



***VIA CERTIFIED MAIL; RETURN RECEIPT REQUESTED AND FACSIMILE***

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**RE: PROTEST OF BLM'S MARCH 11, 2009 COMPETITIVE OIL & GAS LEASE SALE**

The Center for Biological Diversity (the "Center") and Desert Survivors (collectively "conservation groups") formally protest the Bureau of Land Management's ("BLM") entire March 11, 2009 lease sale for the State of California pursuant to 43 CFR 3110.1(a). This protest is filed on behalf of our members, our staff, and members of the public with an interest in protecting these areas. For the reasons outlined below in the attached Statement of Reasons, we respectfully request the BLM withdraw from consideration all parcels up for competitive commercial leasing in the March 11, 2009 sale.

The Center is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has over 200,000 members and online activists throughout the United States, including many members who live in California.

Desert Survivors is a conservation organization with approximately 800 members focused on the protection of desert plants, wildlife and ecosystems. Desert Survivors also engages in a vigorous program of public education about desert lands and their unique character. Desert Survivors' primary goals are to protect fragile desert lands and to teach visitors to those lands about their value. Desert Survivors members place a high value on the continuing existence and essential value of desert wildlife and leads educational and service trips to desert lands including recent trips to the Carrizo Plain National Monument.

**INTRODUCTION**

The BLM's Environmental Assessment ("EA") evaluating the proposed oil and gas lease sale's environmental impacts falls far short of the standards required by the National Environmental Policy Act ("NEPA") and, as explained further in the Statement of Reasons, cannot legally be relied upon to support the agency's conclusion that the proposed lease sale will not have a significant impact on the environment. Furthermore, and despite the disparity in

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information and lazy analysis, the EA does at least indicate that this proposed oil and gas lease sale *may* have significant impacts. Accordingly, the BLM is required to go one step further in its assessment of the lease sale's likely environmental consequences and complete a full Environmental Impact Statement (EIS).

Twenty three parcels – totaling 4,402 acres – are the subject of this proposed sale. The federal government owns both the surface and mineral rights of approximately 680 of these acres. The rest of the acres are split-estates, where private parties own the surface rights and the federal government owns the subsurface mineral rights. All of these acres are located in Kern County, California and are managed by the BLM's Bakersfield Office. All the parcels offered in this sale are within San Joaquin kit fox habitat, an endangered species whose numbers have been declining steadily since its listing due, mainly, to habitat fragmentation. Two of the parcels are also within Areas of Critical Environmental Concern ("ACECs"). Moreover, this lease sale will certainly lead to an unacceptable increase in greenhouse gas emissions directly (from the activities on the land necessary to exploit the resources), indirectly (from the activities necessary to bring the product to market, such as, for example, transporting the fuel to refineries and end users) and cumulatively (from consumer's eventual consumption of the final product).

Despite these obvious concerns, the BLM's EA fails to adequately describe and analyze the environmental setting, consequences, alternatives, or mitigation measures as required by our nation's longstanding environmental protection laws. In analyzing the potential environmental impacts, the agency fails to incorporate the high level of scientific integrity required by NEPA, and relies on several outdated sources to arrive at inaccurate and unsubstantiated conclusions. First, the EA's analysis with regards to the kit fox and impacts to the values for which the ACECs were established fail to identify all of the potential impacts and to provide a full scientific inquiry into the impacts that the proposed project may have on the kit fox or other fragile resources found on these BLM lands. Furthermore, the agency minimizes the potential impacts the preferred alternative would have on greenhouse gas emissions and climate change. These are reasonably foreseeable impacts and they must be addressed by the BLM in its environmental documents.

Under NEPA, federal agencies are required to describe and disclose to the public and policymakers all potential environmental impacts of its activities. As our nation begins to work on regulating and reducing our greenhouse gas emissions to avoid dangerous anthropogenic climate change, it is imperative that federal agencies fully evaluate their projects' impacts on greenhouse gas emissions and climate change; alternatives to their proposed projects that would avoid these impacts; and mitigation measures that would help reduce projects' greenhouse gas emissions and protect sensitive ecosystems and species. This is especially true for energy projects, such as the proposed oil and gas lease sale at issue here, that continue to further and perpetuate the United States' dependency on dirty, greenhouse-gas emitting energy resources at a time our leaders are contemplating ways to reduce our dependency on such fuels and curb emissions of greenhouse gas pollutants. If ever there was a time to communicate to the public and its leaders the true costs of energy development on our public lands it is now. No longer may federal agencies turn a blind eye to a fact that is well-accepted scientifically and politically – that we will face devastating climate changes if we do not stop business as usual practices in the area of energy development and use and begin to drastically reduce greenhouse gas

emissions. Accordingly, the BLM may not rely on an EA that fails to adequately analyze and describe the potential greenhouse gases the project will emit and the eventual and well-understood impacts increases in such emissions will have on the nation's ecosystems and public health and infrastructure. This information is readily available, as detailed below, and the BLM must evaluate and reveal such information before approving energy projects on federal lands, including the lease sale at issue here.

This evaluation must be done at this stage in the process even though the lease itself does not necessarily create immediate surface disturbances. The fact that all leases may have special lease stipulations in order to protect endangered and sensitive species in the area and the fact that the BLM will conduct environmental review before approving development proposals and other surface-disturbing activities on the leased parcels does not relieve the BLM from conducting an accurate and complete environmental analysis of the direct, indirect and cumulative impacts this lease sale will have on wildlife, public lands, protected and sensitive species and climate change. A complete analysis is required at this stage in the leasing process because, as acknowledged in the EA, “[g]enerally, the BLM cannot deny a lessee the right to drill once a lease is issued unless the action is in direct conflict with another existing law.” (EA at 3). For this reason and because some amount of ground-level disturbance may still occur on the leased site before further site-specific environmental review is completed, the leasing stage is extremely critical as it represents an irretrievable and irreversible commitment of resources. The agency's reliance on outdated materials and cursory analysis of the proposed sale's likely impacts creates substantial doubt that future site-specific analyses will be any more adequate or informative than this one. Moreover, this is the agency's only chance to collectively analyze the combined impacts of development on all of the leases. Thus, a comprehensive analysis at this leasing stage is of the utmost importance. Piecemeal analysis of individual drilling applications in the future does not obviate the BLM's legal responsibility to conduct an accurate and complete analysis of impacts now.

### **Request for Relief**

Given this level of importance, and particularly due to the legal violations described in the attached Statement of Reasons that have occurred or will occur on the date of the sale of the parcels at issue here, the conservation groups filing this protest respectfully request that:

1. The BLM withdraw all parcels from the lease sale and suspend any decision to lease the proposed parcels until the agency has complied with federal law and considered all new information, changed circumstances and other relevant issues.
2. The BLM prepare a full Environmental Impact Statement (“EIS”) before approving parcels for competitive lease. A full EIS is required due to the impacts the project will have on the San Joaquin kit fox and other federal and state protected species, as well as its impacts to ACECs and air and water quality.
3. The BLM, in its EIS, fully analyze and reveal the greenhouse gases that will be emitted into the atmosphere as a result of the project, including those emissions resulting from combustion of the final product, and the foreseeable impacts an increase in these emissions will have on climate change.

## STATEMENT OF REASONS<sup>1</sup>

### I. The BLM Should Have Prepared a Full Environmental Impact Statement

The BLM only prepared an EA for this project. However, because the information in the EA indicates that the proposed lease sale *may* have significant impacts, the BLM is required to go one step further and prepare a full EIS. The Council on Environmental Quality's ("CEQ") regulations implementing NEPA make clear that federal agencies can avoid preparing an EIS only if the federal action will have "no significant impact" on the environment. 40 C.F.R. § 1501.4(e). And caselaw interpreting the regulations indicate that the agency should make this finding confidently and with certainty that no "substantial questions" exist as to whether or not "a project may have a significant effect." *See LaFlamme v. Fed. Energy Regulatory Comm'n*, 852 F.2d 389, 397 (9<sup>th</sup> Cir. 1988).

In determining whether or not the effects will be "significant," or whether or not substantial questions exist as to the significance of the effects, the agency must consider the context and intensity of the likely impacts.<sup>2</sup> Considering the EA's lack of information and detailed analysis, it is clear that the BLM did not adequately consider the context and intensity of the reasonably foreseeable impacts that will occur as a result of the lease sale. Before reaching any conclusion that the impacts will not be significant, the BLM must put its action into context and evaluate the intensity of the action and likely environmental effects.

Furthermore, because the EA tiers its analysis to the Caliente RMP's EIS, which the agency finalized in 1997 – an existing, outdated EIS that did not evaluate greenhouse gas emission and climate change – the BLM cannot rely on it to support its conclusion that substantial questions on whether this project may have significant environmental impacts do not exist. The BLM's NEPA Handbook states that "[a]ctions normally requiring an EIS . . . and other actions whose impacts are expected to be significant and which are not fully covered in an existing EIS must be analyzed in a new or supplemental EIS. An EIS should also be prepared if, after or during preparation of an EA, it is determined that the impacts of the proposed action are significant."<sup>3</sup> The state of the environment, including the status of protected species such as the kit fox, has changed greatly since 1997. The need to address climate change head on and to promptly begin reducing our greenhouse gas emissions has reached a state of urgency, yet the EA minimizes the reality of climate change and the impacts any increase in emissions of greenhouse pollutants will have on the environment, including species and their habitat. Similarly, it relies on an outdated programmatic biological opinion that does not consider fully the likely impacts the proposed lease sale and further oil and gas development will have on the endangered San Joaquin kit fox.<sup>4</sup>

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<sup>1</sup> The Center commented on the BLM EA evaluating the environmental impacts of the proposed lease sale. These comments are incorporated by reference and attached herein as Exhibit A.

<sup>2</sup> *See* 40 C.F.R. § 1508.27 (NEPA guidelines stating that "significantly" requires consideration of both context and intensity.)

<sup>3</sup> BLM, *NEPA Handbook* at pp. 1-2.

<sup>4</sup> In its January 12, 2009 comments on the EA at issue here, the Center detailed the inadequacy of the BLM's analysis in regard to the proposed actions adverse impacts on the kit fox. Additionally, conservation groups are filing a Notice of Intent to Sue ("NOI") pursuant to the Endangered Species Act ("ESA"), 16 U.S.C. § 1536, for the

Because this project will certainly result in significant impacts on the environment, and because the Caliente RMP's EIS does not evaluate these impacts, the BLM must complete an EIS fully analyzing these impacts.

#### A. The Effects of Leasing are Not Fully Covered in the RMP EIS

As mentioned above, the EA is tiered to the Caliente RMP/EIS, completed on May 5, 1997. It also states that any future development, production and other activities would be conducted as they had been described in the Caliente RMP. EA at 1. This does not satisfy BLM's duties under NEPA and definitely does not provide an adequate foundation for analysis in the EA. The Caliente RMP/EIS is outdated not simply because it is more than 12 years old but because it does not take into account relevant new information that is critically important to any environmental review. BLM cannot properly rely on the RMP and its EIS for an analysis of impacts it never considered such as greenhouse gas emissions.

The EA makes no attempt whatsoever to question the assumptions laid out in the 1997 RMP, when all manner of circumstances pertaining to oil and gas development, as well as the environment and status of the kit fox, were significantly different. These changes include, but are not limited to: changes in technology, changes in spacing patterns, changes in economics, changes in transportation facilities and other infrastructure, and changes in regulatory affairs that make it easier to drill for oil and increase supplies and demand.

Leasing on the scale of the proposed action is an irretrievable commitment of resources, which requires preparation of an EIS.<sup>5</sup> As recent court decisions have confirmed, if the impacts of oil and gas leasing and development have not been adequately considered in an RMP, the leasing cannot commence.<sup>6</sup> As detailed fully in previous sections, impacts of oil and gas leasing and development are different and better understood than they were in 1997. Holding the lease sale under an inadequate EA that tiers itself to an inadequate RMP/EIS that, among other concerns, does not consider global warming, climate change's current and projected impacts on the environment, and the changes in the kit fox habitat and population is a blatant violation of BLM's duties under NEPA.

Thus, the 1997 scenarios and assumptions are no longer accurate or reliable. Accordingly, the BLM must not only complete an EIS for this particular proposed oil and

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agency's violations over the statute's Section 7 consultation requirements. See 16 U.S.C. § 1536. These letters are attached hereto and are incorporated by reference. Further details on the EA's failure to consider the impacts this proposed lease sale, and future oil and gas leasing in the area, is considered in section II below explaining why the BLM's EA does not make the requisite hard look at the proposed action's likely environmental impacts.

<sup>5</sup> See *Pennaco Energy, Inc. v. U.S. Department of Interior*, 377 F.3d 1147, 1160 (10<sup>th</sup> Cir. 2004).

