C.F.R. §§ 1502.16 (requiring discussion of environmental consequences), 1508.9 (defining an Environmental Assessment as encompassing requirement to address environmental impacts and consider alternatives). These impacts fall into one of three categories: (1) direct impacts; (2) indirect impacts; and (3) cumulative impacts. 40 C.F.R. §§ 1508.7, 1508.8.

Here, impacts include and result from the direct GHG pollution emitted by oil and gas operations to the atmosphere; the indirect, secondary GHG pollution and impacts triggered by exploration, production, and processing, transportation and distribution, and refining; and the cumulative impacts of GHG pollution to the atmosphere from oil and gas leasing and development operations in the broader region and from other GHG pollution sources, such as coal-fired power plants.

According to the American Petroleum Institute (“API”), “[t]he oil and gas industry... includes all direct activities related to producing, refining, transporting, and marketing crude oil and associated natural gas, and refined products.... These segments are the direct activities within the oil and gas industry that have the potential to emit GHG.” API Compendium at 2-1.<sup>10</sup> GHGs released by oil and gas operations include CO<sub>2</sub>, methane, and to a lesser extent nitrous oxide (“N<sub>2</sub>O”).<sup>11</sup>

Key sources of GHG pollution associated with oil and gas exploration, production, and processing (i.e., the upstream end of the oil and gas industry) include combustion sources, such as natural gas compressor engines, vented methane from sources such as tanks, pneumatic devices, well completions and workovers, and gas dehydration and sweetening, and vented CO<sub>2</sub> from coalbed methane (“CBM”) gas. These activities additionally involve the emission of GHGs from electricity imports. *See* Table 1 (below). To a lesser extent, N<sub>2</sub>O is released by combustion sources associated with oil and gas exploration, production, and processing.

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<sup>10</sup> Shires, T.M. and C.J. Loughran. *Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry*, American Petroleum Institute (February 2004) (“API Compendium”) (attached as Exhibit 9); *see also* <http://ghg.api.org/documents/CompendiumErrata205.pdf> (errata).

<sup>11</sup> According to the U.S. Environmental Protection Agency, methane is 21 times more potent than CO<sub>2</sub> as a greenhouse gas, while nitrous oxide is 310 times more potent. *See*, [www.epa.gov/methane/scientific.html](http://www.epa.gov/methane/scientific.html) and <http://www.epa.gov/nitrousoxide/scientific.html>.

**Table 1. GHG Pollution from Oil and Gas Exploration, Production, and Processing Operations.**<sup>12</sup>

<b>EXPLORATION AND PRODUCTION</b>	<b>CO<sub>2</sub></b>	<b>N<sub>2</sub>O</b>	<b>CH<sub>4</sub></b>	<b>Section</b>
<b>COMBUSTION SOURCES – Stationary Devices</b>				
Boilers/Steam Generators	X	X	X	4.1, 4.2, 4.3
Heaters/Treaters	X	X	X	4.1, 4.2, 4.3
Internal Combustion (IC) Engines	X	X	X	4.1, 4.2, 4.3
Turbines	X	X	X	4.1, 4.2, 4.3
Flares	X	X	X	4.4
Incinerators	X	X	X	4.6
<b>COMBUSTION SOURCES – Essential Mobile Sources</b>				
Planes/helicopters	X	X	X	4.5
Supply boats, barges	X	X	X	4.5
Other company vehicles	X	X	X	4.5
<b>COMBUSTION SOURCES – Indirects</b>				
Electricity imports	X	X	X	4.7
Process heat/steam imports	X	X	X	4.7
<b>VENTED SOURCES – Process Vents</b>				
Gas sweetening processes	X		X	5.1
Dehydration processes			X	5.1
<b>VENTED SOURCES – Other Venting</b>				
Tanks	X		X	5.4
Pneumatic devices	X (*)		X	5.6.1
Chemical injection pumps	X (*)		X	5.6.2
Well testing	X (*)		X	5.6.3
Exploratory drilling	X		X	5.6.3
<b>VENTED SOURCES – Maintenance/Turnarounds</b>				
Vessel blowdown	X (*)		X	5.7.2
Well workovers	X (*)		X	5.7.2
Compressor starts	X (*)		X	5.7.2
Compressor blowdowns	X (*)		X	5.7.2
Gathering pipeline blowdowns	X (*)		X	5.7.2
<b>VENTED SOURCES – Non-routine Activities</b>				
Pressure relief valves (PRVs)	X (*)		X	5.7.2
Well tests and blowdowns (when not flared)	X (*)		X	5.7.2
Emergency shutdown (ESD)/ emergency safety blowdown (ESB)	X (*)		X	5.7.2
<b>FUGITIVE SOURCES</b>				
Equipment component leaks	X (*)		X	6.1

X Document provides an emission estimation approach for these sources.

\*Emission estimation approach is provided, but only applicable to CO<sub>2</sub> rich production streams (e.g., CO<sub>2</sub> flood or enhanced oil recovery). Significance of these sources depends on the CO<sub>2</sub> concentration and source-specific emission rate.

Downstream of oil and gas exploration, production, and processing operations, key sources of GHG pollution include the transportation and distribution of oil and gas, and oil refining. According to the API, GHG pollution from transportation and distribution are released

<sup>12</sup> See API Compendium at 2-5.



as crude oil and associated gas are moved from the production sector to refineries or gas processing plants, and may also include the movement of natural gas or other petroleum products to market or distribution centers. Key direct sources of GHG pollution in this subsector include process engines and heaters, storage tanks, and transportation activities. See Table 2.

**Table 2. GHG Pollution from Oil and Gas Transportation and Distribution Operations.**<sup>13</sup>

<b>TRANSPORTATION AND DISTRIBUTION</b>	<b>CO<sub>2</sub></b>	<b>N<sub>2</sub>O</b>	<b>CH<sub>4</sub></b>	<b>Section</b>
<b>COMBUSTION SOURCES – Stationary</b>				
Turbines	X	X	X	4.1, 4.2, 4.3
Engines	X	X	X	4.1, 4.2, 4.3
Heaters	X	X	X	4.1, 4.2, 4.3
Flares	X	X	X	4.4
Catalytic and thermal oxidizers	X	X	X	4.6
<b>COMBUSTION SOURCES – Essential Mobile Sources</b>				
Marine, road, or railroad tankers	X	X	X	4.5
Barges	X	X	X	4.5
Planes/helicopters	X	X		4.5
Other company vehicles	X	X		4.5
<b>COMBUSTION SOURCES – Indirects</b>				
Electricity imports	X	X	X	4.7
Process heat/steam imports	X	X	X	4.7
<b>VENTED SOURCES – Process Vents</b>				
Storage tanks			X	5.4
Loading/unloading/transit			X	5.5
Pneumatic devices			X	5.6.1
<b>VENTED SOURCES – Maintenance/Turnarounds</b>				
Pipeline blowdowns			X	5.7.4, 5.7.5
Pigging operations			X	5.7.4
Compressor starts			X	5.7.4
Compressor blowdowns			X	5.7.4
Compressor station blowdowns			X	5.7.4
Vessel blowdowns			X	5.7.4
<b>VENTED SOURCES – Non-Routine Activities</b>				
Pressure relief valves			X	5.7.4, 5.7.5
Surge tanks			X	5.7.4
<b>FUGITIVE SOURCES</b>				
Process equipment leaks			X	6.1
Pipeline leaks			X	6.1

With regards to oil refining, the API explains, “The refining segment consists of all refinery sites that take in crude and produce finish products, such as gasoline.” API Compendium at 2-12. GHG pollution is released during distillation processes that separate petroleum hydrocarbons into narrower boiling ranges, and a number of processes that react the hydrocarbons, including cracking, coking, reforming, alkylation, and isomerization. While CO<sub>2</sub> is the key GHG pollutant associated with refining, methane and nitrous oxide are also released during the process. See Table 3 (below).

<sup>13</sup> See API Compendium at 2-11.

Table 3. GHG Pollution from Oil Refining Operations.<sup>14</sup>

<b>REFINING</b>	<b>CO<sub>2</sub></b>	<b>N<sub>2</sub>O</b>	<b>CH<sub>4</sub></b>	<b>Section</b>
<b>COMBUSTION SOURCES – Stationary Devices</b>				
Boilers	X	X	X	4.1, 4.2, 4.3
Process heaters	X	X	X	4.1, 4.2, 4.3
Turbines	X	X	X	4.1, 4.2, 4.3
Engines	X	X	X	4.1, 4.2, 4.3
Flares	X	X	X	4.4
Catalytic and thermal oxidizers	X	X	X	4.6
Coke calcining kilns	X	X	X	4.6
Incinerators	X	X	X	4.6
<b>COMBUSTION SOURCES – Essential Mobile Sources</b>				
Company vehicles	X	X		4.5
<b>COMBUSTION SOURCES - Indirects</b>				
Electricity imports	X	X	X	4.7
Process heat/steam imports	X	X	X	4.7
<b>VENTED SOURCES – Process Vents</b>				
Catalytic cracking	X			5.2.1
Catalytic reforming	X			5.2.1
Catalyst regeneration	X			5.2.1, 5.2.4
Thermal cracking				5.2.6
Flexi-coking	X			5.2.3
Delayed coking	X			5.2.3
Steam methane reforming (hydrogen plants)	X			5.2.2
Sulfur recovery units				5.2.6
Asphalt production				5.2.5
<b>VENTED SOURCES – Other Venting</b>				
Storage tanks				5.4
Pneumatic devices				5.6.1
Loading racks			X	5.5
<b>VENTED SOURCES – Maintenance/Turnarounds</b>				
Equipment/process blowdowns			X	5.7.6
Heater/boiler tube decoking			X	5.7.6
Compressor starts			X	5.7.6
<b>VENTED SOURCES – Non-routine Activities</b>				
Pressure relief valves (PRV)	X		X	5.7.6
Emergency shut down (ESD)	X		X	5.7.6
<b>FUGITIVE SOURCES</b>				
Fuel gas system leaks			X	6.1, B.3
Other process equipment leaks			X	6.1, B.3
Wastewater collection and treating			X	6.2.1
Sludge/solids handling				6.2.1
Cooling towers				6.2.1

According to the API, other oil and gas industry operations that may release GHGs include petrochemical manufacturing, mining, heat and electricity generation, and oil and gas retail and marketing. These processes utilize equipment and practices that release CO<sub>2</sub>, methane, and N<sub>2</sub>O. See API Compendium at 2-10, 2-15, 2-16, and 2-17. As is evident, the cumulative

<sup>14</sup> See API Compendium at 2-13.

GHG footprint of the oil and gas industry can be quite large, extending from a single well downstream to refineries and other major sources. A hard look at the full lifecycle of GHG pollution emitted from oil and gas development (i.e., both upstream and downstream) is essential; BLM must not look at GHG pollution from small, individual sources “in a vacuum.” *Grand Canyon Trust v. FAA*, 290 F.3d 339, 342 (D.C. Cir. 2002).

Once this full lifecycle is understood, BLM can properly consider alternative strategies, tactics, and measures to reduce GHG pollution. *See* 42 U.S.C. § 4321, 4331 (detailing NEPA’s purpose and declaration of national environmental policy). This takes advantage of NEPA’s requirement that BLM consider “alternatives to the proposed action” and “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.” 42 U.S.C. §§ 4332(2)(C)(iii), 4332(2)(E). BLM must “[r]igorously explore and objectively evaluate all reasonable alternatives” and specifically “[i]nclude the alternative of no action.” 40 C.F.R. §§ 1502.14(a), (d). Alternatives, notably, constitute NEPA’s “heart.” 40 C.F.R. § 1502.14(a). Operating in concert with NEPA’s mandate to address environmental impacts, BLM’s fidelity to alternatives analysis allows agencies to “sharply defin[e] the issues and provid[e] a clear basis for choice among options by the decision maker and the public.” 40 C.F.R. § 1502.14.

Here, these alternatives consist of GHG-specific lease stipulations and post-lease conditions of approval to oil and gas operations designed to reduce GHG pollution from oil and gas development activities carried out on public lands – principally production-based activities. These measures must be identified and analyzed on the basis of decision-making and NEPA analysis completed *before* BLM makes a commitment by surrendering lease rights. While BLM of course retains the ability after lease rights are surrendered to subject development to conditions of approval, the lease rights delimit the breadth and scope of such conditions. Thus, certain GHG pollution reduction measures may require BLM to subject the lease to a stipulation at the point of sale. Reliance on conditions of approval may be appropriate but only if these conditions are identified and evaluated prior to the point of commitment. Without pre-commitment decision-making and analysis, BLM cannot ensure that GHG pollution would be constrained within acceptable limits.

BLM must, of course, not only take a hard look at GHG pollution from oil and gas activities, but must also take a hard look at the impacts of climate change to the environment and to BLM management activities. BLM cannot blindly take a business-as-usual approach and ignore the impact of climate change impacts in its formal planning and decision-making processes.<sup>15</sup> Merely identifying impacts is, of course, only the first step. The second step is for BLM to consider management alternatives designed to protect against climate change impacts. As a general proposition, these alternatives should center on activities that promote ecological resiliency and adaptability. Sufficient landscape permeability, intact wildlife habitat (in particular core areas and migration/adaptation corridors), healthy watersheds, *etc.*, are all important.<sup>16</sup>

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<sup>15</sup> The impacts of global warming and climate change are detailed below in Section IV.5.

<sup>16</sup> Science-based mechanisms are being developed which enable BLM to compile information using computational models to predict landscape, vegetation, and wildlife changes in response to changing climate conditions. *See, e.g.*, LandScape America, a collaborative project of NatureServe and the National Geographic Society

Given the nature of observed and anticipated climate change impacts, *in situ* conservation may be possible but, in other instances, *in situ* conservation may act as a death sentence for isolated environments. In these latter instances, BLM will have to coordinate intensively with its federal and state partners to protect, e.g., wildlife linkages to allow species to migrate towards more suitable environments. *See* 2007 GAO Report at 43-44. Once climate change impacts are better understood, BLM may also need to re-calibrate or reconsider the purpose, design, or efficacy of planned or ongoing management activities. While BLM may be resistant to this idea, it is important to note that the cost of BLM's failure to consider such alternatives in terms of damaged wildlands, shrinking fish and wildlife populations, lost tourist revenue, and disappearing drinking water supplies may be exorbitant.

We reiterate that this analysis must take place before lease rights are sold. A review of BLM's recent NEPA logs for a number of Field Offices in Montana and North Dakota, including the Miles City Field Office, Great Falls Oil and Gas Station, Billings Field Office and the North Dakota Field Office, evidences numerous discrete oil and gas decisions and attests to the legal and pragmatic difficulty – if not impossibility – of addressing climate change and GHG emissions issue at the APD stage given: (1) the geographic scale of climate change impacts; (2) the massive volume of APD-stage decisions; (3) the legal consequence of the lease rights to BLM's authority; (4) the fact that these APD-stage decisions typically present a singular, myopic element of the overall lifecycle of GHG emissions from production, processing, transmission, and distribution activities; and (5) the need for BLM to solicit public review and comment on these decisions.<sup>17</sup>

Furthermore, as demonstrated by the oil and gas leases in the BLM NEPA logs for Montana and North Dakota Field Offices, BLM is approving the majority of new wells through use of "Categorical Exclusions" to NEPA and "Determinations of NEPA Adequacy" ("DNAs") and is therefore rarely preparing either Environmental Assessments or Environmental Impact Statements. Unlike, in particular, Environmental Impact Statements, categorical exclusions receive perfunctory and truncated review at best; often the decision to capture a decision within a categorical exclusion is supported by no more than a checklist. DNAs are not even expressly sanctioned by NEPA or CEQ regulations, and appear patently inappropriate in the context of approving oil and gas development. Regardless, given the much abbreviated treatment given to APDs, it is highly unlikely that BLM will – or could – consider climate change at this stage or afford the public a meaningful opportunity to raise climate change issues at the APD stage. Moreover, given the nature of the problem, and the evidence contained within this protest, it is, put simply, arbitrary and capricious to defer such consideration until the APD stage. These issues must be addressed at a broader scale. Finally, BLM frequently emphasizes that it has only

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(<http://www.natureserve.org/projects/landscape.jsp>); Climate Impacts Group, University of Washington (<http://cses.washington.edu/cig/pnwc/cc.shtml>); Climate Change and Aspen: An Assessment of Impacts and Potential Responses (2006) ([http://www.agci.org/pdf/Canarv/ACIA\\_Report.pdf](http://www.agci.org/pdf/Canarv/ACIA_Report.pdf)); Easterling DR, Meehl J, Parmesan C, Chagnon S, Karl TR, Meams LO. 2000, *Climate extremes: observations, modeling, and impacts*, Science 289:2068-74.

<sup>17</sup> Montana and North Dakota NEPA logs are available online at: <http://www.blm.gov/mt/st/en/info/nepa.html> (examples attached as Exhibits 10 and 11); pending and final applications for permits to drill are available online at: [http://www.blm.gov/mt/st/en/prog/energy/oil\\_and\\_gas/apds.html](http://www.blm.gov/mt/st/en/prog/energy/oil_and_gas/apds.html).

limited resources. It is difficult to imagine that addressing the issues and concerns presented in this protest at the APD stage is possible given BLM's limited resources.

Pragmatically, given the GHG pollution caused by the full lifecycle of oil and gas development, broad-scale pre-commitment decision-making and NEPA analysis, whether completed regionally, state-wide, or for each Resource Area: (1) offers significant efficiencies of scale; (2) affords BLM the chance to reach out to federal and state partners; (3) is better able to engage the public and the oil and gas industry in a meaningful, transparent dialogue; and (4) allows all parties to plan for and implement GHG reduction measures in a uniform, efficient, and consistent fashion.

Of note, once a NEPA analysis is completed, BLM must prepare a supplement whenever "[t]he agency makes substantial changes in the proposed action that are relevant to environmental concerns" or "[t]here are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." 40 C.F.R. §§ 1502.9(c)(1)(i)-(ii). As noted by the Supreme Court of the United States,

It would be incongruous with ... [NEPA's] manifest concern with preventing uninformed action, for the blinders to adverse environmental effects, once unequivocally removed, to be restored prior to the completion of agency action

.....

*Marsh v. Or. Nat. Resources Council*, 490 U.S. 360, 371 (1989). Thus, BLM cannot simplistically rely on existing NEPA analyses to justify the lease sales given that these NEPA analyses do not appear to address global warming and climate change in *any* capacity – let alone a meaningful capacity. To rely on existing NEPA analyses, BLM would have to prepare a NEPA supplement.

However, importantly, the August 26, 2008 lease sale constitutes a distinct "proposal" for purposes of NEPA compared to RMP-stage proposals and thus a supplement may not be the proper route to go. 40 C.F.R. § 1508.23. A supplemental NEPA analysis would generally not provide the proper basis for the lease sales unless BLM: (1) took a lease-stage hard look at the impacts of oil and gas leasing within the precise context of the proposed parcels to properly understand the significance and acceptability of impacts; (2) considered lease-stage alternatives; and (3) considered alternatives that did not fixate solely on oil and gas but, more broadly, addressed protection of the environment as a whole. On the second point, lease-stage alternatives are distinct from RMP-stage alternatives, in particular relative to BLM's duty to address a no action alternative. In short, an RMP-stage no action alternative consists of the "continuation of present level or systems of resource use" while a lease-stage no action alternative consists of the distinct option of not selling the lease. *See* 43 C.F.R. § 1610.4-5.

By adhering to NEPA's action-forcing mandates, BLM best achieves NEPA's noble purpose and policies (42 U.S.C. §§ 4321, 4331). As explained by the Supreme Court, "the thrust of [NEPA] is ... that environmental concerns be integrated into the very process of agency decision-making." *Andrus v. Sierra Club*, 442 U.S. 347, 350 (1979). As demonstrated herein,

BLM's lease sale violates this basic principal because climate change concerns have not been "integrated into the very process of agency decision-making." *Id.*

BLM should not be surprised by this Protest; we filed similar protests on March 21, 2008, May 30, 2008, and August 8, 2008. Moreover, Secretarial Order 3226, which explicitly requires BLM to address climate change concerns, was signed over seven years ago in 2001. BLM's duty to address global warming and climate change specifically through NEPA was also acknowledged over ten years ago by the Council on Environmental Quality ("CEQ"). CEQ, in draft guidance issued in 1997, stated that the "NEPA process provides an excellent mechanism for consideration of ideas related to global climate change."<sup>18</sup> CEQ then decided that the available scientific evidence showed that climate change is a reasonably foreseeable impact that must be considered in NEPA documents.<sup>19</sup> Of course, at this juncture, the available scientific evidence demonstrates that global warming and climate change are not merely reasonably foreseeable, but *observed*, with impacts to our environment being felt *now*. *See, e.g.*, 2007 IPCC Synthesis Report. Regardless, even then, CEQ concluded that "it would be prudent to consider in the context of planning for major federal actions, both their potential impact on emissions of greenhouse gases and how climate change might itself affect major federal projects."<sup>20</sup>

CEQ importantly noted that "a regulatory change is not necessary in order to require federal agencies to consider global climate change in NEPA documents" because the scope of NEPA is broad enough to include such effects.<sup>21</sup> In particular, the CEQ Guidance stated that "[c]onsideration of the potential impact of climate change on [large-scale] projects may be critical to avoiding costly operation and maintenance problems in future decades," and therefore consideration of climate change is especially crucial in programmatic analyses.<sup>22</sup> Specifically, CEQ called upon federal agencies to determine how their activities contribute to the emission of GHGs and thus to global warming and climate change, and to review how the agencies' activities will in turn be affected by the consequences of climate change.<sup>23</sup>

In accordance with CEQ's Guidance, other agencies have issued guidance incorporating climate change into NEPA documents. The National Park Service's Handbook for Environmental Impact Analysis notes that programmatic documents are often "ideal places" to

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<sup>18</sup> Memorandum from McGinty, Kathleen A., Chairman, Council on Environmental Quality, to Heads of Federal Agencies on Draft Guidance Regarding Consideration of Global Climatic Change in Environmental Documents Prepared Pursuant to the National Environmental Policy Act 1 (Oct. 8, 1997) ([www.mms.gov/eppd/compliance/reports/ceqmemo.pdf](http://www.mms.gov/eppd/compliance/reports/ceqmemo.pdf)) (attached as Exhibit 12).

<sup>19</sup> *Id.* at 4.

<sup>20</sup> *Id.* at 3.

<sup>21</sup> *Id.* at 4, fn. 3.

<sup>22</sup> *Id.* at 2.

<sup>23</sup> *Id.* at 5.

address issues such as global warming.<sup>24</sup> The Minerals Management Service (“MMS”), BLM’s counterpart in terms of managing offshore oil and gas resources, established NEPA Procedures to address climate change considerations in NEPA documents, citing to CEQ’s 1997 Guidance document.<sup>25</sup> In keeping with its own guidance and CEQ’s conclusion that climate change is a “reasonably foreseeable” impact of greenhouse gas emissions, MMS – right now – inventories GHG pollution caused by oil and gas leasing on the Outer Continental Shelf and considers the contribution of such leases to climate change in both programmatic and lease-specific NEPA analyses.<sup>26</sup>

For example, in its programmatic Final EIS for Outer Continental Shelf Oil and Gas Leasing Program from 2007 to 2012, MMS estimated “the total emissions of CO<sub>2</sub> and CH<sub>4</sub> for all projected activities associated with the proposed 5-year program.”<sup>27</sup> MMS then used this information to determine potentially appropriate mitigation measures as well as to determine which GHG reductions would have the greatest impact in reducing GHG emissions. In addition to its programmatic NEPA analyses, MMS has also considered GHG emissions in individual lease sales to address both the impact of climate change on the lease sale as well as the lease sale’s contributions to the adverse effects of climate change.<sup>28 29</sup> BLM, in recent months, has itself acknowledged the importance of addressing climate change concerns in programmatic planning and decision-making processes for solar and geothermal energy development. *See* 73 Fed. Reg. 28500, 28501 (May 16, 2008) (geothermal); 73 Fed. Reg. 30908, 30911 (May 29, 2008) (solar).

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<sup>24</sup> National Park Service, Director’s Order No. 12 Handbook for Environmental Impact Analysis, 89 (2001), available at <http://home.nps.gov/applications/npspolicy/DOrders.cfm> (relevant excerpts attached as Exhibit 13).

<sup>25</sup> *See* MMS, *NEPA Procedures, Global Climate Change*, available at <http://www.mms.gov/eppd/compliance/nepa/procedures/climate/index.htm>; MMS, *Global Climate Change Considerations* available at [www.mms.gov/eppd/compliance/nepa/procedures/climate/considerations.htm](http://www.mms.gov/eppd/compliance/nepa/procedures/climate/considerations.htm) (relevant excerpts of both attached as Exhibit 14).

<sup>26</sup> MMS, Outer Continental Shelf Oil and Gas Leasing Program: 2007-2012 Final Environmental Impact Statement, IV-3 - IV-12 (April 2007), available at [www.mms.gov/5-year/2007-2012\\_FEIS.htm](http://www.mms.gov/5-year/2007-2012_FEIS.htm) (relevant excerpts attached as Exhibit 15); MMS, Environmental Assessment Proposed Oil and Gas Lease Sale 195 Beaufort Sea Planning Area, Appendix I (July 2004) available at [www.mms.gov/alaska/ref/eis\\_ea.htm](http://www.mms.gov/alaska/ref/eis_ea.htm), [www.mms.gov/alaska/ref/EIS%20EA/BeaufortFEIS\\_195/Sale195/EA195without%20linkver4.pdf](http://www.mms.gov/alaska/ref/EIS%20EA/BeaufortFEIS_195/Sale195/EA195without%20linkver4.pdf) (relevant excerpts attached as Exhibit 16).

<sup>27</sup> Exhibit 15, MMS, 2007-2012 FEIS at IV-12, Tables IV-1 – IV-3, IV-5.

<sup>28</sup> Exhibit 16, EA for Proposed Oil and Gas Lease Sale 195, Appendix I; Appendix C, Section VI.C.4 of the Biological Evaluation.

