



THE WILDERNESS SOCIETY

September 19, 2008

Delivered via electronic mail (geothermal_EIS@blm.gov) and U.S. mail (with attachments)

Geothermal Programmatic EIS
c/o EMPSi
82 Howard Street, Suite 110
San Francisco, CA 94105

Re: Comments on the Draft Programmatic Environmental Impact Statement for Geothermal Energy Leasing

To Whom It May Concern:

Please accept and fully consider these scoping comments on behalf of The Wilderness Society and the other organizations identified below. The Wilderness Society's more than 300,000 members and supporters nationwide care deeply about the management of our public lands. Founded in 1935, our mission is to protect wilderness and inspire Americans to care for our wild places. We appreciate the opportunity to submit these comments to the Bureau of Land Management and Forest Service on the Programmatic Environmental Impact Statement (PEIS) for Geothermal Energy. We are submitting these comments today via electronic mail and also forwarding a copy with attachments to you separately.

We support development of clean, renewable energy resources because doing so promotes non-polluting, sustainable energy production that will benefit Americans and our public lands in the long term and encourages a move from a fossil fuels-based economy to a renewables-based economy. While we recognize geothermal energy can contribute to a clean energy economy and reduction of greenhouse gas emissions, like all energy production on public lands, geothermal resources must be developed responsibly and in a sustainable manner. This is of special importance in the western states which comprise the planning area, where water is a finite resource and becoming evermore so due to global warming. We must take precautions so that developing geothermal energy does not exacerbate the very problem that it has the potential to mitigate. If properly sited, geothermal energy can make a valuable contribution to our energy supply.

Geothermal energy development is an essential component of a renewable energy portfolio. As the PEIS states, there are potentially 12,000 MW of this resource in the planning area that are viable for commercial development by 2025. In Nevada alone, there are present-day requests of nearly 1,500 MW of geothermal energy seeking grid interconnection. Consequently, geothermal will play an increasingly important role in meeting both immediate and future western energy

needs. As a renewable energy resource, geothermal energy stands alone as a “baseload” resource and has a very high (80% plus) “capacity factor” – meaning that commercial geothermal facilities produce power that can be consistently relied upon. Megawatt for megawatt, therefore, geothermal has the immediate capacity to replace energy coming from coal-fired power plants. Geothermal can also facilitate development of wind and solar resources, serving as a needed back-up or operating reserve to cover contingencies (i.e., when the wind is not blowing or the sun is not shining) and combining with these resources to use more transmission line capacity (wind and solar generally use only 50% or less of total transfer capacity), which ultimately lowers transmission costs for renewable energy.

In the spirit of assisting the agencies with responsible development of this important resource, we are raising two overarching concerns that are of particular relevance in this programmatic study, for which we also proposed detailed solutions. First and foremost, programmatic environmental studies serve the best opportunity to address suitability issues – i.e., given lands and hydrology impacts associated with known geothermal technologies and the many uncertainties with unknown and emerging technologies, not all western public lands are appropriate for this type of energy development. Valuable public lands, including roadless areas and proposed wilderness, must be closed to geothermal leasing and development. Second, a programmatic EIS is the perfect opportunity to develop a thoughtful and consistent approach to leasing and permitting. The Draft PEIS would open 117 million acres of public lands to competitive leasing all at once; this is not an acceptable approach. This vast amount of acreage suggests that a rigorous suitability analysis has not been performed in the current study. Rather, the agencies should develop a uniform process for prioritizing lease applications and site-specific permits for lands considered suitable for this type of energy production.

By preventing unnecessary impacts and facilitating development in the *right* places and in the *best* ways, such an approach should actually *speed* responsible development by avoiding unnecessary conflicts. Further, such an approach would ensure that geothermal development on public lands will truly achieve the goals set for using renewable energy to transition away from fossil fuels and combat the negative impacts of climate change.

These and other concerns are detailed in the comments below.

I. Large-scale Geothermal Energy Leasing Requires Development of a Thoughtfully Designed Approach

A. The risks and unknowns specific to geothermal energy development require caution before rushing into a large-scale program

According to the Energy Information Association, there are currently roughly 2,400 megawatts (MW) of installed geothermal electricity generation in the western United States, less than 1% of total U.S. generation capacity. The Reasonably Foreseeable Development Scenario (RFD) for the Draft PEIS forecasts that within the planning area, 12,100 MW of geothermal potential are considered viable for commercial electrical generation in 242 power plants by 2025; the RFD further estimates direct use applications of 4,200 thermal MW by 2025. Such massive development of geothermal resources will no doubt have significant impacts to the public lands

and their many resources. We believe development predicted on this scale warrants careful studies of the impacts to public lands, water and other affected natural resources prior to issuing leases.

While significant development of flash steam power plants has allowed analysis of impacts from this indirect use of geothermal resources, most of the geothermal power plants planned for construction in the U.S. are binary-cycle. Though impacts from binary-cycle plants do not appear to be radically different from flash steam plants, additional technologies are being developed that will require much greater analysis before their impacts can be understood. In particular, “co-produced geothermal fluids,” also known as “produced water cut”, and “enhanced geothermal systems” are emerging technologies whose impacts are relatively unknown. Development of these resources should not be done without close examination of potential risks and impacts, and if development does occur it should be done slowly, in a phased manner, to ensure ongoing study can identify and fix problems and issues which arise.

For new technologies such as enhanced geothermal systems, a cautious approach emphasizing monitoring and strategic development is critical. Though the Draft PEIS states that “It is anticipated that there may be applications for research and development drilling on public and NFS lands in the future. While it is a viable and proven technology, it is unlikely that it will be applied at a large scale in the western US within the next 20 years.” Draft PEIS 1-9. The technological options have not been thoroughly tested in the US and requires further investigation to ensure that unacceptable impacts are avoided.

While Chapter 4 of the Draft PEIS examines the general types of impacts expected from geothermal development, the inability to predict future development scenarios, including types of development, timing and location will require additional site-specific analysis for individual leases and project applications.

Recommendations: Due to the projected scale of geothermal development and relative lack of knowledge of the impacts of such development, the agencies should approach geothermal development on public lands in a measured manner, using strategic development and monitoring, to ensure all impacts are minimized and mitigated and unacceptable impacts are avoided altogether. By “strategic” we mean that the locations with the highest potential resources coupled with the fewest environmental impacts are given priority, so that we encourage production while avoiding the most sensitive lands. In the case of new and developing technologies, research and development should be undertaken with caution and large-scale deployment of new technologies should only be done after sufficient analysis has been completed. Site-specific analysis of leases and project applications will also be necessary to address the particular impacts of future leases and projects. Overall, in addressing potential impacts to natural resources, the agencies should apply the “mitigation hierarchy” recommended by the Council on Environmental Quality of (1) avoid; (2) minimize; (3) reclaim/restore; (4) restore.

B. Geothermal development is not always renewable: water use of certain geothermal development systems demands in-depth analysis.

Renewable energy resources are naturally replenishable, but flow-limited. They are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time. Some (such as geothermal and biomass) may be stock-limited in that stocks are depleted by use, but on a time scale of decades, or perhaps centuries, they can probably be replenished. Renewable energy resources include: biomass, hydro, geothermal, solar and wind. (Source: http://www.websters-online-dictionary.org/RE/RENEWABLE_RESOURCES.html)

Because of water use, certain types of geothermal development are not “renewable” in the way that other renewable energy sources are. The Draft PEIS acknowledges that for flash steam facilities, “about 15-20 percent of the fluid would be lost due to flashing to steam and evaporation through cooling towers and ponds.” Draft PEIS, p. 2-47. The Draft PEIS further addresses these impacts in Chapter 4, stating that potential impacts on water resources could occur if reasonably foreseeable actions were to result in “Substantially depleted groundwater supplies or interfered substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level;” or “Resulted in changing conditions so that the geothermal resource itself was degraded.” Draft PEIS, p. 4-40. During drilling operations,

Extracting geothermal fluids could result in drawdowns in connected shallower groundwater aquifers, with the resulting potential to affect streams or springs that are connected to the water table aquifer. The potential for these types of adverse impacts is reduced through extensive aquifer testing, which is the basis for designing the geothermal plant and for locating, designing, and operating the extraction and injection wells. Combined with the requirement to comply with state and federal regulations that protect water quality and with limitations imposed by water rights issued by the state engineer, the impacts on water quality and the potential for depleting water resources is expected to be minimized. **There is a medium risk for moderate to high impacts on groundwater supplies from the use of groundwater for geothermal activities.** Draft PEIS, p. 4-43 (emphasis added).

During utilization,

Geothermal resource utilization could affect groundwater resources because of consumption of water by evaporation and the need to reinject water to replenish the geothermal reservoir. The magnitude of the effects would vary depending on groundwater conditions and availability within the basin and on the type of geothermal plant. Availability of water resources could be a limiting factor, affecting the expansion of geothermal resource development in a given area. Draft PEIS, p. 4-44.

The Draft PEIS further states that, “withdrawing shallow groundwater or surface water for cooling purposes could affect nearby springs.” Draft PEIS, p.4-45.

Clearly, flash cycle plants have significant potential for depleting the water which is a critical component of the geothermal resource, limiting the “renewable” nature of this development. Further, all geothermal development has the potential for impacts to surface and groundwater quality and quantity, and analysis and mitigation must focus on limiting these impacts.

Recommendation: Because geothermal development can result in depletion of geothermal resources and water, if development conflicts occur between geothermal and wind or solar facilities, the impacts to water should be an important consideration in determining the best use of an area, as well as surface disturbance, so that renewable energy development with the least impacts to resources that are present is given priority. The BLM and Forest Service should also prioritize binary cycle geothermal development over flash steam development to reduce the risk of depleting geothermal resources. The PEIS should specifically require additional site-specific analysis of potential impacts to geothermal and water resources of individual lease and project proposals.

C. Geothermal leasing and development should not be implemented in the same way as oil and gas leasing and development

The Draft PEIS repeatedly mentions the perceived similarities between oil and gas drilling and geothermal development and the intent of the agencies to rely on their experience with oil and gas development for fashioning their approach to managing geothermal energy development. The Draft PEIS states:

BLM and FS have had a great deal more experience managing lands for development of oil and gas resources, and many more management plans address these resources. Development of oil and gas resources result in many of the same kinds of impacts as development of geothermal resources (e.g., surface disturbance resulting from the footprints of facilities, wells, pads and pipelines, as described in Section 2.5, Reasonably Foreseeable Development Scenario); therefore, BLM and FS have determined that it is appropriate to take an approach to development of geothermal resources similar to that taken to development of oil and gas resources. Areas that require protection from the effects of development of fluid resources are more likely to require protection from the similar effects of development of geothermal resources. Draft PEIS, p. 2-6.

In fact, for Areas of Critical Environmental Concern (ACECs), the agencies simply defer to the management approach for oil and gas development (Draft PEIS, p. 2-7), even though specific resources protected in individual ACECs vary widely and, as a result, the impacts of geothermal development on those resources will also vary. Analysis and management decisions specific to geothermal development are necessary.