<sup>6</sup> See *id.* at 1156-60 (because RMP and related EIS did not analyze specific potential effects of coalbed methane, development was not properly authorized until these effects were fully evaluated); *Montana Wilderness Association v. Fry*, 310 F. Supp. 2d 1127 (D. Montana 2004) (RMP and related EIS did not consider impacts of leasing, so leases issued under the RMP were not validly issued.)

gas lease sale, but it must also amend or revise the Caliente RMP before holding any other lease sales on lands managed by the Caliente RMP. An amendment to an existing RMP is required if BLM needs to consider monitoring and evaluation findings, new data, new or revised policy, a change in circumstances or a proposed action that may result in a change in the scope of resource uses, or a change in the terms, conditions, and decisions of the approved plan.<sup>7</sup> As stated in BLM's Land Use Planning Handbook (Section VII.B), RMP amendments are prompted by the need to: "respond to new, intensified, or changed uses on public land" or "consider significant new information from resource assessments." Indeed, BLM itself has recognized the need for a plan revision and began the scoping process last year. The state of the climate crisis and its impacts on public lands, ecosystems and human health, as well continued and documented changes in kit fox habitat and populations are two changes that demand amendments to the Caliente RMP before any further commitment of resources takes place. Without such amendments, any further actions taken pursuant to this RMP would be arbitrary and capricious and in violation of federal environmental laws and BLM's own guidance documents.

B. The EA fails to adequately address greenhouse gas emissions and climate change

The BLM's failure to consider and calculate all greenhouse gas pollutants that will be emitted as a result of oil and gas development on these parcels taints every element of the environmental analysis in the EA. The Supreme Court recently acknowledged that "[t]he harms associated with climate change are serious and well recognized."<sup>8</sup> Likewise, the Interior Secretary, apparently in recognition that climate change presented a suite of problems for the management and protection of America's public lands, issued Secretary Order No. 3226, which specifically requires BLM to "consider and analyze potential climate change impacts" when undertaking long-range planning exercises, including specifically "management plans and activities developed for public lands."<sup>9</sup> Finally, NEPA, as interpreted by recent caselaw, also requires the BLM to consider greenhouse gas emissions and climate change, including how climate change has and will continue to impact the affected environment.

Without this information, the BLM cannot adequately describe the existing environment, nor can it properly analyze the proposed project's reasonably foreseeable direct, indirect and cumulative impacts. In other words, absent a complete analysis of the project's likely greenhouse gas emissions and the likely impacts these emissions will have on climate change, the BLM cannot demonstrate how its proposed action will have no significant impact on the environment. NEPA regulations require that when considering whether its proposed action may have a significant effect on the environment, an agency must analyze the impacts "in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. [. . .] Both short- and long-term effects are relevant."<sup>10</sup> The BLM must

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<sup>7</sup> 43 C.F.R. § 1610.5-5.

<sup>8</sup> *Massachusetts v. EPA*, 127 S. Ct. 1438, 1455 (2007).

<sup>9</sup> Interior Sec'y Order No. 3226.

<sup>10</sup> 40 CFR 1508.27(a).

complete a full EIS that puts the proposed lease sale into context by explaining the true nature of greenhouse gas emissions and climate change and by fully assessing the project's impacts within this environmental context.

Although the EA provides some discussion of impacts to global warming and climate change, it minimizes the project's true costs by simply dismissing its impacts as small in comparison to overall new oil and gas development. EA at 27. The EA claims that the impacts of the greenhouse gas emissions "generated by the predicted development of 20 wells over the next ten years is expected to be minimal." *Id.* It supports this assertion by pointing out that the "total number of producing oil and gas wells in [the district] has stayed relatively constant at approximately 45,000 because the number of new wells is largely offset by the abandonment of old wells." *Id.* As such, according to the BLM, the current leasing proposal represents less than .2 percent of the annual new well activity for the area and a much smaller fraction of existing well population. *Id.* Although this data is relevant to assessing the environmental impacts of the proposed sale, it improperly downplays the impacts the proposed project's impacts on global warming and climate change. It is well understood that continuing business as usual greenhouse gas emissions will have significant impacts on climate change, no matter how small these emissions might be in comparison to other projects or the oil and gas leasing program overall.

1. *The EA fails to adequately describe global warming as part of the environmental setting*

One prime example of inadequate context and information is the BLM's failure to adequately disclose pertinent information on greenhouse gas emissions, global warming, and their known net impacts on climate changes. Instead, the BLM provides much generalized information on how global warming is expected to impact Southern California and briefly explains California's efforts to reduce and control its greenhouse gas emissions. EA at 10, 39-40. The information provided by the BLM in this regard in no way complies with its NEPA duties.

First, the impacts to California are expected to be great and long-lasting. Rather than fully explain these predicted impacts so that the public can truly appreciate the nature of the preferred alternative and its impacts on the environment, the BLM provides a brief paragraph that quickly summarizes the problems California will likely encounter in the face of global warming, giving the impression that these impacts are minimal and of no import in how public lands should managed and developed. Climate change poses enormous risks to California. Scientific literature on the impact of greenhouse gas emissions on California is well developed.<sup>11</sup> The California Climate Change Center ("CCCC") has evaluated the present and future impacts of climate change to California and the project area in research sponsored by the California Energy Commission and the California Environmental Protection Agency.<sup>12</sup> The severity of the

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<sup>11</sup> Additional reports issued by California agencies are available at <http://www.climatechange.ca.gov>, and IPCC reports available at <http://www.ipcc.ch/>.

<sup>12</sup> Cayan, et al. 2007. Our Changing Climate: Assessing the Risks to California. California Climate Change Center. Available at: [http://www.climatechange.ca.gov/biennial\\_reports/2006report/index.html](http://www.climatechange.ca.gov/biennial_reports/2006report/index.html)

impacts facing California is directly tied to atmospheric concentrations of greenhouse gases.<sup>13</sup> According to the CCCC, aggressive action to cut greenhouse gas emissions today can limit impacts, such as loss of the Sierra snow pack to 30 percent while a business-as-usual approach could result in as much as a 90 percent loss of the snowpack by the end of the century. As aptly noted in a report commissioned by the California EPA:

Because most global warming emissions remain in the atmosphere for decades or centuries, the choices we make today will greatly influence the climate our children and grandchildren inherit. The quality of life they experience will depend on if and how rapidly California and the rest of the world reduce greenhouse gas emissions.<sup>14</sup>

Some of the types of impacts to California and estimated ranges of severity – in large part dependent on the extent to which emissions are reduced – are summarized as follows:

- A 30 to 90 percent reduction of the Sierra snowpack during the next 100 years, including earlier melting and runoff.
- An increase in water temperatures at least commensurate with the increase in air temperatures.
- A 6 to 30 inch rise in sea level, before increased melt rates from the dynamical properties of ice-sheet melting are taken into account.
- An increase in the intensity of storms, the amount of precipitation and the proportion of precipitation as rain versus snow.
- Profound impacts to ecosystem and species, including changes in the timing of life events, shifts in range, and community abundance shifts. Depending on the timing and interaction of these impacts, they can be catastrophic.
- A 200 to 400 percent increase in the number of heat wave days in major urban centers.
- An increase in the number of days meteorologically conducive to ozone (O<sub>3</sub>) formation.
- A 55 percent increase in the expected risk of wildfires<sup>15</sup>

By providing details as to the ranges of proposed impacts, and indicating that the higher-range of impact estimates are projected if greenhouse gas emissions continue to increase under a “business as usual” scenario, decision-makers and the public will be better informed of the magnitude of the climate crisis and the urgency with which it must be addressed.

Moreover, the brief description of California’s Global Warming Solutions Act is completely unhelpful, as it does not explain how the legislation would prevent the predicted global warming impacts from occurring or how this project would mesh with this Act such that its emissions of greenhouse gas pollutants would be mitigated, reduced, or insignificant.

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<sup>13</sup> *Id.*; Hayhoe, K., et al. 2004. *Emissions pathways, climate change, and impacts on California*. PNAS 101 no. 34:12422-12427.

<sup>14</sup> Our Changing Climate: Assessing the Risks to California. 2007.

<sup>15</sup> *Id.* at 15.

Furthermore, tiering the EA to the 1997 Caliente RMP's EIS is especially troubling in light of the rapid changes to ecosystems due to climate change and in the growth in scientists' understanding of greenhouse gas emissions and climate change since 1997. In the past 12 years, scientists' and the public's understanding of greenhouse gas emissions and their contribution to climate change has grown substantially. It is now widely accepted that the "warming of our climate system is unequivocal."<sup>16</sup> This warming is evidenced by the significant increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.<sup>17</sup> There is no longer any doubt about the role anthropogenic emissions in causing such changes.<sup>18</sup> The Environmental Protection Agency's ("EPA") recent decision document denying California's application for a Clean Air Act ("CAA") waiver for implementation of its Clean Vehicle Law concludes that greenhouse gas emissions contribute to global warming and are causing significant public harm.<sup>19</sup> As the agency documented in its decision, "[s]evere heat waves are projected to intensify in magnitude and duration over portions of the U.S. where these events already occur, with likely increases in mortality and morbidity, especially among the elderly, young, and frail."<sup>20</sup>

Likewise, in its Four Annual Assessment Report, the Intergovernmental Panel on Climate Change ("IPCC") found that there have been significant increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level.<sup>21</sup> Eleven of the past twelve years rank among the warmest in the instrumental record of global surface temperature, and it is likely that average temperatures in the Northern Hemisphere have been the highest in at least the past 1,300 years.<sup>22</sup> In sum, there is now a massive body of peer-reviewed literature on the science and impacts of global warming, demonstrating with scientific certainty the current harm to biodiversity and public health and welfare, and the certainty of far greater harm to come if GHG emissions are not rapidly and significantly reduced.<sup>23</sup>

#### i. Global Warming and Biodiversity

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<sup>16</sup> Advance Notice of Proposed Rulemaking, Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. 44354, 44396 (July 20, 2008).

<sup>17</sup> *See id.* at 44396.

<sup>18</sup> *See id.* at 44423 ("The additional heating effect of anthropogenic GHGs in the atmosphere enhances the earth's natural greenhouse effect and causes global temperatures to increase, with associated climactic changes (e.g., changes in precipitation patterns, rise in sea levels, and changes in the frequency and intensity of extreme weather events).").

<sup>19</sup> California State Motor Vehicle Pollution Control Standards; Notice of Decision Denying a Waiver of Clean Air Act Preemption for California's 2009 and Subsequent Model Year Greenhouse Gas Emission Standards for New Motor Vehicles, 73 Fed. Reg. 12156, 12163-69 (March 6, 2008).

<sup>20</sup> *Id.* at 12167.

<sup>21</sup> IPCC, *Summary for Policymakers* at 2 (2007).

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

<sup>23</sup> *See, e.g. Massachusetts v. EPA*, 127 S.Ct. 1438, 1462 (2007); Advance Notice of Proposed Rulemaking, Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. 44354 (July 20, 2008). (These sources both cite to and explain some of this literature.)

In regard to biodiversity, the evidence demonstrates that the climate crisis is one of the most significant threats to terrestrial and marine species from the tropics to the poles. In its Fourth Annual report, the IPCC recognizes this, finding that the resilience of several species is likely to be overcome this century by a dangerous brew of climate change, associated disturbances, such as flooding, drought, wildfire, insects and ocean acidification, and other environmental drivers like pollution and over-exploitation of resources.<sup>24</sup> Along with increases in global average temperatures beyond 1.5-2.5° C and accompanying increased levels of atmospheric carbon dioxide concentrations will come major changes in ecosystem structure and function, species' ecological interactions, and species' geographical ranges.<sup>25</sup>

Other scientific reports have reached the same conclusion as the IPCC that anthropogenic warming has had a recognizable influence on biological systems. In a study published in *Nature* in 2003, the authors reported a “globally coherent fingerprint of climate change impacts across natural systems.”<sup>26</sup> In documenting this “fingerprint” of global warming on ecosystems, scientists have predicted three categories of measurable impacts from recent warming: (1) earlier timing of spring events and later autumn events (i.e. changes in “phenology”), (2) extension of species' range poleward or upward in elevation, and (3) a decline in species adapted to cold temperatures and an increase in species adapted to warm temperatures.<sup>27</sup> And leading herpetologists believe that global warming has already resulted in the extinction of dozens of harlequin frog species.<sup>28</sup>

The Edith's checkerspot butterfly is one of the first species for which scientists documented a clear range shift due to global warming. The butterfly's range has moved both northward and upward in elevation in response to a 0.72° C increase in regional warming.<sup>29</sup> The range shift was not due to butterfly populations actually moving, but instead to a higher proportion of population extinctions in the southern and lowland portions of the range.<sup>30</sup> These population extinctions are the result of the fact that the species' host plant, *Plantago erecta*, now develops earlier in the spring, while the butterfly's caterpillars continue to hatch at the same time.<sup>31</sup> As a result, the caterpillars now hatch on plants that have already completed their lifecycle and dried up, instead of on younger edible plants.<sup>32</sup> The tiny checkerspot caterpillars are unable to move far enough to find other food and, as a result, starve to death.<sup>33</sup>

Another animal struggling under the heavy hand of climate change is the American pika. This small mammal, a relative of the rabbit, is adapted to life in talus piles on high, treeless

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<sup>24</sup> Bernstein et al. 2007. Synthesis Report in *Climate Change 2007: A Report of the Intergovernmental Panel on Climate Change*, available at <http://www.ipcc.ch>.

