



January 16, 2009

Dear Department of Interior Task Force on Climate Change:

Please accept the comments of The Wilderness Society on the Department of the Interior Task Force on Climate Change Draft Subcommittee Reports.

Overall, it is evident that the reports are the product of a considerable investment of time of dozens of Department of Interior (“DOI”) staff and represent a critical and necessary first step in a much needed multi-step action plan to orient DOI on a path towards comprehensively addressing the impact of a changing climate to our public lands. We are disappointed that it is only in the waning days of an eight year Administration that this report is released, but are optimistic that the incoming Administration can leverage the thinking done by this Task Force and step out quickly with a plan for implementation and action.

Our comments include several general comments relevant to the larger Task Force effort followed by comments specific to each of the Reports.

GENERAL COMMENTS

➤ On several occasions the Reports assume that that “any broader laws or policies concerning that regulation of greenhouse gases will result from congressional or overarching executive branch action rather than falling under DOI jurisdiction and decision making.” Similarly, the Reports assume that “indirect GHG emissions from public lands, for example, from products mined from public lands, will be the subject of Congressional action or broad executive branch policies.”

Whether this assumption is accurate or not, DOI cannot pass responsibility entirely and at a minimum should engage actively in supporting the need for law or policy that immediately cuts global warming pollution now. There is broad scientific agreement that keeping global average temperatures from increasing more than another 2 degrees Fahrenheit from today’s levels is necessary if we are to avoid the worst impacts of climate change. According to the Nobel Prize-winning Intergovernmental Panel on Climate Change, we have a reasonable chance of meeting this objective if developed countries as a whole cut their emissions 25-40 percent from 1990 levels by 2020 and at least 80 percent by 2050; within this time frame, major developing countries as whole must also act promptly to slow their emissions growth and then substantially reduce their

emissions. To be within this range in 2020, the U.S. would have to reduce its emissions by 35 percent from current levels.

➤ The Reports are premised on the belief that near term changes are “likely to be within the range of variation seen in weather variability historically” and therefore can be addressed by the flexibility of our existing legal and policy system, whereas it will only be in the longer term that changes will be so pronounced and dramatic as to require significant changes to, or entirely new, law and policy. (Some exceptions to this notion, especially, for example, in Alaska are noted.) This premise is likely not entirely reliable, however.

On December 16, 2008 the U.S. Climate Change Science Program released a report that found certain results of climate change are occurring faster than previously expected.¹ In addition to the principle finding of higher ocean level rises due to ice sheets melting at greater rates, the report also found the Western United States could be entering a period of long-term, sustained drought. Given that changes are occurring much faster than they previously predicted, it is likely that “short-term” and “long-term” effects will in fact be more akin to “immediate term” and “short-term”, which will require much quicker implementation of the report’s recommendations.

➤ The Task Force’s need to divide their work between subcommittees is understandable and largely makes sense. However, as noted early in the Law & Policy Report, there is considerable overlap between “policy” (purview of the Law & Policy subcommittee) and “management” purview of the Land & Water subcommittee) and too bright of a separation between the two is artificial. The Task Force will need to make a concerted effort to integrate the work of the subcommittees’ in order to ensure effective and complementary approaches. As acknowledged in the report, changing existing law and policy faces a longer time frame as a practical matter, but this longer time horizon should not be an impediment to implementing critical shorter time frame management needs.

➤ The reports highlight “increased temperature, changes in precipitation patterns, and sea level rise” as primary effects of climate change on DOI lands. However, as the Department moves forward with its analysis as they relate to climate change, it should explicitly recognize that climate change causes a wide range of impacts that are only indirectly tied to these three factors, including storm intensity, increased variability of all climate metrics, disappearance of sea ice, glaciers, and permafrost, etc.