<sup>29</sup> Accentuating BLM’s duty to address GHG emissions from onshore oil and gas leasing and development prior to the sale of a lease, it is notable that once a lease is sold, MMS retains more legal authority to protect the environment than BLM. *See, e.g.*, 43 U.S.C. § 1351(h) (delineating MMS’ development-stage legal authority); *see also Wyoming Outdoor Council*, 157 I.B.L.A. 259, 265-66 (October 15, 2002) (rejecting BLM argument that BLM may defer NEPA analysis subsequent to lease issuance by refusing to equate BLM’s limited post-commitment authority, pursuant to 30 U.S.C. § 226(g), with MMS’ more expansive post-commitment authority, pursuant to 43 U.S.C. § 1351(h)).

#### 4. The Public Trust Duty Requires that BLM Consider and Analyze Potential Climate Change Impacts.

BLM is subject not only to its statutory responsibilities, but the Public Trust Duty, a principle embedded in law as an attribute of the Federal Government's sovereignty. While the Public Trust Duty is most frequently applied to state governments, it applies with equal force to the Federal government. In basic terms, the Public Trust Duty is derived from the common law of property and acts as a fundamental safeguard to ensure that public trust resources are properly managed to ensure the public's welfare and survival. *See Illinois Cent. R. Co. v. Illinois*, 146 U.S. 387, 455 (1892), *Geer v. Connecticut*, 161 U.S. 519, 525-29 (1896) (detailing ancient and English common law principles of sovereign trust ownership of air, water, sea, shores, and wildlife). In effect, here, the Public Trust Duty underscores the need for BLM to take a precautionary approach to managing the public lands and not hide behind the false premise that corporate oil and gas interests are on a par with the broader interests of the whole public.

The Public Trust Duty imposes upon BLM a duty of "reasonable care" in protecting the trust. Restatement (Second) of Trusts § 176 (1957) ("The trustee is under a duty to the beneficiary to use reasonable care and skill to preserve the trust property."). The Public Trust Duty is, to a degree, reflected in Secretarial Order 3226, FLPMA, and NEPA, providing a foundation to interpret and apply these statutory provisions in the context of federal public lands. *See e.g.*, 42 U.S.C. § 4331(b)(1) (2006) (declaring a national duty to "fulfill the responsibilities of each generation as trustee of the environment for succeeding generations"). However, the Public Trust Duty is also fundamentally more expansive, imposing upon BLM a duty that cannot be excused by mere reference to or compliance with BLM's statutory mandates. As the Court said in *Illinois Central*, "[t]he state can no more abdicate its trust over property in which the whole people are interested...than it can abdicate its police powers in the administration of government and the preservation of the peace...." 146 U.S. 387, 460.

As a trustee, BLM must protect trust resources for present and future generations. BLM is therefore prohibited from allowing irrevocable harm to public lands or the atmosphere by private interests. In *Geer v. Connecticut*, the Supreme Court explained that:

[T]he power or control lodged in the State, resulting from this common ownership, is to be exercised, like all other powers of government, as a trust for the benefit of the people, and not as a prerogative for the advantage of the government, as distinct from the people, or for the benefit of private individuals as distinguished from the public good. . . . [T]he ownership is that of the people in their united sovereignty.

161 U.S. 519, 529.

Here the trust resources, or "*res*," are the public lands themselves and, more broadly, the atmosphere whose stability is harmed by anthropogenic GHG pollution. The Public Trust Duty obligates BLM to exercise its duty of reasonable care by quantifying GHG pollution from oil and gas operations on public lands, to affirmatively reduce GHG pollution, and to affirmatively take action to ensure that our public lands and the environment are sufficiently resilient and have the



adaptive capacity to withstand, as best as they are able, climate change impacts. As noted, the Public Trust Duty, in a sense, tips the balance in favor of the broad public interest as compared to the insular interests of the oil and gas industry.

#### **5. The Endangered Species Act Requires that BLM Engage in Section 7 Consultation with the Fish & Wildlife Service.**

In addition to the above legal duties, BLM also must consider the specific effects of climate change in the oil and gas leasing context on threatened and endangered species. As with the analysis under NEPA, consultation under Section 7 of the ESA must examine the impacts to species from climate change, accounting for the direct, indirect, and cumulative impacts of BLM's current August 26, 2008 lease sale in addition to the cumulative impacts caused by past, present, and reasonably foreseeable oil and gas development and other activities carried out on BLM lands.

Congress enacted the ESA, in part, to provide a "means whereby the ecosystems upon which endangered species and threatened species depend may be conserved...[and] a program for the conservation of such endangered species and threatened species..." 16 U.S.C. § 1531(b). The ESA "is the most comprehensive legislation for the preservation of endangered species ever enacted by any nation." *Tennessee Valley Authority v. Hill*, 437 U.S. 153, 180 (1978). The Supreme Court's review of the ESA's "language, history, and structure" convinced the Court "beyond a doubt" that "Congress intended endangered species to be afforded the highest of priorities." *Id.* at 174. As the Court noted, "the plain intent of Congress in enacting this statute was to halt and reverse the trend toward species extinction, whatever the cost." *Id.* at 184.

Under section 7(a)(2) of the ESA, every federal agency "shall...insure that any action authorized, funded, or carried out by such agency ("action agency") is not likely to jeopardize the continued existence of the endangered or threatened species or result in the destruction or adverse modification of habitat of such species...determined...to be critical..." 16 U.S.C. § 1536(a)(2) (Section 7 consultation). Agency "action" is defined in the ESA's implementing regulations to include "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas. Examples include, but are not limited to: (a) actions intended to conserve listed species or their habitat; (b) the promulgation of regulations; (c) the granting of licenses, contracts, leases, easements, rights-of-way, permits, or grants-in-aid; or (d) actions directly or indirectly causing modifications to the land, water, or air." 50 C.F.R. § 402.02.

As demonstrated in this protest, BLM oil and gas leasing and development activities contribute to climate change, BLM is required to consider measures to reduce GHG pollution from its activities and to account for the impacts of climate change to public lands and the environment, and, notwithstanding climate change, oil and gas leasing and development causes impacts to the environment, period. Thus, the November 4, 2008 oil and gas lease sale "may affect" such species, triggering the section 7 consultation requirement.

Section 7 of the ESA requires federal agencies to insure that any “action” they authorize, fund, or carry out is not likely to “jeopardize the continued existence of any endangered [ ] or threatened species,” or result in the destruction or adverse modification of critical habitats. 16 U.S.C. § 1536(a)(2). As noted in *TVA v. Hill*, “this language admits of no exception. 437 U.S. 153, 173. The applicable regulations direct agencies, in considering whether formal consultation is required, “to determine whether any action may affect listed species or critical habitat.” 50 C.F.R. § 402.14(a). A later portion of the same regulation confirms that agencies must consider the “effects of the action as a whole.” 50 C.F.R. § 402.14(c). The “[e]ffects of the action” include the “direct and indirect effects of an action on the species or critical habitat,” and “[i]ndirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.” 50 C.F.R. § 402.02.

Under these regulations, federal agencies are required to consider the “total impact” of a proposed project on listed species when consulting under section 7. *Riverside Irrigation Dist. v. Andrews*, 758 F.2d 508, 512 (10th Cir. 1985) (emphasis added); *North Slope Borough v. Andrus*, 642 F.2d 589, 608 (D.C. Cir. 1980) (agency must look at “all ramifications” of its action). By requiring federal action agencies to broadly assess the effects of their proposed actions, and to consider such effects in the context of independent, baseline harms already occurring to a species, ESA regulations ensure that the section 7 consultation process is not conducted “in a vacuum,” and that agencies will “not take action that will tip the species from a state of precarious survival into a state of likely extinction.” *Nat’l Wildlife Fed’n v. National Marine Fisheries Serv.*, 524 F.3d 917 (9th Cir. 2008).

By defining “effects of an action” broadly, the ESA regulations do not distinguish between direct and indirect effects—both must be considered during consultation. Indeed, the centrality of indirect effects analysis to the consultation process is highlighted throughout the section 7 regulations. In addition to “effects of the action” encompassing both “direct and indirect effects,” the regulatory definition of “action” (actions include those “indirectly causing modifications to the land, water, or air”), “action area,” (“all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action”) and “destruction or adverse modification” of critical habitat (“a direct or indirect alteration that appreciably diminishes the value of critical habitat”) all explicitly include indirect effects. 50 C.F.R. § 402.02 (emphasis added); see also *Village of False Pass v. Clark*, 733 F.2d 605, 611 (9th Cir. 1984) (consultation must insure that direct and indirect effects of agency action will not jeopardize listed species); *Connor v. Burford*, 848 F.2d 1441, 1452 (9th Cir. 1988) (section 7 requires preparation of biological opinion analyzing all phases of agency action).

In determining what constitutes an indirect effect, the regulations demand only that they be “reasonably certain to occur,” 50 C.F.R. § 402.02. Under even the most rigid of formulations, the contribution of oil and gas extraction on global warming are reasonably foreseeable indirect effects of the BLM oil and gas leasing. The greenhouse gas emissions and their contribution to global warming—which pose greater risks of mass extinctions than any other activity in human history—are consequently a reasonably foreseeable consequence of the BLM’s action. It is equally clear that BLM oil and gas development poses threats to listed species far beyond the regulation’s *de minimis* “may affect” threshold. See 51 Fed. Reg. 19,926, 19,949 (June 3, 1986) (section 7 rulemaking in which FWS and NMFS interpreted the “may affect” threshold for

initiation and reinitiation of consultation as a very low bar, finding that “any possible effect, whether beneficial, benign, adverse, or of an undetermined character, triggers the formal consultation requirement”) (emphasis added)). Consequently, in addition to the direct impacts of oil and gas leasing and development on listed species, GHG pollution from oil and gas leasing also creates indirect and cumulative effects compelling formal ESA section 7 consultation.

**IV. BLM MUST ADDRESS GLOBAL WARMING, CLIMATE CHANGE, AND GHG POLLUTION FROM FEDERAL ONSHORE OIL AND GAS DECISIONMAKING ACTIONS BEFORE LEASE RIGHTS ARE SOLD.**

**1. BLM Must Quantify Past, Present, and Reasonably Foreseeable GHG Emissions from Oil and Gas Development to Address the Direct, Indirect, and Cumulative Impacts of these GHG Emissions to the Environment.**

As explained above, direct and indirect GHG emissions from oil and gas industry operations include CO<sub>2</sub>, methane, and to a lesser extent N<sub>2</sub>O, from a number of sources and processes. In Montana, North Dakota, and South Dakota, BLM’s surrender of lease rights will open the door for further conventional natural gas development, coalbed methane (“CBM”) development, crude oil development, and attendant operations to enable and facilitate this development.

Indeed, development of oil and gas, including CBM, occurs throughout Montana east of the Rocky Mountain Front, as well as in western North Dakota and western South Dakota. Statistics with the Montana Board of Oil and Gas show that in 2007, 148 oil wells, 372 gas wells, and 63 CBM wells were drilled in the State.<sup>30</sup> Production data with the Montana Board of Oil and Gas also shows that virtually every County in eastern Montana produced oil and/or gas in 2007. See Table 4 below. According to the BLM’s August 26, 2008 lease sale notice, oil and gas leases will be offered for sale in many of Montana’s producing Counties, including Golden Valley, Stillwater, Musselshell, Carbon, and Beaverhead.

**Table 4.** Oil and Gas Production in Montana by County, 2007.<sup>31</sup>

<b>County</b>	<b>Bbls Oil</b>	<b>Mcf Gas</b>
Big Horn	61559	13062106
Blaine	228270	13035474
Carbon	457109	1952657
Carter	14734	96209
Chouteau	0	1619986
Custer	0	79839
Daniels	10033	0
Dawson	540988	210343

<sup>30</sup> Montana Board of Oil and Gas data available online at <http://bogc.dnrc.mt.gov/idpintro.asp>.

<sup>31</sup> Data from Montana Board of Oil and Gas

Fallon	7251299	26786265
Fergus	0	59850
Garfield	14733	2190
Glacier	449982	1697997
Golden Valley	0	94673
Hill	2151	14684022
Liberty	78325	1948477
McCone	13226	0
Musselshell	144456	6601
Petroleum	26216	3936
Phillips	0	19985419
Pondera	128794	548295
Powder River	335830	95493
Prairie	93051	9481
Richland	20137661	16726594
Roosevelt	1398093	762518
Rosebud	273700	14835
Sheridan	1733665	876052
Stillwater	0	583553
Sweetgrass	0	69189
Teton	51535	1507
Toole	455589	4001343
Valley	122077	1132069
Wibaux	790113	605614
Yellowstone	22821	0

Similarly, lands in a number of western North Dakota counties that currently produce oil and/or gas are slated to be leased by the BLM. According to the August 26, 2008 lease notice, lands in Billings, McKenzie, Mountrail, Slope, Dunn, Golden Valley, Bowman, and Williams, Counties will be offered for lease. According to the North Dakota Industrial Commission, Department of Mineral Resources, Oil and Gas Division, oil and/or gas was produced in all of these Counties in 2007.<sup>32</sup> In South Dakota, land is offered for sale in Harding County, where most of South Dakota's historic and producing wells are located.<sup>33</sup> It is reasonable to conclude that leasing these lands in Montana, North Dakota, and South Dakota will lead to further oil and gas development.

GHG pollution associated with such oil and gas development will stem from a number of potential sources. According to a review by the California Air Resources Board, and reinforcing the API Compendium discussed above in Section III.3, such sources include:

<sup>32</sup> See Oil and Gas Division Production Data by County. Reports online at: <https://www.dmr.nd.gov/oilgas/stats/countymot.pdf> and <https://www.dmr.nd.gov/oilgas/stats/countymgt.pdf>.

<sup>33</sup> See South Dakota Department of Environment and Natural Resources Minerals and Mining Program maps, online at: <http://www.state.sd.us/DENR/DES/mining/Oil&Gas/o&g-maps.htm>.

- Exploration, which includes CO<sub>2</sub> emissions from truck motors used in vibroseis or other exploratory operations;
- Well development, which includes GHG emissions from pad clearing, road construction, rigging up and drilling, the use of drilling fluids, casing placement, and well completion and testing (including emissions from hydraulic fracturing and the flaring and venting of flowback gases);
- Primary and secondary production phases, which include GHG emissions from the installation and use of compressor engines, well treatment and workovers, wellsite visits, wellsite facilities (including separators, heater treaters, gas conditioning, dehydration, wastewater disposal, and evaporation ponds), leaks from primary and secondary production equipment (e.g., pipelines, valves, etc.), and accidental releases (e.g., well blowouts); and
- Site abandonment, which includes GHG emissions from plugging activities and site reclamation.<sup>34</sup>

Inventories of GHG emissions from oil and gas activities are now commonplace. The Environmental Protection Agency (“EPA”) is currently in the process of updating its Inventory of U.S. Greenhouse Gas Emissions and Sinks for 1990-2006.<sup>35</sup> A draft report is presently available for review.<sup>36</sup> Archived EPA information provides reports for previous inventories.<sup>37</sup> MMS, as discussed above, has also been quantifying GHG emissions from offshore oil and gas operations in both programmatic and lease-specific NEPA analyses.

Additionally, individual states, particularly in the Rocky Mountain region, have taken the initiative to understand and reduce GHG pollution by preparing state-level inventories. In fact, several oil and gas producing states, including Montana, have developed GHG pollution inventories with specific estimates provided for the oil and gas industry:

- **Colorado.** According to an October 2007 GHG inventory for the State of Colorado, oil and gas operations directly released 5.16 million metric tons of CO<sub>2</sub> equivalent (“CO<sub>2</sub>e”) in 2005, more than 4% of the state’s total GHGs.<sup>38</sup> See Final Colorado Greenhouse Gas

<sup>34</sup> Zahniser, A., *Characterization of greenhouse gas emissions involved in oil and gas exploration and production activities*, review for California Air Resources Board (undated) (attached as Exhibit 17) (available at [www.wrapair.org/WRAP/ClimateChange/GHGProtocol/meetings/071025/Characterization\\_of\\_O&G\\_Operations\\_Sector\\_Emissions.pdf](http://www.wrapair.org/WRAP/ClimateChange/GHGProtocol/meetings/071025/Characterization_of_O&G_Operations_Sector_Emissions.pdf))

<sup>35</sup> [www.epa.gov/climatechange/emissions/usinventoryreport.html](http://www.epa.gov/climatechange/emissions/usinventoryreport.html).

<sup>36</sup> [www.epa.gov/climatechange/emissions/downloads/08\\_CR.pdf](http://www.epa.gov/climatechange/emissions/downloads/08_CR.pdf).

<sup>37</sup> [www.epa.gov/climatechange/emissions/usgginv\\_archive.html](http://www.epa.gov/climatechange/emissions/usgginv_archive.html).

<sup>38</sup> CO<sub>2</sub> equivalent refers to the global warming potential of a GHG, where CO<sub>2</sub> has a potential of “1” and, for example, methane has a potential of “21.” Therefore, one ton of methane equals 21 tons of CO<sub>2</sub> equivalent.

Emissions Inventory and Reference Case Projections 1990-2020 (attached as Exhibit 18).<sup>39</sup> Furthermore, GHGs from oil and gas operations are projected to increase by more than 80% by 2020. Although GHG pollution is reported to stem from both oil and gas production processing, and refining, the inventory states that “[t]he natural gas industry accounts for the majority of both GHG emissions and emissions growth in the fossil fuel industry as a whole.” Exhibit 18 at E-5.

- **Montana.** According to a September 2007 GHG inventory for the State of Montana, oil and gas operations released 4.7 million metric tons of CO<sub>2</sub>e in 2005, more than 12% of the state’s total GHG emissions. Furthermore, GHGs from oil and gas operations are projected to increase by more than 10% by 2020. GHG emissions from oil and gas operations in Montana are reported to stem from CBM production and processing, conventional natural gas production and processing, and oil development and refining. *See* Final Montana Greenhouse Gas Emissions Inventory and Reference Case Projections 1990-2020 (attached as Exhibit 19).
- **New Mexico.** According to the November 2006 GHG inventory for the State of New Mexico, oil and gas operations released 19.3 million metric tons of CO<sub>2</sub>e in 2000, more than 23% of the state’s total GHG emissions. Based on this data, oil and gas operations represent the second largest source of GHGs in New Mexico. Although this report shows that oil and gas GHGs are projected to increase by only 3.62% by 2020, the report based this projection on the assumption that there would be no change (i.e., decrease or increase) in natural gas or oil production in the state, an assumption that appears invalid and which may, regardless, have only limited correlation to GHG increases or decreases. GHG emissions from oil and gas operations in New Mexico are reported to stem from CBM production and processing, conventional natural gas production and processing, and oil development and refining. *See* Final New Mexico Greenhouse Gas Emissions Inventory and Reference Case Projections 1990-2020 (attached as Exhibit 20).
- **Wyoming.** According to a Spring 2007 GHG inventory for the State of Wyoming, oil and gas operations released 11.5 tons of CO<sub>2</sub>e in 2005, more than 20% of the state’s total GHG emissions. Furthermore, by 2020, GHGs from oil and gas operations are projected to increase by nearly 10%. GHG emissions from oil and gas operations in Wyoming are reported to stem from CBM production and processing, conventional natural gas production and processing, and oil development and refining. *See* Final Wyoming Greenhouse Gas Emissions Inventory and Reference Case Projections 1990-2020 (attached as Exhibit 21).

While these GHG quantification efforts largely constitute top-down efforts to quantify GHG emissions and are less refined than bottom-up inventories prepared on the basis of specific equipment inventories and GHG measurements, they nonetheless provide a useful starting point for BLM.

Complementing this governmental GHG quantification work is the API Compendium, Exhibit 9, referenced above. In addition to explaining sources of GHGs associated with the oil

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<sup>39</sup> [www.coloradoclimate.org/ewebeditpro/items/O14F13894.pdf](http://www.coloradoclimate.org/ewebeditpro/items/O14F13894.pdf).

and gas industry, the API Compendium lists emission factors and methodologies for estimating GHG gas emissions from compressor engines, fugitive sources, pneumatic controllers, and among many other pieces of equipment and processes. The API Compendium provides the best available information to quantify GHG emissions from oil and gas operations, particularly with regards to combustion sources, in particular on a bottom-up basis; a recent review by the California Energy Commission found that the API Compendium's "methods and data on evaluating combustion emissions and refinery emissions are considered the best information."<sup>40</sup> Although this same review recommended refinement of certain API Compendium methodologies, the review found the Compendium to be accurate and reliable.<sup>41</sup> A review of the API Compendium – as well as follow up assessments of the API such as the California Energy Commission's review – should provide BLM with a solid basis for quantifying GHG emissions from BLM-authorized oil and gas development whether on a top-down or bottom-up basis.

The California Climate Action Registry is also in the process of finalizing protocols for quantifying GHG pollution from the natural gas transmission and distribution industry sector. In a 2007 final draft report entitled, the California Climate Action Registry identified methods to quantify GHG emissions from combustion sources, including compressor engines, direct emissions from process vents, fugitive emissions, and indirect GHG emissions.<sup>42</sup> Although the final draft report focuses on the natural gas transmission and distribution sector, many of the processes and equipment used by this sector are also used at the exploration and production stage of natural gas development. By way of example, the State of New Mexico, under the leadership of Governor Bill Richardson and the New Mexico Environment Department is also in the process of developing reporting protocols for oil and gas production and processing for The Climate Registry. The State of New Mexico has already established a mandatory GHG reporting program for oil and gas operations. *See* 20.2.73 & 20.2.87 N.M.A.C.

In terms of scale, BLM should *at least* quantify GHG emissions from past, present, and reasonably foreseeable oil and gas development within each Resource Area in Montana, North Dakota, and South Dakota. As suggested, however, a broader, regional landscape-scale effort may be warranted given, from the mitigation perspective, the scale at which GHG reduction measures must operate to have the most impact and, from the adaptation perspective, given the scale at which climate change will impact public lands and the environment. Obviously, any effort – including Resource Area-specific efforts – should account for the cumulative impacts of other GHG sources across the landscape, including state permitted oil and gas development. Furthermore, BLM should assess the proportion of GHG pollution from oil and gas development relative to state, regional, and national GHG pollution totals.

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<sup>40</sup> California Energy Commission, *Evaluation of Oil and Gas Sector Greenhouse Gas Emissions Estimation and Reporting*, prepared by TIAX LLC and ICF Consulting (April 14, 2006) (attached as Exhibit 22).

<sup>41</sup> In the California Energy Commission review of the API Compendium, ICF Consulting provides recommendations for refining estimates of methane emissions from oil and gas operations.

<sup>42</sup> California Climate Action Registry, *Discussion Paper for a Natural Gas Transmission and Distribution Greenhouse Gas Reporting Protocol*, prepared by the URS Corporation and the LEVON Group (2007) (attached as Exhibit 23).

It may behoove and in fact be necessary for BLM to prepare a programmatic NEPA analysis to revise or amend RMPs throughout the Rocky Mountains to account for and reduce GHG emissions, properly justify oil and gas management activities, and properly protect public lands and the environment by evaluating climate change impacts and considering management alternatives designed to protect and manage public lands and the environment to withstand climate change impacts. Given the scale of this endeavor, it may also behoove BLM to initiate a top-level policy or rulemaking process to provide guidance to field staff and encourage the development of models to predict climate change. As noted in the 2007 GAO Report, “resource managers said that they need local- and regional-scale models to predict change on a small scale as well as improved inventory and monitoring.” 2007 GAO Report at 41.

Maps and analysis of BLM’s oil and gas leasing and development program provide information to assist BLM in its effort to quantify and understand the full magnitude of past, present, and reasonably foreseeable GHG pollution from oil and gas development. For example, maps detailing federally-leased lands and the location of federal and state oil and gas wells for Montana and, more broadly, Colorado, Wyoming, and New Mexico are a testament to the enormous amount of existing oil and gas activity in the Rocky Mountain West. Exhibits 24 (Colorado), 25 (New Mexico), 26 (Montana), and 27 (Wyoming). Such activity has, notably, been intensifying over the course of the last several years, with a steady stream of new leases being sold and new drilling permits being issued, often in areas proposed for wilderness protection by the public or in areas managed for wildlife protection. Exhibit 28.

Of note, while the amount of activity has been enormous, a recent analysis by The Wilderness Society demonstrates that 44,479,478 acres of federal mineral resources were under lease as of the end of Fiscal Year 2007, but that only 11,629,625 acres, or 26%, were actually under production.<sup>43</sup> Furthermore, while BLM, nationwide, issued 7,124 Applications for Permit to Drill in 2007, only 5,343 were actually drilled, demonstrating a surplus of 1,781 APDs.<sup>44</sup> This is troubling data, indicating that BLM is enabling the oil and gas industry to stockpile leases with little benefit to the broader public interest and with demonstrably little to no effect on energy prices or supply. The Wilderness Society’s analysis is buttressed by a Special Report prepared by the Committee on Natural Resources Majority Staff which concludes that increased drilling activity has not led to lower gasoline prices, that the oil and gas industry is not producing energy on a vast number of federal onshore oil and gas leases, and that, relatedly, there are vast areas already available for development thus suggesting that there is little reason to rush to lease more federal lands.<sup>45</sup>

Notwithstanding calls for intensified leasing of federal minerals, these analyses and data suggest that BLM could – and, indeed, should – ratchet back its leasing program to ensure that further leasing and consequent development properly addresses the climate change issues

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<sup>43</sup> [www.wilderness.org/Library/Documents/upload/Rocky\\_Mtn\\_APDs\\_Acres\\_Leased\\_Tables\\_080531%20.pdf](http://www.wilderness.org/Library/Documents/upload/Rocky_Mtn_APDs_Acres_Leased_Tables_080531%20.pdf) (attached as Exhibit 29).