<sup>25</sup> *Id.*

<sup>26</sup> Parmesan, C. & G. Yohe. 2003. A globally coherent fingerprint of climate change impacts across natural systems. *Nature* 421: 37-42.

<sup>27</sup> Parmesan, C. & G. Hector. 2004. Observed Impacts of Global Climate Change in the U.S. Prepared for the Pew Center on Global Climate Change.

<sup>28</sup> Pounds, J.A. et al. 2006. Widespread amphibian extinctions from epidemic disease driven by global warming. *Nature* 439: 161-167.

<sup>29</sup> Parmesan, C. & G. Yohe 2003.

<sup>30</sup> *Id.*

<sup>31</sup> *Id.*

<sup>32</sup> *Id.*

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

mountain peaks. Fossil evidence demonstrates that pikas once ranged widely over North America, but their range has contracted to a dwindling number of isolated peaks during the warm periods of the last 12,000 years.<sup>34</sup> Pikas are limited by their metabolic adaptation to their cold habitat niche.<sup>35</sup> Hence, while more mobile alpine species such as birds may be able to shift their ranges poleward as warming temperatures and advancing treelines, competitors, and predators impact their mountain habitat, pikas are generally incapable of such long range dispersal.<sup>36</sup> Rather, they can only migrate upslope as the climate warms.<sup>37</sup> In large portions of its range, however, the American pika is already occupying the highest elevation talus habitats that exist on a given mountain range; in such cases there is no upslope habitat to migrate to, and the mountain's population will ultimately disappear as the climate continues to warm. Already, at least 9 of 25 (36%) of pika populations found in the Great Basin have been extirpated and the pika range has shifted upslope by 900 feet in this region. This small creature may well become one of global warming's first victims. In order to prevent this prediction from becoming a reality, the Center submitted to the Fish and Wildlife Service ("FWS") a petition to list the mammal pursuant to the ESA, 16 U.S.C. § 1531, et seq. On February 12, 2009, in response to a lawsuit filed by the Center, the FWS agreed to make the requisite 90-day finding that the petition may or may not be warranted pursuant to the ESA by May 1, 2009.<sup>38</sup> This may lead to eventual protection of the pika and its critical habitat, but the listing will have force and the pika will have a shot at continued survival only if greenhouse gas emissions are drastically reduced to address current climate change dilemmas and to prevent these dilemmas from worsening beyond repair in the future.

On May 15, 2008, the FWS recognized the impacts climate change was having and would continue to have on the Arctic ecosystem and one of its most spectacular species – the polar bear. On this date, in response to a petition and eventual lawsuit filed by the Center, the FWS listed the polar bear as a threatened species under the ESA.<sup>39</sup> Marine mammals, polar bears are completely dependent upon Arctic sea ice as their primary habitat for survival.<sup>40</sup> They need sea ice as a platform from which to hunt their primary prey of ice-dependent seals, to make seasonal migrations between the sea ice where they feed and their terrestrial denning areas, and to find mates.<sup>41</sup> Some polar bears even give birth to their cubs in snow dens and on top of the drifting ice.<sup>42</sup>

But, because of global warming, the polar bears' critical habitat is literally melting under them, threatening their continued existence.<sup>43</sup> Indeed, the Arctic has experienced the effects of

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<sup>34</sup> Krajick, K. 2004. All Downhill from Here? *Science* 303: 1600-1602.

<sup>35</sup> *Id.*

<sup>36</sup> *Id.*

<sup>37</sup> *Id.*

<sup>38</sup> 16 U.S.C. § 1533(b)(3)(A); Stipulated Settlement Agreement, *Center for Biological Diversity v. Salazar*, 2:08-cv-01936-FCD-JFM (E.D. Cal., February 12, 2009).

<sup>39</sup> Endangered and Threatened Wildlife and Plants, Determination of Threatened Status for the Polar Bear (*Ursus maritimus*) Throughout its Range, 73 Fed. Reg. 28212 (May 15, 2008)

<sup>40</sup> *Id.* at 28212, 28214, 28219, 28255.

<sup>41</sup> *Id.* at 28212, 28214, 28219, 28255.

<sup>42</sup> *Id.* at 28212, 28214, 28219, 28255.

<sup>43</sup> See generally *id.* (Explaining the FWS's decision to protect the polar bear as a threatened species and describing the wide-range of impacts polar bears have experienced and will continue to experience as a result of global warming.

global warming earlier and more intensely than any other area on the planet. Over the past 100 years, average Arctic temperatures increased at almost twice the global average rate.<sup>44</sup> Over the past three decades, portions of the Arctic have warmed at 10 times the world average.<sup>45</sup> Even using moderate projections of future greenhouse gas emissions levels, average temperatures in the Arctic are projected to increase an additional 9° F by the end of this century.<sup>46</sup> That average temperature increase masks even greater warming in the autumn and winter than in the summer.<sup>47</sup>

As a result of this warming, as well as changes in atmospheric and oceanic circulation patterns, Arctic sea ice is melting very rapidly.<sup>48</sup> In September 2007 the minimum Arctic sea-ice extent hit a new record minimum, fully one million square miles below the average minimum sea-ice extent between 1979 and 2000.<sup>49</sup> There was less ice in the Arctic in September 2007 than more than half of the world's leading climate models project for 2050.<sup>50</sup> The sea-ice extent is also declining in the winter, as is the age and thickness of the ice that remains.<sup>51</sup> Given these changes, it follows that the length of the sea ice melt season is increasing.<sup>52</sup> As described above, because polar bears are dependent upon sea ice for survival, the combined effects of these global warming consequences on individual bears' reproduction and survival translate into impacts on polar bear populations.<sup>53</sup>

Like the Arctic, the ocean ecosystem is also providing scientists deep and early insight into the adverse impacts of global warming on biodiversity. For example, the coral reef ecosystems have already begun suffering and declining due to global warming.<sup>54</sup> An estimated 30 percent of coral reefs globally are already severely degraded and 60 percent may be lost by 2030.<sup>55</sup> The primary cause of coral reef degradation on a global scale is bleaching, the expulsion of symbiotic algal zooxanthellae from coral, triggered, inter alia, by elevated sea temperatures.<sup>56</sup> The oceans absorb a large percentage of the extra heat in the climate system due to global warming, and since 1961 the average temperature of the global ocean has increased to depths of

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

<sup>45</sup> *Id.* at 28270.

<sup>46</sup> *Id.* at 28230.

<sup>47</sup> *Id.* at 28228.

<sup>48</sup> *Id.* at 28220-5.

<sup>49</sup> *Id.* at 28220-1.

<sup>50</sup> *Id.* at 28233.

<sup>51</sup> *Id.* at 28222.

<sup>52</sup> *Id.* at 28223.

<sup>53</sup> *See id.* at 28274-28275 (describing the decline of certain polar bear populations, increased instances of unusual polar bear deaths, such as drowning, and the likely mortality events that will occur in the future. ("As changes in habitat become more severe and seasonal rates of change are more rapid, catastrophic mortality events that have yet to be realized on a large scale are expected to occur." *Id.* at 28275).

<sup>54</sup> Hoegh-Guldberg, O. 1999. Climate Change, Coral Bleaching and the Future of the World's Coral Reefs. *Marine Freshwater Resource* 50: 839-866.

<sup>55</sup> Hughes, T.P. et al. 2003. Climate Change, Human Impacts, and the Resilience of Coral Reefs. *Science* 301: 929-933.

<sup>56</sup> Hoegh-Guldberg, O. 1999. Climate Change, Coral Bleaching and the Future of the World's Coral Reefs. *Marine Freshwater Resource* 50: 839-866.

at least 3,000 m in some areas.<sup>57</sup> This warming causes the coral to release algae, which attaches directly to the coral. This leaves the coral white, weakened and more susceptible to death.

In 1998, which at the time was the warmest year on record, bleaching occurred in every ocean, ultimately resulting in the death of 10-16 percent of the world's living coral.<sup>58</sup> In 2005, which eclipsed 1998 as the warmest year on record, a major bleaching event swept through the Caribbean, bleaching over 90 percent of live coral in some areas, ultimately resulting in the death of about 20 percent of living coral region-wide.<sup>59</sup> Before this unprecedented single-year die-off even began, the Caribbean contained the world's most degraded coral reefs, having already lost as much as 80 percent of live coral over the preceding 30 years.<sup>60</sup> Thus, it will not take many more episodes like the 2005 bleaching event before living coral reefs in the Caribbean disappear entirely.<sup>61</sup>

Two types of coral — the elkhorn coral (*Acropora palmata*) and staghorn coral (*Acropora cervicornis*) — have already begun to disappear. Because of bleaching caused by warmer waters, these coral have gone from being dominant species to being listed as “threatened” under the ESA.<sup>62</sup> For at least the past 3,000 years, these coral were the dominant reef-building corals in the Caribbean.<sup>63</sup> Virtually every reef from the Florida Keys, across the Caribbean to the Mesoamerican Reef in Belize, was largely comprised of one or the other (or both) of these formerly ubiquitous species.<sup>64</sup> Over the past 30 years, however, the two species have declined by upwards of 90 percent.<sup>65</sup> The primary drivers of the decline have been disease and temperature-induced bleaching.<sup>66</sup> In addition, the period of decline coincided with an ongoing period of increased hurricane activity, with intense storms destroying entire reef tracts in certain areas.<sup>67</sup> The cumulative result: by the beginning of the 21st Century, elkhorn and staghorn corals had been reduced to a scattering of mostly small colonies amidst a large sea of coral rubble.

While coral reefs are threatened by many additional factors, including pollution and direct destruction from dredging and other activities, climate change is an increasingly dominant

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<sup>57</sup> Alley et al. 2007. Summary for Policy Makers in *Climate Change 2007: Impacts, Adaptation and Vulnerability: Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. (M.L. Perry et al., eds., Cambridge University Press 2007).

<sup>58</sup> Hoegh-Guldberg, O. 1999. Climate Change, Coral Bleaching and the Future of the World's Coral Reefs. *Marine Freshwater Resource* 50: 839-866.

<sup>59</sup> Hansen J.M. et al. 2006. Global temperature change. *Proceedings of the National Academy of Sciences (PNAS)* doi: 10.1073/pnas.0606291103; Federal Response to the 2005 Caribbean Bleaching event, available at [http://coralreefwatch.noaa.gov/caribbean2005/docs/2005\\_bleaching\\_federal\\_response.pdf](http://coralreefwatch.noaa.gov/caribbean2005/docs/2005_bleaching_federal_response.pdf).

<sup>60</sup> Gardner T.A. et al. 2003. Long-term Region-wide Declines in Caribbean Corals. *Science* 301: 958.

<sup>61</sup> Hoegh-Guldberg. 2005. Marine Ecosystems and Climate Change, *Climate Change and Biodiversity*. [Lovejoy, T.E. & L. Hannah (eds.)].

<sup>62</sup> *Endangered and Threatened Species: Final Listing Determination for Elkhorn Coral and Staghorn Coral*, 71 Fed. Reg. 26852 (May 9, 2006).

<sup>63</sup> Hughes, T.P. 1994. Catastrophes, Phase Shifts and Large-Scale Degradation of a Caribbean Coral Reef. *Science*. 265: 1547-1551.

<sup>64</sup> *Id.*

<sup>65</sup> *Id.*

<sup>66</sup> *Id.*

<sup>67</sup> Precht, W. & A. Aronson. 2004. Climate Flickers and Range Shifts of Reef Corals. *Front. Ecol. Environ.* 2(6): 307-314.

threat. Clear evidence shows that the record-setting ocean temperatures of 1998 and 2005 that triggered widespread bleaching and mortality are the product of global warming.<sup>68</sup> And while the link between coral bleaching and global warming is relatively intuitive, even the outbreaks of coral disease that ravaged the elkhorn and staghorn coral species have been linked to elevated water temperatures.<sup>69</sup> Finally, scientific evidence indicates that global warming increases the chances of severe weather events like the series of intense hurricanes that have impacted Caribbean reefs in recent decades.<sup>70</sup>

Although bleaching caused by warming waters might be the most well-known effect of global warming on coral reefs, it is not the only impact changing the ocean ecosystem. At the same time oceans absorb the increased heat added to the climate from the burning of greenhouse gases, so, too, do they absorb the increased levels of the most important greenhouse gas – CO<sub>2</sub>. Increases in CO<sub>2</sub> concentrations enhances acidification of the ocean, which only adds to the global warming-induced changes already threatening the survival of coral and other important marine species.<sup>71</sup>

Acidification is a natural result of the ocean's carbonate buffer system. Carbon dioxide absorbed by seawater reacts to form carbonic acid. Carbonic acid then dissociates to form bicarbonate, releasing hydrogen ions in the process. The hydrogen ions then bond with carbonate ions to form even more bicarbonate. This reaction, in turn, reduces the amount of carbonate ions in the oceans' waters and decreases the pH. Reduction in carbonate is an important concern because many organisms depend on it to form their shells and skeletons. Thus, as CO<sub>2</sub> enters the oceans' waters, there is a profound impact on the entire marine ecosystem, for ocean acidification severely affects many calcifying species like coral and phytoplankton that play a crucial role in supporting marine life.