➤ Both the Law & Policy and Land & Water Management Reports discuss options for a Secretarial Order. It is imperative that the Administration provide strong policy direction to the agencies. Our recommendation is to provide both a top-level mandate through a Presidential executive order as well as through an updated Secretarial Order. We concur with the discussion and Option 3 recommendation (p. 50) in regards to **revisiting and reissuing Secretarial Order 3225**. Issuance of a revised order should be a near-term priority. Bureau specific “step down” guidance might also be necessary, but

¹ For more information see: <http://www.usgs.gov/newsroom/article.asp?ID=2091>

such guidance should not supplant a Secretarial Order that provides department-wide consistency and direction. Such a Secretarial Order should also require that all management decisions include analyses of the impacts of proposed decisions on emissions of GHG from the projects proposed, and mitigation options for such activities. To the extent that some DOI planning and NEPA documents consider global warming, they all fail to take any action to mitigate the impacts or protect and strengthen ecological health.

The Secretarial Order should acknowledge that significant activities permitted to occur on federal lands, especially fossil fuel extraction projects, are major contributors to U.S. GHG emissions. For example, roughly half of the coal mined (and combusted)—nearly half a billion tons per year—in the U.S. derives from federal lands, and close to one-third of oil produced in the U.S. comes from federal lands and waters. Federal agencies with responsibilities for managing these resources, (i.e., the BLM and MMS) should be required to assess the magnitude of the contributions to GHG emissions from these activities, and analyze various options for avoiding or mitigating the consequences of the use of these resources.

➤ It is extremely important to **acknowledge the costs of inaction** regarding global warming. Climate change is affecting natural resources of all types: freshwater availability, agricultural productivity, soil fertility, and the survival of species. Human health depends on the health of our ecosystems, from providing fresh, clean drinking water to capturing carbon from the atmosphere. These “ecosystem service” benefits of nature are enjoyed free of charge by households and communities, and contribute significantly to human economies. Though our very well-being is totally dependent upon the continued flow of these “ecosystem services” they are generally treated in policy discussions as public goods with no markets and no prices, so are rarely detected by our current economic evaluations. Where these benefits have been reliably quantified the values are staggering. For example, tourism and outdoor recreation in the United States has been valued at a \$112 billion market.

COMMENTS ON THE REPORT OF THE SUBCOMITTEE ON LAW AND POLICY

➤ Overall, the Law & Policy report provides a comprehensive overview of the range of legal and policy issues that the DOI will need to address. Many of the issues involve cross-jurisdictional challenges that will require skill, finesse and, likely, lengthy negotiations. As noted, it will be important to give early consideration of issues that will need to be addressed in the mid- and long-term. We urge the incoming Secretary to reach out quickly to Congress and state and federal interests. In the absence of clear direction on who of these various parties should take the lead initiating further planning, we encourage DOI to step forward and lead by example. More months of inaction is not what is needed.

➤ The report focuses solely on water scarcity, while downplaying the **use of water in many mining applications** (p. 27). However, in addition to this important issue, other climate change-related stressors may affect DOI mining claim responsibilities. For example, shifting habitats could change the ecological value of land, as parcels become better suited as habitat for endangered species. Similarly, conditions for post-mining land restoration may need to change in order to reflect future needs of species. The option presented in this section focuses on private sector economic impacts associated with water scarcity and mining claims. In addition to monitoring for impacts on mining operations, current and projected water resources should be monitored with respect to ecosystem and human community needs.

➤ While FWS has “already faced the issue of how far to go in maintaining endangered species,” this report highlights the potentially daunting scale at which species may be threatened and endangered as a result of climate change. Unlike previous cases, climate change will likely present a host of species with significant challenges both immediate and long-term. The section on **Habitat Lost** (p. 36) goes into little discussion of how DOI intends to grapple with the important challenges it will face in terms of managing for species that have lost their traditional habitat. In addition to “criteria for recognizing and addressing the situation when a species will inevitably become extinct” (Option 3), a “triage” process may be needed in order to more effectively allocate Department resources as an increasing number of species become at risk of extinction due to the effects of climate change.