<sup>44</sup> *Id.*

<sup>45</sup> [http://resourcescommittee.house.gov/images/stories/Documents/truth\\_about\\_americas\\_energy.pdf](http://resourcescommittee.house.gov/images/stories/Documents/truth_about_americas_energy.pdf) (attached as Exhibit 30).



identified and raised by this Protest. More leasing will simply do little to nothing to lower energy prices or increase energy supplies. The mineral resources aren't going anywhere and will remain important long into the future. If anything, as energy demand continues to intensify and fossil fuel supplies near or surpass their peak, keeping a reserve of minerals in the ground may benefit the country in the long term. In any event, as should be evident, BLM has the opportunity to optimize existing and future oil and gas development such that GHG pollution is reduced and more energy resources are provided to the market for consumers.

BLM's failure to deal with GHG pollution and climate change is resulting in GHG pollution, the waste of energy resources, and a failure to plan, protect, and manage public lands and the environment to withstand climate change impacts. The time is ripe to meaningfully and thoughtfully address the key intersection between climate and energy; we are on the brink, conservatively, of 126,000 new federal oil and gas wells in the Rocky Mountain West (*see* Exhibits 31 & 32) and in the midst of extensive state and regional-level efforts to address climate change. Reiterating a point made above, climate issues are energy issues and energy issues are climate issues, and these issues can only be resolved through proper long-range planning and analysis.

Given this information, we were deeply troubled by BLM's statements to the press regarding a prior lease sale protest in New Mexico, dated March 30, 2008, which some of the Coalition's members filed against the April 16, 2008 lease sale. A passage in a May 23, 2008 article in the New Mexico Business Weekly (attached as Exhibit 33) regarding our March 30, 2008 Protest, referencing and quoting BLM Deputy State Director for Minerals Steve Herrell, is illuminative of BLM's apparent, and unfortunate, position:

"We're studying the protest through an internal review now," Herrell said. "We expect to have a response within a couple of weeks."

A favorable ruling, however, doesn't seem likely. Herrell said it's too difficult, if not impossible, to determine the impact of emissions from specific sites and operations on global warming.

"There is still a lot we don't know and understand about global warming," Herrell said. "How much an individual action contributes is impossible to determine. Even if we measure emissions from one lease or a number of leases, to determine the direct impact on global warming would be very hard for any scientist to prove. Legal action against lease sales is not the way to resolve global warming."

Mr. Herrell's statements miss the point. Just because it may or may not be difficult to determine the direct impact of GHG emissions from oil and gas development on global warming does not obviate BLM's legal responsibilities. As demonstrated above, BLM can quantify GHG pollution from specific sites and operations and create an aggregate GHG emissions total for BLM-authorized oil and gas development to determine the contribution of such development to global, national, regional, and local GHG emissions footprints. But, given the varied equipment and technologies used in oil and gas development, varied conditions and circumstances in the field, and the fact that upstream oil and gas production often involves individually minor, but

collectively significant GHG pollution sources, it is also equally important to refine this information to identify the precise sources and magnitude of those GHG emissions. Such refined data enables BLM to best support GHG reduction efforts by identifying the highest impact, most cost-effective GHG reduction measures, and positions BLM to work effectively with federal and state agency partners, the public, and the oil and gas industry. In so doing, BLM allows all parties the opportunity to plan for and implement GHG reduction measures in a uniform, efficient, and consistent fashion.

BLM, by complying with its legal obligations, can scale-up existing efforts and instill certainty in the process for industry through planning and decision-making to address climate change. Indeed, this is core purpose behind Secretarial Order 3226, FLPMA's RMP planning provisions, the NEPA process, and the Public Trust Duty. Findings from other Rocky Mountain State GHG pollution inventories explain the need for the BLM to follow through with such actions in Montana. For example, as explained in the Final New Mexico GHG Inventory and Reference Case Projections, 1990-2020:

The sheer number and wide diversity of oil and gas activities in New Mexico present a major challenge for greenhouse gas assessment. Emissions of carbon dioxide and methane occur at many stages of the production process (drilling, production, and processing/refining), and can be highly dependent upon local resource characteristics (pressure, depth, water content, etc.), technologies applied, and practices employed (such as well venting to unload liquids which may result in the release of billions of cubic feet of methane annually). With over 40,000 oil and gas wells in the State, three oil refineries, several gas processing plants, and tens of thousands of miles of gas pipelines in the State – and no regulatory requirements to track CO<sub>2</sub> or CH<sub>4</sub> emissions – there are significant uncertainties with respect to the State's GHG emissions from this sector.

Exhibit 20 at D-35. The Final New Mexico GHG Inventory and Reference Case Projections further noted:

Local estimates of field gas use and provided by [the New Mexico Oil & Gas Association] suggest that top-down estimates of natural gas production-related emissions provided here (based on national average emission rates) may be low. Furthermore, CO<sub>2</sub> emissions that may occur as the result of CO<sub>2</sub> mining and use for enhanced oil recovery could be significant, but have not been estimated. Further analysis of emissions from activities in all of the State's principal gas and oil basins, as well as of emissions from transmission and distribution sources could help to resolve some of these uncertainties. Given the large emission reduction potential that may exist in these sectors, such efforts could be quite valuable.

*Id.* at D-18. Additionally, as the Final Colorado Greenhouse Gas Emissions Inventory and Reference Case Projections 1990-2020 states:

Emissions of CH<sub>4</sub> and entrained CO<sub>2</sub> can occur at many stages of production, processing, transmission, and distribution of oil and gas. With over 23,000 gas and oil wells in the state, 43 operational gas processing plants, 2 oil refineries, and over 32,000 miles of gas pipelines, there are significant uncertainties associated with estimates of Colorado's GHG emissions from this sector. This is complicated by the fact that there are no regulatory requirements to track CO<sub>2</sub> or methane emissions. Therefore, estimates based on emissions measurements in Colorado are not possible at this time.

Exhibit 18 at E-2. While oil and gas industry GHG emissions are being inventoried, these inventories have yet to fully capture the diversity and magnitude of GHG pollution from oil and gas industry operations. Coupled with its legal responsibilities and the various GHG quantification tools available, the BLM is well poised to conduct the very "further analysis" that is needed to resolve uncertainty and ensure accurate planning, environmental analysis, and decision-making in Montana and the Rocky Mountain region as a whole.

## **2. BLM Must Identify, Consider, and Adopt a GHG Emissions Limit or GHG Reduction Objective for BLM-authorized Oil and Gas Activities.**

Effective GHG emissions management should be based upon an enforceable GHG pollution limit set by BLM for oil and gas development. Alternatively, BLM could set an objective for overall GHG reductions in line with science-based recommendations. For example, Montana's Climate Action Plan recommends that greenhouse gas emissions be reduced to 1990 levels by 2020.<sup>46</sup> Additionally, New Mexico, through Executive Order, has established a statewide goal to reduce GHG pollution to 2000 levels by 2012, 10% below 2000 levels by 2020, and 75% below 2000 levels, and a specific goal of reducing methane emissions from the oil and gas industry by 20% by 2020.<sup>47</sup> Colorado, similarly, is calling for a 20% reduction in GHG pollution below 2005 levels by 2020 and an 80% reduction below 2005 levels by 2050.<sup>48</sup>

Establishing GHG limits or GHG reduction objectives is important to satisfy BLM's responsibility to prevent "permanent impairment," "prevent unnecessary or undue degradation," to "minimize adverse impacts on the natural, environmental, scientific, cultural, and other resources and values," and to satisfy the Public Trust Duty. 43 U.S.C. §§ 1702(c), 1732(b), & 1732(d)(2)(A)). Without a GHG emissions limit or GHG emissions reduction objective, BLM may hamstring its own ability to address climate change by not having a definable and achievable goal. Furthermore, without articulated GHG limits or GHG reduction objectives, it is difficult if not impossible to ensure that actual GHG reduction efforts are effective; put another way, those efforts are rudderless.

<sup>46</sup> Montana Climate Change Action Plan, Final Report of the Governor's Climate Change Advisory Committee (November 2007) ([www.mtclimatechange.us/ewebeditpro/items/O127F14041.pdf](http://www.mtclimatechange.us/ewebeditpro/items/O127F14041.pdf)) (attached as Exhibit 74).

<sup>47</sup> See [www.nmenv.state.nm.us/aqb/GHG/Docs/EO\\_2006\\_069.pdf](http://www.nmenv.state.nm.us/aqb/GHG/Docs/EO_2006_069.pdf) (attached as Exhibit 34).

<sup>48</sup> Governor Bill Ritter, Jr., Colorado Climate Action Plan (November 2007) ([www.colorado.gov/cs/Satellite?c=Page&cid=1194261894265&pagename=GovRitter%2FGOVRLayout](http://www.colorado.gov/cs/Satellite?c=Page&cid=1194261894265&pagename=GovRitter%2FGOVRLayout)) (attached as Exhibit 35).

To set a GHG emissions limit, or GHG reductions objective, BLM should look to the latest science concerning overall global GHG concentration thresholds. The latest and best science appears to be the paper – *Target Atmospheric CO<sub>2</sub>: Where should Humanity Aim?* – authored by, amongst others, Dr. James Hansen, discussed above, and attached as Exhibit 11. According to the paper, “If humanity wishes to preserve a planet similar to that on which civilization developed, paleoclimate evidence and ongoing climate change suggest that CO<sub>2</sub> will need to be reduced from its current 385 ppm to at most 350 ppm.” Exhibit 5 at 1. Notably, this is a lower overall ppm objective than set by IPCC. The paper argues that this lower objective is necessary because:

Paleoclimate data and ongoing changes indicate that ‘slow’ climate feedback processes not included in most climate models, such as ice sheet disintegration, vegetation migration, and GHG release from soils, tundra or ocean sediments, may begin to come into play on time scales as short as centuries or less. Rapid ongoing climate changes and realization that Earth is out of energy balance, implying that more warming is ‘in the pipeline’, add urgency to investigation of dangerous level of GHGs.

*Id.* As the paper warns:

Realization that today’s climate is far out of equilibrium with current climate forcings raises the specter of ‘tipping points’, the concept that climate can reach a point such that, without additional forcing, rapid changes proceed practically out of our control.

*Id.* at 10. Importantly, there is a distinction between “tipping levels” and the “point of no return – the “climate state beyond which the consequence is inevitable, even if climate forcings are reduced.” *Id.* Of note, while the paper focuses on CO<sub>2</sub>, the reduction of non-CO<sub>2</sub> GHGs – such as methane – “could alleviate the CO<sub>2</sub> requirement, allowing up to about +25 ppm CO<sub>2</sub> for the same climate effect, while resurgent growth of non-CO<sub>2</sub> GHGs could reduce allowed CO<sub>2</sub> a similar amount.” *Id.* at 11.

Of course, BLM, as a single federal agency, cannot alone constrain and reduce GHG emissions within the limits recommended by the draft paper. BLM can, however, do its part by establishing a GHG emissions limit for federal oil and gas activities – e.g., by identifying a proportional amount of GHG reductions – or by setting GHG reduction objectives, e.g., a reduction of aggregate GHG pollution by 15% by 2015, a reduction of 25% by 2020, a reduction of 35% by 2025, *etc.* States, such as Montana, New Mexico and Colorado, as noted above, have taken this latter approach. GHG emissions limits or GHG reduction objectives can then be used to drive the development of better drilling technologies and constrain or even, if necessary, prohibit development to ensure that such development does not unacceptably contribute to global warming and climate change.

We anticipate that BLM may object to setting a GHG emissions limit or GHG reduction objective by punting to other federal or state agencies, such as the EPA.<sup>49</sup> This would be a mistake. BLM has independent legal obligations pursuant to Secretarial Order 3226, FLPMA, NEPA, and the Public Trust Duty to address greenhouse gas pollution from oil and gas development and independent legal obligations to address climate change impacts to public lands and the environment. Moreover, as the steward of our federal onshore oil and gas resources, BLM is uniquely positioned to address greenhouse gas pollution from oil and gas development and to empower existing state and industry initiatives. BLM must not shirk its responsibility.

### **3. BLM Must Identify, Consider, and Adopt Management Measures to Reduce GHG Emissions from BLM-authorized Oil and Gas Management Activities.**

Efforts to reduce GHG pollution from oil and gas development have been underway for some time but, unfortunately, have had only a limited effect and have not even come close to constraining GHG emissions within the limits recommended by the scientific community to mitigate anthropogenic climate change. Nonetheless, these efforts have demonstrated that GHG pollution reduction measures are technologically proven and frequently cost-effective, if not negative-cost and therefore an analogue of energy efficiency. This is for the common sense reason that if you reduce, for example, the emission of methane, a potent GHG pollutant, you end up putting more product in the pipeline for the benefit of the oil and gas company *and*, ultimately, the consumer. In accord with BLM's legal obligations, these efforts, must however be identified, evaluated, planned, and implemented in a uniform and consistent fashion to ensure that GHG reduction efforts are commensurate to the scale of the problem presented by climate change; *ad hoc*, voluntary, unplanned, and minimalist efforts simply will not suffice.

The intensification of these efforts through the development and implementation of planning and management frameworks is a logical component of the legal prohibitions against waste in oil and gas production; if, as a byproduct of implementing GHG reduction measures, the oil and gas operator creates a commercial product – such as carbon dioxide for Enhanced Oil Recovery or methane for consumers – then the failure to implement these measures is, by definition, unnecessary and wasteful. 43 C.F.R. §§ 3160.0-5, 3161.2, 3162.7, 3163.5. In fact, for years, CBM was itself considered little more than a waste product but is now a valuable source of energy. The opportunities to prevent unnecessary waste support a go-slow approach to oil and gas leasing and development to allow for the development of more robust technological GHG reduction measures with the capability of constraining GHG emissions within acceptable GHG

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<sup>49</sup> Indeed, in New Mexico, BLM, on July 11, 2008, denied a mirror lease sale protest that some of the parties to this Protest had filed regarding an April 2008 lease sale. BLM indicated that it could not “enforce” a specific emissions limit. It is entirely unclear what BLM means by this statement. That said, BLM seems to suggest that it lacks the ability to constrain pollution from oil and gas operations. If this is the case, this is troubling indeed, and leads to the question of whether BLM should be authorizing activities that create impacts for which it has no control to prevent. BLM's reliance on voluntary compliance programs – such as Best Management Practices – may be helpful, assuming that the efficacy of these measures is properly addressed through planning and NEPA analysis, but that does not obviate the need to identify a quantifiable objective or limit with which to determine how much action – whether through mandatory or voluntary measures – must be taken. The key is to ensure that pollution reduction efforts are effective – and to know whether something is effective requires the identification of a goal, objective, or limit to adhere to.

limits or to ensure the achievement of GHG reduction objectives. While such an approach may not serve the short-term interests of the oil and gas industry, it does serve the long-term interests of the whole public. In effect, BLM needs to account for the public interest – not merely industry’s desire for short-term profit margins – to ensure that oil and gas resources are developed through responsible, long-term, phased planning and development that minimizes waste and enables the widespread deployment of GHG pollution reduction measures.

In any event, as BLM moves forward in this endeavor, BLM should first look to EPA’s voluntary GHG reduction programs. For example, EPA manages a “Methane to Markets” program designed to advance “cost-effective, near-term methane recovery and use as a clean energy source ... to reduce global methane emissions in order to enhance economic growth, strengthen energy security, improve air quality, improve industrial safety, and reduce emissions of greenhouse gases.”<sup>50</sup> EPA also manages the well-known Natural Gas STAR program.<sup>51</sup> These programs provide useful starting points for BLM-based efforts to affirmatively reduce GHG emissions from federal oil and gas operations and ensure compliance with BLM’s legal obligations.<sup>52</sup>

States, on the basis of their concerns over the consequences of global warming and climate change to their economies and environments, have also developed individualized Climate Action Plans to address global warming and climate change by reducing GHG emissions.<sup>53</sup> See 43 U.S.C. § 1712(c)(9) (requiring BLM to coordinate and act consistently with state-based plans and programs); 43 C.F.R. §§ 1610.3-1, 1610.3-2 (same). These States, recognizing the importance and viability of regional-scale solutions, have also come together in a collaborative effort called the Western Climate Initiative to develop a regional-scale market-based GHG reduction mechanism, and The Climate Registry, a regional-scale GHG emissions reporting program.<sup>54</sup> Draft design elements have supported the inclusion of upstream oil and gas operations.

The EPA and the State-level efforts are admirable, and provide BLM with a host of information to assist BLM in meeting its own obligations pursuant to Secretarial Order 3226,

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<sup>50</sup> [www.epa.gov/methanetomarkets/](http://www.epa.gov/methanetomarkets/).

<sup>51</sup> [www.epa.gov/gasstar/](http://www.epa.gov/gasstar/). Notably, many major oil and gas producers in Montana and North Dakota are EPA Natural Gas STAR partners, including ConocoPhillips, EnCana Oil and Gas, Exxon, Marathon, and others. See <http://www.epa.gov/gasstar/partner.htm>.

<sup>52</sup> Of note, the Protestors have been in meetings with representatives of the oil and gas industry that participate in EPA’s programs wherein the representatives have indicated that their deployment of GHG reduction measures may actually slow in anticipation of market-based GHG reduction programs. The reason behind this potential slow-down is that these companies may not otherwise be able to get credit for GHG reductions taken prior to the deployment of the market-based GHG reduction programs. This suggests that BLM must initiate near-term measures to ensure that efforts to reduce GHG emissions do not regress and potentially compromise long-term GHG reduction efforts.

<sup>53</sup> See, e.g., Exhibit 35 (Colorado); Exhibit 36 (New Mexico Climate Change Advisory Group, Final Report (December 2006)).

<sup>54</sup> Information pertaining to the Western Climate Initiative can be found at [www.westernclimateinitiative.org/](http://www.westernclimateinitiative.org/); information pertaining to The Climate Registry can be found at [www.theclimateregistry.org/](http://www.theclimateregistry.org/).

FLPMA, NEPA, and the Public Trust Duty. These efforts, far from excusing BLM inaction, evidence the fact that the time is now for BLM to step up to the plate and address GHG pollution and climate change in a meaningful way.

As an initial action, BLM should subject leases to the stipulation that the lessee must actively participate in EPA's GHG reduction programs – e.g., EPA's Natural Gas STAR program – given that the mineral resources being extracted are the people's resources and that lessees that derive profit from public resources should be held to the highest standards. Requiring lessees to actively participate in EPA's Natural Gas STAR program is especially reasonable in light of the fact that Montana's Climate Action Plan explicitly recommends that "Montana adopt a policy to encourage natural gas companies in the state to participate in EPA's Natural Gas STAR Program and provide enforcement and verification of the participation."<sup>55</sup> BLM could play a key role in furthering this recommendation, which is clearly reasonable and not speculative.

BLM should also subject the leases to a stipulation that empowers BLM to fully implement future laws, policies, and plans designed to combat climate change and reduce GHG pollution. Once BLM surrenders lease rights, BLM may be unable to subject lease operations to these laws and policies without violating the lessees' rights. At the least, enforcing these laws and policies in the context of already-issued leases may be met with fierce resistance by the lessees. Given that lease development can last for decades, it would be unfortunate if BLM commits public lands to activities that would undercut anticipated laws and policies designed to combat global warming and climate change. Bottom line, a simple solution would be to expressly subject leases to stipulations to ensure that future GHG reduction laws and policies can be fully implemented. This would benefit forward-looking oil and gas companies that have built up expertise in GHG reductions and provide a front-end incentive for companies to implement GHG reduction measures whose cost could be accounted for in lease sale offers.

These broad-brush measures, however, are only a first step. Given the existence, now, of technologically and economically viable GHG reduction measures, BLM should conduct a more in-depth analysis of these GHG pollution reduction measures as a component of BLM's RMP planning process and NEPA alternatives analysis to address whether the leases being offered for sale should be subjected to more specific GHG reduction stipulations. The alternatives would consider, e.g., stipulations mandating, generally, that oil and gas operations will be subjected to the best available GHG reduction measures, or mandating, specifically, precise types of GHG reduction measures. In some instances, BLM may be able to rely on conditions of approval *if* BLM *first* identifies and evaluate the efficacy of these conditions of approval prior to the point of commitment. Again, pending broader RMP-level planning and NEPA analysis, it may also behoove BLM to take a go-slow approach in authorizing development of existing leases to ensure that GHG pollution reduction measures can have the most significant cumulative benefit.

However BLM proceeds, the need for pre-commitment NEPA analysis is critical. Existing GHG reduction measures are sometimes implemented because they are economically worthwhile from the perspective of the oil and gas operator. But even if these GHG reduction

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<sup>55</sup> Exhibit 74 at 4-12.

measures are implemented, they may be unable, without more, to achieve GHG limits or GHG reduction objectives. Moreover, just because a particular measure is economically beneficial does not mean that a company will in fact implement the measure. Oil and gas lessees, like any business, may find it more economically beneficial to invest in new leases, the drilling of new wells, or endeavors other than in GHG pollution reduction measures. BLM may therefore find it necessary to incentivize or mandate GHG pollution reduction measures to reflect BLM's broad conservation duties, retain the authority to constrain development on the leasehold to restrict GHG pollution within acceptable or achieve GHG pollution reduction objectives, or direct where oil and gas companies which extract public mineral resources focus their investments. Legally, such options must be identified and considered before lease rights are conferred.<sup>56</sup> Pragmatically, pre-commitment decision-making and NEPA analysis BLM provides BLM with an informed basis to address GHG pollution, coordinate with federal and state agency counterparts, reach out to the public, ensure that GHG emissions can be constrained within acceptable limits, and provide the lessee with notice and thus the basis to plan for drilling-stage activities in advance.

In terms of the precise types of GHG reduction measures, and the types of GHG emissions they reduce, GHG reduction measures targeting methane emissions are especially important. Not only is methane a potent GHG, but methane reductions typically involve methane recovery, therefore yielding a high potential for payback.<sup>57</sup> Indeed, Montana's Climate Action Plan predicts that reducing methane emissions from the oil and gas sector in Montana would likely have net benefit, meaning producers are most likely to make money.<sup>58</sup> The Montana Climate Action Plan explicitly recommends that methane emissions from the oil and gas sector be reduced by 30% by 2020.<sup>59</sup> To achieve this goal, the Climate Action Plan recommends preventative maintenance of oil and gas facilities, reducing flash losses from storage tanks, wells, compressor stations, and gas plants, and changing and replacing parts and devices to reduce leaks and improve efficiency.<sup>60</sup>

Other specific measures that reduce methane and often yield a payback include:

- Retrofitting or replacing high-bleed pneumatic controllers with low-bleed or no-bleed pneumatics.<sup>61</sup>

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<sup>56</sup> The distinction between BLM's pre- and post-lease authority is particularly important in the context of BLM's duty to address a "no action" alternative which, at the point a lease is offered for sale, is *the option of not issuing the lease* and thus the decision not to allow oil and gas development, period. 40 C.F.R. § 1502.14(d). This option is foreclosed by the sale and issuance of the lease as the lessee is given the legal right to develop the lease. 43 C.F.R. § 3101.1-2.

<sup>57</sup> As of the date of this Protest, natural gas prices are around \$7.27/Mcf at the wellhead. *See* <http://tonto.eia.doe.gov/oog/info/ngw/ngupdate.asp>. Efforts to recover methane are, in essence, recovering money.

<sup>58</sup> *See* Exhibit 74 at Ex. 8.

<sup>59</sup> *Id.* at 4-12.

<sup>60</sup> *Id.*

<sup>61</sup> *See* Exhibit 37 ([www.epa.gov/gasstar/pdf/lessons/ll\\_pneumatics.pdf](http://www.epa.gov/gasstar/pdf/lessons/ll_pneumatics.pdf)).



- Requiring green completions to be used when completing CBM and conventional natural gas wells. Green completions capture methane and other gases typically vented or flared during completion flowback operations.<sup>62</sup>
- Enhancing maintenance of compressor engines, including periodic replacement of compressor rods and rod packing.<sup>63</sup>
- Replacing glycol dehydrators with desiccant dehydrators, utilizing flash tank separators at glycol dehydrators, optimizing glycol circulation rate, or utilizing other zero emission dehydrator technologies.<sup>64</sup>
- Installing plunger lift systems in gas wells.<sup>65</sup>
- Conducting directed inspection and maintenance at wellheads, compressor stations, and processing plants to reduce fugitive leaks from valves, flanges, and other connectors.<sup>66</sup>
- Installing vapor recovery units on crude oil, condensate, or other tanks storing liquid petroleum products.<sup>67</sup>

Details on a number of other potential methane reduction measures for the oil and gas industry are readily available online at the EPA's Natural Gas STAR website, [www.epa.gov/gasstar/techprac.htm](http://www.epa.gov/gasstar/techprac.htm).

Additionally, many methane reduction measures are detailed in the recently finalized report by the Four Corners Air Quality Task Force. The Four Corners Air Quality Task Force, which the BLM was actively a part of, released its final report on mitigation options for the oil and gas industry on November 1, 2007.<sup>68</sup> This report details a number of potential strategies to reduce air pollution, including methane. Notably, the report indicates that many methane reduction measures also reduce emissions of volatile organic compounds ("VOCs"). VOCs react

<sup>62</sup> See Exhibits 38 & 39.

([www.epa.gov/gasstar/workshops/durango\\_sept2007/06\\_%20bp\\_rec\\_Greenhouse\\_gas\\_emission\\_reduction.pdf](http://www.epa.gov/gasstar/workshops/durango_sept2007/06_%20bp_rec_Greenhouse_gas_emission_reduction.pdf) and [www.epa.gov/gasstar/workshops/durango\\_sept2007/05\\_weatherford\\_rec.pdf](http://www.epa.gov/gasstar/workshops/durango_sept2007/05_weatherford_rec.pdf)). See also Exhibit 40 ([http://www.epa.gov/gasstar/workshops/glenwood\\_sept2007/04\\_recs.pdf](http://www.epa.gov/gasstar/workshops/glenwood_sept2007/04_recs.pdf)).

<sup>63</sup> See Exhibit 41.

([www.epa.gov/gasstar/workshops/glenwood\\_sept2007/03\\_methane\\_savings\\_from\\_compressors.pdf](http://www.epa.gov/gasstar/workshops/glenwood_sept2007/03_methane_savings_from_compressors.pdf)).