A letter signed by the top 25 marine scientists who study ocean acidification emphasized that the decrease in pH resulting from un-checked CO<sub>2</sub> emissions will cause devastating and irreversible impacts on human time scales.<sup>72</sup> The authors predicted that without immediate carbon dioxide emissions reductions, pH will decrease by more than 0.2 units by mid-century.<sup>73</sup> And they're not alone in their predictions. The IPCC estimates that over the 21st century, the ocean's pH level could decrease to as much as 0.35 units.<sup>74</sup>

Already, the oceans have taken up about 50 percent of the CO<sub>2</sub> produced by humans since the industrial revolution, lowering the average ocean pH by 0.11 units.<sup>75</sup> Currently, the

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<sup>68</sup> Hansen J. et al. 2006. Global temperature change. *Proceedings of the National Academy of Sciences (PNAS)* doi:10.1073/pnas.0606291103; Alley et al. 2007.

<sup>69</sup> Harvell C.D. et al. 2002. Climate Warming and Disease Risks for Terrestrial and Marine Biota. *Science* 296: 2158-2162.

<sup>70</sup> Santer, B.D. 2006. Forced and Unforced Ocean Temperature Changes in Atlantic and Pacific Tropical Cyclogenesis Regions. *Proceedings of the National Academy of Sciences (PNAS)* doi:10.1073/pnas.0602861103; see also Alley et al. 2007.

<sup>71</sup> Alley et al. 2007.

<sup>72</sup> Calderia, K. et al. 2007. Comment on "Modern-age buildup of CO<sub>2</sub> and its effects on seawater acidity and salinity" by Hugo A. Loáiciga, *Geophysical Research Letters* 34: L18608.

<sup>73</sup> *Id.*

<sup>74</sup> Alley et al. 2007.

<sup>75</sup> Sabine C.L. et al. 2004. The Oceanic Sink for Anthropogenic CO<sub>2</sub>. *Science* 305: 367-371; Alley et al. 2007.

ocean takes up approximately 22 million tons of CO<sub>2</sub> each day.<sup>76</sup> While preindustrial levels of atmospheric CO<sub>2</sub> hovered around 280 ppm, they have now increased to over 380 ppm; if current trends continue, they will increase another 50 percent by 2030.<sup>77</sup> These rising CO<sub>2</sub> levels will take time to reverse even after implementing corrective measures, and, over time, the ocean will absorb up to 90 percent of this CO<sub>2</sub>, greatly affecting the oceans' pH level.<sup>78</sup>

This foretells a stark future for marine life. Due to acidification, within our lifetimes, coral reefs may erode faster than they can rebuild.<sup>79</sup> Corals are extremely vulnerable to ocean acidification and scientists studying acidification predict that coral reefs will decline in density and diversity unless CO<sub>2</sub> emissions are stabilized at present levels.<sup>80</sup> Under conservative models of future CO<sub>2</sub> emissions, most of the world's coral reefs, already bleaching in the warmer waters, will erode to rubble by the end of the century.<sup>81</sup> Corals provide vital functions for marine ecosystems, and their loss will likely bring grave impacts to the oceans and the species that inhabit them.

Ocean acidification also impacts calcifying plankton species at the base of the marine food chain. Like coral, plankton also play a vital role in the marine ecosystem. These organisms contribute much of the organic material entering the marine food chain and are responsible for about 50 percent of the earth's primary production.<sup>82</sup> Carbon dioxide uptake by the ocean causes impaired growth and development for calcifying plankton, and acidification dissolves the protective armor of some plankton, limiting their ability to survive. Thus, as the ocean absorbs more CO<sub>2</sub> and pH levels continue to decrease, the marine environment is expected to undergo profound changes due to impacts at many different levels in the food chain.

The BLM made no efforts to describe this environment and global warming as the context in which the oil and gas leasing project occurs. This information is necessary to enable the agency, Congress and the American public to completely understand the true costs of oil and gas development on public lands. Tiering to the 1997 Caliente RMP EIS hardly makes up for this lack of scientific detail regarding greenhouse gas emissions and climate change. As detailed above, the state of the science and the environment does not look the same as it did in 1997, and, as explained further below, the need to take all necessary steps to lower greenhouse gas emissions and avoid dangerous anthropogenic climate change has reached a state of urgency arguably unforeseeable in 1997. Times have changed; these impacts are foreseeable; and vast scientific studies (widely-accepted scientific studies) exist so that the BLM and all federal agencies can analyze the foreseeable impacts of greenhouse gas emissions and climate change.

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<sup>76</sup> Feely, R.A. et al. 2006. Carbon Dioxide and Our Ocean Legacy (2006).

<sup>77</sup> Orr J.C. et al. 2005. Anthropogenic ocean acidification over the twenty-first century and its impacts on calcifying organisms. *Nature* 437: 681-686.

<sup>78</sup> Kleypas J.A. et al. 2006. Impacts of Ocean Acidification on Coral Reefs and Other Marine Calcifiers: A Guide for Future Research, available at <http://www.ucar.edu/news/releases/2006/report.html.s>

<sup>79</sup> Feely et al. 2006.

<sup>80</sup> Hoegh-Guldberg O. et al. 2007. Coral Reefs Under Rapid Climate Change and Ocean Acidification. *Science* 318: 1737-1742.

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

<sup>82</sup> Royal Society. 2005. Ocean Acidification Due to Increasing Atmospheric Carbon Dioxide, available at [www.royalsoc.ac.uk](http://www.royalsoc.ac.uk).

ii. Global warming and human health

In its Advanced Notice of Proposed Rulemaking, Regulating Greenhouse Gas Emissions under the CAA, the EPA explicitly acknowledged that climate change resulting from elevated greenhouse gas levels would result in human health risks such as heat-related mortality, exacerbated air quality, aggravated risks for respiratory infection, aggravation of asthma, and potential premature death for people in susceptible groups.<sup>83</sup> In addition, the EPA has published or cited favorably to multiple documents evaluating the harms associated with the climate crisis and by highlighting many of these impacts.<sup>84</sup> The EPA's recent decision document denying California's application for a waiver under § 209(b) of the CAA, while legally flawed, explicitly used the word "harm" when discussing continued GHG emissions.<sup>85</sup>

The international community has also studied and voiced concern over greenhouse gas emissions' threat to public health. The World Health Organization has estimated that as of the year 2000, 154,000 deaths and the loss of 5.5 million daily adjusted life years per year worldwide were already attributable to global warming.<sup>86</sup> These figures have clearly mounted over the past eight years and will continue to grow if business as usual practices continue. Moreover, the IPCC, a conservative synthesis of the most reliable scientific knowledge available about climate change, leaves no question that the emissions of greenhouse gases and the resulting changes to Earth's climate are endangering the public health and welfare.<sup>87</sup>

iii. Global warming and the economy

The changes brought about by abrupt climate change will bring enormous economic costs along with the environmental impacts. A recent study by Weitzman, an economics professor at Harvard, indicates that while traditional cost-benefit analysis cannot properly capture the costs of climate change, including tipping points, a different analysis is more likely to capture the costs.<sup>88</sup> In addition, the much-respected Stern Review, published in 2007, estimates that the costs of climate change will range from 5% to 20% of GDP.<sup>89</sup> In contrast, the Stern Review estimated that rapid action to address climate change would only cost approximately 1% of GDP.<sup>90</sup> In 2007, this would have corresponded to approximately \$318 billion, while the cost of inaction – abrupt climate

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<sup>83</sup> 73 Fed. Reg. 44354, 44426-44427 (July 20, 2008).

<sup>84</sup> ANPR, 73 Fed. Reg. 44,426-27.

<sup>85</sup> 73 Fed. Reg. 12,156-01 (Mar. 6, 2008).

<sup>86</sup> World Health Organization, 2002. The World Health Report 2002. Available at <http://www.who.int/whr/2002/en/index.html>.

<sup>87</sup> See IPCC, 2007: Summary for Policymakers. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Solomon, S., et. al, eds.). Cambridge University Press, Cambridge UK and New York, NY, USA.

<sup>88</sup> Weitzman E.L. 2007. *On Modeling and Interpreting the Economics of Catastrophic Climate Change*. Harvard University mimeo.

<sup>89</sup> Stern N. 2007. *Stern Review: The Economics of Climate Change* (Cambridge University Press).

<sup>90</sup> *Id.*

change – has been estimated at over \$400 billion.<sup>91</sup> The message is clear: the U.S. cannot afford to gamble with abrupt climate change.

## 2. *The EA does not adequately address climate tipping points*

Another example of inadequate context and information is the lack of analysis of abrupt climate change, or tipping points. The CEQ regulations require that an agency “evaluate reasonably foreseeable significant environmental effects on the human environment,” even where information relevant to making this evaluation is “incomplete or unavailable.”<sup>92</sup> If this is the case, the agency must clearly show that the information is “lacking” by providing what credible scientific information it does have on these reasonably foreseeable impacts and making an effort to analyze these impacts based on this information.<sup>93</sup> What information the agency must provide depends upon the costs of obtaining the information.<sup>94</sup>

For example, the agency must include “information relevant to reasonably foreseeable adverse impacts,” even if it is “incomplete,” if it is “essential to a reasoned choice among alternatives and the overall costs of obtaining it aren’t exorbitant.”<sup>95</sup> Even where the costs are exorbitant, or the means of obtaining the information are unknown, the agency must still provide information on reasonably foreseeable adverse impacts. This information includes:

“(1) A statement that such information is incomplete or unavailable; (2) a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment; (3) a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment, and (4) the agency’s evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community.”<sup>96</sup>

Under this section, reasonably foreseeable “includes impacts which have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason.”<sup>97</sup>

The EA neglects to mention any information on tipping points and the dangerous impacts of abrupt climate change. By failing to include this information, one can only conclude that the BLM believed the information to be “incomplete or unavailable.” As such, the EA clearly violates the above-described NEPA regulation.

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<sup>91</sup> Binschadler R. 2008. Why Predicting West Antarctic Ice Sheet Behaviors is so Hard: What We Know, What We Don’t Know, and What We Will Find Out in *Sudden and Disruptive Climate Change* (M.C. MacCracken et al., eds.).

<sup>92</sup> 40 CFR 1502.22.

<sup>93</sup> *Id.*

<sup>94</sup> *See id.*

<sup>95</sup> *Id.* at § 1502.22(a).

<sup>96</sup> *Id.* at § 1502.22(b).

<sup>97</sup> *Id.*

To begin, it is well accepted that there will be tipping points, and ample evidence demonstrating that unchecked greenhouse gas emissions will result in abrupt climate change.<sup>98</sup> In fact, various studies have attempted to quantify when such a threshold may be reached. The most recent estimate by Hansen and colleagues is that prolonged time spent over 350 ppm CO<sub>2</sub> will result in catastrophic impacts.<sup>99</sup> The present global mean of CO<sub>2</sub> is 385 ppm, already putting us in the “dangerous zone” for experiencing such impacts.<sup>100</sup> Hansen and his colleagues used “paleoclimate data to show that long-term climate has high sensitivity to climate forcings,” making the 385 ppm number alarming.<sup>101</sup> They concluded:

If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, 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, but likely less than that. The largest uncertainty in the target arises from possible changes of non-CO<sub>2</sub> forcings. An initial 350 ppm CO<sub>2</sub> target may be achievable by phasing out coal use except where CO<sub>2</sub> is captured and adopting agricultural and forestry practices that sequester carbon. If the present overshoot of this target CO<sub>2</sub> is not brief, there is a possibility of seeding irreversible catastrophic effects.<sup>102</sup>

Due to the slow response time for the full effects of anthropogenic greenhouse gas emissions to be manifested in the climate system, “[w]arming ‘in the pipeline’, mostly attributable to slow feedbacks, is now about 2°C. No additional forcing is required to raise global temperature to at least the level of the Pliocene, 2-3 million years ago, a degree of warming that would surely yield ‘dangerous’ climate impacts.”<sup>103</sup>

Hansen et al. (2008) define several concepts: “(1) the *tipping level*, the global climate forcing that, if long maintained, gives rise to a specific consequence, and (2) the *point of no return*, a climate state beyond which the consequence is inevitable, even if climate forcings are reduced. A point of no return can be avoided, even if the tipping level is temporarily exceeded. Ocean and ice sheet inertia permit overshoot, provided the climate forcing is returned below the tipping level before initiating irreversible dynamic change.”<sup>104</sup>

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<sup>98</sup> See Meehl M.L. et al. 2007. Global Climate Projections in *Climate Change 2007: The Physical Science Basis: Contribution of Working Group I to the Fourth Assessment Report of the IPCC*. (S. Solomon et al., eds., Cambridge Press).s

<sup>99</sup> Hansen J. et al. 2008. Target Atmospheric CO<sub>2</sub>: Where Should Humanity Aim? *The Open Atmospheric Science Journal* 2: 217-231. (Previous estimates considered 450 ppm the threshold for catastrophic climate change.)