➤ **Reliance on history as a guide to management.** In several sections of the Report, there is reference to the practice (dictated either by law or simply by convention) of managing “to maintain or restore historic conditions.” The report acknowledges that this is likely to become increasingly difficult under a changing climate and suggests that a change in policy may be needed, particularly in the Management Policy of the National Park Service. We applaud the recognition of the challenge of maintaining historical conditions in the face of climate change, but we caution against eliminating the direction to manage for natural conditions. “Natural conditions” occupy a venerated place in our nation’s system of conservation laws. Maintaining “scenery and the natural and historic objects and wild life” has been the explicit duty of the NPS since its inception, and laws like the Wilderness Act, the National Forest Management Act, and others direct agencies to protect our natural heritage. It is true that our understanding of the meaning of “natural” has deepened beyond the simplistic notion of “unaffected by humans” to include historical ecological conditions, “untrammelled” landscapes, and places without obvious human impacts, but the fundamental goal of conservation remains to protect nature in its various forms. We do not believe that it would be appropriate to abandon the distinction between natural and man-made simply because of the difficulty of sustaining nature in the face of a man-made shift in climate.

The proliferation of meanings of naturalness has spawned a proliferation of land management classes from wilderness, which is managed to minimize human control, to national parks, where human imprint on the scenery is kept to the minimum necessary to provide for its enjoyment, to wildlife refuges and some national parks that are managed

explicitly to conserve aspects of historical biodiversity. In addition to conserving the multiple meanings of naturalness, this system provides a diversity of approaches to conservation – a diversity that will be increasingly needed as we face an uncertain future under climate change. The fact that we don’t currently know how best to conserve nature under a changing climate suggests that we will need to apply a range of management practices across the landscape – from the heavy-handed restoration allowed on “multiple-use” lands to the “hands off” approach of wilderness.

While we appreciate consideration of “coordinated property management...across federal and public land owners” as an option to “make it easier to reach mutual national public goals” (p.62), we are disappointed not to see conservation of natural conditions, especially historical biodiversity, articulated as the goal of management for all Departmental lands under a changing climate. We appreciate consideration of a revised and updated Secretarial Order on Climate Change, but we are disappointed to see the option limited to discussion of some vague “focal point” (p. 50). The Wilderness Society specifically recommends the inclusion of an option that directs agencies to conserve biological diversity to the maximum extent allowed under statute, with particular emphasis on public lands and water and incentives for private land conservation.

Further, because of the crucial role that wilderness promises to play in a multi-faceted approach to nature conservation under climate change, we recommend that the Secretary rescind the suite of instruction memoranda implementing the 2003 *Utah v. Norton* settlement, collectively and popularly known as the “No More Wilderness” policy, and direct all Interior agencies to inventory and protect wilderness-quality lands.

- **Invasive Species** (pp. 34-36): Option 1 addresses the need for an invasive species risk assessment only when a management option involves “moving a species outside its historic range”; however, other strategies (such as establishing new corridors, refuges, etc.) may benefit from such analysis.
- We appreciate reference to the creation of targeted **land acquisition programs** (p. 34) to meet habitat acquisition strategies, but note that the option is raised only in the context of migratory bird refugia and no mention is made of successful land acquisition programs such as The Land and Water Conservation Fund. In addition, while administered by Forest Service, another model for DOI to consider is the Forest Legacy Program. Providing opportunities for all species to migrate or shift their ranges as temperatures and other conditions change is essential to the survival of plants, fish and wildlife. As noted in our comments on the Land & Water Management chapter, it is not realistic to imply that these acquisition programs are adequate in their current form or at current funding levels.
- Consultation with the **State of Alaska on subsistence issues** should also include BIA and tribal representatives. This dialogue should move beyond “potential questions relating to Title VIII”, to include identifying actions needed after parties have identified items of concern pertaining to Title VIII.

- We support the concept described in the report of **instituting a “no regrets” or “double benefits” approach** whereby actions are taken that will help the resource regardless of climate change effects and at the same time provide benefits in terms of managing the effects of climate change. While this concept is discussed only in the context of NPS, it should be expanded Department wide.

- We also support an emphasis on **consistency of information and guidance, as well as intra-departmental integration**. Access to consistent information as well as shared analytical approaches to decision making is critical and should not preclude acknowledgment of the differences in mission between the various Services and Bureaus within the Department. We support both the idea of inter-and intra-Departmental Advisory Committees that can facilitate the development and implementation of such shared direction and resources.