Although similarities exist in the development and impacts of developing geothermal energy and oil and gas, there are also fundamental differences and opportunities. As discussed above and throughout these comments, the technologies used and still in development for geothermal energy often require significant amounts of water and can have different effects than oil and gas drilling. Also, while development of these energy sources can cause significant damage to other resources, such as wilderness qualities, wildlife, water, vegetation, and recreation opportunities,

the agencies have already made major commitments to oil and gas leasing, and seen the devastating results to the public lands. The BLM and Forest Service should take the opportunity offered by this programmatic document to avoid the mistakes of the oil and gas program. Significant problems have beset the oil and gas program, including: inappropriate prioritization of leasing and drilling over all other resources and values; lack of adequate impacts analysis; failure to use the best available scientific research to inform management; insufficient monitoring and mitigation of impacts; inadequate leasing stipulations and Best Management Practices (BMPs) to protect other resources; abuse of exceptions and waivers from stipulations and BMPs; failure to employ true phased development; and inadequate bonding and reclamation. The failure to carefully plan, consider impacts and avoid damage to other resources and users of the public lands has resulted in serious conflict and devastating impacts to the public lands, as well as negative impacts to our economy and public health.

Geothermal development offers the opportunity to increase our national energy supplies while limiting greenhouse gas emissions and subsequent impacts from climate change. However, if the agencies do not learn from and avoid a repeat of the mistakes of the oil and gas program, any potential benefits could be outweighed by the recurrence of the problems listed above. BLM should instead adopt a measured approach that maximizes the benefits of geothermal development while limiting impacts to other resources and values. This PEIS provides an important opportunity to design a thoughtful approach to geothermal leasing and development.

Recommendation: BLM should adopt a measured approach to geothermal development, taking into consideration the unique aspects of geothermal development and avoiding the problems of the oil and gas program in order to maximize the benefits of geothermal development while limiting impacts to other resources and values.

D. Analysis and management of geothermal development should be conducted to achieve a net decrease in greenhouse gas emissions and related impacts that contribute to climate change.

The development of renewable energy sources, including geothermal, offers the opportunity to limit damaging impacts from climate change by displacing electricity production from fossil fuels and thus reducing greenhouse gas emissions. As stated in the Draft PEIS:

“A study comparing greenhouse gas emissions from electrical generation using fossil fuels and geothermal fluids found that geothermal produces an order of magnitude less in carbon dioxide, hydrogen sulfide, methane, and ammonia (Bloomfield *et al.* 2003).” Draft PEIS, p. 1-20.

“Direct use of geothermal resources, such as using geothermal to heat buildings, has the potential to displace 18 million barrels of oil per year (WGA 2006). Increased geothermal energy utilization could help the US reduce greenhouse gas emissions and meet policy goals (Bloomfield *et al.* 2003).” Draft PEIS, p. 1-20.

We support the BLM’s recognition of the importance of analyzing the effects of its action on climate change. Global climate change is now acknowledged to be a major consideration for

effects of major federal actions. The Supreme Court has concluded that “[t]he harms associated with climate change are serious and well recognized.” *Massachusetts v. E.P.A.*, 127 S.Ct. 1438, 1455 (2007). Further, the Supreme Court has held that while agency action may not completely reverse the effects of climate change, it does not relieve the agencies of the responsibility to take action to reduce it. *Id.* at 1458. In fact, an order issued by the Secretary of the Interior requires that:

Each bureau and office of the Department will consider and analyze potential climate change impacts when undertaking long-range planning exercises, when setting priorities for scientific research and investigations, when developing multi-year management plans, and/or when making major decisions regarding the potential utilization of resources under the Department’s purview.

U.S. Dept. of the Int., Sec. Order No. 3226 (Jan. 19, 2001), Section 3.

While there are many anticipated benefits to geothermal energy production over fossil fuels, in order to maximize these benefits, the PEIS must also address the potential for geothermal energy development to have adverse impacts on climate change or to increase negative impacts to resources that are affected by climate change. For example, many western landscapes are already becoming increasingly fragile due to global climate change and development of geothermal energy could inflict further damage on undeveloped lands. These landscapes may very well have important value as carbon “sinks,” which could be lost if they are developed.¹ Further, undeveloped land has value as potential habitat as wildlife migrates to respond to climate changes. Damage to these lands for geothermal energy production, although more limited than other forms of energy development, could thus contribute to the negative impacts of climate change. Moreover, when analyzing individual projects, the net benefit for reducing the impacts of climate change may be affected by such factors as the location of the project in relation to workforce, due to the combustion engines used in construction and operation by personnel.

Though the Draft PEIS does address impacts to air quality and climate from geothermal development, it does so only in the context of comparisons between geothermal development and fossil fuels development. The PEIS should further analyze negative impacts to climate change from geothermal development on lands that are undeveloped and have values as carbon “sinks” and/or potential habitat. The PEIS should also seek to avoid or mitigate negative impacts on climate change from geothermal development by designating only appropriate lands for geothermal energy development and incorporating lease stipulations and BMPs to protect these lands.

Recommendations: The agencies should manage geothermal development on the public lands in a manner that will result in a net benefit for reducing the impacts of climate change and maximize these benefits. The PEIS should analyze climate impacts of geothermal development in the context of both the negative impacts to carbon-sinks and wildlife habitat and migration corridors, as well as the positive impacts in displacing fossil fuels electricity production.

¹ See, e.g., *Have Desert Researchers Discovered a Hidden Loop in the Carbon Cycle?*, *Science*, Vol. 320, pp. 1094-140 (June 13, 2008) (attached).

Further, the PEIS should require similar analyses of proposed leasing and projects at a site-specific level, taking into account need for water, use of geothermal resources, and impacts from traffic to and from the site. Fully considering the net benefits from geothermal development will enable the agencies to best manage development of energy on the public lands and national forests to maximize the potential to reduce contributions to global warming.

II. The Proposed Action Is Not Sufficient to Protect the Resources which the Agencies Are Charged with Managing.

A. The agencies must consider a more protective range of alternatives.

NEPA mandates consideration of a full range of alternatives. The range of alternatives is “the heart of the environmental impact statement.” 40 C.F.R. § 1502.14. NEPA requires BLM to “rigorously explore and objectively evaluate” a range of alternatives to proposed federal actions. *See* 40 C.F.R. §§ 1502.14(a), 1508.25(c).

NEPA’s requirement that alternatives be studied, developed, and described both guides the substance of environmental decision-making and provides evidence that the mandated decision-making process has actually taken place. Informed and meaningful consideration of alternatives -- including the no action alternative -- is thus an integral part of the statutory scheme.

Bob Marshall Alliance v. Hodel, 852 F.2d 1223, 1228 (9th Cir. 1988), cert. denied, 489 U.S. 1066 (1989) (citations and emphasis omitted).

“An agency must look at every reasonable alternative, with the range dictated by the nature and scope of the proposed action.” *Nw. Env’tl. Defense Center v. Bonneville Power Admin.*, 117 F.3d 1520, 1538 (9th Cir. 1997). An agency violates NEPA by failing to “rigorously explore and objectively evaluate all reasonable alternatives” to the proposed action. *City of Tenakee Springs v. Clough*, 915 F.2d 1308, 1310 (9th Cir. 1990) (quoting 40 C.F.R. § 1502.14). This evaluation extends to considering more environmentally protective alternatives and mitigation measures. *See, e.g., Kootenai Tribe of Idaho v. Veneman*, 313 F.3d 1094, 1122–23 (9th Cir. 2002) (and cases cited therein).

NEPA requires that an actual “range” of alternatives is considered, such that the Act will “preclude agencies from defining the objectives of their actions in terms so unreasonably narrow that they can be accomplished by only one alternative (i.e. the applicant’s proposed project).” *Col. Env’tl. Coal. v. Dombek*, 185 F.3d 1162, 1174 (10th Cir. 1999), citing *Simmons v. U.S. Corps of Engineers*, 120 F.3d 664, 669 (7th Cir. 1997). This requirement prevents the environmental impact statement (EIS) from becoming “a foreordained formality.” *City of New York v. Dep’t of Transp.*, 715 F.2d 732, 743 (2nd Cir. 1983). *See also Davis v. Mineta*, 302 F.3d 1104 (10th Cir. 2002).

For this PEIS, the broad scope of the proposed action requires a broad range of alternatives. However, the Draft PEIS currently considers only two actual alternatives: the proposed alternative, Alternative B, for leasing on a broad scale and another, Alternative C, for more

limited leasing based on existing transmission lines. The Draft PEIS itself states that Alternative A is not an alternative but rather a baseline against which to compare the two action alternatives. Draft PEIS, p. 2-30. This range is insufficient.

Recommendations: The PEIS should incorporate aspects of both alternatives into a broader range and expand the conservation emphasis in the range of alternatives; many additional conservation measures that are within the range between “no leasing” (Alternative A) and making the majority of lands available for leasing (Alternative B) are discussed below and should be included for consideration and in the selected alternative. For example, the agencies could prioritize projects in proximity to existing transmission lines without necessarily precluding projects that are outside of energy corridors. Also, instead of simply evaluating lease applications as received, the agencies could give priority to projects that are in non-controversial locations, have already completed a robust environmental analysis and mitigation plan, and/or sited near existing or planned corridors. The agencies could also phase leasing based on the most well-documented geothermal resources and limit the amount of leasing based on protecting wildlife habitat and other uses. Buffers around existing geothermal resources on lands that are protected from leasing should also be incorporated. A research and development component should also be considered, such that a portion of lands could be leased for experimental technologies, but only on a limited basis in the planning area.

B. The proposed action, Alternative B should not be adopted, because it formally makes the majority lands available for leasing and development without sufficient analysis or protections.

Alternative B would make 117 million acres of BLM land and 75 million acres of Forest Service land open to geothermal leasing for direct and indirect use, a total of 192 million acres comprising approximately 77% of the planning area. Draft PEIS, p. 2-7. The Draft PEIS refers to the agencies’ discretion in deciding whether to issue leases, but Alternative B does not provide a reasoned approach for exercising this discretion to ensure the best use of our public lands. The decision would be made without sufficient protection for other natural values, such as wilderness characteristics and other recreational or scientific use of geothermal resources. Further, Alternative B would only provide a limited buffer around the geothermal resources in Yellowstone National Park, based on areas that are already protected by a non-discretionary closure (as opposed to the 15 miles in Alternative C). Draft PEIS, p. ES-6. Alternative B also does not encompass practical considerations, such as the availability of transmission, existing or planned, for development.

The Draft PEIS analogizes to the structure of oil and gas leasing. *See, e.g.*, Draft PEIS, pp. 2-6 – 2-7. In the context of oil and gas leasing, issuance of a lease is considered an irretrievable and irreversible commitment of federal resources and, unless issued with a “no surface occupancy” stipulation, cannot be presumed to allow the agencies to retain control to prohibit damage to the environment. *See, e.g., Bob Marshall Alliance v. Hodel*, 852 F.2d 1223, 1227 (9th Cir. 1988); *Pennaco Energy v. U.S. Dept. of Interior*, 377 F.3d 1147, 1160 (10th Cir. 2004). Accordingly, it is important that allocations of land as open to leasing be based on thorough environmental review, in addition to providing for sufficient site-specific analysis to occur prior to leasing. Because the Draft PEIS specifically states that projects can be tiered to the PEIS and not all

development will warrant additional environmental analysis, the PEIS must critically analyze the lands that it designates as open to leasing, which requires inventorying the area for wilderness and roadless characteristics and protecting those places with valuable and vulnerable resources. Alternative B does not include sufficient commitments to inventory or to apply protective measures.

Recommendation: The PEIS should not adopt Alternative B.

C. Additional elements required for an approach to be adopted in the PEIS.

Alternative C includes significant improvements from Alternative B. This alternative would still make approximately 92 million acres of land available for leasing for commercial transmission. Draft PEIS, p. ES-6. However, there would be a protective 15-mile buffer around the boundary of Yellowstone National Park and leasing would be confined to a 20-mile corridor (10 miles from centerline) from existing transmission lines and those under development, with protective management prescriptions. *Id.* Nonetheless, Alternative C fails to protect additional valuable places and resources that are at risk of damage or destruction if leased for geothermal development.