<sup>100</sup> *Id.*

<sup>101</sup> *Id.* at 218.

<sup>102</sup> *Id.* at 217. As discussed further below, because climate forcing from anthropogenic non-CO<sub>2</sub> greenhouse emissions are approximately offset by cooling affect of anthropogenic aerosol emissions, Hansen et al. (2008) consider future CO<sub>2</sub> change as approximating the net human-made forcing change, with several caveats.

<sup>103</sup> *Id.* at 225 (internal citation omitted.)

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

However, reducing atmospheric CO<sub>2</sub> concentrations to 350 ppm would not be enough to stabilize Arctic sea ice and save imperiled species such as the polar bear and the entire Arctic web of life:

Stabilization of Arctic sea ice cover requires, to first approximation, restoration of planetary energy balance. Climate models driven by known forcings yield a present planetary energy imbalance of +0.5-1 W/m<sup>2</sup>. Observed heat increase in the upper 700 m of the ocean confirms the planetary energy imbalance, but observations of the entire ocean are needed for quantification. CO<sub>2</sub> amount must be reduced to 325-355 ppm to increase outgoing flux 0.5-1 W/m<sup>2</sup>, if other forcings are unchanged. A further imbalance reduction, and thus CO<sub>2</sub> ~300-325 ppm, may be needed to restore sea ice to its area of 25 years ago.<sup>105</sup>

Atmospheric CO<sub>2</sub> concentrations must be reduced quickly: “Indeed, if the world continues on a business-as-usual path for even another decade . . . prospects for avoiding a dangerously large, extended overshoot of the 350 ppm level will be dim.”<sup>106</sup> Yet, as Hansen et al. (2008) note, the “[r]ealization that we must reduce the current CO<sub>2</sub> amount has a bright side: effects that had begun to seem inevitable, including impacts of ocean acidification, loss of fresh water supplies, and shifting of climatic zones, may be averted by the necessity of finding an energy course beyond fossil fuels sooner than would otherwise have occurred.”<sup>107</sup>

Ultimately, these authors conclude

[w]ith simultaneous policies to reduce non-CO<sub>2</sub> greenhouse gases, it appears still feasible to avert catastrophic climate change. [. . .] We must begin to move now toward the era beyond fossil fuels. Continued growth of greenhouse gas emissions, for just another decade, practically eliminates the possibility of near-term return of atmospheric composition beneath the tipping level for catastrophic effects. [. . .] The stakes, for all life on the planet, surpass those of any previous crisis. The greatest danger is continued ignorance and denial, which could make tragic consequences unavoidable.<sup>108</sup>

The best basis for determining tipping points may be the use of paleoclimate data. Based on such data, Hansen and colleagues have estimated that remaining at CO<sub>2</sub> concentrations above 350 for a prolonged period of time is likely to invoke tipping points.<sup>109</sup> Paleoclimate data also indicate that in the past, at temperatures expected to be reached by 2100, Greenland and Antarctica contributed several meters to sea level.<sup>110</sup>

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<sup>105</sup> *Id.* at 226 (internal citations omitted) .

<sup>106</sup> *Id.* at 227.

<sup>107</sup> *Id.* at 228.

<sup>108</sup> *Id.* at 229.

<sup>109</sup> Hansen et al. 2008.

<sup>110</sup> Overpeck J. et al. 2006. Paleoclimatic Evidence for Future Ice-Sheet Instability and Rapid Sea-Level Rise. *Science* 311: 1747.

The rate of rise at this temperature was approximately 1.6m/century.<sup>111</sup> Thus, the current CO<sub>2</sub> level of 385 ppm is not only “dangerous,” but catastrophic and could lead to tipping points this century. Reaching any single tipping point can bring severe economic and ecological consequences.

But perhaps more worrisome is the linkage between tipping points such that reaching one tipping point may in turn trigger a second. An example is the connection between Arctic sea ice and permafrost melt rates. Permafrost refers to permanently frozen land; this surface stores large amounts of carbon. As permafrost thaws under the heat of global warming, it releases carbon, often as methane.<sup>112</sup> Methane has a global warming potential that is approximately 25 times greater than that of carbon dioxide over 100 years. The release of methane as permafrost thaws creates a positive feedback loop that may result in a climate tipping point.<sup>113</sup> Recent evidence indicates that the loss of Arctic sea ice, one tipping point, accelerates permafrost thaw, a second tipping point. The multiplicative effect of reaching several tipping points on a similar time scale would drastically increase the costs associated with climate change.

While no one may be able to predict with certainty on exactly which date a threshold for abrupt climate change may be reached, as described above, there is ample evidence that unchecked greenhouse emissions will result in abrupt climate change. Ample evidence also exists showing that among the many consequences of climate change, “tipping points” carry the greatest threat to wildlife, human welfare, and economic security. Thus, abrupt climate change is a reasonably foreseeable adverse impact, as defined under the NEPA regulations described above, of continuing our fossil fuel consumption which this oil and gas lease sale is designed to facilitate. Moreover, given the nature and science of tipping points, the BLM’s conclusion that the “level of greenhouse gas associated with the proposed action . . . is not expected to detectably influence climate change” is erroneous. EA at 28. Any increase in emission levels, which will certainly be a result of this project, may have a “detectably influence on climate change,” bringing us ever closer to the tipping point.

The costs of obtaining and explaining this information as part of the environmental setting in which the BLM is making its decision is, obviously, not

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<sup>111</sup> Rohling E.J. et al. 2008. High Rates of Sea-level Rise during the Last Interglacial Period, *Nature Geoscience* 1:38.

<sup>112</sup> Christensen T.R. et al. 2004. Thawing Sub-Arctic Permafrost: Effects on Vegetation and Methane Emissions, *Geophys. Res. Letters* 31: L04501; In our comments submitted on January 12, 2009 on the EA for the proposed lease sale at issue here, the Center also discussed scientific evidence on black carbon, a short-lived pollutant that contributes to global and regional warming and present particularly troublesome problems for the Arctic. These comments are not repeated here, but are attached hereto and are incorporated by reference. See Comments from Center for Biological Diversity on Environmental Assessment for Oil & Gas Competitive Leasing Certain Parcels within the Bakersfield Field Office March 11, 2009 at 10-11. EA No. CA-160-09-001. (Submitted January 12, 2009).

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

exorbitant. Even if it were, the BLM failed to meet the standards of 40 CFR § 1502.22(b), explained earlier. As summarized above, credible scientific evidence exists on the chances and likely impacts of abrupt climate change. As such, the BLM must provide this information and consider it in its alternatives analysis.

C. Leasing the Parcels Will Have a Cumulatively Significant Impact on the Environment

NEPA requires consideration of whether the action is related to other actions with individually insignificant but cumulatively significant impacts in determining the intensity of the action's impact.<sup>114</sup> Under NEPA, the BLM is required to analyze all environmental impacts of the proposed action, including direct, indirect and cumulative effects.<sup>115</sup> Direct effects are those effects actually caused by the proposed action, indirect effects "are caused by the action and are later in time or farther removed in distance, *but are still reasonably foreseeable*," connected effects "are interdependent parts of a larger action and depend on the larger action for their justification," and a cumulative effect "is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."<sup>116</sup>

In the context of oil and gas leasing on federal lands, courts have interpreted these provisions of NEPA to require a "comprehensive" analysis of the "successive, interdependent steps culminating in oil and gas development and production," including the "effects of oil and gas activities beyond the lease sale phase."<sup>117</sup> NEPA demands that such analysis not only be comprehensive, but also detailed and quantified. Accordingly, an agency "must . . . include a 'useful analysis of the cumulative impacts of past, present and future projects.'"<sup>118</sup> An agency cannot merely mention the likelihood of future oil and gas operations. An assessment of cumulative effects must include a "useful analysis," including "discussion and an analysis in sufficient detail" to assist the agency in its decision-making process and its efforts to avoid environmental impacts.<sup>119</sup> Finally, the agency must also consider the degree to which the proposed action may establish a

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<sup>114</sup> 40 C.F.R. § 1508.8 (effects include ecological, aesthetic, historical, cultural, economic, social or health impacts, whether direct, indirect, or cumulative).

<sup>115</sup> 42 U.S.C. §4332(C)(i); 40 C.F.R. § 1508.25.

<sup>116</sup> *See generally* 40 C.F.R. § 1508.

<sup>117</sup> *Connor v. Buford*, 848 F.2d 1441, 1444-45 (9<sup>th</sup> Cir. 1988).

<sup>118</sup> *Churchill County v. Norton*, 276 F.3d 1060, 1080 (9<sup>th</sup> Cir. 2001)(citing *Muckleshoot Indian Tribe v. U.S. Forest Service*, 177 F.3d 800, 809-10 (9<sup>th</sup> Cir. 1999).

<sup>119</sup> *Id.*

precedent for future actions with significant effects or represents a decision in principle about a future consideration in evaluating the intensity of the action's impact.<sup>120</sup>

The EA assessing the environmental impacts of the proposed lease sale fails miserably to rise to the standards of analysis required by NEPA and its implementing regulations. While the EA does include some general information on other activities in this area and the general proximity of other oilfields, it fails to provide adequate information on the preferred alternative's impacts when considered in light of past, present and future activities taking place in the area. The BLM must adequately consider and provide to the public this information. Such analysis should include, among others, oil and gas operations both surrounding public and private lands as well as to other development related impacts and impacts from the local use of rodenticides which are impacting many species in the area including the San Joaquin kit fox and its prey species. Moreover, the analysis must also include the cumulative impacts of the greenhouse gas emissions, as well as the subsequent impacts on climate change that are reasonably foreseeable as results from the combustion of the oil and gas produced as a result of this action.

The EA mentions, practically in passing, that the "amount of greenhouse gases (CH<sub>4</sub> and CO<sub>2</sub>) generated by the predicted development of 20 wells over the next ten years is expected to be minimal." EA at 27. By separating this proposed lease sale from all oil and gas activities going on in the San Joaquin Valley, as well as from likely future oil and gas activities to occur as part of the oil and gas leasing program overall (and as permitted under the Caliente RMP currently governing the lands at issue), the BLM improperly portends that the activities likely to result from the proposed lease sale will function in a vacuum. That is, the BLM fails too appreciate that the proposed action will be reacting in conjunction with present and future (federal or non-federal) actions likely to take place in the region. As a result, the BLM's analysis of the preferred alternative's foreseeable impacts on global warming and climate change is faulty from the very start.

To begin, the BLM's analysis looks only at the likely greenhouse gas emissions from the wells that would result from this specific lease sale. *See* EA at 27. While it compares the preferred alternative's foreseeable activities to oil and gas activities taking place overall in the San Joaquin Valley, District 4, it does not consider the greenhouse gas emissions resulting from *all* activity currently taking place, nor does it mention the emissions that will result from foreseeable future lease sales and future oil and gas activities in the region. Moreover, the agency does not provide sufficient data explaining how it made its assumptions and accompanying determinations and, where it did attempt to quantify, it only did so for CH<sub>4</sub> emissions.<sup>121</sup>

The EA's assertion that the impacts of the preferred alternative's greenhouse gas emissions are "expected to be minimal," is based on the "fact" that "new wells are largely offset by the abandonment of old wells." EA at 26. As a result, according to the EA, the "total number

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<sup>120</sup> 40 CFR § 1508.27(b)(6).

<sup>121</sup> The EA only considers emissions of CO<sub>2</sub> and CH<sub>4</sub> in general. As alluded to in our earlier discussion, the BLM must also consider impacts from all greenhouse pollutants, including black carbon.

of producing oil and gas wells in District 4 has stayed relatively constant at approximately 45,000.” *Id.* The voluntary abandonment of “old wells” is in no way mitigation for the impacts of new well development, and the EA provides no evidence or analysis to even justify this assertion. Just because the number of producing wells may have remained constant, does not mean that this will always hold true. Nor does it mean that old wells would be abandoned at the same rate and time period as when the new wells that will result from this sale and future sales are complete and start producing. Thus, there could be a significant increase in the amount of greenhouse gas emissions resulting from oil and gas production in this area. Furthermore, even if the BLM could show that old wells would be abandoned at the same rate as new wells are developed, it would still not mitigate the impacts of this proposed lease sale because greenhouse gases persist and accumulate in the atmosphere. It is not just the rate at which greenhouse gases are produced that is at issue but the total accumulated load in the atmosphere.