<sup>64</sup> See Exhibit 42 ([www.epa.gov/gasstar/workshops/durango\\_sept2007/08\\_natural\\_gas\\_dehydration.pdf](http://www.epa.gov/gasstar/workshops/durango_sept2007/08_natural_gas_dehydration.pdf)).

<sup>65</sup> See Exhibit 43 ([www.epa.gov/gasstar/pdf/lessons/ll\\_plungerlift.pdf](http://www.epa.gov/gasstar/pdf/lessons/ll_plungerlift.pdf)).

<sup>66</sup> See Exhibit 44 ([www.epa.gov/gasstar/workshops/durango\\_sept2007/03\\_dim\\_in\\_gas\\_production\\_facilities.pdf](http://www.epa.gov/gasstar/workshops/durango_sept2007/03_dim_in_gas_production_facilities.pdf)).

<sup>67</sup> See Exhibit 45 ([www.epa.gov/gasstar/pdf/lessons/ll\\_final\\_vap.pdf](http://www.epa.gov/gasstar/pdf/lessons/ll_final_vap.pdf)).

<sup>68</sup> This report is available at [www.nmenv.state.nm.us/aqb/4C/Docs/4CAQTF\\_Report\\_FINAL\\_OilandGas.pdf](http://www.nmenv.state.nm.us/aqb/4C/Docs/4CAQTF_Report_FINAL_OilandGas.pdf).

with sunlight to form ground-level ozone, a criteria pollutant for which the Clean Air Act sets National Ambient Air Quality Standards (“NAAQS”) to limit unhealthy concentrations nationwide. *See* 40 CFR § 50.10. The EPA just strengthened the NAAQS for ozone, limiting concentrations to no more than 75 parts per billion over an eight hour period. *See* 73 Fed. Reg. 16435-16514. BLM should therefore plan, analyze, and implement measures to reduce both methane and VOCs from oil and gas development to address both global warming and ozone impacts.<sup>69</sup>

Many, if not all, of the measures identified by the Montana Climate Action Plan, EPA’s Natural Gas STAR program and the Four Corners Air Quality Task Force are applicable to oil and gas development in Montana, North Dakota, South Dakota and the broader Rocky Mountain region. Natural gas production, including CBM, will utilize well drilling and completions, compressor engines, pneumatic controllers, dehydrators, wellhead equipment, and other processes and equipment where methane emissions could be reduced or eliminated. Oil production will utilize tanks, wellhead equipment, and other processes and equipment where methane could be reduced or eliminated. BLM should step up to the plate and follow the lead of the Montana Climate Action Plan and work to achieve the 30% reduction in methane emissions by 2020. Indeed, many companies producing oil and gas in Montana and North Dakota have already reported success in utilizing a number of methane reduction measures. For example:

- BP has successfully utilized green completions to reduce methane emissions from CBM well completions. *See* Exhibits 39 & 40.
- EnCana Oil and Gas (USA) has replaced a number of high-bleed pneumatic controllers with low-bleed pneumatics, installed a number of plunger lifts, and utilized green completions, replaced gas-actuated pumps with solar electric pumps, and utilized vapor recovery units.<sup>70</sup>
- Marathon Oil has undertaken a number of methane reduction measures, including installing vapor recovery units, replacing high-bleed pneumatic controllers with low or no-bleed pneumatic controllers, and installing plunger lifts.<sup>71</sup>
- Burlington Resources, a subsidiary of ConocoPhillips, has successfully reduced methane emissions through the use of plunger lift systems.<sup>72</sup>

While these are just some examples highlighting both the feasibility and acceptance of methane reduction measures among companies operating in Montana and North Dakota, they

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<sup>69</sup> In fact, the BLM has a legal responsibility to ensure protection of the NAAQS in accordance with FLPMA. *See* 43 U.S.C. § 1712(c)(8); 43 C.F.R. § 2920.7(b)(3).

<sup>70</sup> *See* Exhibit 48 ([http://www.epa.gov/gasstar/workshops/glenwood\\_sept2007/09\\_scott\\_mason\\_ancillary\\_equipment.pdf](http://www.epa.gov/gasstar/workshops/glenwood_sept2007/09_scott_mason_ancillary_equipment.pdf)).

<sup>71</sup> *See* Exhibit 49 ([http://www.epa.gov/gasstar/workshops/denver\\_apr08/denver2.pdf](http://www.epa.gov/gasstar/workshops/denver_apr08/denver2.pdf)).

<sup>72</sup> *See* Exhibit 50 ([http://www.epa.gov/gasstar/workshops/farmington-feb06/burlington\\_resources.pdf](http://www.epa.gov/gasstar/workshops/farmington-feb06/burlington_resources.pdf)).

highlight the need for the BLM to conduct a more in-depth analysis of these methane reduction measures before surrendering lease rights to: (1) address whether these measures should be made mandatory through lease stipulations (because, e.g., they would otherwise conflict with a lease issued only with standard terms and conditions); (2) afford BLM the chance to reach out to federal and state partners; (3) engage the public and the oil and gas industry in a meaningful, transparent dialogue; and (4) allow all parties to plan for and implement GHG reduction measures in a uniform, efficient, and consistent fashion, as well as to take advantage opportunities to reduce emissions of other harmful air pollutants, such as VOCs.

Relative to carbon dioxide reductions from oil and gas operations, the Montana Climate Action Plan recommends that the oil and gas sector reduce emissions by:

a) using new efficient compressors, b) optimizing gas flow to improve compressor efficiency, c) improving performance of compressor cylinder ends, d) capturing compressor waste heat, e) replacing compressor driver engines, and f) using waste heat recovery boilers.<sup>73</sup>

The state of New Mexico's Climate Change Advisory Group similarly recommended:

There are a number of ways in which CO<sub>2</sub> emissions in the oil and gas industry can be reduced, including (1) installing new efficient compressors, (2) replacing compressor driver engines, (3) optimizing gas flow to improve compressor efficiency, (4) improving performance of compressor cylinder ends, (5) capturing compressor waste heat, and (6) utilizing waste heat recovery boilers. Policies to encourage these practices can include education and information exchange, financial incentives, and mandates or standards that require certain practices.

The [Climate Change Advisory Group] recommends that New Mexico focus attention on reducing GHG emissions from fuel combustion in the oil and gas industry through education, financial incentives, mandates and/or standards – coupled with cost and investment recovery mechanisms, if appropriate – to: (1) improve the efficiency of compressors; (2) boost waste heat recovery for compressors and boilers including the deployment of CHP systems that could sell excess power back to the grid; and to a lesser extent, (3) replace gas-driven compressors with electrical compressors when doing so reduces CO<sub>2</sub> emissions (the average carbon intensity of New Mexico electricity would need to be reduced by approximately 30% to make this option carbon-neutral).<sup>74</sup>

These strategies are all very applicable in Montana, North Dakota, and South Dakota. In part to address GHG emissions, but to also address the cumulative impact of climate change and oil and gas development to the built and natural environments, BLM should subject leases to unitization – and at least consider whether this requirement should be considered as a lease stipulation. Through unitization, BLM could reduce surface disturbance and damage, use fewer

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<sup>73</sup> Exhibit 74 at 4-12.

<sup>74</sup> Exhibit 36 at 5-14.

wells to access the shared subsurface resource, limit the amount of field processing equipment, roads, and other related development infrastructure, and ensure more uniform and consistent GHG pollution reduction planning and action.

**4. BLM Must Track and Monitor GHG emissions from BLM-authorized Oil and Gas Operations through Time.**

Hand-in-hand with the need to quantify GHG emissions, setting GHG limits or reduction objectives, and requiring the implementation of GHG reduction measures, BLM must also establish a system to track and monitor GHG emissions, the efficacy of GHG reduction measures, and impacts to the environment to support adaptive management. 43 U.S.C. § 1711(a); 43 C.F.R. §§ 1610.4-3, 1610.4-9. As noted in the 2007 GAO Report, “Resource managers interviewed for our case studies ... stated that they need better resource inventories and monitoring systems.” 2007 GAO Report at 43. By quantifying GHG emissions and baseline conditions through inventories, and tracking and monitoring the emissions GHG pollution and changes to the baseline through time, BLM would provide itself with an informed basis to address climate change and ensures that its activities comport with BLM’s duties pursuant to Secretarial Order 3226, FLPMA, NEPA, and the Public Trust Duty.

**5. BLM Must Consider How Global Warming and Climate Change Impact the Environment, and Whether Such Impacts Warrant Additional Environmental Protections.**

**a. Climate Change Impacts – Summary Information**

Many of the public resources managed by the BLM – and, more broadly, BLM’s sister agencies in the Department of the Interior and Agriculture – are being impacted by global warming and climate change. Impacts, of course, are not limited to public resources, but extend across Montana’s, North Dakota’s, South Dakota’s landscapes and the broader environment. BLM should account for this harm through pre-commitment lease-stage decision-making and NEPA analysis to ensure that BLM prevents permanent impairment, prevents unnecessary or undue degradation, minimizes adverse environmental impacts, and complies with the Public Trust Duty. 43 U.S.C. §§ 1702(c), 1732(b)), 1732(d)(2)(A).

For example, pre-commitment lease-stage decision-making and NEPA analysis may demonstrate that BLM should or must: (1) place certain areas off limits to leasing or surface occupancy by oil and gas operators; (2) subject leases to stipulations or otherwise take affirmative action to protect the environment within or proximate to the leaseholds because of the significance and magnitude of climate change impacts; or (3) take a timeout on leasing and even further oil and gas development to ensure that GHG pollution is properly addressed through, e.g., a landscape-scale RMP amendment or revision, and to coordinate management with other federal and state partners (43 U.S.C. § 1712(c)(9); 43 C.F.R. §§ 1610.3-1, 1610.3-2). Such options need to be addressed by BLM as reasonable NEPA alternatives prior to the point lease rights are sold.

Regardless, to understand the actual and potential harm suffered by BLM public resources as a consequence of global warming and climate change, it is helpful to begin with the IPCC. The IPCC, in its report on climate change impacts, adaptation, and vulnerability, (“IPCC Impacts Report”) assessed the “current scientific understanding of impacts of climate change on natural, managed and human systems, the capacity of these systems to adapt and their vulnerability.”<sup>75</sup> Relative to observed global warming and climate change impacts, the IPCC Impacts Report concluded the following:

- “Observational evidence from all continents and most oceans shows that many natural systems are being affected by regional climate changes, particularly temperature increases.”<sup>76</sup> The IPCC Impacts Report goes on to state that “[t]here is very high confidence ... that recent warming is strongly affecting terrestrial biological systems, including such changes as ... “poleward and upward shifts in ranges in plant and animal species.”<sup>77</sup>
- “A global assessment of data since 1970 has shown it is likely that anthropogenic warming has had a discernible influence on many physical and biological systems.”<sup>78</sup>
- “Other effects of regional climate changes on natural and human environments are emerging, although many are difficult to discern due to adaptation and non-climatic drivers.”<sup>79</sup>

Beyond observed impacts, the IPCC Impacts Report also addresses the state of knowledge about future impacts. The IPCC Impact Report’s conclusions relative to terrestrial species are troubling:

- “The resilience of many ecosystems is likely to be exceeded this century by an unprecedented combination of climate change, associated disturbances (e.g., flooding, drought, wildfire, insects, ocean acidification), and other global change drivers (e.g., land use change, pollution, over-exploitation of resources).”<sup>80</sup>

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<sup>75</sup> IPCC, 2007: Summary for Policymakers. In: *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Groups III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA ([www.ipcc.ch/SPM13apr07.pdf](http://www.ipcc.ch/SPM13apr07.pdf)) (attached as Exhibit 49).

<sup>76</sup> *Id.* at 1.

<sup>77</sup> *Id.* at 2.

<sup>78</sup> *Id.*

<sup>79</sup> *Id.* at 3.

<sup>80</sup> *Id.* at 5.

- “Approximately 20-30% of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperature exceed 1.5-2.5°C.”<sup>81</sup>
- “For increases in global average temperature exceeding 1.5-2.5°C and in concomitant atmospheric carbon dioxide concentrations, there are projected to be major changes in ecosystem structure and function, species’ ecological interactions, and species’ geographic ranges, with predominantly negative consequences for biodiversity, and ecosystem goods and services e.g., water and food supply.”<sup>82</sup>
- Calibrated specifically to North America, “[w]arming in western mountains is projected to cause decreased snowpack, more winter flooding, and reduced summer flows, exacerbating competition for over-allocated water resources.”<sup>83</sup>

Five other reports contain a summation of the current science-based understanding of climate change impacts to the environment in the Western U.S., including Montana. These reports provide a solid foundation for initiating Montana-, North Dakota-, and South Dakota-based climate change mitigation and adaptation efforts.

First, the GAO, in its 2007 Report (Exhibit 4), reinforces the IPCC’s work and provides context for the state-level reports prepared by Colorado and New Mexico detailed below. The GAO identified a myriad of physical effects to federal public lands including “drought, floods, glacial melting, sea level rise, and ocean acidification.” 2007 GAO Report at 5.

Second, the Rocky Mountain Climate Organization and NRDC published a report entitled *Hotter and Drier: The West’s Changed Climate* (“RMCO/NRDC Report”) (attached as Exhibit 50). Synthesizing much of the existing research regarding climate change, and refining that research in the specific context of the Western U.S., the RMCO/NRDC Report warns that “[t]he American West has heated up even more than the world as a whole” and “in the five latest years” experienced warming “70 percent[] more than the overall planet’s warming.” RMCO/NRDC Report at iv; 1-6. The RMCO/NRDC Report proceeds to convincingly detail how the West is getting drier, how global warming is disrupting ecosystems, and how warmer temperatures affect business, recreation, and tourism. RMCO/NRDC Report at 7-34.

Third, the Montana Climate Action Plan makes clear that there is a need to reduce greenhouse gases to safeguard the natural resources of Montana. As Montana Governor Brian Schweitzer explained in 2005:

Montana has been locked in the grip of a drought for most of the past two decades. During that time, we have seen some of the lowest precipitation levels in the state’s recorded history, and Montana is not alone in this suffering. Most Western states find

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<sup>81</sup> *Id.* at 6.

<sup>82</sup> *Id.*

<sup>83</sup> *Id.* at 11.

themselves in the same situation. Chronic drought has severely impacted our lake levels, our crop and livestock production, our forests, our fish and wildlife resources, and our tourism industry. I am very concerned about the connection these conditions have to global climate change, and ultimately the effect they will have on Montana's short and long-term future.<sup>84</sup>

The Montana Climate Action Plan and Governor Schweitzer's concerns are bolstered by a recent report documenting the effects of climate change on the Clark Fork watershed of western Montana. A July 2008 report by the Clark Fork Coalition reports that climate change is leading to lower river flows and lake levels, declines in fish and wildlife populations, including imperiled species like the westslope cutthroat trout, bull trout, and grizzly bear, and more catastrophic fires, drier summers, among other impacts.<sup>85</sup>

Third, the State of Colorado issued a Climate Action Plan in November 2007 ("CO Climate Action Plan") (Exhibit 35). As Governor Bill Ritter, Jr., noted in the CO Climate Action Plan's opening message:

Global warming is our generation's greatest environmental challenge. The scientific evidence that human activities are the principal cause of a warming planet is clear, and we will see the effects here in Colorado. But the seeds of change are also here in Colorado, in our scientific and business communities, and in each of us individually.

This Colorado Climate Action Plan is a call to action. It sets out measures that we in our state can adopt to reduce emissions of greenhouse gases by 20 percent by 2020, and makes a shared commitment with other states and nations to even deeper emissions cuts by 2050.

Why is this important? For Colorado, global warming will mean warmer summers and less winter snowpack. The ski season will be weeks shorter. Forest fires will be more common and more intense. Water quality could decline, and the demand for both agricultural and municipal water will increase even as water supplies dwindle.

The CO Climate Action Plan proceeds to detail the present and future impacts of climate change to Colorado. Some of these impacts are indirect, caused by "the displacement of millions of people living in coastal areas, thawing of arctic ecosystems and accelerated loss of usable lands to deserts." CO Climate Action Plan at 7. Critically, the CO Climate Action Plan states that "the direct risks to the state are very serious." *Id.* These "direct risks" are numerous, including current observations of shorter and warmer winters, with thinner snowpack and earlier spring runoff, with less precipitation overall, and more of that precipitation falling as rain, not snow. *Id.*

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<sup>84</sup> Letter from Montana Governor Brian Schweitzer to Richard Opper, Director, Montana Department of Environmental Quality (December 13, 2005) (attached as Exhibit 75).

<sup>85</sup> Clark Fork Coalition, "Low Flows, Hot Trout: Climate Change in the Clark Fork Watershed" (July 2008) (attached as Exhibit 76).

Droughts are longer, and there are more wildfires “burning twice as many acres each year than before 1980.” Beetle infestations are now “[w]idespread” and there is also a “[r]apid spread of West Nile virus.” *Id.* On top of these observed impacts, “[i]n the coming decades, scientists project that Colorado and neighboring western states will see”:

- (1) 3-4 degree temperatures increases by 2030, with more frequent and longer-lasting summer heat extremes;
- (2) even “[l]onger and more intense wildfire seasons” with fires “projected to claim more land each year than the year before”;
- (3) “Midwinter thawing and much earlier melting of snowpack” with resultant “flooding,” “ski season[s]” shortened by “three to six weeks,” and “added stress on reservoirs”;
- (4) “Much lower flows in rivers in the summer months and a greater vulnerability to drought with consequent impacts to the ability of “[a]lready over-used river systems” to satisfy “existing water rights and future growth,” degradation of water quality, and a potential “decline” in “[h]ydropower production”;
- (5) Slower recharge in groundwater aquifers, with an overall decline of 20% projected for the Ogallala aquifer if temperatures increase by more than 5 degrees F.
- (6) “Movement of plant and animal species to higher elevations and latitudes” and the fragmentation of high-elevation habitat. “Many of today’s high-elevation species will face localized or total extinction”;
- (7) “Insect attaches in forests” caused by warmer winter temperatures that will “reduce winterkill of beetles,” warmer summer temperatures that will “allow faster insect lifecycles,” and forests rendered vulnerable by “summer droughts”;
- (8) “Less snow cover and more winter rain on farm lands” whereby the “[p]elting rain on bare ground will increase soil erosion”; and, if that isn’t enough:
- (9) “More weeds.”

*Id.* These impacts are obviously dramatic, extending, as noted by the CO Climate Action Plan, across state lines.

Fourth, the State of New Mexico, reflecting these trans-boundary impacts, prepared a 2005 Report entitled *Potential Effects of Climate Change on New Mexico* (“NM Climate Change Report”) (attached as Exhibit 51) to inform its Climate Change Advisory Group. The NM Climate Change Report – mirroring the impacts identified in the CO Climate Action Plan – identified substantial impacts to: (1) water resources; (2) infrastructure (e.g., flood control, electrical power distribution, sewage, water supply, and transportation); (3) agriculture; (4) natural systems (e.g., forests, grasslands, deserts, lakes and streams); (5) outdoor recreation and



related tourism; (6) environmental quality and health (e.g., from intensified ozone levels); (7) environmental justice and native peoples (because of these communities limited resources to adapt and cope with climate change). NM Climate Change Report at 1-4.

Fifth, the Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research, recently issued a report entitled *The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity in the United States* (“USDA Climate Change Synthesis”) (attached as Exhibit 52). This report identifies the particular impacts of climate change on the Western United States, explaining that climate change “has very likely increased the size and number of forest fires, insect outbreaks, and tree mortality in the interior West, the Southwest, and Alaska, and will continue to do so.” *Id.* at 7. In addition, the report notes that drought could be more severe and of increased intensity in the Western United States. *Id.* at 8. Furthermore, the report notes, climate change is resulting in reduced snowpack and earlier runoff, thus disrupting the use of water resources. *Id.* at 3, 192. In sum, the report concludes:

Warmer summer temperatures in the western U.S. have led to longer forest growing seasons, but have also increased summer drought stress, increased vulnerability to insect pests and increased fire hazard. Changes to precipitation and the size of storm events affect plant-available moisture, snowpack and snowmelt, streamflow, flood hazard, and water quality.

*Id.* at 183.

The 2007 IPCC Report, 2007 CO Climate Action Plan, 2005 NM Climate Change Report, 2007 GAO Report, 2008 RMCO/NRDC Report, and the 2008 USDA Climate Change Synthesis, provide BLM with an excellent base of knowledge to begin the process of properly understanding and affirmatively taking action to address climate change in the region and, specifically, in Montana and North Dakota. Moving beyond these general reports, the sections below highlight and illuminate in more depth some of specific climate change impacts. Of note, many of the studies and reports referenced below pertain to Montana’s, North Dakota’s, and South Dakota’s sister states – in particular Colorado and New Mexico. Insofar as BLM may be apt to dismiss these studies and reports on that basis, BLM would be making a mistake. Efforts are only now intensifying how climate change will impact localized environments. The studies and reports prepared for Colorado and New Mexico – and other Rocky Mountain landscapes – provide a starting point. They are of course not meant to supplant Montana-specific evaluation. Instead, they are intended to provide a basis of information that can be used by BLM to identify and evaluate Montana-, North Dakota-, and South Dakota-specific impacts.

## **b. Climate Change Impacts to Water Quality & Quantity**

Perhaps the most obvious climate change impact noted above is the erosion of winter cold in the West’s mountains. As GAO noted, “warmer springs have resulted in earlier snowmelt

....”<sup>86</sup> 2007 GAO Report at 5. Additionally, “more precipitation falls as rain and less as snow.” *Id.* at 21. This limits winter recreational opportunities on public lands and diminishes water supplies that the public lands provide residents across the West. A recent article in *Science* “demonstat[ed] statistically that the majority of the observed low frequency changes in the hydrological cycle (river flow, temperature, and snow pack) over the western U.S. from 1950-1999 are due to human-caused climate changes from greenhouse gases and aerosols.”<sup>87</sup>

Warming is thus *already* reducing the amount of alpine tundra in the West. For instance, scientists studying the effects of climate change on Rocky Mountain National Park, home to the largest expanse of alpine tundra in the United States outside of Alaska, projected that warming of 5.6 degrees Fahrenheit could cut the Park’s area of tundra in half.<sup>88</sup> An increase of 9 to 11 degrees Fahrenheit could virtually eliminate the park’s tundra.<sup>89</sup> As the climate heats up, plant and animal species seek the habitat they need by moving toward the poles or to higher elevations. *See* 2007 IPCC Synthesis Report at 2 (“In terrestrial ecosystems, earlier timing of spring events and poleward and upward shifts in plant and animal ranges are with *very high confidence* linked to recent warming (*italics original*)).

In Montana’s Glacier National Park, only 27 of an estimated 150 glaciers remain since the park was established in 1910. At the same time, mean annual summer temperatures in Glacier National Park have increased three times more than the global average. By 2030, it is predicted that all of the National Park’s namesake glaciers will be extinct. Concurrently, snowpack in the mountains of the Clark Fork watershed has decreased 30% on average from 1950-2000. Together, these impacts are leading to reduce streamflows. The report further notes that reduce streamflows, among other climate change impacts, will lead to, a “5-30% decline in trout habitat over the next century” and a “27-99% decline in large-enough habitat patches for the threatened bull trout.”<sup>90</sup>

In Yosemite National Park, a century ago, pikas lived as low as 7,800 feet. Today, they cannot be found any lower than 8,300 feet.<sup>91</sup> As one researcher has said, “[w]e might be staring pika extinction in the Great Basin, maybe in Yosemite, too, right in the face. . . . They don’t

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<sup>86</sup> *See also* 2007 IPCC Synthesis Report at 2 (discussing observed changes to hydrological systems); Mote P. W., Hamlet A. F., Clark M. P., and Lettenmaier D. P. 2005. Declining Mountain Snowpack in Western North America. *Bulletin of the American Meteorological Society*. 86: 39-49.

<sup>87</sup> Barnett, Tim P., *et al.*, *Human-induced changes in the hydrology of the western United States*, Revised version submitted to the *Journal Science* January 10, 2008, and published in *Science Express* January 31, 2008 (attached as Exhibit 54).

<sup>88</sup> N. Hobbs and others, *Future Impacts of Global Climate on Rocky Mountain National Park: Its Ecosystems, Visitors, and the Economy of its Gateway Community – Estes Park* (2003) 1-45, 16-17, [http://www.nrel.colostate.edu/projects/star/papers/2003\\_final\\_report.pdf](http://www.nrel.colostate.edu/projects/star/papers/2003_final_report.pdf) (attached as Exhibit 55).

<sup>89</sup> *Id.*

<sup>90</sup> *See* Exhibit 76.

<sup>91</sup> C. Mortiz, *Report – Year 4 of the terrestrial vertebrate resurvey of the ‘Grinnel sites’ in Yosemite National Park* at 1 (2006) ([http://mvz.berkeley.edu/Grinnell/pdf/Yosemite\\_Report\\_2006-FINAL.pdf](http://mvz.berkeley.edu/Grinnell/pdf/Yosemite_Report_2006-FINAL.pdf)).

have much up-slope habitat left.”<sup>92</sup> In Glacier National Park, the glaciers are melting; “since 1850, the estimated numbers of glaciers in the park has dropped from 150 to 26.” 2007 GAO Report at 5. Generally, “[a]s alpine habitats warm, the tree line is expected to move upslope, with forests beginning to invade alpine and subalpine meadows.” 2007 GAO Report at 28. With “[s]ome of these changes ... already occurring,” the impacts to wildlife that relies on these systems – “bighorn sheep, pikas (relatives of the rabbit), mountain goats, wolverines, and grizzly bears – “may be harmed.” 2007 GAO Report on 28.