In order to protect these values, the PEIS must:

1. Expand categories of lands that are closed to leasing.

We agree with the agencies' assessment of categories of certain lands as closed to geothermal leasing, including Wilderness Areas, Wilderness Study Areas, National Conservation Areas, Wild and Scenic Rivers, National Recreation Areas, and other special management areas. However, there are other important areas that must be excluded from geothermal leasing and development.

a) Forest Service Inventoried Roadless Areas

The Roadless Area Conservation Rule mandates no new road construction or reconstruction in inventoried roadless areas. *See*, 66 Fed. Reg. 3243, 3270 (January 12, 2001). Further, the Draft PEIS acknowledges that the need for road construction and maintenance for exploration, drilling and utilization phases of geothermal energy development. *See, generally*, Draft PEIS, pp. 2-40 - 2-46. Accordingly, since these lands cannot be developed in accordance with the Roadless Rule, they should not be made available for leasing.

b) Lands with wilderness characteristics

The Draft PEIS states:

BLM has the authority to address lands with wilderness characteristics and describe protective management prescriptions in RMPs. In keeping with the public involvement process that is part of all land use planning efforts, the BLM

will consider public input regarding lands to be managed to maintain wilderness characteristics.

Draft PEIS, 1-25. We appreciate the BLM's acknowledgment of its authority and commitment to public participation in managing lands to protect wilderness characteristics. Since the PEIS will amend as many as 122 land use plans and many RMPs will not be revised for years after the PEIS is finalized, the inventory and protective management of lands with wilderness characteristics should occur as part of this planning process.

Pursuant to FLPMA, "The Secretary shall prepare and maintain on a continuing basis an inventory of all public lands and their resource and other values (including, but not limited to, outdoor recreation and scenic values), giving priority to areas of critical environmental concern. This inventory shall be kept current so as to reflect changes in conditions and to identify new and emerging resource and other values." 43 U.S.C. §1711(a). Wilderness character is a resource for which BLM must keep a current inventory. As the U.S. Court of Appeals for the Ninth Circuit recently held: "wilderness characteristics are among the 'resource and other values' of the public lands to be inventoried under § 1711. BLM's land use plans, which provide for the management of these resources and values, are, again, to 'rely, to the extent it is available, on the inventory of the public lands, their resources, and other values.'" 43 U.S.C. § 1712(c)(4)." *Oregon Natural Desert Ass'n v. Bureau of Land Management*, 531 F.3d 1114, 1119 (9th Cir. 2008). Therefore, BLM is required to consider "whether, and to what extent, wilderness values are now present in the planning area outside of existing WSAs and, if so, how the Plan should treat land with such values." *Id.* at 1143.

BLM has defined "wilderness characteristics" to include naturalness and providing opportunities for solitude or primitive recreation. See Instruction Memoranda 2003-274, 2003-275, Change 1. These values are to be *identified and protected* in the land use planning process. See BLM Land Use Planning Handbook (H-1601-1, 2005); *Oregon Natural Desert Ass'n v. Bureau of Land Management*, *supra*. Further, BLM's national guidance provides for management that emphasizes "the protection of *some or all* of the wilderness characteristics as a priority" over other multiple uses. (emphasis added). This guidance does not limit its application to lands suitable for designation of Wilderness Study Areas; for instance, the guidance does not include a requirement for the lands at issue to generally comprise 5,000-acre parcels or a requirement that the lands have *all* of the potential wilderness characteristics in order to merit protection.

During the scoping process, we provided GIS data regarding lands with wilderness characteristics, which not only constitutes significant new information but also facilitates the agency's review and consideration of protection. In *Oregon Natural Desert Association v. Rasmussen*, CV 05-1616-AS, Findings and Recommendations (D. Or. April 20, 2006); Order (D.Or. Dec. 12, 2006), the court found that BLM's failure to re-inventory lands for wilderness values and to consider the potential impact of decisions regarding management of a grazing allotment violated its obligations under NEPA and FLPMA, then enjoined any implementation of the decision until the agency re-inventoried the lands at issue and prepared an environmental document taking into account the impacts of its decisions on wilderness values. In *Oregon Natural Desert Association v. Rasmussen*, the district court found that BLM had violated NEPA

by failing to consider significant new information on wilderness values and potential impacts on wilderness values, and had also failed to meet its obligations under FLPMA by failing to engage in a continuing inventory of wilderness values. It concluded:

The court finds BLM did not meet its obligation under NEPA simply by reviewing and critiquing [a local environmental group's] work product. *It was obligated under NEPA to consider whether there were changes in or additions to the wilderness values within the East-West Gulch, and whether the proposed action in that area might negatively impact those wilderness values, if they exist.* The court finds BLM did not meet that obligation by relying on the one-time inventory review conducted in 1992. *Such reliance is not consistent with its statutory obligation to engage in a continuing inventory so as to be current on changing conditions and wilderness values.* 43 U.S.C. § 1711(a).

BLM's issuance of the East-West Gulch Projects [environmental analysis] and the accompanying Finding of No Substantial Impact (FONSI) in the absence of current information on wilderness values was arbitrary and capricious, and, therefore, was in violation of NEPA and the [Administrative Procedure Act].

Id. (emphasis added).

The Geothermal PEIS presents an opportunity for the BLM to consider information that has previously been submitted regarding lands with wilderness characteristics in the lands at issue in the PEIS and to inventory these lands, which contain numerous areas proposed for wilderness designation in citizen's wilderness inventories and/or found to have wilderness characteristics. Prior to identifying lands open to geothermal leasing and development, we recommend that the agencies assess information received regarding wilderness characteristics, including inventorying lands identified, and exclude lands with wilderness characteristics, citizen-proposed wilderness, and wilderness inventory units from the lands available for consideration of siting geothermal energy projects.

c) Important habitat and migration corridors

The WGA - consistent with state wildlife action plans - has recently produced the Wildlife Corridors Initiative Report (available at <http://www.westgov.org/wga/publicat/wildlife08.pdf>), which identifies important wildlife corridors and habitats in the western states and makes recommendations for best protecting these crucial areas. The agencies should consult this report for information on the areas identified and/or confer with the WGA Western Wildlife Habitat Council before completing the PEIS, in order to incorporate this data into decisions regarding which lands will be available for leasing. The agencies should also ensure that additional analysis is conducted, in the PEIS and/or prior to leasing and development, to accurately determine the present of important habitat, including vegetation and migration corridors, and to take appropriate measures to avoid or otherwise mitigate potential damage, as discussed in further detail in the following section of these comments.

d) Places that would be excluded from development under bills pending in Congress

All areas that would be closed to geothermal development under bills currently pending in Congress should be excluded from leasing in the PEIS. This should include lands that are included in pending legislation for designation in one of the categories listed as closed to leasing in the Draft PEIS or would otherwise include provisions that prohibit geothermal energy development

e) Appendix with other specific places of concern

Appendix A details specific places that are inappropriate for geothermal energy development and/or require special analysis of potential damage to natural and cultural resources prior to leasing and development, including areas around national parks, citizens' inventories or other valuable resources. These areas should be closed to geothermal leasing in the PEIS or upon confirmation of potential damage to the identified values and resources.

2. Designate buffers to protect geothermal resources already prioritized for recreational/scenic values

a) Research shows that drilling for geothermal energy in proximity to other known geothermal features can disturb and damage these features.

The National Park Service's web page on Yellowstone's geothermal resources states, "In Iceland and New Zealand, geothermal drill holes and wells 2.5 - 6.2 miles distant have reduced geyser activity and hot spring discharge."

(<http://www.nps.gov/yell/naturescience/geothermalresources.htm>) This confirms the necessity of creating buffer zones around geothermal resources with surface features that are part of protected areas, such as national parks, or have been identified for the recreational and scenic values. Disturbances to these features would have major economic and environmental impacts on our national parks and other areas with geothermal resources. Tourism would decrease as a result of loss of thermal features, and endemic species that depend on the geothermal resources of the area would likely suffer.

The New Zealand Geothermal Association provides evidence of damage caused to thermal features as a result of geothermal development that is not well-planned. Some environmental effects that have been documented in New Zealand include loss of active geysers, unsustainable draw down, and subsidence. According to the association, "Of more than 200 geysers active in the central North Island in the 1950s, only about 40 remain."

(http://www.nzgeothermal.org.nz/environmental/surface_effects.asp) These potential impacts are unique to geothermal resources, and therefore must be analyzed thoroughly.

b) Additional protections around Yellowstone National Park.

The PEIS must include a buffer around Yellowstone National Park in order to protect the thermal features found there. According to the National Park Service, 75% of the world's geysers are located in Yellowstone. The NPS warns that "research is needed to determine the extent to which YNP's geothermal systems connect with areas of lease application west and north of the boundary." (<http://www.nps.gov/yell/naturescience/geothermalresources.htm>) Clearly, the necessary scientific research substantiating the effects that geothermal development could have on the park's features is not yet adequate. While Alternative C would provide a 15 mile buffer and close the Island Park Geothermal Area to leasing, further analysis and protections are needed.

(1) Background

The geothermal features in Yellowstone National Park were largely responsible for its designation as this country's first national park in 1872. These features are a global treasure. Nowhere else in the world can you find the array or number of geysers, hot springs, mud pots, and fumaroles found in Yellowstone. More than 75% of the world's geysers, including the world's largest are in Yellowstone's seven major basins.

As stated above, in almost every other geyser area in the world, including those in New Zealand, Iceland, China and the United States, development has seriously affected or permanently destroyed the thermal features of those areas. The park's thermal features lie in the only essentially undisturbed geyser basin left worldwide. Ten miles north of Yellowstone, research has demonstrated that the LaDuke Hot Springs are connected to geothermal features within Yellowstone.

(2) Montana & U.S. Water Compact, Yellowstone Controlled Groundwater Area

As a national park, the lands within Yellowstone's boundary are protected by statute from geothermal leasing. Other existing statutes are in existence to protect Yellowstone's geothermal features such as the Island Park Known Geothermal Resource Area and wilderness designations and given necessary deference within the Draft PEIS. However, a significant agreement ratified in 1993 by the State of Montana and the U.S. Government has not been acknowledged or considered within the Draft PEIS. That agreement is the Water Rights Compact between the State of Montana and United States of America, National Park Service (<http://data.opi.state.mt.us/bills/mca/85/20/85-20-401.htm>).

The State of Montana and the National Park Service entered into a Water Rights Compact on May 12, 1993 that committed the two entities to protecting the geothermal integrity of Yellowstone National Park. This agreement designated and provided protections for the Yellowstone Controlled Groundwater Area in Montana. The statement of intent for the Yellowstone Controlled Groundwater Area is as follows:

Yellowstone National Park was reserved for the express purpose of "preservation, from injury or spoliation, of all timber, mineral deposits, natural curiosities, or wonders within said park, and their retention in their natural condition." (17 Stat. 32.) The parties agree

that Congress reserved water necessary to preserve the hydrothermal features within the reserved land of YNP. These reserved water rights have priorities as of the date on which the land was reserved.

The parties understand that knowledge of the interrelationship of hydrothermal features within YNP, the hydrothermal system that supports those features, and groundwater in surrounding areas of Montana will benefit from increased study. The parties agree that the hydrothermal features of YNP are a unique and irreplaceable resource and represent one of the few undisturbed hydrothermal systems in the United States.