Moreover, the leasing program in the area is large overall, with a lot of activity already taking place and more expected to come. California is the fourth largest oil producer, and home to the highest producing onshore federal lease.<sup>122</sup> Most of the state’s oil and gas production occurs in the San Joaquin Valley on lands managed by the BLM’s Bakersfield Office.<sup>123</sup> The highest producing onshore lease in the “lower 48 states” is in Kern County.<sup>124</sup> As of 2005, the BLM’s Bakersfield Office’s oil and gas program included over 473 active leases on over 260,000 acres.<sup>125</sup> The EA implies that the impacts of well development from this proposed lease sale are minimal because there is so much well development occurring in the area. In 2007, according to the EA, approximately “1,500 new oil and gas wells were drilled in San Joaquin Valley, District 4 . . . The current leasing proposal represents less than 0.2 percent of the annual new well activity for the area and a much smaller fraction of the existing well population.” EA at 26-27. Rather than imply that new wells are not significant, as the EA asserts, the BLM’s reasoning indicates just the opposite – that the impacts from the development from the wells is a cumulative and significant impact. This is especially true when one considers the fact that the “San Joaquin Valley is expected to continue as the primary source of oil in California’s oil and gas development.” EA at 18.

In addition to misrepresenting the true impact of additional oil and gas development activities, the BLM goes on to confidently misstate its duties under NEPA, asserting that “[e]nvironmental impacts of greenhouse gas emissions from oil and gas consumption are not effects of the proposed action as defined by the [CEQ], and thus are not required to be analyzed under NEPA.” EA at 28. It goes on to explain that “[g]reenhouse gas emissions from consumption of oil and gas are not direct effects under NEPA because oil and gas leasing and production would not be a proximate cause of greenhouse gas emissions resulting from consumption.” *Id.* Emissions from combustion of the end product are also not an indirect effect of the proposed action, according to the BLM, because “oil and gas leasing and production would not be a proximate cause of greenhouse gas emission resulting from consumption.” *Id.*

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<sup>122</sup> See [http://www.blm.gov/ca/st/en/fo/bakersfield/Programs/Minerals/bkfo\\_minerals.html](http://www.blm.gov/ca/st/en/fo/bakersfield/Programs/Minerals/bkfo_minerals.html) (last accessed February 22, 2009).

<sup>123</sup> See <http://www.blm.gov/ca/st/en/prog/energy/og.html> (last accessed February 22, 2009).

<sup>124</sup> *Id.*

<sup>125</sup> BLM 2005 California Oil and Gas statistics, [http://www.blm.gov/ca/st/en/fo/bakersfield/Programs/Minerals/bkfo\\_minerals.html](http://www.blm.gov/ca/st/en/fo/bakersfield/Programs/Minerals/bkfo_minerals.html) (last accessed February 22, 2009).

Since emissions from consumption are neither direct or indirect effects, the BLM continues, “a cumulative impact analysis would not reveal an incremental effect attributable to this proposed leasing decision.” *Id.*

If the BLM’s reasoning won the day, it would be hard to imagine many scenarios where an individual project’s cumulative impacts on greenhouse gas emissions and climate change would need to be addressed. As defined by NEPA’s implementing regulations, a cumulative impact can “result from individually minor but collectively significant actions taking place over a period of time.”<sup>126</sup> It is precisely such individually small impacts that are identified here that, taken together, have caused the impacts to climate change we are now facing globally. When added to past, present and future oil and gas activities in the region and nationwide, this project presents significant impacts. Moreover, oil and gas leasing and production activities are certainly a proximate cause of greenhouse gas emissions released into the atmosphere as a result of consumption. Otherwise, the oil and gas leasing program would serve no purpose, and oil and gas companies would not be bidding for rights to develop on thousands upon thousands of acres of public lands. The oil and gas leasing program, and the desire to explore and produce oil and gas exists only because the companies intend that the product will be consumed in one form or another by consumers to fuel their cars, homes and businesses. As such, activities related to oil and gas leasing and development are causes of and necessary for consumption, which leads to the emission of greenhouse gas pollutants into the atmosphere.

The Ninth Circuit has recently come to the exact opposite conclusion as that reached by the BLM. In *Center for Biological Diversity v. NHTSA*, the court found that the cumulative impacts analysis carried particular importance: “[t]he impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct.”<sup>127</sup> The Court faulted the agency’s cumulative impacts analysis for failing to “discuss the *actual* environmental effects resulting from those emissions or place those emissions in context of . . . other rulemakings.”<sup>128</sup> Importantly, the court pointed out that “the fact climate changes are largely a global phenomenon that includes actions that are outside the agency’s control . . . does not release the agency from assessing the effects of its actions.”<sup>129</sup> The court expressed particular concern with regard to the non-linear aspect of “irreversible adverse climate change” or “tipping points” wherein a seemingly small change in emissions can evoke a dramatic climate response.<sup>130</sup> This indicates that increases perceived as small cannot be immediately disregarded as insignificant. Accordingly, the BLM must consider the cumulative impacts of its action, including the cumulative impacts the project’s greenhouse gas emissions and greenhouse gases resulting from consumption of the end product as a result of the preferred alternative will have in an EIS.

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<sup>126</sup> 40 C.F.R. § 1508.7.

<sup>127</sup> *Center for Biological Diversity v. NHTSA*, 508 F.3d 508, 550 (9<sup>th</sup> Cir. 2007).

<sup>128</sup> *Id.* at 549.

<sup>129</sup> *Id.* at 550 (internal quotations removed).

<sup>130</sup> *Id.* at 554.

D. The BLM Must Adequately Consider the Cumulative Impacts of Climate Change on Biodiversity

As detailed above, global warming and climate change have already begun transforming the earth's ecosystems and pushing species into extinction. These and other impacts may be irreversible if greenhouse gas emissions continue to grow. Although the BLM attempts to describe the cumulative impacts of climate change on biodiversity, it fails to fully appreciate its effects, therefore, understating the project's reasonably foreseeable environmental impacts.

In the EA, the BLM acts as if the changing landscape in Southern California will not have profound effects on the species living there and, perhaps, push some plants and animals into extinction. *See* EA at 39. They assume that since "San Joaquin Valley animal species have evolved under desert conditions they may be better able to persist in a more arid climate than other species." *Id.* Yet, they provide no evidence to back up this assumption.

Furthermore, the agency concludes that "[s]o long as future drought periods do not exceed the time period that source animals can persist, the San Joaquin Valley suite of species is expected to persist." *Id.* at 40. The BLM should have analyzed exactly what would happen to species if drought does persist, which is likely the case under climate change.<sup>131</sup>

Conservation groups have demonstrated the evidence on the current and likely future effects on species because of climate change. The BLM cannot assume that species will manage to adapt or that water supplies will magically rebound from drought to avoid their NEPA duties and inform the public and decision-makers of all the likely effects of its preferred alternative.

E. Leasing the Parcels will Establish a Precedent for Future Actions Like Exploration and Drilling with Significant Effects and Represent a Decision in Principle about a Future Consideration

The BLM must also consider the degree to which the proposed action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration in evaluating the intensity of the action's impact.<sup>132</sup> Leasing a parcel of land is the first step in the oil and gas exploration and development process on federal lands. Once a lease is issued, the lessee has contractual rights and the BLM does not have the right to deny an application for permit to drill.<sup>133</sup> Clearly, leasing these parcels will establish a precedent for future actions like exploration and drilling, with potentially significant effects. Making these lands available for oil and gas exploration and drilling also represents a decision in principle about future consideration, committing the country to continued oil and gas development,

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<sup>131</sup> *See* Barnett T.P. et al. Human-Induced Changes in the Hydrology of the Western United States, *Science* doi: 10.1126/science.1152538. Based on observations showing that the hydrological cycle of the western U.S. has changed significantly over the last half of the twentieth century. *Id.* Barnett, et al., presented a regional, multivariable climate-change detection and attribution study, focusing on the changes that have already affected this primarily arid region with a large and growing population. The results show up to 60 percent of the climate-related trends of river flow, winter air temperature, and snow pack between 1950 and 1999 are human-related. They portend, in conjunction with previous work, a coming crisis in water supply for the Western United States.

<sup>132</sup> 40 C.F.R. § 1508.27(b)(6).

<sup>133</sup> *See* 43 C.F.R. § 3101.1-2.

consumption of dirty fossil fuels and the increase of greenhouse gas emissions in the earth's atmosphere. Therefore, an EIS is warranted in this case.

#### F. The Environmental Effects of Leasing the Parcels are Controversial

The EA fails to consider the degree to which the proposed action's environmental effects are likely to be highly controversial.<sup>134</sup> The controversy surrounding BLM's proposed lease sale should come as no surprise. Oil and gas drilling on parcels that contain habitat for threatened and endangered plants and animals and which are located in air quality non-attainment basins has been opposed in the past. Additionally, there is increasing controversy and public opposition to oil and gas drilling on public lands throughout the West and to continued fossil fuel use and increases in greenhouse gas pollutants. This opposition is not just coming from environmentalists, but Congress, federal agencies, and Executive Branch offices, as well. The Obama Administration, as well as Congressional leaders, have made clear of their intent to move America to a new type of energy development, focused on renewables, technologies that reduce environmental impacts, and reducing demand.<sup>135</sup>

Despite these fatal flaws and obvious information gaps, the BLM quickly reaches the conclusion that the "level of greenhouse gas associated with the proposed action (possible 20 wells) is not expected to detectably influence climate change. *Id.* at 28. This conclusion is unsound and unsubstantiated, especially when considered in light of the findings and conclusions above. By not providing the current scientific evidence on greenhouse gas emissions, global warming and climate change, as required by NEPA, the EA provides no context by which the reader can understand the relevant environmental problems associated with global warming and climate change and how the proposed lease sale will contribute to this environmental problem now and into the future. Thus, the BLM misrepresents how significant the project's impacts will be by failing to appreciate the substantial harm that will result if greenhouse gases continue to rise unabated. Therefore, the BLM must put the lease sale, and the oil and gas leasing program overall, in context by providing information that adequately characterizes global warming as part of the current environmental setting in a new or supplemental EIS and must adequately consider the proposed project's direct, indirect and cumulative impacts on greenhouse gas emissions and climate change.

#### G. Leasing the Parcels May Adversely Affect the San Joaquin Kit Fox<sup>136</sup>

The San Joaquin kit fox was listed as a Federally Endangered species in 1967 and as a threatened species in California in 1971.<sup>137</sup> The EA's analysis of impacts to the San Joaquin kit fox is also wholly inadequate. Every parcel of land in the proposed lease area is kit fox habitat whose historical habitat has been heavily fragmented and significantly degraded. EA at 33. The

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<sup>134</sup> 40 C.F.R. § 1508.27(b)(4).

<sup>135</sup> See, e.g., Broder, John. *E.P.A. Expected to Regulate Carbon Dioxide and Other Greenhouse Gases*, New York Times (Feb. 19, 2009); Kay, J. *Seasoned California Voice in White House*, San Francisco Chronicle (Feb. 17, 2009); Eilperin, J. *Democrats Pen Principles for Climate-Change Bills; Senate Panel Sets Goal of Creating Cap-and-Trade System* (Feb. 4, 2009); Tankersley, J. *Obama still plans to cut emissions*, The Nation at pg. 11 (Jan. 25, 2009).

<sup>136</sup> Conservation Groups have filed a Notice of Intent to Sue for violations of the ESA in regard to the kit fox along with this protest. That letter is attached herein and incorporated by reference.

<sup>137</sup> Cypher et al. 2000.

BLM's Oil & Gas Management Guidelines (at Appendix C) state that surface disturbing activities should not be allowed under any limited surface use stipulations where the proposed action is likely to jeopardize a listed species or is inconsistent with the recovery needs of a listed species. EA at 63 Appx. C. Because these lease sales may contribute to the continued decline of the San Joaquin kit fox and thereby are inconsistent with its recovery needs, and in addition there is evidence that this and other recent project proposals may jeopardize this species, BLM should not authorize any surface disturbance in San Joaquin kit fox habitat at this time.