- The background section on **land use planning**, and particular the section on public lands managed by FLMPA shortchanges the *existing* obligation of DOI to analyze climate change impacts in land use planning decisions. In April 2007, the U.S. Supreme Court issued a decision that recognized the severity of the climate change crisis, and the U.S. Environmental Protection Agency’s obligation to confront the problem. The Supreme Court held, in Massachusetts v. EPA, 127 S. Ct. 1438 (2007), that the “unambiguous” definition of “air pollutants” includes carbon dioxide and other greenhouse gases. Evidence abounds that carbon dioxide is present in the atmosphere at concentrations that will be injurious to human health and welfare, animals and plant life. Accordingly, given the Supreme Court’s conclusion that, “[t]he harms associated with climate change are serious and well recognized,” the federal government has a responsibility to take action to reduce it, even if such action may not completely reverse global warming. Neither DOI nor BLM in particular is not exempt from that responsibility.

For example, in enacting the FLPMA, Congress enacted a policy that “the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values....” Id. at § 1701(a)(8). Further, FLPMA directs BLM to manage the lands under its jurisdiction in such a manner that will “best meet the present and future needs of the American people;” “provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions;” and “take[] into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish....” Id. § 1702(c). In addition, the statute requires BLM to “minimize adverse impacts on the natural, environmental, scientific, cultural, and other resources and values (including fish and wildlife habitat) of the public lands involved.” Id. § 1732(d)(2)(a). FLPMA imposes an obligation on BLM to take the effects of climate change into account in managing and in making decisions about various uses of the public lands under its stewardship.

Thus, while we generally support the implementation of options provided on page 55 of the Law and Policy Subcommittee Report, we also recommend the following option be included and adopted in order for the DOI to be in compliance with existing legal duties: Require each bureau to evaluate the potential climate change effects that land use planning decisions may be causing, including but not limited to: the amount of motorized vehicle use and associated GHG emissions, the effects of dust from vehicle use off-road, and GHG emissions from the mineral development. DOI could then require appropriate mitigation measures to be incorporated into land use plans through revisions and amendments as necessary. Such mitigation measures that could be built into the land use planning document may include restrictions on uses that have a causal connection to human-induced climate change and other methods as discussed on pages 66-68 of the Law and Policy Subcommittee Report.

➤ The discussion on the **National Environmental Policy Act** in the report is disappointing. The past eight years have witnessed an assault on NEPA that has eroded the applications of the law to the point where major federal actions with significant environmental effects are taken without any environmental analysis. Some agencies, including DOI, have improperly shifted the application of NEPA to later stages of decision making. Council of Environmental Quality (“CEQ”) regulations state that agencies should integrate the NEPA process at the earliest time possible; the regulations also expressly state that the adoption of “formal plans” is major federal action subject to NEPA. However, agencies have not heeded this mandate, with some agencies (the Forest Service for example) going as far as seeking to exempt planning document entirely from NEPA analysis. By misconstruing NEPA to mean that an agency does not have to document NEPA analysis until narrow, site-specific actions are taken, agencies have effectively exempted themselves from NEPA's provisions at the decision stage. Moreover, some agencies fail to apply NEPA until after they have entered into binding contracts that create financial incentive for the agency to go forward with an action regardless of its environmental impacts. Categorical exclusions have been expanded to include broad categories of actions that should receive a detailed look by the agencies and the public. Many of these actions have either direct or indirect GHG emissions (oil and gas development for example.)

We support prompt action by CEQ to develop and issue detailed guidance to all federal agencies, including DOI, on how to address climate change in their NEPA analysis. In turn, we urge DOI to develop and issue agency and bureau specific guidance. Such guidance, however, should be viewed as supplementary to the *existing* obligations of DOI related to climate change and NEPA analysis. The absence of more detailed guidance must not preclude immediate application and incorporation of comprehensive analysis in all actions with climate change impacts.