Changes to hydrological systems extend well beyond the alpine tundra. The CO Climate Action Plan was based on a stakeholder report prepared in 2006.<sup>93</sup> This report, in Chapter 8 of its appendices (Chapter 8 is attached as Exhibit 56), provided a discussion of the effects of GHG emissions on water resources (“CO Water Adaptation Analysis”). The CO Water Adaptation Analysis notes on page 1 that “[t]he consensus of the scientific community is that warming caused by [GHGs] resulting from a wide variety of human endeavors will likely have significant effects on water supplies and availability in many parts of the world, including the American West.” These effects, summarized on pages 8-2 to 8-3, include what should become a familiar litany: (1) [r]educed snowpack and streamflow; (2) [m]ore drought; (3) [e]arlier snowmelt; (4) [i]ntense precipitation; (5) [i]ncreased water needs; (6) [d]egraded water quality; (7) Interstate compact calls; and (8) [s]econdary impacts” such as “more forest fires” and “outbreaks of forest pests,” which, in turn, “may affect total runoff and runoff timing.”

In 2007, the National Research Council’s Committee on the Scientific Bases of Colorado River Basin Water Management published a detailed report entitled *Colorado River Basin Water Management: Evaluating and Adjusting to Hydroclimatic Variability* (“NRC CO River Report”) (Executive Summary attached as Exhibit 57). Setting the stage for the Colorado River basin, the NRC CO River Report notes on page 1 that:

It is known today that the Colorado River Compact of 1922 – the water allocation compact that divides Colorado River flows between the upper and lower Colorado River basin states – was signed during a period of relatively high annual flows. It is also accepted that the long-term mean annual flow of the river is less than the 16.4 million acre-feet assumed when the Compact was signed – a hydrologic fact of no small importance with regard to water rights agreements and subsequent allocations.

The stage thus set, the NRC CO River Report notes on page 4 that:

Temperature records across the Colorado River basin and the western United States document a significant warming over the past century. These temperature records, along with climate model projections that forecast further increases,

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<sup>92</sup> J. Schwarz, *Tiny Pikas Seem to Be on March Toward Extinction in Great Basin*, *University of Washington Office of News and Information* (December 29, 2005). See also, Beaver EA, Brussard PF, Berger J. 2003, *Patterns of apparent extirpation among isolated populations of pikas (Ochotona princeps) in the Great Basin*, *J. Mammal.* 84: 37-54.

<sup>93</sup> [www.coloradoclimate.org/Climate\\_Action\\_Panel.cfm](http://www.coloradoclimate.org/Climate_Action_Panel.cfm).

collectively suggest that temperatures across the region will continue to rise for the foreseeable future. Higher regional temperatures are shifting the timing of peak spring snowmelt to earlier in the year and are contributing to increases in water demands, especially during summer. Higher temperatures will result in higher evapotranspiration rates and contribute to increased evaporative losses from snowpack, surface reservoirs, irrigated land, and vegetated surfaces....

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Based on analysis of many recent climate model simulations, the preponderance of scientific evidence suggests that warmer future temperatures will reduce future Colorado River streamflow and water supplies. Reduced streamflow would also contribute to increasing severity, frequency, and duration of future droughts.

On the basis of “[m]ulti-century, tree-ring based reconstructions of Colorado River flow,” the NRC CO River Report on page 6 found that while “extended drought episodes are a recurring and integral feature of the basin’s climate,” and that “future droughts will recur,” nonetheless, these “future droughts ... may exceed the severity of droughts of historical experience, such as the drought of the late 1990s and early 2000s.” The management implications are significant:

Steadily rising population and urban water demands in the Colorado River region will inevitably results in increasingly costly, controversial, and unavoidable trade-off choices to be made by water managers, politicians, and their constituents. These increasing demands are also impeding the region’s ability to cope with droughts and water shortages.

NRC CO River Report at 8.

These impacts and management consequences have been further illuminated by a January 23, 2008 report, accepted by the Journal of Water Resources Research, by the Scripps Institution of Oceanography entitled *When will Lake Mead go Dry?* (“Scripps Lakes Mead/Powell Report”) (attached as Exhibit 58). Lake Mead, of course, is an important component of the Colorado River basin. The Scripps Lakes Mead/Powell Report notes on page 3 that global warming is causing “a decrease in runoff to the Colorado River” in the “range between 10-30 percent over the next 30-50 years.” This should be a self-evidently action-sparking fact given that “[t]he Colorado River is quite literally the life’s blood of today’s modern southwest society and economy.” Scripps Lakes Mead/Powell Report at 3. It is on this basis that the Scripps Lakes Mead/Powell Report looked at Lakes Mead and Powell to determine when they will ‘go dry’; that is, when their function as a reservoir will end. [T]he answer is both startling and alarming.” Scripps Lakes Mead/Powell Report at 4. As the Report explains on pages 4-5:

It is obvious that once long-term outflow exceeds inflow the system is doomed to run dry ... currently scheduled depletions (loss of water from consumptive use), along with water losses due to evaporation/infiltration and reduction in runoff due to climate change, have pushed the system into a negative net inflow regime that is no sustainable ... natural variability, i.e., the change of getting strings of dry

years consistent with the historical record, makes the system likely to run dry even with positive net inflow. When expected changes due to global warming are included as well, currently scheduled depletions are simply not sustainable.

Even in accord with very conservative assumptions, “live storage [in Lakes Mead and Powell] will be depleted completely 23-40 years from now . . .” Scripps Lakes Mead/Powell Report at pages 8-9. The consequence of reductions in large storage capacity would, however, be felt much earlier; “only 14 years into the future” there is a “50% chance” that the Lakes’ “minimum power pool level” would be reached by 2021 and “[a]t that point (or before), there would be an abrupt drop in the abilities of the reservoirs to generate hydroelectric power.” *Id.* at 10. Again, this is likely an optimistic projection because these findings were based on very conservative assumptions, including the assumption that “steady state where inflow to the reservoirs is equal to their discharge” (even though “Lake Mead is currently being overdrafted”), and analysis that neglects to include the “natural variability in River flow.” *Id.* More realistic scenarios indicate that there is actually a “50% chance the minimum power pool levels will be realized by about 2017, in the absence of management responses,” not the more optimistic estimate of 2021. *Id.* at 11. “It seems clear that the threat to power production on the Colorado is both real and more imminent than most might expect.” *Id.*<sup>94</sup>

Impacts, of course, to the Colorado River basin are not limited to power production. The Colorado River is home to several aquatic species protected by the Endangered Species Act: Bonytail chub, Humpback chub, Colorado pikeminnow, and Razorback sucker (“CO River Fish”). These CO River Fish are already suffering considerable stress, as demonstrated by the Fish & Wildlife Service’s 1994 critical habitat decision.<sup>95</sup>

Reinforcing the concerns identified in the NRC CO River Report and the Scripps Lakes Mead/Powell Report, in 2006, the New Mexico Office of the State Engineer and the Interstate Stream Commission published a report entitled *The Impact of Climate Change on New Mexico’s Water Supply and Ability to Manage Water Resources* (“NM SEO/ISC Report”) (attached as Exhibit 60). As the NM SEO/ISC Report emphasizes:

Water is so critical to [sic] New Mexico’s quality of life and economic vitality that any impacts to our water resources reverberate across the social, economic and environmental fabric of the State. The anticipated impact of climate change is particularly important since New Mexico is highly dependent on climate-sensitive natural resources (e.g., snowpack, streamflow, forests) and on natural-resource based economic activities (e.g., agriculture, recreation and tourism).

NM SEO/ISC Report at 2. While impacts to water resources identified by the report vary depending on the precise climate change prediction model, there is consensus amongst the models that generally we will witness: (1) an increase in temperature – and potentially, extreme heat waves; (2) a trend towards a higher freezing altitude and reduction in snowpack with delays in the arrival of snow season, acceleration of spring snowmelt, a decrease in total snowfall, and

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<sup>94</sup> See also Robert Kunzig, *Drying of the West*, National Geographic (February 2008) (attached as Exhibit 59).

<sup>95</sup> 59 Fed. Reg. 13,374-13,375 (Mar. 21, 1994).

rapid and earlier seasonal runoff (including, under regional models, a loss of sustained snowpack south of Santa Fe and the Sangre de Cristo range); (3) uncertain changes to precipitation, overall, but intensified evaporative losses from temperature increases that could counteract any increase in precipitation; (4) severe droughts; and (5) an increase in flood events. *Id.* at 5-16. Given the magnitude of these impacts, the report, in its Executive Summary, explains, relative to at least water resources, that:

Climate change needs to be added as “another pressure” along with population growth, changing demographics, existing climate variability, increasing water demand and availability challenges, land use, species protection and other ecosystem demands. Adaptive management strategies will need to be devised that are robust and flexible enough to address climate change.

*Id.* at v. As the NM SEO/ISC Report further notes, “[t]he key to successful adaptation is a robust planning structure that incorporates highly certain predictions (such as temperature increases) as well as less certain forecasts (such as precipitation changes) into scenarios that can direct implementation of flexible management strategies.” *Id.* at vi. The NM SEO/ISC Report also encourages immediate action to address climate change impacts to water, explaining:

Policy makers and managers are also constantly juggling multiple issues of immediate importance and have limited time and resources to take on what appears to be a “new” issue. Climate change is often viewed as one of those issues that can be addressed later when there is more certainty about what is really happening. However, many of the adaptive strategies required to address impacts of climate change will require years to plan and implement, and delaying may increase both vulnerability and ultimately the costs of mitigating those impacts. Often the tools needed to develop adaptive capacity for climate change are the same or similar to those used in current management practices.

*Id.* at 33.

An additional report, completed July 2007, entitled *Climate Change and its Implications for New Mexico's Water Resources and Economic Opportunities* (“NM Water & Economy Report”) serves as an important source of additional water-related information to understand how climate change is impacting and will impact the West.<sup>96</sup> Evidencing the deep concern that all Westerners have with climate change’s impacts to water, the NM Water Report explains that:

The Rio Grande, and the subterranean aquifers that it feeds in some regions, are the principal – and often only – water sources for cities and farms from Southern Colorado through New Mexico and into far West Texas, ... The vulnerability that these water users face together – especially in light of potential climatic and hydrologic changes – is not only indicated by this high level of dependence on a sole source of supply, but by the oversubscribed nature and exhaustive use of this source .... The level of use is so exhaustive of surface supplies that after the thirst

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<sup>96</sup> Hurd, Brian H. and Coonrod, Julie, *Climate Change and its Implications for New Mexico's Water Resources and Economic Opportunities* (July 2007) (attached as Exhibit 61).

is satisfied it is, in fact, normal for the Rio Grande to trickle with salt-laden return flows and summer storm runoff for 180 miles until its confluence with Mexico's Rio Conchos – just above Big Bend national Park near Presidio, Texas – where, newly reconstituted, it continues its remaining 1,100 mile journey to the Gulf of Mexico.

NM Water & Economy Report at 1. The NM Water & Economy Report warns, based on tree-ring analysis and anthropological evidence, that:

Observations indicate that significant climate anomalies are not unprecedented in [New Mexico]; and, that it is entirely plausible that with continued greenhouse gas forcing of the atmosphere, and its rising effects on the earth's energy balance, there can be a reasonable expectation of exceeding these natural extremes in the future (IPCC, 2007).

*Id.* at 2. Illustrating the feedbacks between factors such as temperature, the timing of precipitation, and the amount of precipitation, the NM Water & Economy Report identifies two key results of various climate scenarios:

First, peak flow and total streamflow declines for all of the climate change scenarios, whether or not they are relatively 'wet'. The apparent robustness of this result could have important implications for the management of water resources in the region. Although, there is a potential for summer monsoonal activity to increase, as suggested by the 2080 Wet scenario, this is not likely, according to the model results, to offset the losses from diminished snowpack levels in the headwater regions. Second, there is a pronounced shift in later periods (i.e., 2080s time frame) in the peak runoff month by about 30 days. In all of the 2080 period runs, the peak occurs in April and, perhaps equally as important, there is a significant increase in late winter runoff compared to current conditions.

*Id.* at 11. Such reductions in peak flow and total streamflow, as well as the shift in timing, holds profound implications for Colorado's social and economic vitality and such impacts could similarly affect Montana, North Dakota, and South Dakota:

As might be expected for water use in a basin that exhausts even the present water supply in normal years, any reduction on long-run, average supply necessarily leads to a reduction in long-run average use ... Heavily influenced by the pattern of agricultural irrigation that peaks in June, ... total water use is curtailed as total supplies diminish with the severity of climate change. The dry scenarios lead to declines in total water use of nearly 10% and over 25% for the respective periods of 2030 and 2080. Declines of 2% and 18% accompany the middle scenarios, respectively; and for the wet scenarios water use declines of nearly 4% and 6.3% are projected, respectively.

*Id.* at 12. Impacts extend well beyond water quantity to encompass water quality:

Reduced streamflow lowers assimilative capacity for both point and non-point pollutants. In non-attainment reaches of the river lower TMDLs (total maximum daily load) might be expected and could raise control costs. Climate change might also lead some river reaches to fall out of attainment and require TMDLs and higher pollution control costs.

*Id.* at 18.

### c. Climate Change Impacts to Ecosystems

Climate change impacts to the hydrologic regime are of course intertwined with climate change impacts to freshwater and terrestrial ecosystems. As the NM Water & Economy Report explains:

Increased drying of soils and significant reductions in soil moisture are likely with climate change as potential evapotranspiration rises with increasing temperatures. These effects will compound the adverse effects of changes in the hydrology of runoff and water availability throughout New Mexico. Such changes will affect the quality and condition of New Mexico's significant range- and forest-lands, which is likely to accelerate the severity and extent of forest fires but will likely diminish forage production on rangelands that will adversely impact livestock and wildlife across the region.

*Id.* (references omitted).

Broadening out from this specific link between water and land, experts have "anticipated shifts in the distribution, abundance, and ranges of both plant and animal species." 2007 GAO Report at 26. As "changes in species distribution are likely to occur in the future ... nonnative species might eventually dominate or replace native species in some areas." *Id.*

In forest ecosystems, "forest composition – both the trees and the species that depend on the trees and forest vegetation – may change." 2007 GAO Report at 26. "[S]ugar maple, white bark pine at high elevations, and subalpine spruce forests in the Rocky Mountains have already experienced such changes." *Id.* at 26.

In the context of the "grasslands and shrubland ecosystem," "tree die-offs triggered by drought and exacerbated by higher temperatures may lead to a shift from woodland to shrubland or grassland .... Southwestern pinyon and juniper woodlands are particularly vulnerable to such changes" and such vulnerability may extend to ponderosa pine and chaparral. *Id.* at 26-27. The problem is so severe that "some rare ecosystems, such as alpine tundra, California chaparral, and blue oak woodlands in California may become extinct altogether." *Id.* at 26.

At bottom, "native biodiversity will decrease in many areas, and ... new assemblages of species will be living together, with unknown consequences." *Id.* at 26-27. The impacts to plant and animal species also include changes to plant and animal "phenology" – the "life-cycle events



that are influenced by environmental changes, especially seasonal variations in temperature and precipitation” – including “critical species interactions.” *Id.* at 28-29.

Specifically relative to freshwater ecosystems, “increased water body temperatures may increase the risk of toxic algal blooms as well as the severity of fish diseases.” 2007 GAO Report at 25. In terms of species risk, “temperature increases are most likely to threaten cold-water species, such as trout, salmon, and amphibians.” 2007 GAO Report at 28. Bull trout appear particularly vulnerable; “the bull trout can only survive in a very limited area, and many of its migration corridors have been cut off as a result of ecosystem fragmentation.” *Id.* As noted by the NM SEO/ISC Report:

Aquatic and wetland ecosystems display high vulnerability to climate change. Changes in water temperature and shifts in timing of runoff will change aquatic habitats, resulting in species loss or migration as well as novel and unpredictable interactions of new combinations of species. Stream management practices will have to accommodate these new threats to aquatic species, increasing Endangered Species Act (ESA) and threatened species challenges.

NM SEO/ISC Report at 37.

Climate change will also spur insect and disease infestations, thereby negatively impacting aquatic and terrestrial ecosystems. As GAO noted, “[b]iological effects of climate change include increases in insect and disease infestations ....” 2007 GAO Report at 6. Such infestations “include bark beetles, grasshoppers, and various fungi as well as diseases caused by bacteria, parasites, and viruses.” *Id.* at 23. Notably, the effects may not involve merely the occurrence of these infestations, but an “increase [in] the range and effects of insects and disease infestation.” *Id.* at 23. And, further, a change from “episodic” to “persistent” infestations. *Id.* at 24.

Exemplifying the infestation issue are beetle infestations; with minimum temperatures rising, more beetles can survive winters. Of note, warming is likely to be more intense at high elevations, and at latitudes further from the equator. *See, e.g.*, GAO Report at 17 (discussing elevated temperatures in Glacier National Park relative to global increases). In any event, beetles now can survive at higher latitudes and higher elevations, where extreme cold used to keep them from becoming widespread.<sup>97</sup> In Colorado, the U.S. Forest Service and the Colorado State Forest Service recently predicted, “[a]t current rates of spread and intensification of tree mortality, the MPB [mountain pine beetle] will likely kill the majority of Colorado’s large diameter lodgepole pine forests within the next 3-5 years.”<sup>98</sup> Beetles are also now causing widespread devastation of

<sup>97</sup> Regniere J., Bentz B., *Modeling cold tolerance in the mountain pine beetle, Dendroctonus ponderosae*, *Journal of Insect Physiology*, 53: 559–572 (2007) ([www.usu.edu/beetle/documents/Regniere\\_Bentz2007.pdf](http://www.usu.edu/beetle/documents/Regniere_Bentz2007.pdf)); Logan J., J. Powell, *Ghost Forests, Global Warming, and the Mountain Pine Beetle* (Coleoptera: Scolytidae). *American Entomologist*, 47:3 161-162, 166-168 (2003); Logan J., Regniere J., & Powell J., *Assessing the impacts of global warming on forest pest dynamics*. *Front. Ecol. Environ.*, 1:130-37 (2003).

<sup>98</sup> U.S. Forest Service, Region 2, and Colorado State Forest Service, *Forest Health Aerial Survey Highlights*, available at [http://www.fs.fed.us/r2/news/2008/01/press-kit/survey\\_highlights.pdf](http://www.fs.fed.us/r2/news/2008/01/press-kit/survey_highlights.pdf).

whitebark pines, a high-altitude species that grow where winters almost always have been too cold to allow beetle populations to reach outbreak numbers.<sup>99</sup> In the Yellowstone ecosystem, the loss of whitebark pines threatens the survival of the region's grizzly bears, which depend on the fatty seeds of the whitebark pine as their single most important food source.<sup>100</sup>

Further exemplifying the infestation issue, in the BLM-managed Mojave Desert, "invasive grasses, combined with drought, caused, at least in part, by climate change, have increased the frequency and severity of wildland fires, destroying native plants and transforming some desert communities into annual grasslands." As GAO noted:

Prolonged drought weakens the natural plant communities and then, in periods of wetness, invasive species – particularly grasses – fill the gaps between native vegetation. These invasive grasses can spread and grow faster than native species; the thicker and less evenly spaced vegetation leads to increased fire danger. If a fire starts, it burns much hotter due to the invasive grasses. Native plant communities, such as saguaro cacti and Joshua trees, are damaged, which provides further environment for invasive species and increased fire danger. According to experts, this shift in ecosystems from desert to grassland is likely to continue as the climate changes, which will in turn result in a loss of species diversity in these areas.

2007 GAO Report at 6.

The World Wildlife Fund and the Pew Center on Global Climate Change have compiled compelling scientific evidence linking climate change and impacts to terrestrial and aquatic ecosystems. For example, in 2000, the World Wildlife Fund published a report – *Global Warming and Terrestrial Biodiversity Decline* – wherein the authors, Malcolm & Markham, provide several general conclusions that BLM should consider:

- "It is safe to conclude that although some plants and animals will be able to keep up with the rates reported here, many others will not.
- Invasive species and others with high dispersal capabilities can be predicted to suffer few problems and so pests and weedy species are likely to become more dominant in many landscapes.
- However, in the absence of significant disturbance, many ecosystems are quite resistant to invasion and community changes may be delayed for decades.

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<sup>99</sup> J. Connelly, *West Can't Beat Heat of Global Warming*, Seattle Post-Intelligencer (April 23, 2006) ([http://seattlepi.nwsourc.com/connelly/282173\\_joel23.html](http://seattlepi.nwsourc.com/connelly/282173_joel23.html)).

<sup>100</sup> Logan J., Powell J., *Ghost Forests, Global Warming, and the Mountain Pine Beetle (Coleoptera: Scolytidae)*, American Entomologist. 47:3 161-162, 166-168 (2003); C. Petit, *In the Rockies, Pines Die and Bears Feel It*, New York Times (January 30, 2007) (available at <http://query.nytimes.com/gst/fullpage.html?res=9403E5DB143FF933A05752C0A9619C8B63>).

- Global warming is likely to have a winnowing effect on ecosystems, filtering out those that are not highly mobile and favoring a less diverse, more “weedy” vegetation or systems dominated by pioneer species.
- Non-glaciated regions where previous selection for high mobility has not occurred among species may suffer disproportionately. Therefore, even though high [required migration rates] are not as common in the tropics, there may still be a strong impact in terms of species loss.
- Some species have evolved *in situ* and may fail to migrate at all.
- Future migration rates may need to be unprecedented if species are to keep up with climate change.
- Human population growth, land-use change, habitat destruction, and pollution stresses will exacerbate climate impacts, especially at the pole-ward edges of biomes.
- Increased connectivity among natural habitats within developed landscapes may help organisms to attain their maximum intrinsic rates of migration and help reduce species loss.
- However, if past fastest rates of migration are a good proxy for what can be attained in a warming world, then radical reductions in greenhouse gas emissions are urgently required in order to reduce the threat of biodiversity loss.”<sup>101</sup>

In *Ecosystems and Global Climate Change: A Review of Potential Impacts on U.S. Terrestrial Ecosystems and Biodiversity*, a 2000 report published by the Pew Center on Global Climate Change, authors Malcolm & Pitelka “provid[e] an overview of some of the potential effects of global warming on terrestrial ecosystems and their component species in the United States,” focusing on “key findings, concepts, and information gaps.”<sup>102</sup> Relative to effects on species and communities, Malcolm & Pitelka explain that:

As a result of climate change, existing climatic conditions in many areas will become unsuitable for the species that currently live there, requiring them to migrate to survive ... The fact that species will have to move in itself is not alarming – most have done so in the past and, even in the absence of human interference in the global climate system, will undoubtedly do so again. However, several aspects of anthropogenic global warming are of particular concern, including the potential rapidity of the change and the possibility that certain alpine

<sup>101</sup> Malcolm, J.R. & Markham, A., *Global Warming and Terrestrial Biodiversity Decline* at v-vi. World Wildlife Fund (2000) (attached as Exhibit 62).

<sup>102</sup> Malcolm, J.R. and Pitelka, L.F. *Ecosystems and Global Climate Change: A Review of Potential Impacts on U.S. Terrestrial Ecosystems and Biodiversity* at 1, Pew Center on Global Climate Change (2000) (attached as Exhibit 63).

or polar ecosystems, which are typical of very cold conditions, could be greatly reduced in size or lost entirely.<sup>103</sup>

Malcolm & Pitelka proceed to explain that “global warming has the potential to create a ‘winnowing’ or ‘filtering’ effect similar to the reduction in biodiversity sometimes observed during human development.”<sup>104</sup> Additionally, there “is the possibility that different parts of the ecosystem will respond to the warming at different rates, hence altering the combination of conditions that a species might require.”<sup>105</sup> Malcolm & Pitelka offer conservation strategies to address these impacts relevant to BLM’s efforts to comply with federal law:

an important strategy for allowing organisms to respond to their full potential is to maintain the habitats that they currently live in – that is, to maintain overall ecosystem structure and species composition. This can be accomplished by reducing fragmentation, loss and degradation of habitat, increasing connectivity among habitat blocks and fragments, and reducing external anthropogenic environmental stresses (Markham and Malcolm, 1996). Thus, adaptation to climate change should benefit from existing strategies to conserve biodiversity and protect natural ecosystems. Various general strategies to conserve biodiversity include establishment and maintenance of viable protected area networks, management of wild populations outside of protected areas, and the maintenance of captive populations. Some characteristics of protected area networks that are thought to improve their viability in the face of a changing climate include:

- redundancy of populations;
- maximization of reserve connectivity, size, and number;
- protection of areas that offer significant heterogeneity in topography, habitat, and microclimate; and
- development of biodiversity-friendly management schemes in the landscapes surrounding reserves (Markham and Malcolm, 1996; Malcolm and Markham, 1997).<sup>106</sup>

Authors Parmesan & Galbraith, in the 2004 Report *Observed Impacts of Global Climate Change in the U.S.* published by the Pew Center on Global Climate Change, reinforce the findings and conclusions in Malcolm & Markham’s and Malcolm & Pitelka’s previous studies, concluding that, “human-induced global warming has the potential to severely exacerbate the

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<sup>103</sup> *Id.* at 21.

<sup>104</sup> *Id.* at 22.

<sup>105</sup> *Id.* at 23.