BLM's reliance on an out-dated programmatic biological opinion (EA at 31) is unsupported in the face of new information regarding the kit fox and its likely status into the near future under current management.<sup>138</sup> In this recent study, McDonald-Madden *et al.* found that if current management continues for the San Joaquin kit fox it may be extinct within 24 years. Given this new information, the activities that have been authorized by BLM in the past must be reevaluated and BLM must re-consult with the U.S. Fish and Wildlife Service ("FWS") regarding the impacts to the San Joaquin kit fox from all projects that may affect the species in this area that have already been approved including the oil and gas leasing program. It is clear that the oil and gas leasing and the associated activities are among the actions that are pushing this species to the brink of extinction. BLM cannot continue to rely on the programmatic biological opinion or any other biological opinion to continue its current management for this species on BLM lands and to approve additional impacts to the species. BLM's failure to ensure through consultation that its actions are not jeopardizing the San Joaquin kit fox and its failure to re-consult with FWS violates the Endangered Species Act. BLM's failure to adequately disclose and address likely effects of the proposed action on the species and others also violates NEPA.

Much of the remaining kit fox habitat is fragmented and riddled with competition from livestock and oil drilling.<sup>139</sup> The total kit fox population is also highly fragmented into three large populations and ten smaller subpopulations, equaling a very limited genetic exchange capacity.<sup>140</sup> This in turn makes the kit fox more susceptible to "genetic bottlenecks."<sup>141</sup> Because of the sensitive nature of the remaining kit fox population due to extreme habitat fragmentation, it is becoming increasingly important to preserve what little connected habitat the kit fox has left. The BLM has a special responsibility to delve further into the impacts on the San Joaquin kit fox given that the proposed project includes areas that provide habitat for some of the few remaining kit fox populations.<sup>142</sup>

The EA mentions that kit foxes (among other species) have been seen frequently crossing roads, making them susceptible to vehicle strikes causing death or injury, but fails to take into account the effect of such vehicles strikes on their overall population, and fails to mention any mitigation tactics that could be taken. *See* EA at 33-34.

The EA also mentions the kit fox's susceptibility as prey to coyotes. Elsewhere in the EA, it is briefly mentioned that increased road construction and other human activity can create

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<sup>138</sup> McDonald-Madden. 2008.

<sup>139</sup> Cypher et al. 2002.

<sup>140</sup> *Id.*

<sup>141</sup> *Id.*

<sup>142</sup> *Id.*

predator corridors that enable greater hunting abilities, thus causing a potential decrease in certain types of prey-species. However, the EA fails to take into account that this may be true for the kit fox as well, and does not discuss a prospective number of coyote attacks that could result, having a negative impact on overall kit fox numbers. Kit foxes also feed on various rodents, including kangaroo rats, another species identified in the proposed leasing area. Therefore, a comprehensive analysis of the leasing proposal on the kit fox should examine impacts on its food supply.<sup>143</sup>

The EA also mentions that kit foxes are “frequently observed near oil field facilities” but do not discuss how this may harm the kit fox. For instance, this may lead to kit foxes rummaging through trash and subsequent increases in their human dependency. A sample of kit fox scat found items such as aluminum foil, plastic wrap, paper, and plastic flagging.<sup>144</sup> At least four kit foxes have drowned in pools of oil while two more have died after becoming stuck in a plugged pipe, and two more after being trapped in an oil well cellar.<sup>145</sup> As noted in the EA, two fox pups were also found trapped in a well cellar but were released unharmed. At the former Naval Petroleum Reserves in California, evidence of exposure to toxic chemicals such as arsenic was detected among some kit foxes.<sup>146</sup>

The EA also notes the danger of dens being crushed by heavy equipment. Although the EA notes that this can also cause the kit fox to be crushed or trapped inside its den, and that “[d]ens are ecologically important to kit foxes,” the EA does not analyze how likely this is to occur, or what the effects are expected to be on the kit fox population in the region. While the EA mentions that destruction of dens can be “minimized” due to survey and avoidance measures, it does not discuss how effective such measures will be, and thus, we cannot determine what the overall impact on this species is. The EA also fails to discuss any mandatory buffer sites around known kit fox dens.

There has been no recent status review for the San Joaquin kit fox, which is necessary to evaluate the likely impacts the preferred alternative will have on the species considering the changed circumstances. Moreover, the Center has been informed by U.S. Fish and Wildlife Service that the 5-year review noticed to the public in 2006 and currently being prepared will not be finalized for at least another year. From discussions with FWS it also appears that BLM as well as other State and Federal agencies have failed to provide adequate survey and monitoring information for this species to ensure that the impacts of various past and ongoing projects have remained within the limits of the impacts expected when the projects were approved. As a result the populations of San Joaquin kit fox have been declining precipitously; it appears clear that BLM and other land managers as well as FWS have failed in their duties to ensure against jeopardy for this species.

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<sup>143</sup> *Id.*

<sup>144</sup> *Id.*

<sup>145</sup> *Id.*

<sup>146</sup> *Id.*

## II. The EA Fails to Take the Requisite “Hard Look” at Environmental Impacts<sup>147</sup>

As we pointed out during the comment period, the majority of the EA consists of general information including parcel listings, lease stipulations and information on listed species existing within the all the parcels, including the endangered San Joaquin kit fox. It identifies some environmental impacts and potential risks of adverse impacts, but fails to include an analysis of the nature and extent of the resulting impacts. This is insufficient for purposes of NEPA.<sup>148</sup> While the EA identifies some risks, it provide little to no discussion of the extent, likelihood, or cumulative impact of such risks. The EA mentions some potential impacts but does not discuss the likelihood of such occurrences, the effects of such occurrences on the kit fox population or other species, nor any serious discussion of strategies to avoid such incidents. This failure to provide adequate analysis is a violation of NEPA.<sup>149</sup>

Moreover, the EA provides little more than conclusory statements regarding identified impacts to the San Joaquin kit fox and other species, the ACECs, and wetlands and riparian resources and air quality. This is inadequate to met NEPA standards: “[c]onclusory statements which do not refer to scientific or objective data supporting them do not satisfy NEPA's requirement for a ‘detailed statement.’”<sup>150</sup> To comply with NEPA, the EA should have also disclosed “any responsible opposing view” in the analysis.<sup>151</sup> Here, the EA provides absolutely no disclosure of opposing views, despite a plethora of data demonstrating the harsh effects of oil and gas extraction activity on species including the San Joaquin kit fox, as well as information on greenhouse gas emissions and global warming.

Rather than provide details about the nature, extent and likelihood of potential environmental impacts, the BLM simply points the reader to the Caliente RMP governing management of the lands at issue for details on descriptions of typical oil and gas activities. See EA at 18. In sum, the BLM provides the public scant information, points readers to another source for further generalized details unspecific to the parcels up for grabs in the proposed lease sale, and reaches conclusions about environmental impacts without providing adequate evidence

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<sup>147</sup> The Center submitted comments on the EA on January 12, 2009 in which explains why the BLM’s analysis in the EA does not rise to the level of taking a “hard look.” To the extent those concerns are not repeated here, they are attached hereto and incorporated by reference.

<sup>148</sup> See *Defenders of Wildlife v. Babbitt*, 130 F. Supp. 2d 121, 128 (D. D.C. 2001) (setting aside agency’s EIS where it “states that noise would be increased and both the pronghorn and their habitat would be disturbed” but contains “no analysis of what the nature and extent of the[se] impacts will be;” see also *Nat’l Parks & Conservation Assoc. v. Babbitt*, 241 F.3d 722, 743 (9<sup>th</sup> Cir. 2001) (NEPA document inadequate where it identified “an environmental impact” but “did not establish the intensity of that impact.”).

<sup>149</sup> See *Defenders of Wildlife*, 130 F. Supp. 2d at 121.

<sup>150</sup> *Citizens Against Toxic Sprays, Inc. v. Bergland*, 428 F. Supp. 908, 922 (D. Or. 1977).

<sup>151</sup> 40 C.F.R. § 1502.9(b); See also *Center for Biological Diversity v. United States Forest Service*, 349 F.3d 1157 (9<sup>th</sup> Cir. 2003) (holding that an agency’s failure to disclose opposing scientific opinion violates NEPA); *Seattle Audubon Society v. Moseley*, 798 F.Supp. 1473, 1482 (W.D. Wash. 1992) (NEPA requires that an agency candidly disclose in its EIS the risk of its proposed action, and that it respond to the adverse opinions held by respected scientists.”) See also, *Blue Mountain Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1214 (9<sup>th</sup> Cir. 1998) (holding an environmental analysis inadequate when “virtually no reference to any material in support of or in opposition to its conclusions.”)

or explanation. In the end, one would be hard-pressed to conclude that the BLM followed its duty to take a “hard look” at the environmental consequences of its proposed action.

A. The EA Relies on a Faulty Reasonable Foreseeable Development Scenario the Misrepresents the True Nature of the Proposed Action

In the EA, the BLM relies on a Reasonable Foreseeable Development (RFD) scenario setting out the agency’s analysis on how development would likely proceed once the leases are issued. The RFD scenario lies at the foundation of the BLM’s analysis. The BLM uses the RFD scenario to project the amount of future development, the amount of projected surface disturbance, and the extent of environmental damage caused by future exploration and development. The EA relies primarily on the RFD to estimate the extent of impacts on wildlife, water quality, and other areas as well. Using historical data on oil and gas development in the area, the BLM establishes several assumptions that guide its analysis of impacts throughout the EA. Because these assumptions are questionable and largely unsubstantiated or inadequately explained, they impair the BLM’s assessment of the reasonably foreseeable direct, indirect, and cumulative impacts on endangered and sensitive species, critical habitat, air quality, water resources, wildlife and ACECs. As such, they cannot be relied upon to support the analysis in the EA and the BLM’s finding that this proposed lease sale will not have a significant impact on the environment.

Under this RFD, the BLM claims that the leasing will result in only 32 acres of permanent surface disturbance, 20 acres of temporary disturbance, and 30 acres of transient impacts, for a total of 82 acres. EA at 28. Frankly, it is difficult for the conservation groups to comprehend how the proposed action (leasing nearly 4,400 acres of land) will result in the permanent disturbance of less than 0.1% of these lands. The BLM failed to provide citations for any of the assumptions it used to arrive at this amount. It failed to establish how it reached its numbers presented in Table 2 (EA at 20), or how it determined that only a total number of 20 well would be built on these parcels over a 10-year period. *See* EA at 19. All the reader knows is that the BLM asserts that the historical records show that this would be the case, yet the BLM cites to no records or provides no evidence by which the reader can evaluate the BLM’s assumptions.

For example, the EA states that “95-97% of the wells projected to be drilled during the next ten years will be development wells (as opposed to exploratory wells)” and that “95+% of the development wells will be successful.” EA at 20. Where did the BLM get these numbers from? How many wells per pad does this assume, and why? The BLM must disclose the source of these figures, and provide the assumptions used to derive them. It did neither in the EA.

Nor does the updated RFD in the EA include any citations to credible sources, or any other references, to explain how the BLM arrived at the calculations. The EA merely states that the information is “based on data for the past 10 years,” cites only to “[d]ata from the California Department of Conservation, Division of Oil and Gas,” and claims that the BLM estimates are “[b]ased on historical records and proximity of leases to existing fields,” again without summarizing these historical records or providing any context. The EA RFD also contains numerous unsubstantiated assumptions, such as “present economic and political conditions,” the percentage of exploratory vs. development wells, the well success rate, and that the amount of

newly disturbed land is being offset. *See* EA at 18-20. The EA must disclose more information about the assumptions and data the BLM relied upon in calculating its RFD.

In addition, the agency's RFD scenario fails to account for the much larger acreage that will be impacted by roads and other infrastructure needed to explore and develop the parcels at issue. Whatever the surface disturbance acreage truly is, it surely will not be confined to a single neatly defined sacrifice area. Instead, roads, pipelines, power lines, and well pads will be dispersed over large tracts of the project area, fragmenting wildlife habitat and disturbing vegetative communities. The BLM's limited view of what constitutes "surface disturbance" severely underestimates the true extent of disturbance to surface resources.

The BLM added additional language to its final EA, suggesting that any new surface disturbance will be "offset by rehabilitation of land associated with wells being abandoned." EA at 21. As explained above, this assumption is misguided. Abandoning a well in one part of the district does not mitigate for new surface disturbance in another part of the district possibly hundreds of miles away, nor does it mitigate for new surface disturbance in new, undeveloped areas. The BLM's explanation also assumes that abandonment will continue to occur at the same rate and that abandonment and remediation is always successful, yet it provides no historical or scientific data whereby the public and decision-makers can evaluate the BLM's assumption for consistency and adequacy.

#### B. The BLM Fails to Adequately Analyze the Cumulative Air Quality Impacts

Although the BLM does provide some analysis of likely air emissions of air pollutants regulated by the EPA and provides an explanation as to how it reached its calculations, it inappropriately assumes that because its calculations show a "de minimis" increase in criteria pollutants, then it does not need to demonstrate that its action will not result in violations of federal, state or local laws protecting air quality. *See* EA at 26. But, because the BLM completely ignored the cumulative impacts aspects of the proposed project's air pollutant emissions, its conclusion that emissions from the preferred alternative would constitute less than 10 percent of regional emissions, and therefore be excluded from the Clean Air Act's ("CAA") conformity requirement, is unsound. The San Joaquin Valley is currently in nonattainment for several criteria pollutants and it is imperative that any federal action resulting in air emissions in the region ensure that it adequately evaluates its likely emissions so that it may determine whether its proposed project will continue to impair the region's air quality, threatening residents' health and welfare.