This Compact does not recognize a reserved water right to groundwater outside the boundaries of the reserved land of YNP. However, the parties agree that restrictions shall be placed on the development of groundwater adjacent to YNP to the extent necessary to prevent adverse effect on the reserved water right to groundwater within YNP. *The parties agree that the goal of establishment and administration of the Yellowstone Controlled Groundwater Area shall be to allow no impact to the hydrothermal system within the reserved land of YNP.*

Water Rights Compact between the State of Montana and United States of America, National Park Service, Article IV “Yellowstone Controlled Groundwater Area”, Section A (emphasis added)

Article IV went on to indicate that research was limited at the time of signing, and more was necessary to fully understand the interconnectedness of Yellowstone National Park and adjacent lands. A provisional Yellowstone Controlled Groundwater Area was established in 1993, but a commissioned Technical Oversight Committee established a scientifically-based boundary for the Area which is provided in the enclosed map. in Article IV went on to indicate that research was limited at the time of signing, and more was necessary to fully understand the interconnectedness of Yellowstone National Park and adjacent lands. A provisional Yellowstone Controlled Groundwater Area was established in 1993, but a commissioned Technical Oversight Committee established a scientifically-based boundary for the Area inwhich is provided in the enclosed map.

Given the State of Montana’s and the U.S. Government’s commitment to protecting the integrity of Yellowstone’s geothermal resources through the designation of the Yellowstone Controlled Groundwater Area through the Water Rights Compact, the Yellowstone Controlled Groundwater Area must be withdrawn from any consideration for geothermal leasing under this programmatic EIS.

Recommendation: Geothermal leasing is prohibited within the Yellowstone Controlled Groundwater Area established through the 1993 Water Rights Compact between the State of Montana and United States of America, National Park Service.

(3) Areas not covered by the Island Park Known Geothermal Area and the Yellowstone Controlled Groundwater Area

Outside the Island Park Known Geothermal Resource Area and the Yellowstone Controlled Groundwater Area, existing research on areas adjacent to Yellowstone is for the most part lacking or inadequate. Moreover, it is likely that other important aquifers with hydrologic links

to Yellowstone National Park exist but have yet to be designated as Known Geothermal Resource Areas.

Alternative C in the Draft PEIS recognizes the importance of Yellowstone's geothermal resources by prohibiting geothermal leasing within fifteen miles adjacent to the Park in addition to the protections provided by statute to the Island Park Known Geothermal Resource Area. As discussed above, a prohibition of geothermal leasing adjacent to Yellowstone will provide inadequate protection unless it includes the entire Yellowstone Controlled Groundwater Area in the State of Montana.

It must be recognized in the Final PEIS that in some instances fifteen miles may not provide adequate protection of Yellowstone's geothermal resources. For any geothermal leasing proposals outside the Island Park and Yellowstone controlled areas and up to fifty miles from the park boundary, the Park Service should be given the opportunity to consult as to whether or not the proposed activity might interfere with the natural function of any geothermal feature or hydraulically linked aquifer in Yellowstone Park. When current science and technology cannot provide absolute assurance regarding the effect of a proposed action on geothermal resources in Yellowstone Park, then that activity should be prohibited on federal land and private lands with federal mineral rights.

Recommendation: Use of geothermal resources as an energy source should not be pursued in areas where a hydrologic link with Yellowstone National Park geothermal features is possible. A permanent ban should be placed on all geothermal development on federal lands within a 15-mile radius of Yellowstone Park. The protected area should be expanded to fully incorporate the Island Park Geothermal Area (a minimum of 32 miles outside Yellowstone Park) and, in Montana, the Yellowstone Controlled Groundwater Area. In addition, the National Park Service should be provided a formal consultation role in any proposal beyond the protected buffer, up to fifty miles from the park boundary.

c) Identify other areas where buffers are necessary due to protected geothermal resources (including other national parks or national monuments that exist due to presence of geothermal resources)

The agencies must work with the National Park Service (NPS) and other agencies and organizations to determine where geothermal features exist that could potentially be impacted by development. Although national parks and monuments are not open to leasing in the PEIS, buffer zones around these sites must also be identified and closed to leasing where necessary to protect the resources.

The Draft PEIS makes no reference to the Geothermal Steam Act Amendments of 1988, which require the Secretary of the Interior to maintain a list of NPS units with significant thermal features, monitor the features (with priority to those in proximity to current, proposed or potential geothermal development), deny lease applications that would result in a significant adverse effect to the thermal features and ensure that all leases and permits include stipulations to protect the significant thermal features. 30 U.S.C. § 1026. As discussed above, geothermal development can affect geothermal features at a distance of miles. Geothermal leases that have

the potential to impact a significant thermal feature must either be denied or granted with compulsory stipulations to protect the resource. The 1988 amendments *require* that impacts to thermal features within the National Park System are considered in geothermal leasing and development. The testimony submitted by the National Parks Conservation Association (NPCA) in connection with the 1988 amendments highlights the potential risk to geothermal features that propelled this legislation. *See*, Statement of Destry Jarvis, Vice President for Conservation Policy, NPCA - attached to these comments. NPCA's testimony also provides important information on other NPS lands that could be negatively impacted by geothermal energy development, listing lands with volcanic and thermal activity or features and those that, at the time of the testimony, were already identified as having high potential for development. *Id.* These lands, due to their features, remain at risk and due special consideration; they are also set out in Appendix A to these comments.

Recommendation: The Final PEIS must incorporate the list of significant thermal features within the NPS and ensure that the formal consultation with the NPS occurs for any leasing and/or development activities with the potential to impact these features.

3. Identify and prioritize for leasing places that would be more appropriate for geothermal

In addition to avoiding ecologically-sensitive lands, the PEIS can identify areas that are more likely to be suitable for development and non-controversial; and leasing could be prioritized in these areas. Factors that should be considered are set out below.

a) Impaired or degraded lands

The PEIS should require that lands that are already impaired be considered first for proposed geothermal development. Abandoned mines, developed oil and gas fields, and other brownfields, which are not being restored to ecological function, provide opportunities for geothermal energy development without loss of other uses and values. Such sites are often close to existing infrastructure, which is another important consideration, both in conjunction with degraded sites and as a separate factor.

b) Proximity to existing infrastructure

Proximity to existing infrastructure will minimize new road construction or major roadway improvements (such as paving and widening), avoiding another set of impacts on the public lands. Further, proximity to the load that will be served by the project will limit the amount of new transmission needed and reduce related income.

c) Co-siting with solar energy projects

Federal land agencies are currently in the process of completing a PEIS for solar energy development as well. Both solar and geothermal energy are long-term, industrial uses of public lands. While we support the development of renewable, clean energy sources, we encourage the agencies to mitigate the impacts of all energy development to the extent possible. One mitigation

measure that could prove greatly beneficial is the possibility of co-siting geothermal and solar energy projects, thereby reducing environmental impacts. The agencies should explore this possibility in the PEIS, and create terms to encourage this type of development.

d) Siting to maximize use of transmission for renewable energy

The federal agencies are involved in designation of transmission corridors on public lands and national forests, including the West-wide Energy Corridor PEIS. Individual states are engaged in designation of zones to prioritize development and transmission of renewable energy, such as California's Renewable Energy Transmission Initiative and Nevada's Renewable Energy Zones. The Western Governors Association (WGA) is undertaking an initiative to designate Renewable Energy Zones. Prioritizing lands for lease and development that are within these zones or in proximity to other approved renewable energy development projects will maximize access to transmission. This approach should also be incorporated into the PEIS.

e) Possibility of land exchange

The agencies should consider land exchange as a mitigation measure for geothermal development due to the industrial and long-term use of public lands.

4. Conduct strategic leasing or use conditional development stipulations

Because the current BLM geothermal program is very small in scale when compared to the reasonably foreseeable development scenario laid out in the Draft PEIS, the agencies should conduct strategic leasing to prioritize areas that are not controversial and have proven technology, to limit leasing on unknown technologies until they are proven successful both in the utilization phase and in the reclamation phase.

We also reiterate our scoping comment that the PEIS should analyze the use of conditional-development lease stipulations. As it is often difficult at the time of leasing to have the best data on site-specific impacts for future geothermal full-field development within an area, a leasing stipulation that conditions the right of development on the results of future and more-detailed studies provides an opportunity to clarify that development may ultimately be limited. This type of stipulation could also be used to support a research and development program, as discussed below.

5. Restrict development initially to traditional geothermal resources and/or established technology; commit to an R&D leasing program to develop additional technologies

a) Only technologies analyzed in this PEIS can be approved by tiering to the PEIS and important to use R&D leasing

It is essential that the PEIS clearly states that only geothermal technologies described and analyzed for impacts in the PEIS can be tiered to this document. These are specifically dry steam, flash steam, and binary-cycle power plants.

b) The agencies should support a program for developing new technologies, using R&D leasing

While we support research and development (R&D) of new geothermal technologies, especially those that reduce impacts on public lands by utilizing heat differential technology and thus do not require use of limited water sources, R&D activities require new NEPA analysis. Applications for R&D, including “enhanced geothermal systems,” cannot be tiered to this PEIS because their impacts are not analyzed in the document. However, the PEIS could describe and commit the agencies to develop and support a R&D leasing program for new technologies, which could be facilitated through the use of conditional development leases.

Recommendation: The management alternative to be selected for the PEIS should include the protective and proactive measures described above.

III. The PEIS Does Not Adequately Assess Environmental Consequences to Key Resources.

NEPA requires that the scope of environmental analysis be commensurate with the proposed action. *Kern v. United States Bureau of Land Management*, 284 F.3d 1062, 1072 (9th Cir. 2002). In light of the multistate range of lands and millions of acres that would be affected by the decisions in the PEIS, a more thorough analysis of potential impacts to other resources and values is necessary, as detailed below.

A. The agencies are required to assess the planning projects of other federal agencies and local governments in order to provide adequate cumulative impact analysis.

NEPA requires the agencies to consider the cumulative impacts of and related to the PEIS. NEPA regulations define “cumulative impact” as:

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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

40 C.F.R. § 1508.7 (emphasis added).

To satisfy NEPA’s hard look requirement, the cumulative impacts assessment must do two things. First, BLM must catalogue the past, present, and reasonably foreseeable projects in the area that might impact the environment. *Muckleshoot Indian Tribe v. U.S. Forest Service*, 177 F.3d 800, 809–10 (9th Cir. 1999). Second, BLM must analyze these impacts in light of the proposed action. *Id.* If BLM determines that certain actions are not relevant to the cumulative impacts analysis, it must “demonstrat[e] the scientific basis for this assertion.” *Sierra Club v. Bosworth*, 199 F.Supp.2d 971, 983 (N.D. Ca. 2002). A failure to include a cumulative impact analysis of actions within a larger region will render NEPA analysis insufficient. *See, e.g., Kern*

v. U.S. Bureau of Land Management, 284 F.3d 1062, 1078 (9th Cir. 2002) (analysis of root fungus on cedar timber sales was necessary for an entire area).

This definition clearly encompasses the other large-scale energy development being planned for the same lands under analysis in this PEIS, which will inevitably compound the effects of leasing and development of geothermal energy on the natural resources of our public lands, such as wildlife habitat, wilderness character and roadlessness, water, scenic beauty, and cultural resources.