<sup>106</sup> *Id.* at 33.

outcomes of already high levels of stress on ecosystems.”<sup>107</sup> Parmesan & Galbraith discuss several anticipated effects to wild plants, animals, and ecological processes including: (1) evolutionary changes; (2) physical and physiological changes; (3) phenological changes; (4) range shifts; (5) community changes; and (6) ecosystem process changes.<sup>108</sup> Perhaps most troubling, however, is the fact that these potential changes may complicate species survival because “a variety of other anthropogenic forces are simultaneously stressing natural systems.”<sup>109</sup> “The net result of these pressures is that biological systems may already be in the early stages of a major extinction event that could result in the global loss of one-third of all species by 2100.”<sup>110</sup>

Parmesan & Galbraith emphasize that adaptation of species to climate change could be compromised by the influence of “[m]odern, human-dominated landscapes”:

Natural ecosystems increasingly are confined to smaller and more isolated fragments, and population sizes of wild native species have generally declined (Groombridge, 2992). These constrictions have limited the options available to natural systems to contend with the predicted rapid changes in climatic extremes or in the frequency and intensity of disturbances. Reduced population sizes often result in diminished genetic variation, which could limit potential for local adaptation. The increased separation between natural habitat fragments decreases successful dispersal, thereby hindering simple shifts in species’ distributions. Increased fragmentation also lowers the probability of successful recolonization of devastated areas after catastrophic disturbances because colonists not only have farther to travel, but they are coming from smaller source populations within impoverished communities. Consequently, modern ecological systems have lowered resiliency to the types of nonlinear climate dynamics predicted by scenarios of global climate change (Schneider and Root, 1996); Easterling et al., 2000a, b; Meehl et al., 2000 a, b; Parmesan et al., 2000; Alley et al., 2003).<sup>111</sup>

Parmesan & Galbraith recommend, as a general matter, the need for a “better understanding of which systems or species are most or least susceptible to projected climate change.” Parmesan & Galbraith recommend several specific actions:

- “Reassess species and habitat classifications to evaluate their relative vulnerabilities to climate change.”<sup>112</sup>

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<sup>107</sup> Parmesan, C. & Galbraith, H., *Observed Impacts of Global Climate Change in the U.S.* at 1. Pew Center on Global Climate Change at 3 (2004) (attached as Exhibit 64).

<sup>108</sup> *Id.* at 7.

<sup>109</sup> *Id.* at 10.

<sup>110</sup> *Id.*

<sup>111</sup> *Id.* at 39.

<sup>112</sup> *Id.* at 42.

- “Design new reserves that allow for shifts in the distributions of target species,” in particular by “protecting corridors or placing more value on areas with high topographic and elevational diversity.”<sup>113</sup>
- “Promote native habitat corridors between reserves” to “aid the redistribution of wild species between preserved areas.”<sup>114</sup>
- “Practice dynamic rather than static habitat conservation planning,” in particular through “empirical adaptive management.”<sup>115</sup>
- “Alleviate the effects of other stressors” given that “it may be easiest to reduce the overall stress on a species by mitigating some of the non-climate stressors.”<sup>116</sup>

On this point, the Western Governors’ Association (“WGA”) has a Wildlife Corridors Initiative through which it published its June 2008 report (attached as Exhibit 65). The report is related to the WGA’s February 2007 resolution emphasizing the “importance of wildlife corridors and crucial habitat” and “asks the Western states, in partnership with important stakeholders, to identify key wildlife corridors and crucial wildlife habitats in the West and make recommendations on needed policy options and tools for preserving those landscapes.” Exhibit 65 at 103. As the June 2008 Report explains on page 4:

Large, intact and functioning ecosystems, healthy fish and wildlife populations, and public access to natural landscapes contribute to the West’s quality of life and economic well-being. Important wildlife movement corridors and crucial wildlife habitats within these landscapes are critical to maintaining these Western qualities. Yet the integrity of these ecosystems is at risk around the nation, and the Western States are also affected by human activity occurring in important wildlife corridors and crucial wildlife habitats. Western States must also contend with an inter-connected mixture of private, state and federal lands.

Emphasizing the role of climate change, the June 2008 Report also explains on page 5:

Climatic changes over the 20<sup>th</sup> century have already had significant effects on wildlife species throughout the American West, and in the coming decade these effects will continue and intensify (Root et al. 2005). Shifts in the timing of wildlife mating, migration, and other life-history traits (phenological shifts) will continue to occur as climate conditions change, and these shifts will lead to potential mismatches between wildlife and their food sources or other habitat

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<sup>113</sup> *Id.*

<sup>114</sup> *Id.*

<sup>115</sup> *Id.*

<sup>116</sup> *Id.*

attributes. Climatic changes in the West increasingly will restructure the composition of wildlife populations as some species adapt and proliferate while others are displaced or die out, and the changes increasingly will alter the functions and values of crucial habitats and wildlife corridors. The effects on wildlife will manifest at the level of whole communities (e.g. sagebrush-steppe, high alpine, wetland, stream, lake) as well as at the level of individual species. Also, temperature and precipitation changes are facilitating the northward expansion of exotic and invasive species and pests (such as the pine beetle) that can cause major shifts in the types of plants and animals present.

Of note, beginning on page 103, the June 2008 Report reproduces a December 2007 Oil & Gas Working Group Report which provides a wealth of information, identifies issues, and provides a myriad of recommendations.

To further assist BLM in its efforts to address impacts to the ecosystem – and to craft management alternatives to address these impacts accordingly – three published, peer-reviewed studies are attached. The first, *Catastrophic Shifts in Ecosystems* (Exhibit 66) emphasizes that there can be “sudden drastic switches” in ecosystems and recommends that “strategies for sustainable management of ... ecosystems should focus on maintaining resilience.”<sup>117</sup> The second, *Does Adaptive Management of Natural Resources Enhance Resilience to Climate Change* (attached as Exhibit 67), notes in its abstract that “[e]merging insights from adaptive and community-based resource management suggest that building resilience into both human and ecological systems is an effective way to cope with environmental change characterized by future surprises or unknowable risks” and “that these emerging insights have implications for policies and strategies for responding to climate change.”<sup>118</sup> The third, *Forecasting the Effects of Global Warming on Biodiversity* (attached as Exhibit 68), should provide assistance to BLM once BLM begins to address the consequences of climate change to BLM public resources.<sup>119</sup>

#### **d. Climate Change Impacts to Socioeconomic Conditions**

Broadening out the discussion from biological and ecological impacts, the public depends on the public lands and the ecological resources they contain, such as drinking water supplies, fish and game, and diversity of species to support local economies.<sup>120</sup> As the GAO explained, “[e]conomic and social effects of climate change include adverse impacts on recreation and

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<sup>117</sup> Scheffer, M., et al., *Catastrophic shifts in ecosystems*, *Nature*, Vol. 413:591-96 (October 11, 2001).

<sup>118</sup> Tompkins, Emma L. & Adger, W. Neil, *Does Adaptive Management of Natural Resources Enhance Resilience to Climate Change?*, *Ecology & Society* 9(2):10 (2004).

<sup>119</sup> Botkin, Daniel B. et al., *Forecasting the Effects of Global Warming on Biodiversity*, *BioScience*, Vol. 57 No.3:227 (March 2007).

<sup>120</sup> See, e.g., M. Harris, P. Morton, Culver, *Natural Dividends: Wildland Protection and the Changing Economy of the Rocky Mountain West* (The Wilderness Society) ([www.tws.org/Library/Documents/NaturalDividends.cfm](http://www.tws.org/Library/Documents/NaturalDividends.cfm)) (attached as Exhibit 69).

tourism; infrastructure; water supplies; and fishing, ranching, and other resource-use activities.” 2007 GAO Report at 6. The increased “frequency of extreme events, such as fire or drought, could limit recreational activities on federal lands.” 2007 GAO Report at 30.

Climate change impacts – not only from extreme events but, also, degradation to aquatic and terrestrial ecosystems, detailed above – are already reducing fishing and hunting opportunities on the public lands. Some have predicted losses of western trout populations as high as 64 percent and of Pacific Northwest salmon of 20 to 40 percent by 2050.<sup>121</sup> See also 2007 IPCC Synthesis Report at 2 (“In some marine and freshwater systems, shifts in ranges and changes in algal, plankton and fish abundance are with *high confidence* associated with rising water temperatures, as well as related changes in ice cover, salinity, oxygen levels and circulation” (italics original)). In Montana, drought and higher temperatures have led to fishing closures and restrictions to sustain fish populations in eight out of the last ten years.<sup>122</sup> During the summer of 2007, closures were in force on 29 rivers in Montana by August 2. Since 2000, the number of annual fishing permits issued to Yellowstone National Park visitors has dropped by nearly a quarter, from 67,700 to 51,900, even as total park visitation remained steady.<sup>123</sup> One fly fisherman who has traveled from California each of the past 15 years to fish the Yellowstone River reacted to the decline: “I decided yesterday that I won’t be back anymore. There just aren’t enough fish to make it worthwhile.”<sup>124</sup>

Moreover, “climate change could affect infrastructure and operational costs on federal lands.” 2007 GAO Report at 31. In terms of “water supplies and quality”:

Snow and ice serve as natural reservoirs in mountainous areas and northern regions of the United States, gradually supplying water into the summer months. Much of the west relies on spring snowmelt to provide a steady stream of water into summer months, when demand is highest. However, warmer temperatures and changes in winter precipitation patterns from snow to rain are expected to continue causing reduced snowpack and early snowmelt. Water supply shortages will likely increase the cost of water. In addition, the experts said that water quality is likely to decline if harmful algal blooms, bacteria, or botulism occur as a result of increased temperature; such occurrences would likely result in increased water treatment costs.

2007 GAO Report at 33; see also NM SEO/ISC Report. “Water issues are particularly significant in the southwestern United States ... According to experts discussing the fresh waters ecosystem,

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<sup>121</sup> J. Williams, Trout Unlimited, Testimony, U.S. Senate, Committee on Energy and Natural Resources, Subcommittee of Water and Power, June 6, 2007, <http://www.livingrivers.org/pdfs/CongressionalTestimony/WilliamsTestimony.pdf> (attached as Exhibit 70).

<sup>122</sup> *Id.*

<sup>123</sup> U.S. Department of the Interior, National Park Service, Yellowstone National Park, *Yellowstone Fish Reports, 2000 to 2005*, <http://www.nps.gov/yell/planyourvisit/fishreports.htm> and *Park Statistics*, <http://www.nps.gov/yell/parkmgmt/statistics.htm>.

<sup>124</sup> R. Tosches, *Warm waters deadly to Yellowstone trout*, Denver Post (July 29, 2007).



less surface water availability means lower groundwater recharge rates and further demand on the existing groundwater resources.” “[R]eductions in groundwater could affect communities ... causing wells to dry up, thereby forcing people to abandon homes or greatly increasing the cost of living in the area” and may also cause “greater competition for water, which could have a negative economic impact on ranchers and some communities situated near federal lands.” 2007 GAO Report at 33.

These conclusions are supported by the NM Water & Economy Report (Exhibit 61) which explains that “[c]limate change introduces water supply changes – in these cases, reductions – that exacerbate relative scarcity and result in even larger price increases in order to induce water transfers from agriculture to urban water users.” NM Water & Economy Report at 14. These impacts are economic as well as cultural. New Mexico’s “long-standing Hispanic acequias communities will likely be early targets of water transfers – causing local economic dislocation and increased poverty.” *Id.* at 19 (reference omitted). Additionally, “tourism, arts, and recreation, which together contribute \$360 million to New Mexico’s economy, might decline as the States’ unique landscapes, environment, and scenic opportunities are potentially degraded by changes in riparian ecosystems and agrarian land use.” *Id.*

Although the NM Water & Economy Report is of course focused on New Mexico, the impacts are illustrative of the impacts of climate change throughout the West. In terms of the overall costs of climate change compared to the overall costs of climate change abatement, it is increasingly clear that abatement is not only economically feasible, but, economically, the only rational option. As the 2008 RMCO/NRDC Report (Exhibit 50) explains:

A new study by the business consulting firm McKinsey & Company, co-sponsored by NRDC, examines the cost and market potential of more than 250 greenhouse gas abatement technologies and concludes that the United States can do its part to stabilize the climate at little to no net cost, considering energy-efficiency savings. In sharp contrast, estimates of the annual benefits from stopping global warming range as high as 20 percent of total economic output. Moreover, the transition to a cleaner and more efficient energy economy will improve air and water quality, protect public health, and increase our energy security and productivity, all while we continue to grow our economy as forecasted, decade after decade.

RMCO/NRDC Report at 35.

Given the threats of climate change to public land resources, BLM faces an increasingly daunting challenge to protect the public resources for which BLM is responsible and to ensure that its actions do not compromise the interests of the rest of Montana, North Dakota, South Dakota and the broader Rocky Mountain region. BLM should be cognizant of the fact that the impacts of global warming and climate change will likely “depend on the rate and magnitude of climate change” wherein “some changes will occur quickly and will be readily apparent, while others will occur gradually and be less apparent in the near term.” 2007 GAO Report at 7. As the 2005 NM Climate Change Report explains on page 8:

Surprises are inevitable .... Climate changes and ecosystem responses are not always gradual, but can occur abruptly over a few decades or less. Complex human and natural systems often respond in a nonlinear manner to increasing stress. That is, they change gradually or not at all until a threshold (“tipping point”) is reached, and then they change dramatically. Positive feedbacks can amplify the impacts of small changes into enormous effects, such as when a wildfire grows until it begins creating its own winds and “blows up” catastrophically.

These “[s]urprises” should not suggest that BLM can do nothing. As discussed above, taking action to improve the resiliency and adaptive capacity of ecological systems (in part by mitigation or eliminating impacts) is an essential management step. Such action does not require a precise understanding of climate change impacts. As noted in the NM SEO/ISC Report (Exhibit 60):

Policy and managerial responses need not (and should not) wait for better climate predictions. It is already clear that temperatures are rising and that extreme events are becoming more common, so assessing the vulnerabilities of existing management strategies and resource availability can proceed without certainty about changes in precipitation. A close look at risk, even without firm quantification, can often lead to optimal solutions that may not be immediately apparent and that may avoid expensive missteps ... managers already operate within a context of uncertainty ... Climate change is thus not a stand alone issue. It will add an additional layer of uncertainty to the complexity ... Managers will thus need robust and resilient planning scenarios and processes, and highly adaptive management structures to adapt to changing predictions.

NM SEO/ISC Report at 37.

The evidence provided in this Protest is just the tip of an ever-growing iceberg -- one that stands in stark contrast to the reality of shrinking icebergs and collapsing iceshelves in the Antarctic. This evidence demonstrates that global warming and climate change has the potential if not the reality to cause severe, unprecedented, and game-changing impacts to BLM public lands and, more broadly, to Montana, North Dakota, South Dakota and the entire Rocky Mountain West. If there is a silver lining, it is that these impacts can also be addressed and, hopefully, remedied through proactive land protection and management. Time, though, is running out.

V. **BLM HAS FAILED TO ADDRESS GLOBAL WARMING, CLIMATE CHANGE, AND GREENHOUSE GAS EMISSIONS FROM FEDERAL ONSHORE OIL AND GAS DECISIONMAKING ACTIONS.**

BLM has historically completed Documentations of Plan Conformance and NEPA Adequacy that purport to justify the lease sale on the basis of RMPs and RMP-stage NEPA Analyses. As noted, in the context of climate change at least, we do not believe that these RMPs

and RMP-stage NEPA Analyses as presently constructed can supplant BLM's lease-stage legal responsibilities. In particular, the RMP-stage NEPA analyses do not supplant BLM's NEPA duties, in particular relative to BLM's duty to consider the option of not issuing leases, and BLM's duty to consider lease-specific stipulations rather than just standard lease terms and conditions.

BLM Field Offices in New Mexico, at least, are now preparing lease-stage EAs to justify oil and gas lease sales. However, these lease-stage NEPA analyses have failed to satisfy BLM's duties pursuant to Secretarial Order 3226, FLPMA, and the Public Trust Duty which have both substantive and procedural components. BLM, in New Mexico, has at least nominally agreed and, as explained in its July 11, 2008 Protest Decision, has ordered Field Offices to prepare a "new EA to analyze the potential impacts from lease exploration and development, and account for potential GHGs emitted during exploration, development, and transportation."<sup>125</sup> In that protest decision, BLM acknowledges that "current oil and gas development activities contribute to the GHG emissions that may affect climate," and that "[i]t is true that current planning documents do not directly address GHG or climate change."<sup>126</sup>

In Montana, North Dakota, and South Dakota, however, we are unaware of lease-stage EAs. Furthermore, not one of BLM's Resource Management Plans for the lease sale areas in Montana, North Dakota, and South Dakota address global warming, climate change, or GHG emissions from oil and gas leasing and development. Specifically, our review of relevant RMPs implicated by recent BLM lease sales in Montana, North Dakota, and South Dakota – e.g., the Billings Resource Area RMP (1984), the Headwaters Resource Area RMP (1984), the Powder River Basin RMP (1985), the Big Dry RMP (1995), the Judith Valley Phillips RMP (1994), the North Dakota RMP (1987), and the South Dakota RMP (1986) – revealed utterly no discussion concerning global warming, climate change, or GHG emissions from past, present, or reasonably foreseeable oil and gas leasing and development.

This failure – at both the RMP and lease stages – is stark given: (1) Secretarial Order 3226's explicit mandate, in section 3, to consider climate change "when making major decisions regarding the potential utilization of resources under the Department's purview" and in "planning and management activities associated with oil, gas and mineral development on public lands"; (2) FLPMA's mandates to protect the environment, prevent "permanent impairment," prevent "unnecessary or undue degradation," and "minimize adverse impacts" (43 U.S.C. §§ 1701(a)(8), 1702(c), 1732(b), 1732(d)(2)(A)); (3) NEPA's mandate that BLM consider the adverse environmental impacts of and reasonable alternatives to a proposed action; and (4) BLM's Public Trust Duty. To the extent that BLM believes that climate change impacts were indirectly addressed within these plans, we note that this would, in effect, be an improper consideration by proxy type argument which does not satisfy BLM's legal duties.

In an April 21, 2008 Protest Decision, BLM's Acting State Director for Montana dismissed a protest submitted by Montana Trout Unlimited which raised climate change

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<sup>125</sup> Bureau of Land Management Protest Decision regarding March 31, 2008 Protest, 3 (July 11, 2008) (attached as Exhibit 71).

<sup>126</sup> *Id.* at 2.

concerns, stating that “the analysis of direct, indirect, and cumulative impacts to climate change from oil and gas leasing and development in the area in question would likely be low based on the level of activity forecast in the [Reasonably Foreseeable Development] scenarios for the different planning areas ....”<sup>127</sup> BLM, however, had no basis for making this decision because it has never addressed climate change issues through the NEPA process or any other process for that matter; BLM’s statement is thus little more than unsubstantiated speculation.

Furthermore, the Montana BLM’s Protest Decision arbitrarily minimizes the significance of GHG emissions from oil and gas activities by breaking the activities up into tiny pieces. Even isolating the scale of analysis, cumulative GHG emissions from intensive oil and gas development in, e.g., the Powder River Basin of Montana and Wyoming, are potentially significant. Estimates of recoverable coalbed methane in the Powder River Basin have increased from 1.1 to 14.3 trillion cubic feet, 5.0 TCF of which is in Montana and 9.3 TCF is in Wyoming.<sup>128</sup> Gas production in the Powder River Basin RMP area also spiked between 1999 and 2004.<sup>129</sup> In total, as of 2003, 37,233 oil and gas wells had been drilled in Montana.<sup>130</sup> Looking forward, in the next twenty years, BLM anticipates a low of 6,470 and a high of 18,225 new coalbed methane wells and a low of 450 and a high of 1,775 new conventional oil and gas wells in the Montana portion of the Powder River Basin.<sup>131</sup> The coalbed methane wells alone will require 250 to 700 field compressors, 25 to 70 sales compressors, and thousands of miles of gathering lines.<sup>132</sup> In the Wyoming portion of the Powder River Basin, BLM projects an astounding 39,367 new coalbed methane wells, over 1,300 compressors totaling 862,700 horsepower, and 3,200 new conventional oil and gas wells over the course of a ten-year period beginning in 2003; long-term projections range from 81,000 to 139,000 new coalbed methane wells and an untold amount of associated infrastructure.<sup>133</sup>

BLM’s failure to address GHG pollution from oil and gas development and BLM’s failure to address the climate change impacts to the environment is not isolated to Montana. Across the entire Rocky Mountain West, BLM has buried its head in the sand. For example, none of Colorado’s RMPs address global warming, climate change, or GHG pollution from oil and gas leasing and development. In the Colorado Oil and Gas Leasing and Development Final Environmental Impact Statement, BLM failed to address the climate change impacts, except to

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<sup>127</sup> Bureau of Land Management, Protest Decision Regarding November 13, 2007 Trout Unlimited Protest (April 21, 2008) (attached as Exhibit 72).

<sup>128</sup> Draft Supplement to the Montana Statewide Oil and Gas Environmental Statement and Amendment of the Powder River and Billings Resource Management Plans, Volume II at Min-1 (December 2006).

<sup>129</sup> *Id.*, Volume II at Min-3.

<sup>130</sup> *Id.*, Volume II at Min-3.

<sup>131</sup> *Id.*, Volume II at Min-4, Min-18.

<sup>132</sup> *Id.*, Volume II at Min-18.

<sup>133</sup> Bureau of Land Management, *Final Environmental Impact Statements and Proposed Plan Amendment for the Powder River Basin Oil and Gas Project*, Executive Summary at xxx, 2-10, and Appendix A-2 (Jan. 2003).

state summarily that the impacts on climate and air quality will be minor and local.<sup>134</sup> BLM makes this claim, despite its own admission that the “existing air quality throughout much of the Study Area is unknown.”<sup>135</sup> Similarly, in the Glenwood Springs Resource Area Oil and Gas Leasing and Development Final Supplemental Environmental Impact Statement, BLM responded to a comment requesting it to consider climate change impacts by summarily stating: “Methane, carbon dioxide, and several other atmospheric chemicals have been postulated to have an effect on global climate.” “However, both the nature and the degree of this suspected relationship are unknown at this time.”<sup>136</sup> Unfortunately, the Glenwood Springs Oil and Gas RMP – though absurdly dismissive – is the only RMP that appears to even reference GHG emissions from oil and gas activities in Colorado.

In New Mexico, in the Farmington RMP, for example, BLM provides no mention of climate change and global warming.<sup>137</sup> In the EIS for that RMP, BLM did, however, respond to a comment submitted by the San Juan Basin Health Department asking BLM to address the contribution of the proposed oil and gas development to CO<sub>2</sub> levels and greenhouse gas concerns, summarily stating: “Methods to determine the effects of the significance of greenhouse gas emissions (GGE) from individual projects to climate change do not exist and this issue is beyond the scope of this NEPA process.”<sup>138</sup> Unfortunately, the Farmington RMP – though absurdly dismissive – is the only RMP that appears to even reference GHG emissions from oil and gas activities. The Other RMPs in New Mexico – the Carlsbad RMP (1988), Socorro RMP (1989); Mimbres RMP (1992), Roswell RMP (1997), and even the recent RMP Amendment for Federal Fluid Minerals Leasing and Development in Sierra and Otero Counties (2005) – contain, based upon review, utterly no discussion concerning global warming, climate change, or GHG emissions from past, present, or reasonably foreseeable oil and gas leasing and development. Insofar as BLM in New Mexico is now preparing lease stage EAs, the EAs that we have reviewed are woefully deficient, do not address the issues or concerns identified in this protest, and were prepared without public involvement.

Overall, there are four fundamental problems with BLM’s glib approach to the intersection of climate change and oil and gas development in the Rocky Mountain West and, in

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<sup>134</sup> Bureau of Land Management, Colorado Oil and Gas Leasing and Development Final Environmental Impact Statement (January 1991), 2-31, 4-1, available at: [http://www.blm.gov/co/st/en/BLM\\_Programs/land\\_use\\_planning/rmp/kremmling/kremmling\\_amendments.html](http://www.blm.gov/co/st/en/BLM_Programs/land_use_planning/rmp/kremmling/kremmling_amendments.html) (last accessed August 6, 2008) (addressed leasing in five resource management planning areas within the state of Colorado, including several at issue here: Glenwood Springs, Kremmling, Little Snake, and San Juan/San Miguel).

<sup>135</sup> *Id.* at 3-4.

<sup>136</sup> Bureau of Land Management, Glenwood Springs Resource Area Oil and Gas Leasing and Development Final Supplemental Environmental Impact Statement, 5-17 – 5-18 (January 1999) available at: [http://www.blm.gov/co/st/en/BLM\\_Programs/land\\_use\\_planning/rmp/glenwood\\_springs/glenwood\\_springs\\_amendments.html](http://www.blm.gov/co/st/en/BLM_Programs/land_use_planning/rmp/glenwood_springs/glenwood_springs_amendments.html) (last accessed August 6, 2008).

<sup>137</sup> Bureau of Land Management, *Farmington Resource Management Plan* (Dec. 2003).