Existing CEQ regulations and NEPA case law currently require climate change analysis.² Greenhouse gas (GHG) emissions are within the direct, indirect and cumulative effects that NEPA documents must analyze.³ Not only are increased GHG emissions “reasonably foreseeable”⁴ but so too are their climate consequences. The overwhelming consensus of national and international scientific evidence supports the conclusion that the build-up of greenhouse gases in the atmosphere is contributing to global warming, and that the subsequent changes will adversely affect our local, regional and global environments.⁵

Gathering and developing information about how climate change is affecting the public’s natural resources is precisely the kind of action NEPA was intended to spark. CEQ regulations require federal agencies to get information “essential to a reasoned choice among alternatives” when the overall costs of obtaining the information are “not exorbitant.” 40 C.F.R. § 1502.22(a). Modeling to predict effects of climate change on specific landscapes and wildlife populations is absolutely essential when planning nearly any activity on public land, whether to allow energy exploration or leasing, transportation planning or energy transmission corridors. The cost of failing to obtain such information in terms of damaged forests, shrinking fish and wildlife populations, lost tourist revenue, and disappearing drinking water supplies may very well be exorbitant.⁶ As steward of the public lands, the Department of the Interior must act to address the threat climate change poses.⁷

To date, most of DOI’s NEPA analysis of actions with climate change implications, fail to satisfy even the most minimal legal, or responsible policy requirements. The following example from a draft EIS related to oil shale development is emblematic of DOI’s unacceptable response:

The assessment of GHG emissions and climate change is in its formative phase, and it is not yet possible to know with confidence the net impact on climate.

² See, e.g., *Ctr. for Biological Diversity v. Nat’l. Highway Traffic Safety Admin.*, 508 F.3d 508, 550 (9th Cir. 2007) (NHTSA failed to evaluate adequately global warming impacts of changes to fuel efficiency standards for vehicles); *Mid States Coalition for Progress v. Surface Transp. Bd.*, 345 F.3d 520 (8th Cir. 2003) (increased coal consumption and global warming emissions was reasonably foreseeable effect of railroad expansion to transport coal).

³ See 40 C.F.R. § 1508.8.

⁴ 40 C.F.R. §§ 1508.7, 1508.8.

⁵ See, e.g., U.S. Climate Change Science Program, *Effects of Climate Change on Energy Production and Use in the United States* (Report to Congress by U.S. Secretaries of Energy and Commerce and the Director of the Office of Science and Technology) (October 2007), available at <http://www.climate-science.gov/Library/sap/sap4-5/final-report/default.htm>.

⁶ Even in circumstances where an agency determines that the “costs of obtaining information is exorbitant or the means to obtain it are not known,” CEQ regulations require an agency in its EIS to (1) state that the information is unavailable; (2) state the information’s relevance; (3) give a summary of the existing “scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts”; and (4) evaluate such impacts based on “theoretical approaches or research methods generally accepted in the scientific community.” 40 C.F.R. § 1502.22(b).

⁷ See, e.g., 43 U.S.C. § 1732(d)(2)(a) (FLPMA requires BLM to “minimize adverse impacts on the natural, environmental, scientific, cultural, and other resources and values (including fish and wildlife habitat) of the public lands involved.”).

Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHG are likely to accelerate the rate of climate change. The direct emissions of climate change air pollutants from tar sands development facilities are likely to be a small fraction of global emissions. [U.S. Bureau of Land Management, *Oil Shale and Tar Sands Draft Programmatic Environmental Impact Statement*. Dec. 21, 2007, pp. 5-40 to 5-41]

NEPA's requirements are not satisfied by the assertions quoted above, assertions that lack support or analysis and that are selective. Nor are they satisfied by statements that necessary and relevant information – such as information about the CO₂ emissions of the coal plants needed to generate the electricity that will convert shale and tar sands to oil – is “not available.” Such statements ignore requirements of NEPA and the CEQ regulations with regard to use of the best available science and procedures to follow when information is incomplete or unavailable.

Section 1502.22 of the CEQ rules addresses “incomplete or unavailable information” and directs that an agency must either obtain the necessary information or, if the overall costs of obtaining it are exorbitant or the means are unknown, the agency must include within an EIS: 1. a statement explaining what information is incomplete or unavailable; 2. an explanation of why that missing information is relevant to the evaluation or reasonably foreseeable significant adverse effects; 3. a summary of the existing credible scientific evidence relevant to the issues; and 4. the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community.

The supplement must also contain a quantitative cumulative effects analysis (CEA). A CEA is not intended to be a list of actions and receptors; it is intended to be a quantitative analysis of the “impacts to resources, ecosystems and human communities that may be affected and used towards developing an adequate understanding of how the resources are susceptible to effects.”