Further, NEPA, as explained by the Council on Environmental Quality, also directs agencies to consider potential conflicts with the objectives of other plans, policies or controls, which requires an assessment of possibilities for resolving conflicts and a thorough consideration of how not resolving the conflict could “impair the effectiveness of land use control mechanisms for the area.” 40 C.F.R. § 1502.16(c); *Forty Most Asked Questions Concerning CEQ’s National Environmental Policy Act Regulations*, 23a. Similarly, FLPMA requires that the BLM’s guidance and management policies shall “be consistent with officially approved and adopted resource related policies and programs of other Federal agencies, State and local governments and Indian tribes.” 43 U.S.C. § 1712(c)(9); 43 C.F.R. § 1610.3-2.

There are currently several major planning processes underway in the Western United States that we want to highlight for the BLM to address in the Geothermal PEIS because of the potential overlap in goals. California’s Renewable Energy Transmission Initiative (RETI), the Western Governors Association’s Western Renewable Energy Zones (WREZ), and the West-wide Energy Corridors PEIS are all transmission initiatives in the project area. The states of Colorado, New Mexico, and Nevada also have initiatives to identify locations and provide incentives for renewable energy development and transmission.

The West-wide Energy Corridor PEIS is of particular relevance to the Geothermal PEIS. These two processes should be viewed as an opportunity for synergy and as an opportunity to bring more renewable energy into the American electricity grid while minimizing environmental degradation. If both energy corridors and geothermal energy development projects are properly sited and renewable technologies such as solar, wind, and geothermal energy are given preference in new transmission rights-of-way within the corridors, these efforts together can help America reduce its reliance on the fossil fuels responsible for global climate change. Currently, the West-wide Energy Corridor PEIS is the subject of significant controversy, due to the failure to assess the need for corridors to support renewable energy, as well as the failure to avoid ecologically important areas. Although the Draft PEIS makes note of this initiative, it fails to provide analysis of the cumulative impacts that will result from both of these programs being established in the same project area.

In addition, BLM is preparing a solar energy program and oil shale/tar sands program and has recently completed a wind energy program. All of these planning processes impact lands in the western states and will utilize transmission corridors, and in combination have the potential to disturb a majority of public and Forest Service lands in the West.

Chapter 5 of the Draft PEIS states that geothermal development would have a minor cumulative impact on resources such as vegetation and soil due to its comparatively small footprint: “The contribution to cumulative impacts of geothermal projects on public and FS lands would be small or negligible unless a significant permanent, uncompensated loss of the current productive use of a site occurred, or if future uses were precluded” Draft PEIS at 5-18. However, in context of a small area cleared for geothermal, and other areas all over the West cleared for solar, wind, oil shale, and transmission for all of these energy sources, the cumulative impacts can actually be expected to be quite large, with geothermal development making a significant contribution. In addition, because transmission will be necessary for indirect use geothermal projects, it is imperative that the agencies analyze transmission initiatives in the project area and provide cumulative impact analysis. Disregard of these processes may lead to duplicative corridors and unnecessary lands, wildlife and natural resource impacts.

Before preparing the Final PEIS, the agencies must go back and analyze not just the small impacts from geothermal plants, but the *cumulative* impacts of geothermal plants and transmission in context with solar plants, wind turbines, oil shale and tar sands mines, and the many other planning processes in the project area.

Recommendation: Because leasing of land for geothermal development is a commitment of the resource for future exploration and development, the agencies must conduct cumulative impact analysis of reasonably foreseeable future actions in context of other energy development and transmission projects in the western states.

B. Socioeconomic analysis.

There are several areas where the Draft PEIS for Geothermal Leasing in the Western US (Draft PEIS) falls short in the analysis of the potential socioeconomic impacts associated with leasing public lands for the development of geothermal energy. These are described briefly below and discussed in greater detail in the sections which follow.

- 1) The socioeconomic analysis in the Draft PEIS is superficial and is based heavily on documents that were produced by the geothermal energy industry itself.
- 2) The analysis of the socioeconomic impacts is one-sided, focusing only on the potential benefits of geothermal energy development without assessing the potential costs of such development on public lands.
 - a. The Draft PEIS fails to address the potential impacts to rural economies from potential impacts to public lands. Many economies benefit from undeveloped public lands and this potential impact should be analyzed in the Final EIS.
 - b. The Draft PEIS does not account for the non-market values, including the impacts on local quality of life, which are associated with the undeveloped public lands that may be impacted by geothermal energy development.

These specific concerns are discussed in detail in the sections below.

1. The socioeconomic analysis in the Draft PEIS is superficial and is based heavily on documents that were produced by the geothermal energy industry itself.

The Draft PEIS presents only the most general estimates of the potential jobs and royalties (and these are based only on industry references), without any in-depth analysis or even a qualitative discussion of the overall potential socioeconomic impacts associated with large scale developments on public lands in rural areas.

The socioeconomic analysis in the Draft PEIS refers frequently to several documents which were produced by or for geothermal industry advocacy groups. One of these documents is a two-page promotional document touting only the potential beneficial economic impacts of the industry. They are clearly self-serving for this specific industry and while potentially a valuable source of information, they should not be the only source of information about the socioeconomic impacts of large-scale geothermal energy development on public lands.

In preparing the Final EIS the BLM and FS should do a review of the economic literature on modern rural economies and include analysis of a broader range of impacts. The agencies should also include input and research from a more broad range of sources, rather than relying solely on industry analyses.

2. The analysis of the socioeconomic impacts is one-sided, focusing only on the potential benefits of geothermal energy development without assessing the potential costs of such development on public lands.

While it is certainly possible that the benefits to local communities from geothermal energy development may be substantial, it is also quite likely that such development will have certain costs as well. The Draft PEIS does not analyze the potential costs associated with leasing millions of acres of BLM and FS lands for geothermal energy. The Draft PEIS merely assumes that mitigation, stipulations and BMPs will result in minimal impacts.

Western communities often face the need to balance extractive development and other industrial uses of the region's abundant public lands with the economic and aesthetic benefits that are derived from these lands in their undeveloped state. The economy of the western United States has long been viewed as one dependent upon the extraction of natural resources. However, recent research has shown that this assumption is no longer valid. Commercial geothermal development would be yet another such industrial use, with many of the attendant pitfalls and issues. Yet the Geothermal DPIES does not assess the impacts associated with continued reliance on extraction industries in the context of the changing economy of the region.

a) The Draft PEIS fails to address the potential impacts to rural economies which benefit from undeveloped public lands – lands which will be impacted by the development of geothermal energy projects and related transmission corridors.

The omission of the potential costs to the western economies affected is reflected in the list (on page 4-139 of the Draft PEIS) detailing the conditions under which potential impacts on socioeconomics and environmental justice could occur. This list focuses very narrowly on commodity impacts, jobs and income in the geothermal industry, and revenues from royalties and taxes that might accrue. The list mentions the potential for increases in population and the potential for these increases to strain local resources; however, the analysis does not treat this potential impact with any depth. Missing from the list are the potential impacts on businesses and individuals who may rely on the presence of protected public lands to attract employees, to attract customers or for their own quality of life.

In the last 30 years, the West has evolved beyond being a region whose economy was largely focused on extractive industries, into a more diverse economy (Bennett and McBeth, 1998; Johnson, 2001). As the economies of rural communities in the West evolve, the impact of public land management on these economies also evolves, and the management of our public lands must as well. Sociological and economic research conducted over the last two-plus decades indicates that the environmental amenities provided by public lands are an important economic driver in the rural West. For several examples see: Rudzitis and Johansen, 1989; Johnson and Rasker, 1993, 1995; Rasker 1994; Power, 1995, 1996; Duffy-Deno, 1998; Rudzitis, 1999; Rasker, et al. 2004; Holmes and Hecox, 2004; Whitelaw, et al. 2003.

These indicators include the growing importance of non-labor income from investments and retirement, increasing employment in high technology, knowledge-based, and service industries, the important role that recreation and tourism plays in providing jobs and income, and the rise of small businesses and other entrepreneurial endeavors. The Draft PEIS fails to analyze or account for negative impacts on these segments of the economy. Large scale geothermal energy development is likely to have negative impacts such as habitat fragmentations, loss of quality of life, loss of quality recreation, and reduced quality of hunting and fishing. These impacts can, in turn, have detrimental consequences for non-traditional sectors of the economy which have come into prominence in the West. These non-traditional sectors have been shown to rely upon protected, undeveloped public lands. Such lands enhance the attractiveness of rural western communities for businesses, workers and retirees who are not tied to specific locations for income or employment. These sectors have for decades been the largest portion of almost every county in the U.S.

The recreation opportunities alone provided by wilderness quality and other undeveloped public lands yield direct economic benefits to local communities. The Draft PEIS socio-economic analysis does not include an analysis of the income and jobs associated with recreation, hunting and fishing from each alternative. In our scoping comments, we included a document entitled “Socio-Economic Framework for Public Land Management Planning: Indicators for the West's Economy,” which details our expectations for the baseline analysis of the region's economy as

well as the analysis of the potential impacts of this program. We request that you re-review the document and that your analysis for the Final EIS follow the approach set out in this document.

b) The Draft PEIS does not account for the non-market values, including the impacts on local quality of life, which are associated with the undeveloped public lands that may be impacted by geothermal energy development.

Public lands provide numerous values, some of which are realized when natural resources are extracted, and others which require that the natural ecosystems remain intact. The benefits of these various values often flow to different groups or individuals. Some of the benefits from public lands are more likely to flow to individuals or companies (market benefits), and others are available for the entire population (non-market benefits).

Any time that unique or irreplaceable resources or values are at risk, there is a strong component of non-market value which must be assessed. One of the primary purposes of the public lands system is the provision of public goods such as the protection of unique landscapes, ecological diversity, wildlife habitat, wilderness, and cultural and archeological resources. Large-scale geothermal energy development may put these resources at risk.

To facilitate informed decisions about publicly owned wildlands, economic analysis must take into consideration both market and nonmarket benefits and costs (Loomis 1993). It is important that the FS and BLM examine both market and non-market benefits and costs of large-scale geothermal energy development. Non-market benefits must be measured and compared with the market benefits that accrue to companies and individuals when undeveloped public lands are developed.

In analyzing the socioeconomic impacts of geothermal energy leasing and development, the agencies must complete a full accounting of the costs and benefits associated with this development including non-market costs and benefits. The agencies' accounting should recognize the multiple use aspects and the full extent and value of existing wilderness character and wildlands as a resource within and near new geothermal energy development, which include formally designated Wilderness and Wilderness Study Areas, as well as other areas with wilderness and special characteristics identified by citizens and proposed for protective management. The multiple benefits that derive from protecting wilderness quality and other undeveloped lands include positive economic impacts to local communities. In developing the Final EIS, the agencies should analyze the benefits of protecting all existing wilderness character and wildlands against impairment from large-scale geothermal energy development, and should also consider how managing these lands will affect wildlands and wildlife in other locations and in turn the economies in local communities.

Recommendations: In preparing the Final EIS for geothermal leasing, the BLM and FS must:

- consider the increasing importance of industries and economic sectors that rely on public lands for environmental amenities;
- examine the potential impacts that large-scale geothermal development on public lands may have on key indicators which characterize the modern western economy; and

- estimate the potential non-market benefits and costs associated with large-scale geothermal energy.

C. Visual resources

NEPA requires the agencies to “assure for all Americans . . . aesthetically . . . pleasing surroundings.” 42 U.S.C. § 4331(b)(2). FLPMA specifically directs the BLM to prepare and maintain inventories of the visual values of all public lands, 43 U.S.C. § 1711(a), and manage public lands “in a manner that will protect the quality of . . . scenic . . . values,” §1701(a)(8). BLM has interpreted these mandates as a “stewardship responsibility” to “protect visual values on public lands” by managing all BLM-administered lands “in a manner which will protect the quality of the scenic (visual) values.” BLM Manual 8400 – Visual Resource Management .02, .06(A). BLM utilizes visual resource inventories during its land use planning process to establish management objectives, organized into four classes. These objectives are as binding as any other resource objectives contained in the RMP. *See Southern Utah Wilderness Alliance*, 144 IBLA 70, 84 (1998).