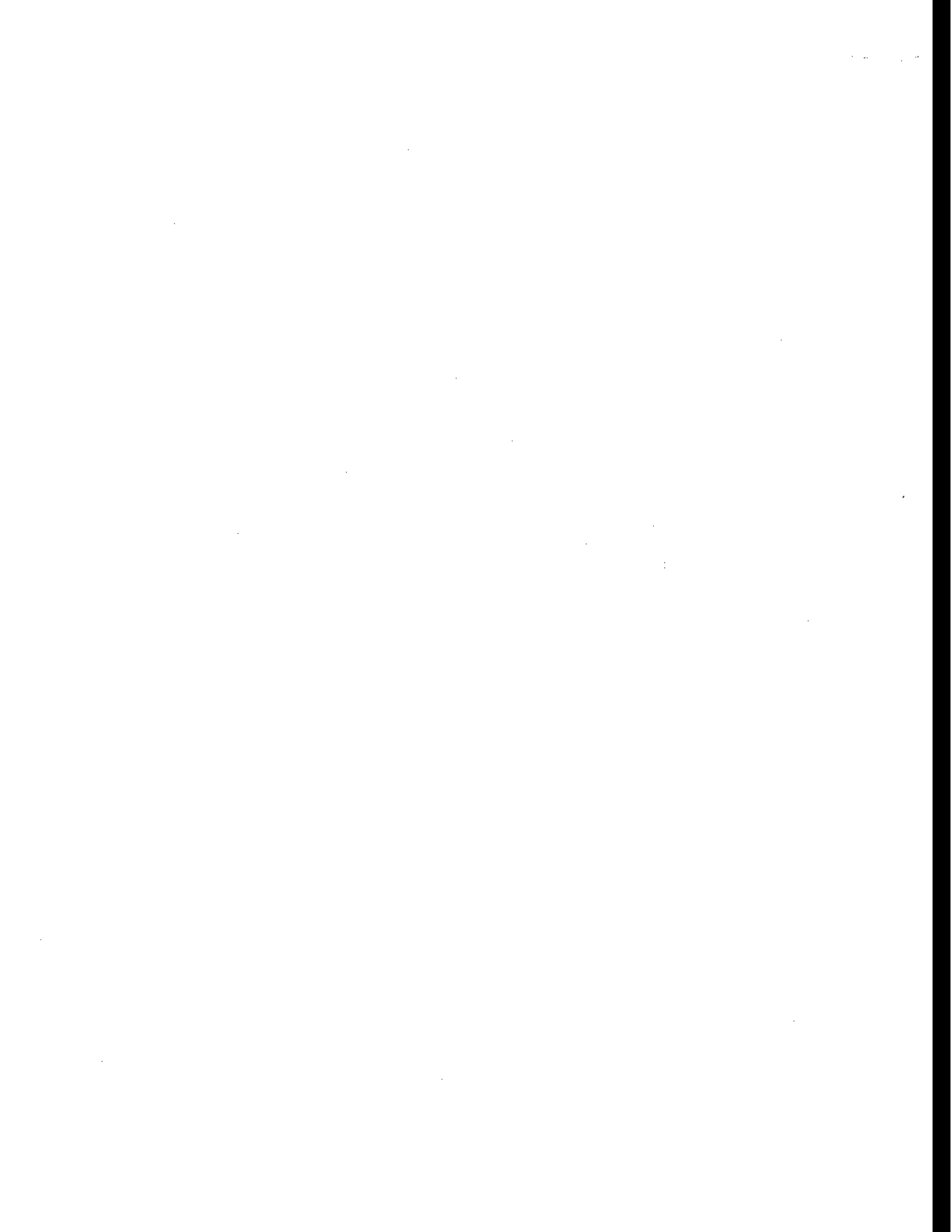
<sup>138</sup> Bureau of Land Management, *Farmington Proposed Resource Management Plan and Final Environmental Impact Statement*, P-9 (Mar. 2003) (excerpts attached as Exhibit 73).

particular, Montana, North Dakota, and South Dakota. First, as this Protest demonstrates, methods do exist to quantify and reduce climate change and other federal agencies – in particular MMS – are quantifying and reducing GHG emissions from oil and gas leasing and development at both the programmatic planning and leasing stages. Second, even if this were not the case, a presumed lack of methodology is not an excuse for barreling forward blindly with an activity known to contribute to a serious environmental issue. 40 C.F.R. § 1502.22. Third, global warming, climate change, and GHG pollution caused by oil and gas leasing and development are indisputably a component of BLM's legal responsibilities and cannot be waived away with, for example, as in the Farmington RMP, an unsubstantiated 32-word sentence claiming that they are beyond the scope of BLM's planning responsibilities. And, fourth, BLM's actions are undermined by recent planning and decision-making processes undertaken for geothermal and solar energy production. In these processes, BLM has identified planning criteria to account for climate change:

- BLM's Information Notice of Planning Criteria for the Programmatic Environmental Impact Statement for Leasing of Geothermal Resources provides that the "BLM will consider and analyze relevant climate change impacts in its land use plans and associated NEPA documents, including the anticipated climate change benefits of geothermal energy." 73 Fed. Reg. 28500, 28501 (May 16, 2008).
- BLM's Notice of Intent To Prepare a Programmatic Environmental Impact Statement To Evaluate Solar Energy Development, Develop and Implement Agency-Specific Programs, Conduct Public Scoping Meetings, Amend Relevant Agency Land Use Plans, and Provide Notice of Proposed Planning Criteria identifies provides that "BLM will consider and analyze relevant climate change impacts in its land use plans and associated NEPA documents, including the anticipated climate change benefits of solar energy." 73 Fed. Reg. 30908, 30911 (May 29, 2008).

Insofar as BLM management – through RMP implementation – affords BLM with adaptive management capacity, adaptive management must be predicated on a foundation of planning and analysis that forthrightly addresses impacts and anticipated uncertainties to support and justify adaptive measures. This is precisely why BLM is preparing programmatic analyses with regard to solar energy development and the leasing of geothermal resources. We applaud these efforts but fail to see how BLM can, on the one hand, for solar and geothermal, accept its responsibilities with regard to climate change but, on the other hand, for oil and gas leasing and development, abdicate its responsibilities. Without a proper foundation of planning and analysis, BLM management is relegated to a reactive posture which not only violates federal law but can be end up costing more than if BLM had taken a preventative approach. Put another way, adaptive measures are not a talisman for inaction; they must be planned and tailored to address specific issues and concerns. It would thus be arbitrary and capricious for BLM to rely, simplistically, on adaptive management principles which were never intended to address an issue as serious and unique as climate change. More fundamentally, such reliance would violate a basic principle of management underlying Secretarial Order 3226, FLPMA, NEPA, and the Public Trust Duty: *look before you leap*.

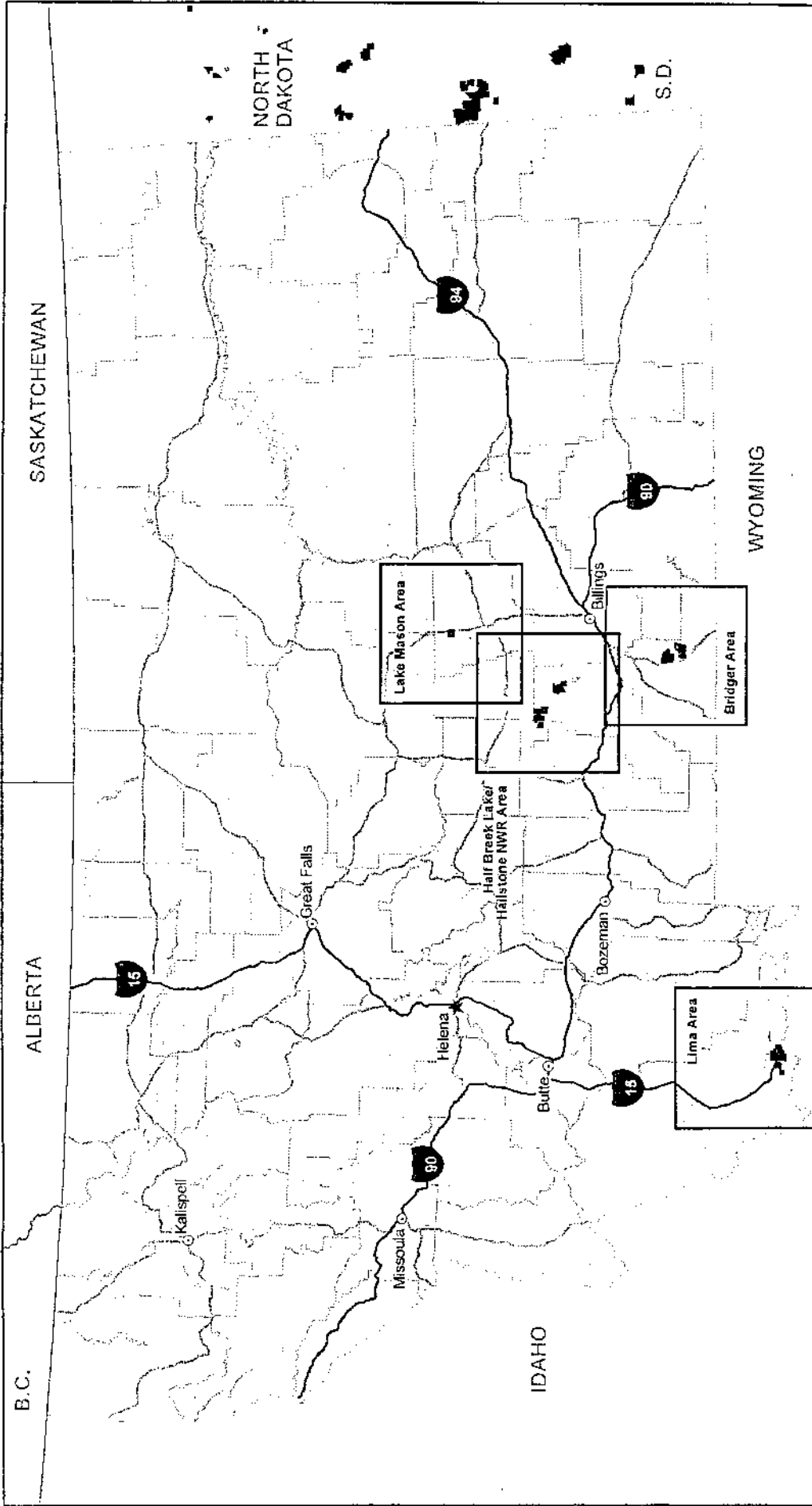
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# **EXHIBIT 1**

**IN SUPPORT OF COALITION PROTEST OF  
BLM'S OIL & GAS LEASE SALE**



# Overview of Montana Lease Parcels

Federal Lease Sale | Montana BLM, November 4, 2008

- Lease Parcels\*
- Detail Map Extent

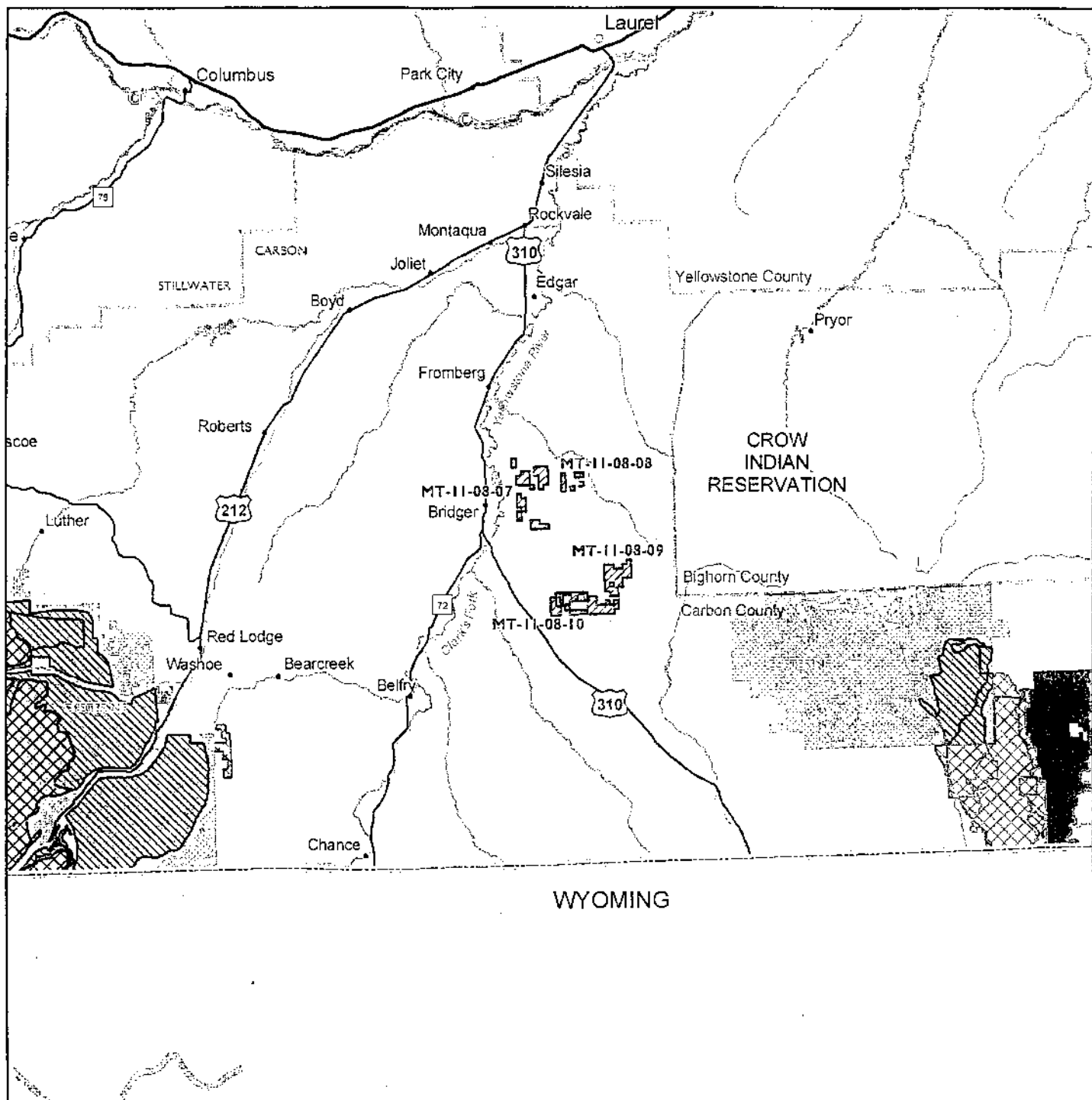
\* Lease Parcel data downloaded from the Montana BLM website on 9/22/2008



UTM Zone 12N NAD 1983  
 Data Sources: BLM, ESRI, MT-NRIS, USGS  
 Sara Waterson  
 September 22, 2008



EARTHJUSTICE



WYOMING

### Bridger Area

Federal Oil & Gas Lease Sale | Montana BLM, November 4, 2008

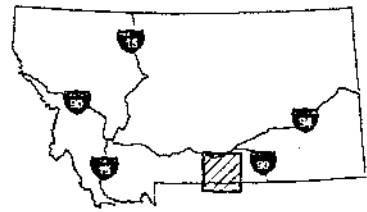
Lease Parcels (data downloaded from the Montana BLM website on 9/22/2008)

#### Wilderness quality and wildlife habitat areas

- |                           |                          |                               |
|---------------------------|--------------------------|-------------------------------|
| BLM Wilderness Study Area | Research Natural Area    | Lewis & Clark Trail/Campsites |
| Wilderness Area           | BLM Special Management   | National Wild & Scenic River  |
| USFS Roadless Area        | National Wildlife Refuge |                               |

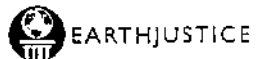
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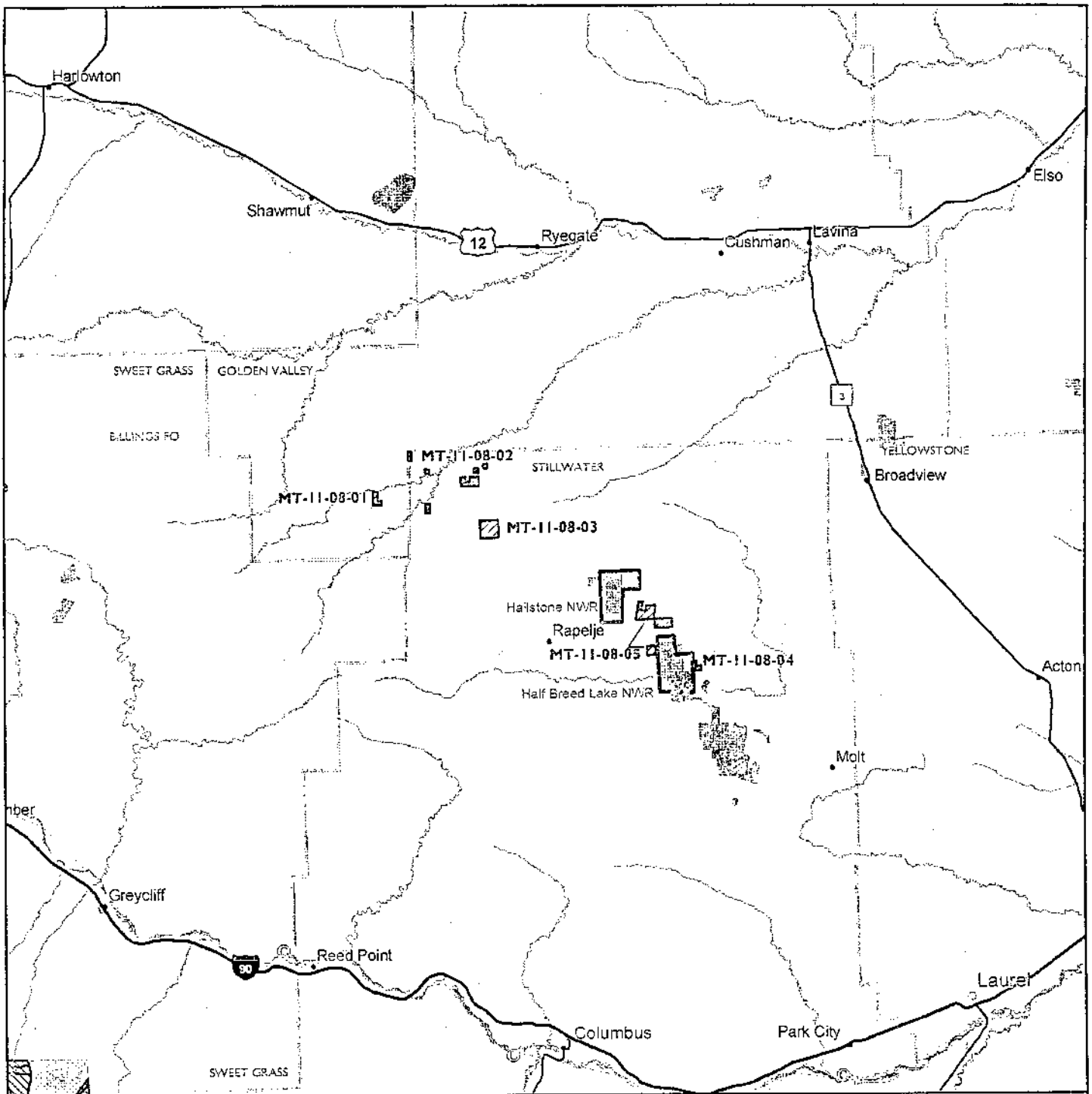
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|------|-----|-----|---------|-----------|-------|
| ACOE | BLM | DOA | NPS     | State     | USFS  |
| BIA  | BOR | DOD | Private | State FWP | USFWS |



0 2.5 5 10 15 Miles

NAD 1983 UTM Zone 12N  
 Data Sources: BLM, ESRI, LSIS, MNHP,  
 MT-NAIS, USDA-PS, USGS  
 Sara Watterson, September 22, 2008





## Half Breed Lake/Hailstone NWR Area

Federal Oil & Gas Lease Sale | Montana BLM, November 4, 2008

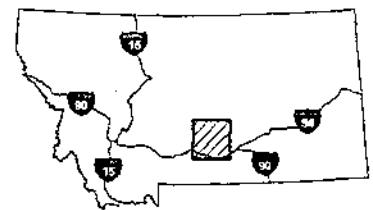
Lease Parcels (data downloaded from the Montana BLM website on 9/22/2008)

### Wilderness quality and wildlife habitat areas

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|---------------------------|--------------------------|-------------------------------|
| BLM Wilderness Study Area | Research Natural Area    | Lewis & Clark Trail/Campsites |
| Wilderness Area           | BLM Special Management   | National Wild & Scenic River  |
| USFS Roadless Area        | National Wildlife Refuge |                               |

### Land Ownership & Administration

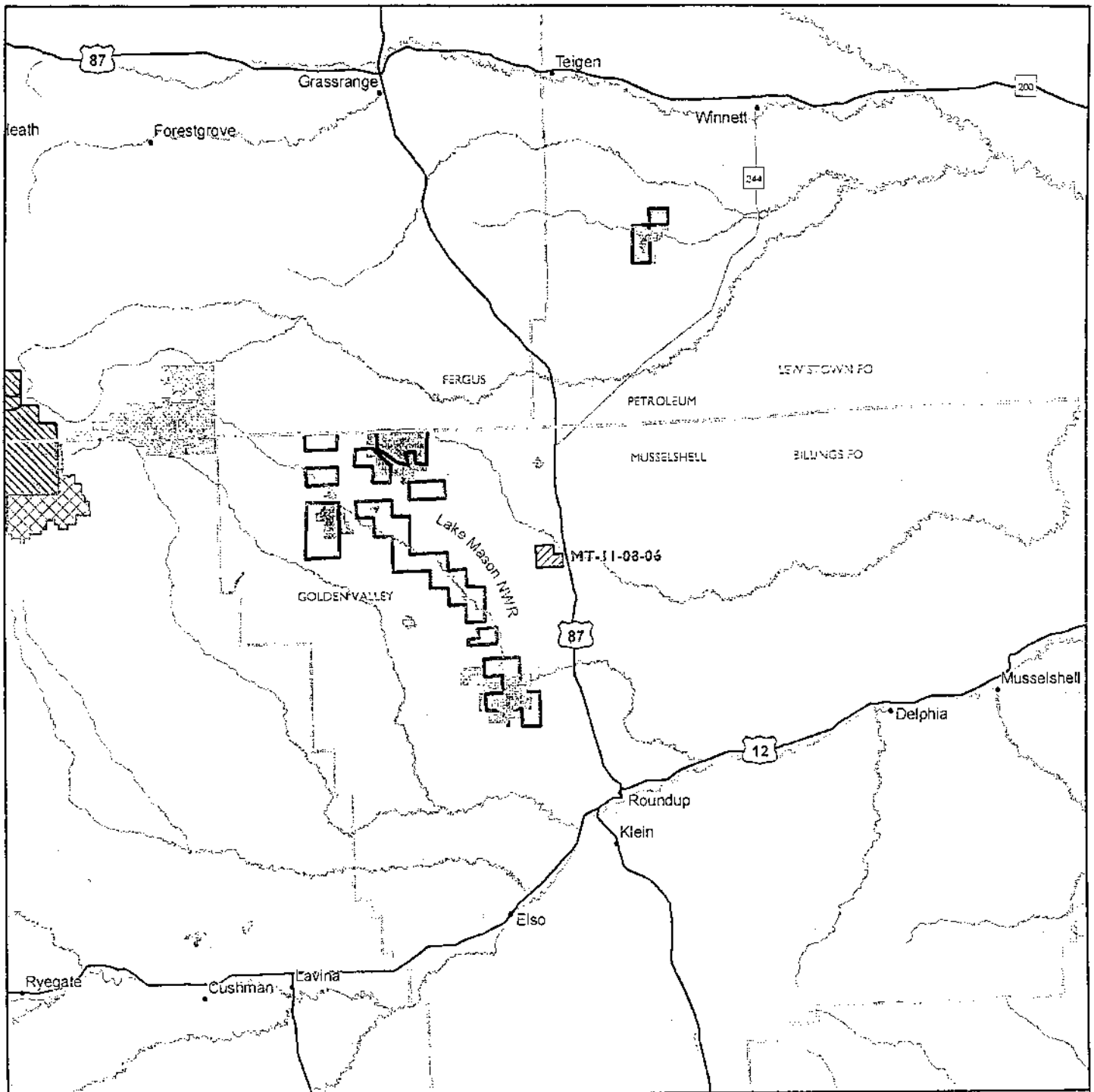
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| ACOE | BLM | DOA | NPS     | State     | USFS  |
| BIA  | BOR | DOD | Private | State FWP | USFWS |



0 2.5 5 10 15 Miles

NAD 1983 UTM Zone 12N  
 Data Sources: BLM, ESRI, LSIS, MNHP,  
 MT-NRIS, USDA-FS, USGS  
 Sara Watterson, September 22, 2008





## Lake Mason Area

Federal Oil & Gas Lease Sale | Montana BLM, November 4, 2008

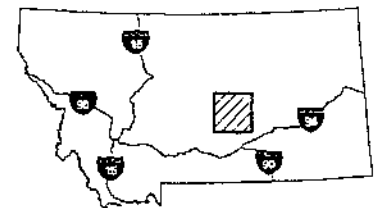
Lease Parcels (data downloaded from the Montana BLM website on 9/22/2008)

### Wilderness quality and wildlife habitat areas

- |                           |                          |                               |
|---------------------------|--------------------------|-------------------------------|
| BLM Wilderness Study Area | Research Natural Area    | Lewis & Clark Trail/Campsites |
| Wilderness Area           | BLM Special Management   | National Wild & Scenic River  |
| USFS Roadless Area        | National Wildlife Refuge |                               |

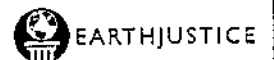
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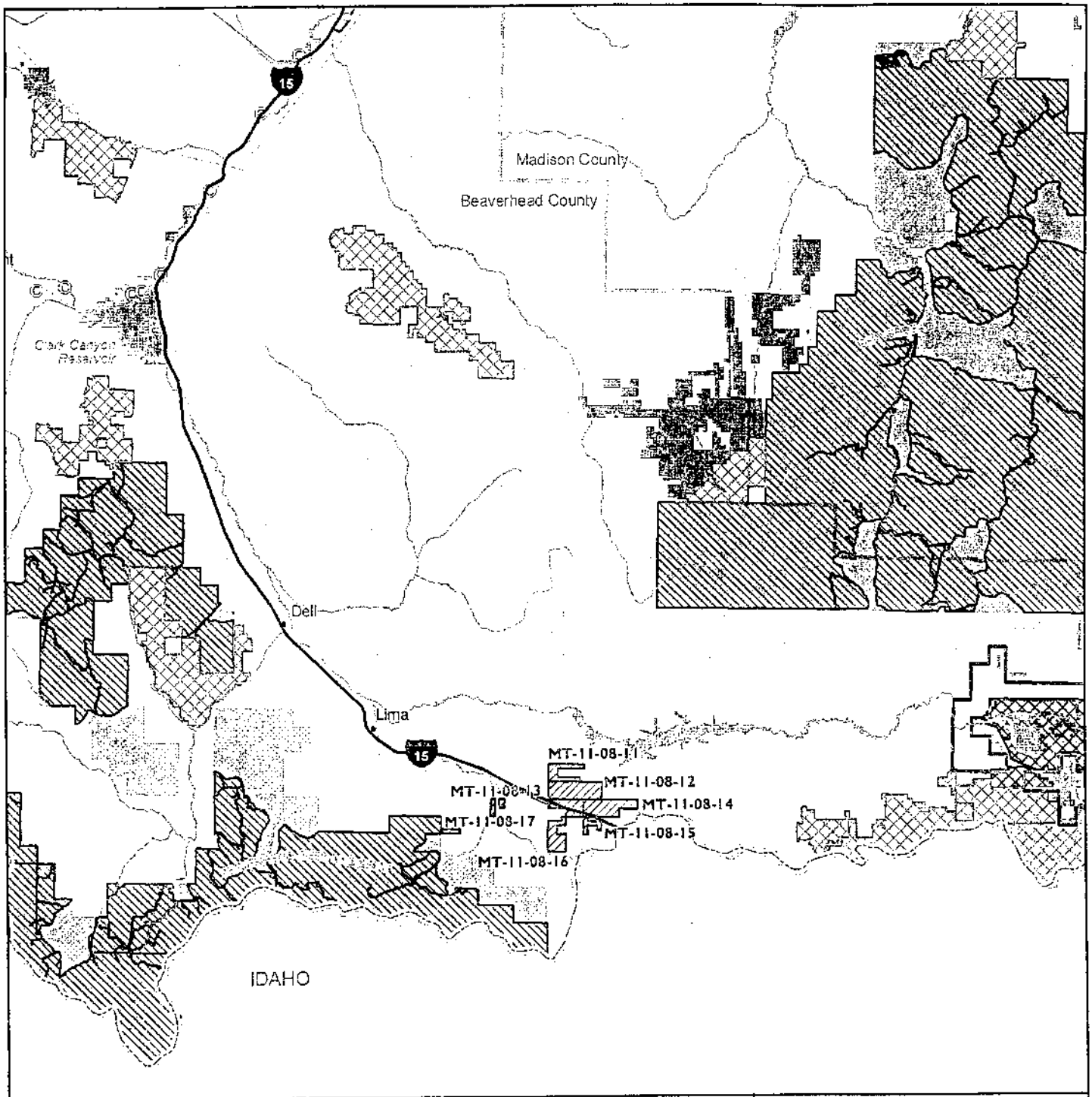
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| ACOE | BLM | DOA | NPS     | State     | USFS  |
| BIA  | BOR | DOD | Private | State FWP | USFWS |