An adequate NEPA analysis must complete a quantitative assessment of climate change impacts from the proposed oil shale and tar sands development and use. A solely qualitative assessment will not be sufficient. CEQ provides seven primary methods for developing the conceptual causal model for a cumulative effects study of ecosystem-level effects, including (1) gathering information; (2) checklists to identify potential cumulative effects; (3) development of matrices to determine the cumulative effects on ecosystems by combining individual effects from different actions; (4) networks and system diagrams to trace multiple, subsidiary effects on various actions that accumulate upon ecosystems; (5) models to quantify the cause-and-effect relationships leading to cumulative effects; (6) trends analysis to assess the status of ecosystems over time and identify cumulative effects problems, establish appropriate environmental baselines, and project future cumulative effects; and (7) overlay maps and GIS analysis to incorporate local information into cumulative effects analysis.

Again, as stated above, while some uncertainty is inherent in assessing the impacts of future actions, it cannot be used as an excuse for failing to assess the possible impacts and biological and value-based thresholds for the affected resources, ecosystem and human communities.

In respect to Options 2 through 4, climate change should be consistently considered in NEPA documents. Options 2 - 4 appears to set up a system where DOI will pre-determine what level of NEPA analysis regarding climate change will be necessary for projects. This point is further illustrated in Option 6 that states a bureau will assess the proposed action, determine if climate is a relevant issue, and then use "standard Departmental language" in NEPA compliance documents.

➤ The report mentions the challenges “the existing system” will face as shifting **precipitation patterns and earlier snow melt affect water resources** (p. 46). We suggest additional attention be paid to the changing needs of ecosystems—especially since competing human demands (irrigation, industry, municipal water supplies, etc.) will only grow. Additional fresh water may be necessary for species to adapt to changing climates (and warmer temperatures), thus putting greater pressure on scarce water supplies. This type of scenario should be included in Department planning and analysis.

➤ In addition to issues associated with **siting offshore oil and gas facilities**, climate change may pose issues to extraction activities in the arid west. Per previous discussion on water scarcity, climate change may create water shortages near potential mining and oil shale sites.

COMMENTS ON THE REPORT OF THE SUBCOMMITTEE ON LAND AND WATER MANAGEMENT

In general, this report captures many of the issues that will be faced by the Department of the Interior in its role as steward of the nation's lands and waters in the coming era of drastic climate changes. It appropriately includes both actions that will help public lands adapt, and ways that both agency operations and land management can help reduce emissions or increase removals of greenhouse gases from the atmosphere.

➤ In the adaptation area, we believe that DOI's primary emphasis should be to increase resilience of the nation's public lands and waters, and this report underestimates the resources and drastic changes in decision-making that will be required. In particular, additional funds and agency capacity will be required to expand the size of reserved lands and connect them through protected corridors through land acquisition or easements. Working across ownership boundaries will require a new way of doing business for DOI agency staff, and perhaps new tools and mandates. Though the report does recommend roving facilitators to support partnerships, we suggest that DOI give more thought to the training and restructuring required to fully protect the nation's natural heritage through the coming decades of climate stress. We believe that DOI also underestimates the investment in staff time and funding that will be required to develop an integrated information system to disseminate new scientific understanding and to monitor the results of management activities. In the face of tremendously expanded demands on time and resources, DOI needs to give significant thought to how it will prioritize action at every level from central administration to field staff.

➤ In the mitigation area, this report emphasizes mitigation through enhanced terrestrial sequestration (which must promote resilience and restoration of degraded landscapes if it is to be effective long term) and operations (which will contribute relatively little to overall U.S. emissions reductions but can have significant public education benefits). DOI also needs to assess and minimize greenhouse gas impacts of public land uses, from visitor use patterns to energy extraction. The GHG footprint of fossil energy activities on public lands dwarfs any other mitigation impact. Fire (adaptation) and biomass (mitigation) sections imply that increased thinning and use of biomass for energy production are universal solutions to help systems resist fire and reduce energy emissions. These are gross simplifications that should not be used to justify a "one size fits all" policy. Consistent with an adaptive management approach, fire should be accepted as a natural and inevitable part of many ecosystems, and thinning projects should concentrate on protecting structures. Biomass for energy generation should be undertaken only when a local analysis shows that it makes economic sense, does not cause ecological harm, and a life cycle analysis demonstrates net GHG removal.