These statutory and regulatory responsibilities are especially important because of the scenic values associated with use and enjoyment of the public lands and national forests, and also with the use and enjoyment of geothermal areas, specifically. The agencies should ensure that natural settings are protected – these settings are often vital to local and regional economies and for cultural resources. Viewsheds and scenic values should be considered as a factor for establishing buffers of protection from surface disturbance.

D. Wildlife habitat and fragmentation analysis

1) Endemic species

There are numerous species that rely on the geothermal characteristics of their habitat for survival. The PEIS should clearly identify these species, their range, and appropriate protections.

2) Habitat fragmentation analysis

Significant portions of the land that will be considered for geothermal energy development in the PEIS contain core habitat areas and migration linkages between those core areas, all of which need to be preserved in order for the regional ecosystems to continue to function. Fragmentation of wildlife habitat affects the ecological composition, structure, and functions of a landscape. Habitat fragmentation has been defined as the “creation of a complex mosaic of spatial and successional habitats from formerly contiguous habitat” (Lehmkuhl and Ruggiero 1991).

Although fragmentation can be difficult to measure, there are a variety of metrics that can be used to assess the degree of existing habitat fragmentation and the condition of the landscape, then applied to available data regarding distribution of wildlife and habitat, and ultimately used to make decisions regarding appropriate locations for geothermal energy projects. We recommend that the agencies complete such an analysis as part of the PEIS.

Existing road density can be calculated by measuring the length of linear features in a given sub-area at regular intervals and then reported as miles of route per square mile (mi/mi²). The degree of habitat fragmentation, the distribution of unroaded areas, or core areas, can also be measured and calculated based on the amount of land beyond a given distance or effect zone, from transportation routes (Forman, 1999). Wildlife species respond to disturbances related to this type of network at varying distances, so determining the size distribution of core areas for a range of effect zones (i.e., of 100ft, 250ft, 500ft and 1320ft) from all routes is also important. Wildlife literature will yield information on the effect zones for different species. For instance, an ongoing study by Sawyer et al. (2005, 2004, 2001) of GPS collared deer on the Pinedale Anticline observed that deer utilized habitat progressively further from roads and well pads over three years of increasing gas development and showed no evidence of acclimating to energy-related infrastructure. Birds are also impacted by roads and management practices associated with energy development, due to fragmentation, changes in vegetation and noise (Mabey and Paul, 2007; Robel, et al., 2004).

In addition to geothermal projects themselves, habitat fragmentation can be caused by transmission corridors, which will be necessary to transmit geothermal energy to electricity grids. Wildlife habitat fragmentation caused by transmission lines, pipelines, and roads generally fall into three broad categories:

1. Construction impacts (access, right-of-way clearing, construction of towers, stringing of cables);
2. Line maintenance impacts (inspection and repair); and
3. Impacts related to the physical presence and operation of the transmission line.

As such, wildlife habitat must be examined on an individual project and site-specific basis. The only way to accomplish this requirement is to ensure that each individual geothermal project is spatially evaluated for direct, indirect and cumulative impacts.

Specific activities that negatively impact wildlife and cause destruction of core habitat or habitat fragmentation include the construction of facilities, disturbance of soil by the use of heavy machinery, site clearing and grading, noisy machinery during construction and maintenance, removal of vegetation, use of herbicides, well drilling, and accidental release of hazardous materials.

The effects of these activities on wildlife can be severe and include removal of habitat, fragmentation of habitat, and the creation of edge effect vegetation and habitat (changes in composition, structure, microclimate, etc. of area adjacent to facility and transmission corridor). Species shown to avoid edges include red-backed vole, snowshoe hare, pine marten and red squirrels. In addition, it is logical to suspect that construction of facilities and transmission in previously undisturbed areas will lead to a direct loss of life to wildlife during construction, operation and service of transmission lines.

We have included The Wilderness Society's most recent Science and Policy Brief, "Habitat Fragmentation from Roads: Travel Planning Methods to Safeguard BLM Lands". This report provides a summary of available scholarly and government reports and studies on the impact of

habitat fragmentation on wildlife, provides methods for calculating habitat fragmentation, and provides recommendations on how to integrate fragmentation analysis into management. BLM should use the information provided in this brief (as well as related information from State Wildlife Action Plans, Audubon Important Bird Areas, and the Wildlands Network) to identify core areas, measure habitat fragmentation, conduct a thorough fragmentation analysis, and inform decisions regarding designation of lands as available for geothermal energy in the PEIS, as well as incorporating these requirements into the PEIS to guide analysis of specific projects.

E. Wilderness and/or roadless characteristics

As mentioned above, because the PEIS will be used to amend land use plans and tiered to in analyzing specific projects, the agencies must inventory the project area for lands with wilderness and/or roadless characteristics and exclude these areas from leasing and development, in order to prevent destruction of these values.

F. Cultural resources

Native and prehistoric cultures also prize geothermal resources, such that there is a significant overlap between geothermal resources and sacred sites. The National Historic Preservation Act affords heightened protection to these resources, establishing a cooperative federal-state program for the protection of historic and cultural resources. In particular, the review process set out in Section 106 (16 U.S.C. § 470f) obligates the agencies to consider the effects of management actions on historic and cultural resources listed or eligible for inclusion under NHPA. Further, Section 110 of the NHPA requires the BLM to assume responsibility for the preservation of historic properties it owns or controls (16 U.S.C. § 470h-2(a)(1)), and to manage and maintain those resources in a way that gives “special consideration” to preserving their historic, archaeological, and cultural values. Section 110 also requires the BLM to ensure that all historic properties within the National Monument are identified, evaluated, and nominated to the National Register of Historic Places. *Id.* § 470h-2(a)(2)(A).

The agencies must place special importance on consultation with Tribes and the PEIS should comment to a specific plan for ensuring identification, evaluation, nomination and protection of cultural resources prior to issuing leases. Further, places where Tribes have already raised concerns and those where there is known to be a significant concentration or high potential for such a concentration of cultural resources should be excluded or avoided from those lands prioritized for leasing and development.

G. GIS Data

As stated in our scoping comments, geographic information systems (GIS) data is critical for ensuring that existing resources can be mapped and considered in this PEIS and subsequent decisions. The agencies should not only obtain and analyze this data, they should also make it available to the public for use in understanding and commenting on impacts, as was done with the West-wide Energy Corridors Draft PEIS.

1) Lands with wilderness characteristics and proposed wilderness: GIS layers needed to complete the PEIS.

Prior to identifying areas appropriate for geothermal energy development as part of the PEIS, it is imperative that the agencies gather the necessary information to ensure that wilderness quality lands are not disturbed. The agencies have before them a unique opportunity to act as stewards of the public domain on a west-wide scale. By collecting and using appropriate GIS data layers before considering appropriate places for geothermal leasing and development, the agencies can ensure that they avoid disturbing our nation’s wild places. **We recommend that the agencies collect and use the following GIS data layers to map areas that are unacceptable for siting geothermal projects and in siting projects to avoid impacting the identified areas:**

State	Contact Information	
Alaska	Address: The Wilderness Society, Alaska 705 Christensen Drive Anchorage, AK 99501 Website: www.wilderness.org	Phone: (907) 272-9453 Email: ak_office@tw.s.org
Arizona	Address: Arizona Wilderness Coalition PO Box 529 Alpine, AZ 85920 Website: www.azwild.org	Phone: (928) 339-4426 Email: azwild@azwild.org
California	Address: California Wilderness Coalition 1212 Broadway, Suite 1700 Oakland, CA 94612 Website: www.calwild.org	Phone: (510) 451-1450 Email: info@calwild.org
Colorado	Address: Colorado Environmental Coalition 1536 Wynkoop Street #5C Denver, CO 80202 Website: www.ourcolorado.org	Phone: (303) 534-7066 Email: info@cecenviro.org
Idaho	Address: The Wilderness Society, Idaho 950 W. Bannock Street Suite 605 Boise, ID 83702 Website: www.wilderness.org	Phone: (208) 343-8153 Email: brad_brooks@tw.s.org
Montana	Address: Montana Wilderness Association PO Box 635 Helena, MT 59624	Phone: (406) 443-7350 Email: mwa@wildmontana.org

	Website: www.wildmontana.org	
Nevada	Address: Nevada Wilderness Project 8550 White Fir Street Reno, NV 89523	Phone: (202) 266-0465 Email:
	Website: http://www.wildnevada.org	
New Mexico	Address: New Mexico Wilderness Alliance 202 Central SE Suite 101 Albuquerque, NM 87102	Phone: (505) 843-8696 Email: Emailnmwa@nmwild.org
	Website: www.nmwild.org	
Oregon	Address: Oregon Wild 5825 North Greeley Portland, OR 97217-4145	Phone: (503) 283-6343 Email: info@oregonwild.org
	Website: www.oregonwild.org	
Utah	Address: The Wild Utah Project 68 South Main Street, Suite 400 Salt Lake City, UT 84101	Phone: (801) 328-3550 Email: wup@xmission.com
	Website: http://www.wildutahproject.org	
Washington	Address: The Wilderness Society, Seattle 720 3 rd Avenue, Suite 1800 Seattle, WA 98104	Phone: (206) 624-6430 Email: bob_freimark@tw.org
	Website: www.wilderness.org	
Wyoming	Address: Biodiversity Conservation Alliance P.O. Box 1512 Laramie, WY 82073	Phone: (307) 742-7978 Email: erik@voiceforthewild.org
	Website: www.biodiversityassociates.org	

Attached with the hard copy of these comments is a CD of GIS data for all available citizen-proposed wilderness areas for Colorado, Idaho, New Mexico, Utah, and Wyoming, current as of September 2008. The offices above can always be contacted for the most current versions of these data; GIS data for Citizen Proposed Wilderness Areas for Alaska, Arizona, California, Montana, Nevada, Oregon, and Washington can be obtained by contacting the offices above.

Many lands with wilderness characteristics have been inventoried and mapped by BLM field offices as part of RMP revisions. BLM should use this data to identify exclusion areas for geothermal leasing. Further, in identifying additional lands with wilderness characteristics, BLM should use GIS mapping to identify exclusion areas, and the agency should make these data layers available to the public as part of their PEIS.

2) Other GIS layers needed to complete the PEIS

As stated above, because the siting of geothermal projects will have significant and long lasting impacts on public lands, it is critical that the agency gather, analyze, and make available to the public any GIS layers which describe sensitive or protected areas. In addition to the lands with wilderness characteristics, citizen proposed wilderness, and wilderness inventories discussed above, we recommend that the agencies **collect and use the following GIS data layers to map areas that are unacceptable for siting geothermal projects and in siting projects to avoid impacting the identified areas:**

1. Designated Wilderness Areas;
2. Wilderness Study Areas;
3. National Monuments;
4. National Conservation Areas;
5. Other lands within BLM's NLCS;
6. National Historic and National Scenic Trails;
7. National Wild, Scenic, and Recreational Rivers, study rivers and segments, and eligible rivers and segments;
8. ACECs, including Outstanding Natural Areas and Research Natural Areas;
9. Forest Service Research Natural Areas;
10. Threatened, endangered and sensitive species habitat (available from USFWS², state wildlife agencies and, for BLM lands, from NatureServe³; critical cores and linkages for wildlife habitat (available from USFWS and state wildlife agencies, including in State Wildlife Action Plans, as well as the Wildlands Project and its affiliated regional organizations⁴) important bird areas (available from BLM and the National Audubon Society⁵);
11. Riparian areas (available from SWReGAP⁶, except for California, which is available from the UCSB Biogeography Lab⁷); and
12. Yellowstone Controlled Groundwater Area (available from Montana's Department of Natural Resources and Conservation, 406-586-5243),

Recommendations: The agencies should complete the additional collection of data and analysis of impacts outlined above, then revise the PEIS to incorporate the results into the selected alternative.