0 2.5 5 10 15 Miles

NAD 1983 UTM Zone 12N  
 Data Sources: BLM, ESRI, LSIS, MNHP,  
 MT-NRIS, USDA-FS, USGS  
 Sara Watterson, September 22, 2008





## Lima Area

Federal Oil & Gas Lease Sale | Montana BLM, November 4, 2008

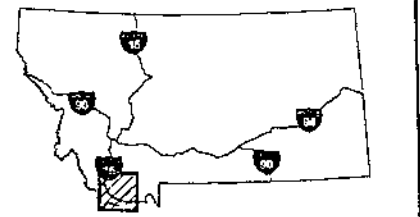
Lease Parcels (data downloaded from the Montana BLM website on 9/22/2008)

### Wilderness quality and wildlife habitat areas

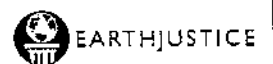
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|---------------------------|--------------------------|-------------------------------|
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| Wilderness Area           | BLM Special Management   | National Wild & Scenic River  |
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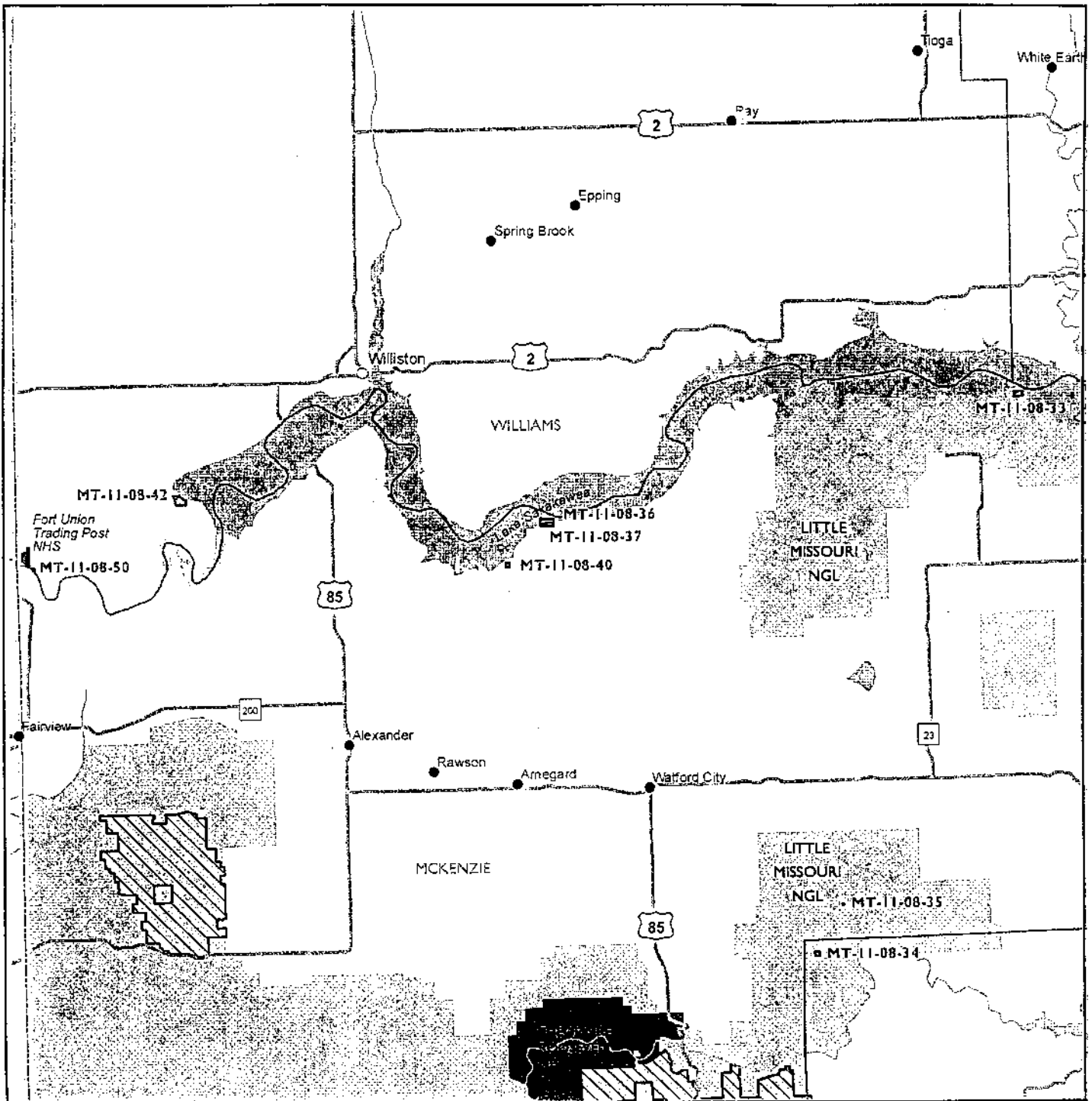
### Land Ownership & Administration

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| BIA  | BOR | DOD | Private | State FWP | USFWS |




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 MT-NRIS, USDA-FS, USGS  
 Sara Watterson, September 22, 2008










## North Dakota Lease Parcels - I

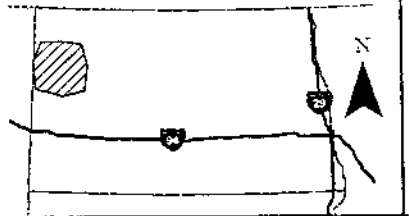
Federal Lease Sale - Montana BLM, November 4, 2008

 Lease Parcels (data downloaded from the Montana BLM website on 9/22/2008)

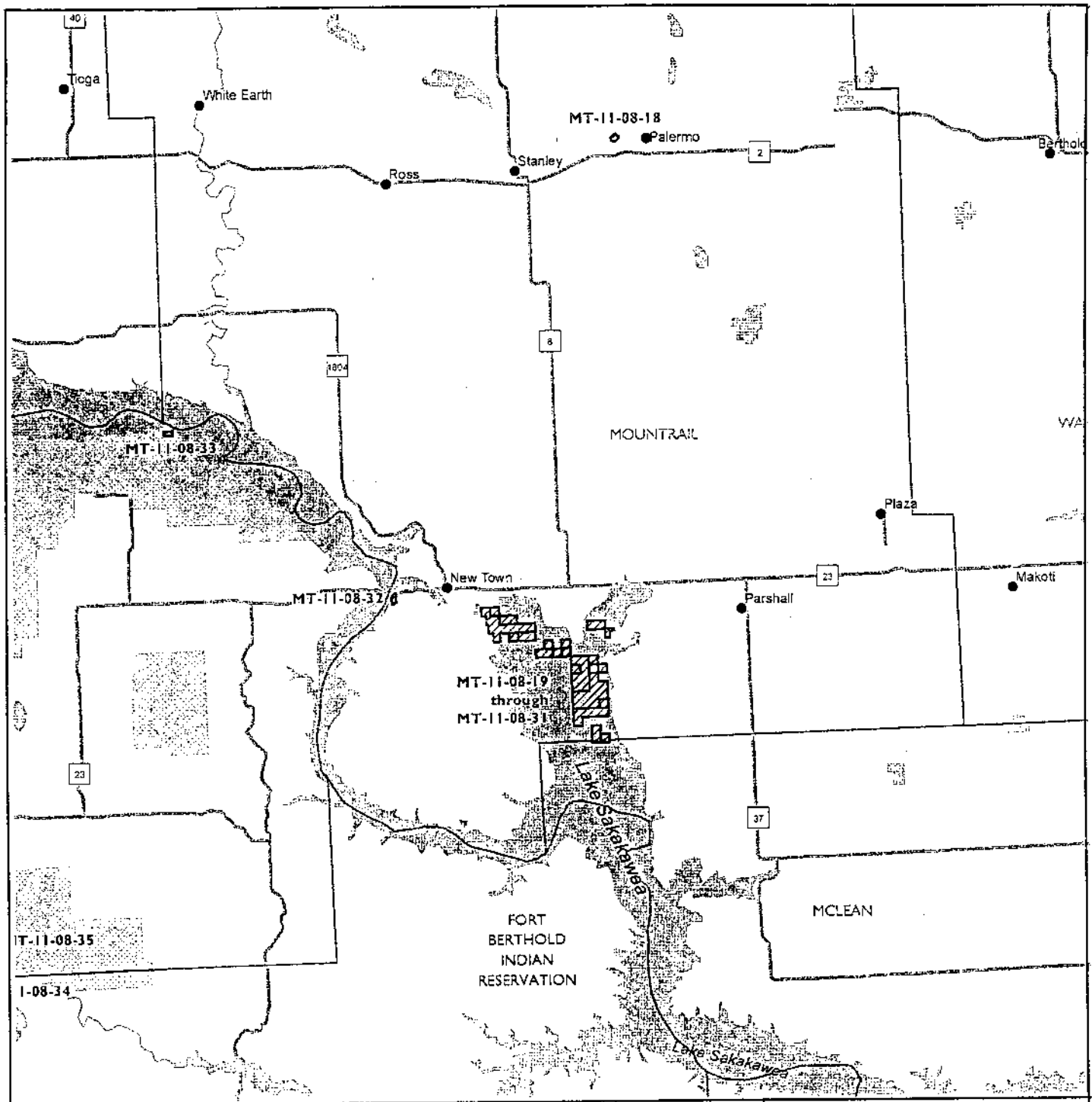
### Land Ownership & Administration

BIA  ACOE  USFWS  USDA-FS Roadless Area  
 BLM  USDA-FS  NPS

Some data are displayed at a larger scale than their stated accuracy; map is intended only for the purpose of determining general lease locations.




NAD 1983 UTM Zone 13N  
 Data Sources: BLM, ESRI, LSIS, USDA-FS, USGS  
 Doug Pflugh/Sara Watterson, September 24, 2008








## North Dakota Lease Parcels - 2

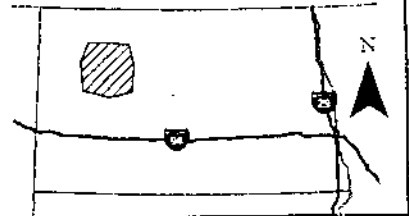
Federal Lease Sale - Montana BLM, November 4, 2008

 Lease Parcels (data downloaded from the Montana BLM website on 9/22/2008)

### Land Ownership & Administration

BIA  ACOE  USFWS  USDA-FS Roadless Area  
 BLM  USDA-FS  NPS

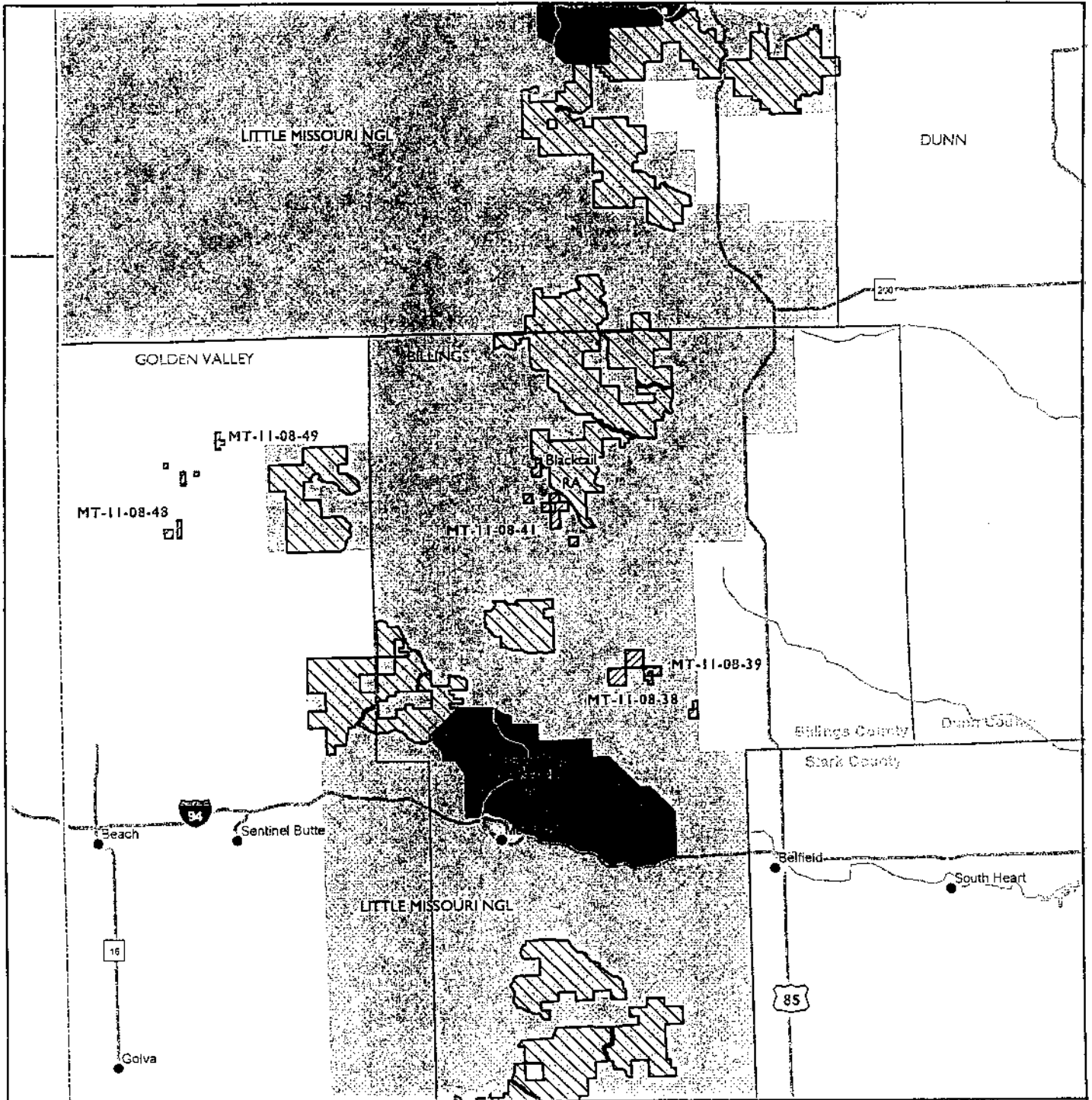
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 Data Sources: BLM, ESRI, LSIS, USDA-FS, USGS  
 Doug Pflugh/Sara Waccerson, September 24, 2008













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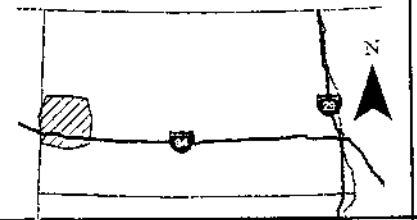
Federal Lease Sale - Montana BLM, November 4, 2008

 Lease Parcels (data downloaded from the Montana BLM website on 9/22/2008)

**Land Ownership & Administration**

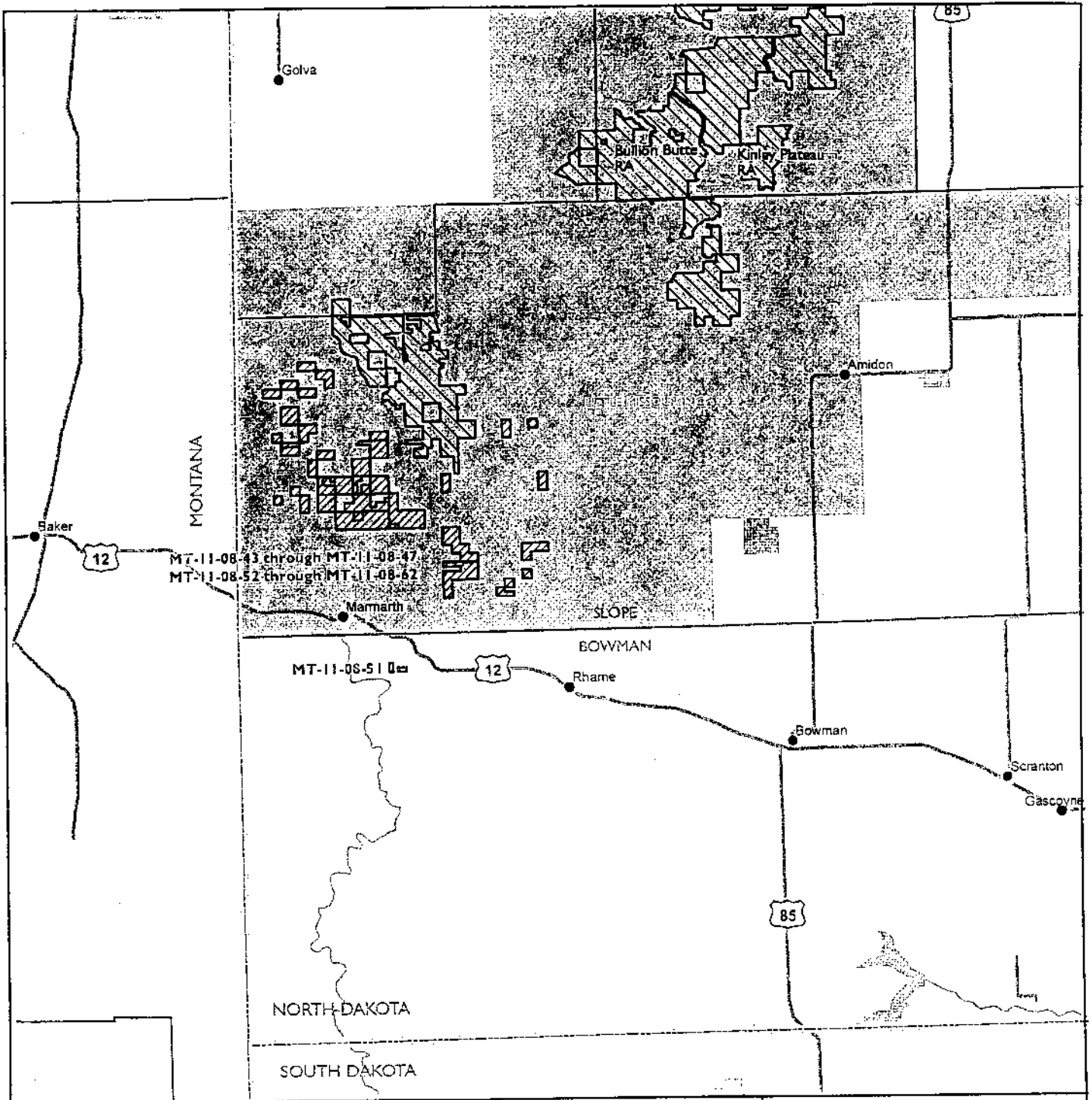
- |     |   |         |   |       |   |                       |
|-----|---|---------|---|-------|---|-----------------------|
| BIA |  | ACOE    |  | USFWS |  | USDA-FS Roadless Area |
| BLM |  | USDA-FS |  | NPS   |   |                       |

Some data are displayed at a larger scale than their stated accuracy; map is intended only for the purpose of determining general lease locations.




NAD 1983 UTM Zone 13N  
 Data Sources: BLM, ESRI, LSIS, USDA-FS, USGS  
 Doug Pflugh/Sara Watterson, September 24, 2008










## North Dakota Lease Parcels - 4

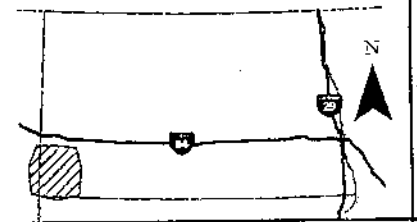
Federal Lease Sale - Montana BLM, November 4, 2008

 Lease Parcels (data downloaded from the Montana BLM website on 9/22/2008)

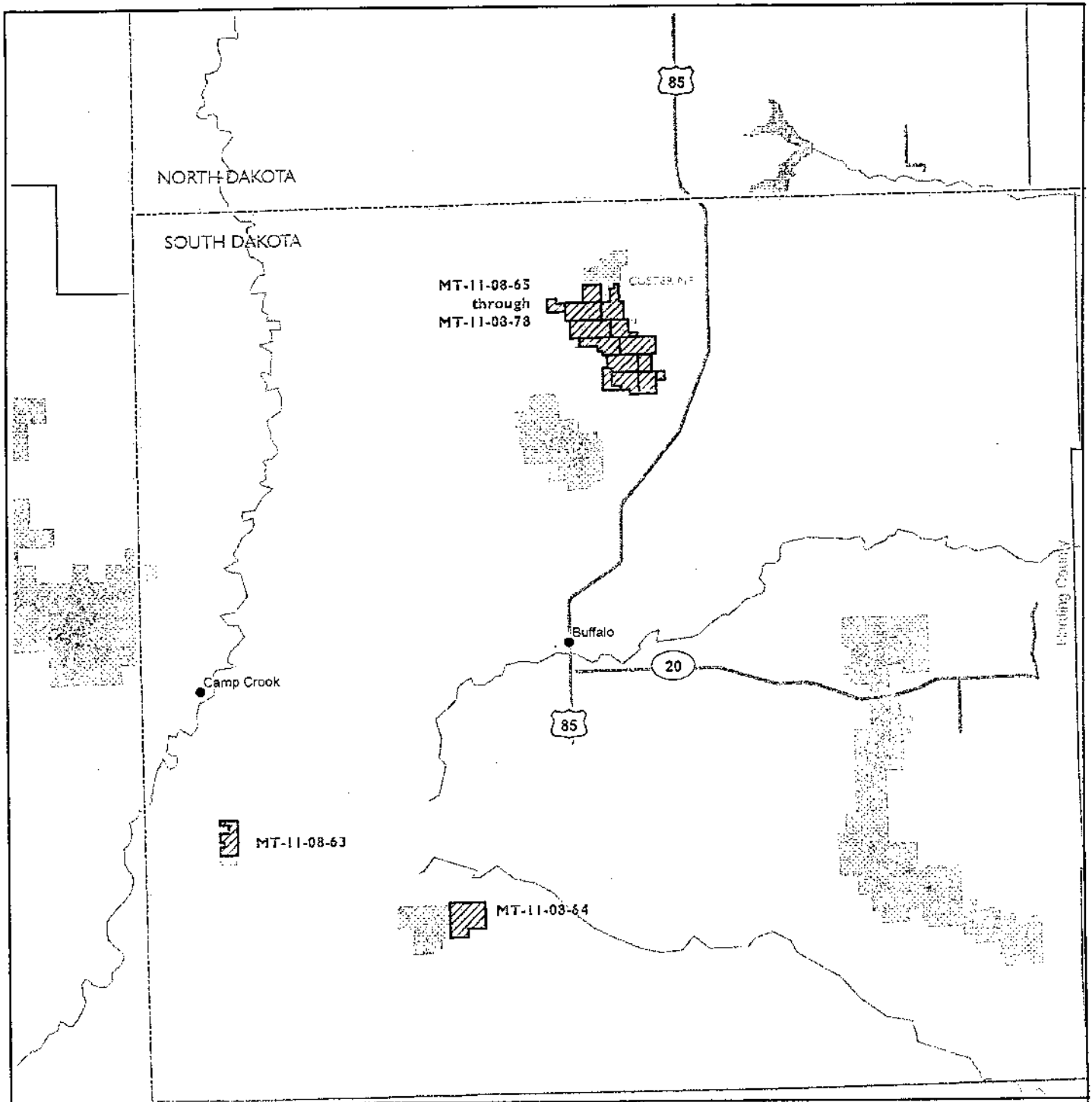
### Land Ownership & Administration

BIA  ACOE  USFWS  USDA-FS Roadless Area  
 BLM  USDA-FS  NPS

Some data are displayed at a larger scale than their stated accuracy; map is intended only for the purpose of determining general lease locations.




NAD 1983 UTM Zone 13N  
 Data Sources: BLM, ESRI, LSIS, USDA-FS, USGS  
 Doug Pflugh/Sara Watterson, September 24, 2008










## South Dakota Lease Parcels - I

Federal Lease Sale - Montana BLM, November 4, 2008

 Lease Parcels (data downloaded from the Montana BLM website on 9/22/2008)

### Land Ownership & Administration

- |   |   |   |   |
|---|---|---|---|
|  BIA |  ACOE    |  USFWS |  USDA-FS Roadless Area |
|  BLM |  USDA-FS |  NPS   |   |

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