COMMON THEMES AND OPTIONS

P 23. Institutional Approaches. Instead of "considering" a unified climate change budget, DOI should require it. Setting this up will force the DOI to confront what it is, and is not, doing to address climate change, and will force all units to adhere to a

common method of accounting for climate change spending – what counts, what doesn't, etc.

pp. 24-5, DOI-Wide Theme 1 – Adaptive Management. There is an appropriate emphasis on adaptive management as an effective management framework given climate uncertainties in areas under substantial human control. DOI agencies have also begun to define scenario planning as a framework for managing resources in the face of not only uncertainty but limited human control, and it would be appropriate to mention this framework as well.

pp. 25-6, DOI-Wide Theme 2 – Management Plans. Need to revise management plans in light of expected climate changes is paramount. Given the magnitude of the task, the need for immediate action, and the scarcity of financial and staff resources, DOI should consider how this can be accomplished in a timely fashion without bypassing environmental protections and public process. Triage may be a relevant model. Prioritizing Alaska may be appropriate in general, but individual units in the lower-48 that face particularly acute challenges should not be neglected. In addition, DOI should update all relative service manuals to provide land managers with a central and definitive reference for policy governing the operation and management of public lands with regards to climate change.

pp. 26-7, DOI-Wide Theme 3 and Option 3 – Redefining Terms. Redefining core terms like “natural” and “unimpaired” has sweeping implications for the mission of many DOI managed land units. The language on p. 27 implies that a high-level national conversation will be sufficient to redefine these terms, with the results then communicated to the field. It will be critical to involve field staff in the full discussion, since implications of a change can be fully understood only when applied to a real landscape. When shifts in definitions (and hence in core mission) are made they should be incremental, with sufficient monitoring to recognize unexpected undesirable consequences. Any effort to redefine terms should also involve a very open process with extensive opportunities for public review. Hastily revised definitions of “natural” and “impairment” could facilitate inappropriate commercial exploitation or diminish requirements for restoration of areas damaged by mining activities or other commercial uses.

pp. 27-8, DOI-Wide Theme 4 and Option 4 – Local Data and Fast Response. The importance of timely feedback and monitoring is appropriately emphasized here. There seems to be a tension, however, between field research and monitoring needs and the centralized research structure. One paragraph notes “the number of layers between the field research needs and the decisions on when and where research is conducted”, perhaps necessitating a “new, restructured process”. The very next paragraph claims that “local feedback and monitoring can normally be done within local budgets or with assistance of regional partnerships”, but that higher-level activities such as model development need more resources. The Option 4 again explains the need for more resources to support field research and data sharing. DOI must advocate consistently for

resources to support local-level field monitoring and the development of creative adaptive responses specific to each locale.

p. 28, DOI-Wide Theme 5 and Option 5 – Education and Technology Transfer. We suggest avoiding the term “technology transfer” when possible, as it implies a one-way flow of information from the knowledgeable core to the less-knowledgeable periphery. Adaptive management and scenario planning will require respectful two-way communication that incorporates field experience into organizational learning about climate impacts and effective responses.

pp. 29-30, DOI-Wide Theme 6 and Option 6 – Partnerships. Working closely with partners is critical, particularly for National Wildlife Refuges that are typically isolated and may find that habitats are no longer suitable for critical trust species. Assigning Interior Climate Action Partners facilitators to help local land units establish cross-boundary partnerships is an important first step. Additional funding will be needed, however, to help private partners meet public trust goals. The text currently states that “use of existing bureau private lands programs and the U.S. Department of Agriculture (USDA) conservation programs would require no new money.” Yet the current needs addressed by these programs will persist even as new partnerships formed to address climate-induced crises dramatically increase the need for funds. It is not realistic to imply that these programs are adequate in their current form or at current funding levels.

p. 30-32, DOI-Wide Theme 7 and Option 7 – Emergency Preparedness. The imperative to plan and prepare for increased natural disturbance and protect physical structures is covered thoroughly.