² http://www.fws.gov/southwest/es/newmexico/ES_home.cfm

³ NatureServe was contracted to identify and map locations of threatened and endangered species habitat that exist only on BLM lands – making these areas even more critical to the survival of the species. This data can be found at www.natureserve.org

⁴ <http://www.twp.org/cms/page1158.cfm>

⁵ <http://www.audubon.org/bird/IBA/>

⁶ <http://ftp.nr.usu.edu/swgap/>

⁷ http://www.biogeog.ucsb.edu/projects/gap/gap_home.html

IV. Additional Analysis Is Required Prior to Leasing and Development.

The agencies have stated that this PEIS will be used to “develop a comprehensive list of stipulations, best management practices, and procedures to serve as consistent guidance for future geothermal leasing and development on public and NFS lands” and to “amend the BLM Resource Management Plans (RMPs) to adopt the resource allocations and procedures.” 73 Fed.Reg. 33803. These uses require that the PEIS include sufficient environmental analysis to justify decisions and also commit the agencies to further analysis prior to approval of leasing.

A. Tiering to the PEIS must be limited and unequivocal commitments to site-specific NEPA analysis included in the PEIS and land use plan amendments.

The PEIS will identify lands that are available for leasing. In order to support amendment of BLM land use plans and for the Forest Service and the BLM to tier to the PEIS in connection with subsequent decision-making processes, the analysis conducted under NEPA must be sufficiently robust to support the determination that specific lands are suitable for development. NEPA requires the agencies to take a “hard look” at the potential environmental consequences of this proposed action, so that they must assess impacts and effects that include: “ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative.” 40 C.F.R. § 1508.8. In the context of a programmatic EIS, “the overview or area-wide EIS would serve as a valuable and necessary analysis of the affected environment and the potential cumulative impacts of the reasonably foreseeable actions under that program or within that geographical area.” Council on Environmental Quality, *Forty Most Asked Questions Concerning CEQ’s National Environmental Policy Act Regulations*, Question 24b, available at <http://ceq.hss.doe.gov/nepa/regs/40/40p3.htm>. For future projects, the agencies can tier to the environmental analysis in the PEIS, but this incorporation “would be followed by site-specific or project-specific EISs,” which “would make each EIS of greater use and meaning to the public as the plan or program develops.” *Id.*, Question 24c.

In addition, NEPA requires the consideration of a reasonable range of alternatives as part of evaluation of a proposed action. NEPA requires the agencies to “rigorously explore and objectively evaluate” a range of alternatives to proposed federal actions. *See* 40 C.F.R. §§ 1502.14(a), 1508.25(c). “An agency must look at every reasonable alternative, with the range dictated by the nature and scope of the proposed action.” *Nw. Env’tl. Defense Center v. Bonneville Power Admin.*, 117 F.3d 1520, 1538 (9th Cir. 1997). An agency violates NEPA by failing to “rigorously explore and objectively evaluate all reasonable alternatives” to the proposed action. *City of Tenakee Springs v. Clough*, 915 F.2d 1308, 1310 (9th Cir. 1990) (quoting 40 C.F.R. § 1502.14). This evaluation extends to considering more environmentally protective alternatives and mitigation measures. *See, e.g., Kootenai Tribe of Idaho v. Veneman*, 313 F.3d 1094, 1122–23 (9th Cir. 2002) (and cases cited therein). In the context of analyzing specific leases, the range of alternatives should also include an alternative not to lease at all.

The PEIS acknowledges the need for additional environmental analysis, although it defers the level of review for individual permits to be determined at the BLM field office or FS unit and

provides for that analysis to be either an EIS or a “tiered environmental assessment (EA),” depending on the extent to which “this PEIS anticipates issues and concerns associated with individual projects, including potential cumulative impacts.” Draft PEIS, p. 2-22. This statement properly acknowledges the need for site-specific analysis, but is too general.

Recommendation: Based on the general level of analysis included in the Draft PEIS, the PEIS and the subsequent amendments to BLM land use plans should specifically and unequivocally require site-specific environmental review prior to approval of projects, including opportunities for public comment and addressing direct, indirect and cumulative impacts. Both of these documents should state that an EIS will be presumed to be required unless the Forest Service or BLM determines that all site-specific concerns have been addressed in this PEIS and the cumulative impact analysis has not substantively changed. There should also be a specific commitment to considering a range of alternatives, including an alternative not to issue a lease for geothermal development.

B. Additional limitations on tiering.

The Draft PEIS acknowledges that the RFD, which forms the basis for the cumulative impact analysis, is limited, stating:

The RFD was based on a review of recent government and industry reports providing assessments of geothermal potential across the western US (Western Governors’ Association 2006; DOE and BLM 2003; NREL 2006; BLM 2007a; Geothermal Energy Association 2007a) and the typical impacts associated with geothermal development (GeothermEx 2007). Few quantitative evaluations have been conducted at this scale, and those that exist are considered largely speculative due to the wide array of variables around future geothermal development. These variables include the speculative estimation of unexplored geothermal resources, the development of geothermal technologies that may allow for extraction of resources currently unusable, the unknown nature of future energy markets, and the unknown future of regulatory and political climates.

Draft PEIS, p. 2-33. Accordingly, where technologies not specifically addressed in the PEIS are proposed, their environmental consequences have not been thoroughly discussed, requiring a new assessment. Similarly, where leases are proposed in areas that were not identified in the PEIS, new analysis is required. Further, if new technologies, geographic areas or economic, regulatory or other conditions change, the cumulative impact analysis in the PEIS will no longer be accurate.

Recommendations: The PEIS should clearly state the limitations of the issues analyzed, the limitations on tiering to the PEIS for environmental analysis, and the need to update the cumulative impacts analysis if relevant factors change.

C. Best management practices must be mandated for incorporation in all permits and should not be subject to waiver, exception or modification.

The Draft PEIS sets out important protective terms and conditions that should be incorporated into permits. *See*, Draft PEIS, pp. 2-16 – 2-17. However, different portions of the Draft PEIS refer to these terms and conditions as those that “will” or “may” apply, giving the impression that some of these terms are required to be incorporated into permits and others may not be, even when they are applicable to a proposed location. Further, since the BLM routinely permits waiver, exception and modification of stipulations and conditions in the context of oil and gas development, there is not guarantee that these measures will be applied.

Best management practices are an important vehicle for mitigating impacts of geothermal development. However, without a definitive commitment to their use, these practices cannot be relied upon to reduce environmental consequences. *See, e.g.*, Council on Environmental Quality, *Forty Most Asked Questions Concerning CEQ’s National Environmental Policy Act Regulations*, Question 19, *Davis v. Mineta*, 302 F.3d 1104, 1125 (10th Cir. 2002).

Recommendation: The PEIS must clearly state that all best management practices, stipulations and conditions are required to be incorporated into permits where the resources that they are designed to protect are present. Further, these provisions should not be subject to waiver, exception or modification unless very narrow, specific qualifications are met and should not be available at all in the context of no surface occupancy stipulations.

D. Compliance with Section 106 of the NHPA and Section 7 of the ESA.

The Draft PEIS states that consultation under Section 106 of the National Historic Preservation Act and Section 7 of the Endangered Species Act will occur prior to leasing and additional consultation will occur as needed for specific projects. Draft PEIS, p. 2-21.

Recommendation: The PEIS should maintain a specific commitment to engaging in consultation prior to leasing and as needed throughout evaluation of a project.

V. The Pending Applications Should Be Assessed in Accordance with the Recommendations Set Out for New Leasing.

A. Pending lease applications should be subject to the screens listed in Section II prior to approval

The 19 pending lease applications should be subject to the screens listed in Section II. Any pending lease applications which conflict with the screens in Section II should either be required to alter their boundaries to avoid citizen-proposed wilderness, inventoried roadless areas, lands with wilderness characteristics and other lands with special values, or the leases should be denied.

The following lease applications encompass lands that are in Forest Service Inventoried Roadless Areas: CACA 043745, 043744, 042989 - Modoc National Forest; NVN 074289 - Humboldt-Toiyabe National Forest/Battle Mountain District; OROR 017049, 017327 - Mt. Hood National Forest; OROR 054587 - Willamette National Forest; WAOR 056025, 056058, 052069 - Mt. Baker National Forest.

The following lease applications encompass lands that are in citizen-proposed wilderness areas: CACA 043745, 043744, 042989 – Modoc National Forest/BLM Surprise Field Office; OROR 017149, 017503 – Mt. Hood National Forest/BLM Prineville Field Office.

Specific comments on individual lease applications are set out in Appendix B to these comments, attached and incorporated by reference.

Recommendation: If pending applications conflict with the screens in Section II, the agencies should either alter the lease boundaries to avoid the conflict or deny the application.

B. Because the pending lease applications anticipate the use of binary cycle systems, the agencies should prioritize leases in areas that are not controversial and have well-documented resources, and consider use of conditional development leases until the technology is proven to be successful

As discussed in previous sections of the comments, because the binary cycle technology proposed for development in the pending lease applications has not been thoroughly tested, the proposed development requires a careful, measured approach to minimize potential impacts.

Recommendation: The agencies should consider prioritizing approval of applications and use of conditional development leases until technology is proven to be successful.

We look forward to continuing to participate in this process. Please feel free to contact us if you have any questions or need additional information. We would also welcome the opportunity to meet with you to present and discuss these comments in person.

Sincerely,

Nada Culver
Senior Counsel, Public Lands Campaign
BLM Action Center
(303) 650-5818 Ext. 117
Nada_culver@tws.org

AND ON BEHALF OF:

Jeff Kuyper, Executive Director
Los Padres ForestWatch
Post Office Box 831
Santa Barbara, CA 93102

Amy Harwood
Bark

PO Box 12065
Portland, OR 97212

Brent Fenty, Executive Director
Oregon Natural Desert Association
33 NW Irving Avenue
Bend, OR 97701

Michael J. Painter, Coordinator
Californians for Western Wilderness
P.O. Box 210474
San Francisco, CA 94121-0474

Doug Heiken, Conservation and Restoration Coordinator
Oregon Wild
PO Box 11648
Eugene OR 97440

Bruce Pendery, Staff Attorney & Program Director
Wyoming Outdoor Council
444 East 800 North
Logan, UT 84321

Craig Kenworthy, Conservation Director
Greater Yellowstone Coalition
PO Box 1874
Bozeman, MT 59771

Ceal Smith
San Luis Valley Water Protection Coalition
P.O. Box 351
Alamosa, CO 81101

Scott Greacen, Executive Director
EPIC- Environmental Protection Information Center
#122
600 F. St., Suite 3
Arcata, CA 95521

Kimberly Baker, Forest and Wildlife Protection Coordinator
Klamath Forest Alliance
P.O. Box 21
Orleans, CA 95556

Tom Darin
Staff Attorney, Energy Transmission

Western Resource Advocates
2260 Baseline Rd., Suite 200
Boulder, CO 80302

Carl Zichella
Director of Western Renewable Programs
Sierra Club
801 K Street, Suite 2700
Sacramento, CA 95814

Johanna H. Wald
Natural Resources Defense Council
111 Sutter Street
San Francisco CA 94104

Michelle Berditshevsky, Executive Director
Mount Shasta Bioregional Ecology Center
P.O. Box 1143
418 South Mount Shasta Boulevard
Mount Shasta, CA 96067

Janie Painter
Save Medicine Lake Coalition
Medicine Lake Citizens for Quality Environment
PO Box 34
Mount Shasta, CA 96067

Sandy Bahr
Conservation Outreach Director
Sierra Club - Grand Canyon Chapter
202 E. McDowell Rd, Suite 277
Phoenix, AZ 85004

Pete Nelson
Director, Federal Lands Program.
Defenders of Wildlife
1130 17th Street N.W.
Washington D.C. 20036-4604

Kyle Haines
Klamath Forest Alliance
Eastside Office
P.O. Box 457
Klamath Falls, OR 97601

Tim Stevens

Yellowstone Program Senior Manager
Northern Rockies Regional Office
National Parks Conservation Association
109 W. Callender St., Suite 3E
Livingston, MT 59047

Attachments and References

Attachments

Habitat Fragmentation from Roads: Travel Planning Methods to Safeguard BLM Lands, The Wilderness Society.