To begin, the BLM's air emission statistics are based only on emissions from oil and gas production, rather than on all development activities that will go into producing oil and gas on these lands. According to BLM "[o]il and gas production is defined as any source used in the production of oil and gas, including but not limited to wells, pumps, tanks, roads, maintenance traffic, heaters and steam generators." EA at 24. As a basis for determining what percentage the proposed action's emissions will be in comparison to overall emissions in the area, the BLM relied on "Estimated Statewide Annual Emissions from Oil and Gas Production, 2006" from the California Air Resources Board (CARB). These emissions are for wells alone. *Id.* Thus, they do not take into account emissions from the other sources described above. Likewise, they don't

include emissions from activities related to exploration, abandonment, and other activities, such as “seismic exploration/diesel drill rig engines and drill pad construction equipment” – activities the BLM acknowledges rely on combustion sources that produce fugitive emissions. *Id.* Furthermore, the BLM acknowledges that “[o]ther emission sources will occur during the operation and maintenance of these leases,” including “oil facilities, gas facilities, operator vehicle traffic, and gas powered oil well pumping units.” Emissions from these sources and related activities must be assessed, quantified and revealed in order to understand the true impacts this project will have on air emissions in this area.

The BLM concludes that the “expected emissions from the proposed action would be low both in relation to the overall activity in the area, and by itself.” EA at 23. However, the BLM ignores the cumulative impacts. That is, it fails to assess the proposed project’s air emissions when considered in light of past, present and future actions likely to take place. The BLM acknowledges that the region experiences a great deal of emissions already from “hundreds of thousands of automobiles and trucks, and significant other industrial and agricultural sources.” EA at 26. Furthermore, it fails to consider the project’s likely impacts on air pollution when considered in conjunction with current oil and gas activities occurring in the region, as well as the reasonably foreseeable oil and gas activities that are going to continue to occur in the region. *See* EA at 18. Because the BLM’s analysis lacks important considerations, fails to consider impacts from all sources related to development of the leases and blatantly ignores the project’s cumulative impacts, its conclusion that its preferred alternative impacts on air quality will be “de minimis” is based on faulty information and, therefore, cannot stand. *See* at 26.

Under the implementing regulations for NEPA, BLM must analyze, among other things, whether the alternatives will meet federal and state air quality standards.<sup>152</sup> Moreover, the action cannot cause or contribute to any new violation of the National Ambient Air Quality Standards (“NAAQS”) or delay timely attainment of any standard or any required interim emission reduction or other milestones.<sup>153</sup> BLM asserts that because the air quality impacts of its preferred alternative are de minimis and less than 10 percent of regional emissions it can ignore the CAA’s requirement that federal agency’s demonstrate conformity with section 176(c) of the Clean Air Act (CAA), as amended, 42 U.S.C. 7401 *et seq.*, and regulations under 40 C.F.R. part 93, subpart w, which states that “no department, agency or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve any activity which does not conform to an applicable implementation plan.” In order to comply with the CAA’s federal conformity provision, BLM must have ensured that the proposed plan conformed to the applicable state implementation plan (“SIP”) before the approving the plan. BLM failed to do this in the EA, given its lack of information and the fact that the information it did provide failed to consider all emissions, direct, indirect and cumulative, that would result from its preferred alternative.

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<sup>152</sup> *See* 40 C.F.R. §1508.27 (10) (requiring that the preparing agency evaluate “[w]hether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment”).

<sup>153</sup> 40 C.F.R. Part 93.

## Conclusion

For the reasons set forth above, conservation groups requests that BLM prepare an EIS that complies with NEPA. Furthermore, the BLM cannot continue to rely tier its environmental analyses to an outdated RMP/EIS and Programmatic BiOp that do not evaluate the true affected environment. Thus, the BLM must amend its RMP to account for climate change and its impacts on biodiversity and the region, as well as update and amend its Programmatic BiOp for the kit fox, which has experienced continuous changes in its habitat because of increased development and which has steadily declined since the completion of the current BiOp relied upon by the BLM. Accordingly, conservation groups urge the BLM to withdraw all of these parcels from the proposed lease sale until it has prepared adequate environment review or choose the No Action alternative discussed in the EA.

Sincerely,

A handwritten signature in black ink that reads "Melissa Thrailkill". The signature is written in a cursive style with a large initial "M".

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## References Cited

Alley et al. 2007. Summary for Policy Makers in *Climate Change 2007: Impacts, Adaptation and Vulnerability: Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. (M.L. Perry et al., eds., Cambridge University Press 2007).

Barnett T.P. et al. Human-Induced Changes in the Hydrology of the Western United States, *Science* doi: 10.1126/science.1152538.

Bernstein et al. 2007. Synthesis Report in *Climate Change 2007: A Report of the Intergovernmental Panel on Climate Change*, available at <http://www.ipcc.ch>.

Binschadler R. 2008. Why Predicting West Antarctic Ice Sheet Behaviors is so Hard: What We Know, What We Don't Know, and What We Will Find Out in *Sudden and Disruptive Climate Change* (M.C. MacCracken et al., eds.).

Bureau of Land Management (BLM), California Oil and Gas Program, <http://www.blm.gov/ca/st/en/prog/energy/og.html> (last accessed February 24, 2009).

BLM, Bakersfield Office Oil and Gas Operations, available at [http://www.blm.gov/ca/st/en/fo/bakersfield/Programs/Minerals/bkfo\\_minerals.html](http://www.blm.gov/ca/st/en/fo/bakersfield/Programs/Minerals/bkfo_minerals.html) (last accessed February 24, 2009).

BLM. California Oil and Gas statistics, [http://www.blm.gov/ca/st/en/fo/bakersfield/Programs/Minerals/bkfo\\_minerals.html](http://www.blm.gov/ca/st/en/fo/bakersfield/Programs/Minerals/bkfo_minerals.html) (last accessed February 24, 2009).

Broder, John, *E.P.A. Expected to Regulate Carbon Dioxide and Other Greenhouse Gases*, New York Times, Feb. 19, 2008.

Calderia, K. et al. 2007. Comment on "Modern-age buildup of CO<sub>2</sub> and its effects on seawater acidity and salinity" by Hugo A. Loáiciga, *Geophysical Research Letters* 34: L18608.

California Climate Change Center. 2006. Our Changing Climate: Assessing the Risks to California. California Climate Change Center.

Cypher et al. 2000.

Christensen T.R. et al. 2004. Thawing Sub-Arctic Permafrost: Effects on Vegetation and Methane Emissions, *Geophys. Res. Letters* 31: L04501.

Department of Commerce. Endangered and Threatened Species: Final Listing Determination for Elkhorn Coral and Staghorn Coral, 71 Fed. Reg. 26852 (May 9, 2006).

Department of the Interior. Endangered and Threatened Wildlife and Plants, Determination of Threatened Status for the Polar Bear (*Ursus maritimus*) Throughout its Range, 73 Fed. Reg. 28212 (May 15, 2008).

Department of Interior. 2008. Sec'y Order No. 3226.

Eilperin, J. *Democrats Pen Principles for Climate-Change Bills; Senate Panel Sets Goal of Creating Cap-and-Trade System*, Washington Post, Feb. 4, 2009.

Environmental Protection Agency (EPA). Advance Notice of Proposed Rulemaking, Regulating Greenhouse Gas Emissions Under the Clean Air Act, 73 Fed. Reg. 44354, 44396 (July 20, 2008).

EPA. California State Motor Vehicle Pollution Control Standards; Notice of Decision Denying a Waiver of Clean Air Act Preemption for California's 2009 and Subsequent Model Year Greenhouse Gas Emission Standards for New Motor Vehicles, 73 Fed. Reg. 12156, 12163-69 (March 6, 2008).

Feely, R.A. et al. 2006. Carbon Dioxide and Our Ocean Legacy (2006).

Gardner T.A. et al. 2003. Long-term Region-wide Declines in Caribbean Corals. *Science* 301: 958.

Hansen J. et al. 2006. Global temperature change. *Proceedings of the National Academy of Sciences (PNAS)* doi:10.1073/pnas.0606291103.

Hansen J. et al. 2008. Target Atmospheric CO<sub>2</sub>: Where Should Humanity Aim? *The Open Atmospheric Science Journal* 2: 217-231.

Harvell C.D. et al. 2002. Climate Warming and Disease Risks for Terrestrial and Marine Biota. *Science* 296: 2158-2162.

Hayhoe, K., et al. 2004. *Emissions pathways, climate change, and impacts on California*. *PNAS* 101 no. 34:12422-12427.

- Hoegh-Guldberg, O. 1999. Climate Change, Coral Bleaching and the Future of the World's Coral Reefs. *Marine Freshwater Resource* 50: 839-866.
- Hoegh-Guldberg. 2005. Marine Ecosystems and Climate Change, *Climate Change and Biodiversity*. [Lovejoy, T.E. & L. Hannah (eds.)].
- Hoegh-Guldberg O. et al. 2007. Coral Reefs under Rapid Climate Change and Ocean Acidification. *Science* 318: 1737-1742.
- Hughes, T.P. 1994. Catastrophes, Phase Shifts and Large-Scale Degradation of a Caribbean Coral Reef. *Science*. 265: 1547-1551.
- Hughes, T.P. et al. 2003. Climate Change, Human Impacts, and the Resilience of Coral Reefs. *Science* 301: 929-933.
- IPCC, 2007: Summary for Policymakers. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Solomon, S., et. al, eds.). Cambridge University Press, Cambridge UK and New York, NY, USA, available at <http://www.ipcc.ch/>.
- Kay, J, *Seasoned California Voice in White House*, San Francisco Chronicle, Feb. 17, 2009.
- Kleypas J.A. et al. 2006. Impacts of Ocean Acidification on Coral Reefs and Other Marine Calcifiers: A Guide for Future Research, available at <http://www.ucar.edu/news/releases/2006/report.html>.
- Krajick, K. 2004. All Downhill from Here? *Science* 303: 1600-1602.
- Meehl M.L. et al. 2007. Global Climate Projections in *Climate Change 2007: The Physical Science Basis: Contribution of Working Group I to the Fourth Assessment Report of the IPCC*. (S. Solomon et al., eds., Cambridge Press).
- Orr J.C. et al. 2005. Anthropogenic ocean acidification over the twenty-first century and its impacts on calcifying organisms. *Nature* 437: 681-686.
- Overpeck J. et al. 2006. Paleoclimatic Evidence for Future Ice-Sheet Instability and Rapid Sea-Level Rise. *Science* 311: 1747.
- Parmesan, C. & G. Yohe. 2003. A globally coherent fingerprint of climate change impacts across natural systems. *Nature* 421: 37-42.
- Parmesan, C. & G. Hector. 2004. Observed Impacts of Global Climate Change in the U.S. Prepared for the Pew Center on Global Climate Change.
- Pounds, J.A. et al. 2006. Widespread amphibian extinctions from epidemic disease driven by global warming. *Nature* 439: 161-167.

- Precht, W. & A. Aronson. 2004. Climate Flickers and Range Shifts of Reef Corals. *Front. Ecol. Environ.* 2(6): 307-314.
- Rohling E.J. et al. 2008. High Rates of Sea-level Rise during the Last Interglacial Period, *Nature Geoscience* 1:38.
- Royal Society. 2005. Ocean Acidification Due to Increasing Atmospheric Carbon Dioxide, available at [www.royalsoc.ac.uk](http://www.royalsoc.ac.uk).
- Sabine C.L. et al. 2004. The Oceanic Sink for Anthropogenic CO<sub>2</sub>. *Science* 305: 367-371
- Santer, B.D. 2006. Forced and Unforced Ocean Temperature Changes in Atlantic and Pacific Tropical Cyclogenesis Regions. *Proceedings of the National Academy of Sciences (PNAS)* doi:10.1073/pnas.0602861103.
- Stern N. 2006. *Stern Review: The Economics of Climate Change* (Cambridge University Press).
- Stipulated Settlement Agreement, *Center for Biological Diversity v. Salazar*, 2:08-cv-01936-FCD-JFM (E.D. Cal., February 12, 2009).
- Tankersley, J. *Obama still plans to cut omissions*, *The Nation*, Jan. 25, 2009.
- Weitzman E.L. 2007. *On Modeling and Interpreting the Economics of Catastrophic Climate Change*. Harvard University mimeo.
- World Health Organization, 2002. The World Health Report 2002. Available at <http://www.who.int/whr/2002/en/index.html>.