Have Desert Researchers Discovered a Hidden Loop in the Carbon Cycle?, Science, Vol. 320, pp. 1094-140 (June 13, 2008)

Map of the Yellowstone Controlled Groundwater Area, courtesy of Montana Department of Natural Resources and Conservation's Water Resources Division. 2273 Boot Hill Court Suite 110, Bozeman, MT 59715. 406-586-5243.

Statement of Destry Jarvis, Vice President for Conservation Policy, National Parks Conservation Association, Before the Subcommittee on Natural Resources Development and Production, U.S. Senate (April 24, 1986).

GIS data

Appendix A – Specific locations that require protection from geothermal leasing.

Appendix B – Comments on individual leasing applications

References

Bennett, K. and McBeth, M.K. 1998. Contemporary Western rural USA economic composition: potential implications for environmental policy and research. *Environmental Management*. 22(3): 371-381.

Duffy-Deno, K. T. 1998. The effect of federal wilderness on county growth in the intermountain western United States. *Journal of Regional Science*. 38(1): 109-136.

Holmes, F.P. and Hecox, W.E. 2004. Does wilderness impoverish rural regions? *International Journal of Wilderness*. 10(3): 34-39.

Johnson, T.G. 2001. The rural economy in a new century. *International Regional Science Review*. 24(1): 21-37.

Johnson, J. and R. Rasker. 1993. The role of amenities in business attraction and retention. *Montana Policy Review*, Vol. 3, No. 2.

Johnson, J.; Rasker, R. 1995. The role of economic and quality of life values in rural business location. *Journal of Rural Studies*, 11(4): 405-416.

Loomis, J. 1993. *Integrated public lands management*. Columbia University Press, New York

Morton, P. 1999. The economic benefits of wilderness: theory and practice. *University of Denver Law Review*. Volume 76, No. 2 pp. 465-518.

Power, T. 1995. Economic well being and environmental protection in the Pacific Northwest: a consensus report by Pacific Northwest economists. Missoula, MT: University of Montana.

Power, T. M. 1996. Lost landscapes and failed economies. Island Press, Covelo, CA.

Rasker, R. 1994. A new look at old vistas: the economic role of environmental quality in western public lands. University of Colorado Law Review. Volume 52, Issue 2 pp369-399.

Rasker, R., Alexander, B., van den Noort, J., Carter, R. 2004. Public Lands Conservation and Economic Well-Being. The Sonoran Institute, Tucson, AZ.

Rudzitis, G. 1999. Amenities increasingly draw people to the rural West. Rural Development Perspectives. 14(3): 9-13.

Rudzitis, G.; Johansen, H. E. 1989. Amenities, Migration, and Nonmetropolitan Regional Development. Report to Nat. Science Foundation, Dept. of Geography, Univ. of Idaho.

Whitelaw, E., et al. 2003. A letter from economists to President Bush and the governors of eleven western states regarding the economic importance of the west's natural environment. (100 total authors) Available at: <http://www.econw.com/pdf/120303letter.pdf>

Appendix A: Places for Special Consideration

This appendix identifies:

- I. Places to avoid on BLM and Forest Service lands because of the existence of sensitive resources which would suffer negative impacts from geothermal development; and
- II. NPS units which, though already excluded from geothermal development in the PEIS, will require additional analysis of potential impacts prior to permitting geothermal development in their proximity. This additional analysis is necessary because of the potential impact to geothermal resources within the NPS units from subterranean connections to areas which may be developed outside the NPS units. If such analysis finds the potential for impacts to geothermal resources within the NPS units, the development should not be allowed or should be required to follow lease stipulations and Best Management Practices designed to prevent such impacts.

I. Places to Avoid

Consultation with local conservation groups has highlighted places that are inappropriate for geothermal development because of sensitive resources which would be heavily impacted from geothermal development.

A. Medicine Lake Highlands: 30 miles northeast of Mount Shasta, the Highlands are vitally sacred to local Tribes including the Pit River Tribe, contain two roadless areas, and sit on a pure aquifer that provides up to 25% of California's waters via the Fall River Springs. The entire uplift of the Medicine Lake Volcano above the 6,000-foot elevation was designated as eligible for the National Register of Historic Places based on its value to local and regional Tribes. This area has already seen proposals for geothermal development and requires formal protection.

B. Mount Shasta: All five local Tribes consider Mount Shasta to be sacred in its entire and, to date, the Forest Service has not consented to lease due to "the risk of adverse impacts to cultural and historic values" on this "iconic landmark known world-wide for its beauty and spiritual significance." This area is the subject of numerous lease applications and requires agency action to reiterate that it is excluded from geothermal development.

II. NPS Units

Lands managed by the NPS are not available for leasing and development in the PEIS, but geothermal energy development on lands managed by the BLM or Forest Service in proximity to the NPS units may damage them. Consequently, these lands serve as areas where appropriate protective buffers from leasing are needed and/or should be further assessed.

A. NPS Units with significant thermal features.

Many NPS units contain important thermal features that could be negatively impacted by geothermal development. The agencies should therefore work closely with the NPS and the USGS during leasing and development to ensure that these resources are protected. Where

appropriate, the agencies must provide buffers to protect the thermal resources of the following parks, listed in 30 U.S.C. § 1026(a):

1. Mount Rainier National Park, Washington
2. Crater Lake National Park, Oregon
3. John D. Rockefeller, Jr. Memorial Parkway, Wyoming
4. Bering Land Bridge National Preserve, Alaska
5. Gates of the Arctic National Park and Preserve, Alaska
6. Lassen Volcanic National Park, California
7. Katmai National Park, Alaska
8. Aniakchak National Monument and Preserve, Alaska
9. Lake Mead National Recreation Area, Arizona/Nevada
10. Wrangell-St. Elias National Park and Preserve, Alaska
11. Corwin Springs Known Geothermal Resource Area, Montana
12. Lake Clark National Park and Preserve, Alaska

B. NPs units previously identified as impacted, or with high potential for impact, by present, proposed, or high potential for geothermal exploration and production activity:

1. Lava Beds National Monument,
2. Bandelier National Monument,
3. Hawaii Volcanoes National Park, Hawaii
4. Death Valley National Monument, California
5. North Cascades National Park, Washington
6. Sequoia National Park, California

C. NPs units that may be inferred to have potential for geothermal development based on recent volcanic activity in the area and/or features (e.g. hot springs, fumaroles, geysers, etc.) within their boundaries:

1. John D. Rockefeller Jr. Memorial Parkway,
2. Lake Clark National Park and Preserve,
3. Casa Grand National Monument,
4. Devils Postpile National Monument,
5. Haleakala National Park,
6. Joshua Tree National Monument,
7. Santa Monica Mountains National Recreation Area,
8. Walnut Canyon National Monument,
9. Yosemite National Park, California
10. Wupatki National Monument,
11. Capulin Mountain National Monument,
12. Sunset Crater National Monument,
13. Craters of the Moon National Monument,
14. Hot Springs National Park,
15. Aniakchak National Monument and Preserve
16. Katmai National Park and Preserve

17. Lake Mead National Recreation Area
18. Great Sand Dunes National Monument
19. Big Bend National Park,
20. Olympic National Park,
21. Bering Land Bridge National Park,
22. Denali National Park and Preserve,
23. Gates of the Arctic National Park and Preserve
24. Glacier Bay National Park and Preserve
25. Cape Krusenstern National Monument
26. Whiskeytown National Recreation Area
27. Point Reyes National Seashore
28. Muir Woods National Monument
29. John Muir National Historic Site
30. Eugene O'Neil National Historic Site
31. Fort Point National Historic Site
32. Golden Gate National Recreation Area
33. Kings Canyon National Park
34. Pinnacles National Monument
35. Cabrillo National Monument

Appendix B: Comments on Specific Pending Lease Applications

El Centro Field Office (Draft PEIS, Chapter 12)

Recommendation: Subject to the screens listed in Section II and all of the other recommendations included in these comments, this lease should be approved. This will protect the other resources of this area while still allowing development of the geothermal resource and the benefits to climate change from renewable energy development.

Modoc National Forest/Surprise Field Office (Draft PEIS, Chapter 13)

The pending lease applications have significant conflicts, overlapping nearly entirely with FS Inventoried Roadless Areas (IRAs) and Citizen Wilderness Inventory Areas (CWIAs). The pending lease applications overlap with the Powley and Soldier IRAs and the Powley Creek and Cedar Mountain CWIAs. However, the DPEIS states that development would result in two binary power plants outside of these conflict areas – one on the private lands of pending lease site CACA 043745 and one in the northwestern portion of pending lease application site CACA 043745 (DPEIS 13-8).

The PEIS also acknowledges that there are known cultural resources in the area of the leases (and even within one of the leases), which would be “considered significant cultural resources to the local Native Americans and tribes.” (PEIS, p. 13-39)

The PEIS further states that areas of potential affect such as access roads, power plants, well pads, etc., would be analyzed at the project specific level and require inventories, evaluations, and appropriate treatments as outlined in the BMPs. As detailed in Appendix D of the PEIS, this would include:

- Unexpected discovery of cultural resources stops development work and requires notice of the responsible BLM officer for evaluation and development of appropriate mitigation measures;
- Section 106 of the National Historic Preservation Act compliance before any specific permitting under the leases; and Development of a Cultural Resources Management Plan if cultural resources are identified at the site, or if areas with high potential to contain cultural materials have been identified.

Under these BMPs, BLM would also conduct Section 106 consultation with the SHPO, Native American tribes with historic ties to the area, and local historic preservation groups. Project specific impacts after leasing would be reduced by implementing these BMPs.

Recommendation: The boundaries of these pending lease applications should be redrawn to exclude the IRAs and CWIAs, or the applications should be denied. Due to the presence of significant cultural resources in the area and even within one lease boundary, it is critical that the agencies follow the BMPs set out in the PEIS to protect these resources. If the lease boundaries are redrawn to exclude IRAs and CWIAs, and subject to the screens listed in Section II and all of the other recommendations included in these comments, this lease should be approved. This will protect the other resources of this area while still allowing development of the geothermal resource and the benefits to climate change from renewable energy development.