p. 33, DOI-Wide Theme 11 – Reduce Other Stressors. The text emphasizes the importance of reducing nonclimate stressors to promote resilience of natural systems. But similarly to the partnership theme, the text here underplays the critical need for new resources - “DOI bureaus already have policies and practices in place to deal with many of the recognized ecological stressors”, though additional resources would be “helpful”. The magnitude of non-climate stresses will increase dramatically as an indirect effect of climate changes (e.g. road erosion will increase as storms intensify, warming will accelerate human migration and development pressures in the wildland urban interface, increased water withdrawals for off-site human uses will threaten in-stream flows and wetlands, invasives introduced by people may benefit more than native species from CO₂ enrichment). DOI managers will need to rethink visitor impacts and human stresses, on DOI lands and around their borders, and may need to rethink the balance between human use and natural protection. Existing programs will be inadequate to address this growing need.

ADAPTATION ISSUES AND OPTIONS

Water Supply

pp. 35-6, Description of Issue. Need to address water supply issues in the southeast – examples focus solely on the western U.S.

p. 38, Option 1 – Assess Vulnerabilities. Drought impacts focus mostly on DOI facilities and native people – needs more information on impacts of water scarcity on other species. (Last paragraph under Option 2, Regional Water Forums, does incorporate ecosystem effects.)

p. 43, Option 6 – Management Activities. The list of possible responses to water scarcity reflects the seriousness of the challenge. As stated here, the purchase of land or water rights to minimize water conflicts will be an important priority for future funding. The importance of controlling ORV use and grazing activities to protect water, also mentioned here, is just one example of the need to rethink the balance of human uses and protection of natural systems.

Water Quality

p. 44, Description of Issue. The reduction of nonpoint pollution to protect water quality, mentioned here, will be an important agenda item for cross-boundary partnerships and land and easement purchases, given that many National Wildlife Refuges do not control land use across their entire watershed.

Flooding

p. 48, Description of Issue. This description focuses on facilities in flood plains, and needs more information about impacts on natural systems, e.g. from increased erosion and sedimentation.

Coastal

p. 58, Option 3 – Restore Coastal Wetlands – Assuming sufficient information has been generated by the 3 demonstration projects, it is imperative that the “lessons learned” be harvested, disseminated, and incorporated into DOI operations. Moreover, DOI should learn from the experience of other agencies doing similar work, such as the Army Corps pursuant to the Coastal Wetlands Planning, Protection and Restoration Act.

p. 59, Option 4 – ACE Dredge Fill Agreement. Coastal development and hardening are listed above as problems and “restoration” as the preferred solution. But Option 4 also mentions expediting Army Corps providing dredged fill for restoration projects, including beach re-nourishment. Among the terms which need to be better defined, DOI should clarify what it means by “restoration”, and using dredged fill for some types of beach “restoration” may run counter to natural processes.

p. 59, Option 5 – Marine Ecosystems. Text mentions possible need to restrict marine traffic to protect resources under DOI jurisdiction. Consistent with the broader need for cross-boundary resource protection, DOI may need to play a more proactive role in protecting public trust resources through regulations that apply beyond the border of lands under its direct control.

Permafrost and Sea Ice

pp. 60-61, Description of Issue. The issues described here focus on protecting the facilities of concessions/contractors, access to oil/gas wells and pipelines, and continuity

of energy production and transportation. There is very little information on natural community impacts, and no mention of snowpack effects and glacial outbursts in lower 48. Proposed solutions are also sparse in this section (assess vulnerabilities and modify contracts/leases).

Native Peoples

pp. 63-73. The division into separate sections for 48-states, Alaska, and 50 United States (including islands/territories) makes for a choppy presentation of information, and it is not clear where the topics overlap among the three sections.

pp. 64-5, Contiguous United States Description of Issue Effects. This section describes allocation of climate-affected resources as a “zero-sum game”, for which “management solutions will often require improved coordination among competing resource users, Indian and non-Indian, rather than actions that address the challenges facing a single group.” Although multi-party coordination is undoubtedly required, this language might be interpreted to imply that Indians should be prepared to cede their treaty rights to meet the needs of the non-Indian resource users who shoulder much more responsibility for causing climate change.

p. 68, Alaska Description of Issue. The cost of relocating native villages is a potentially large issue for DOI, and puts a face on current impacts of climate change. The costs of inaction are huge. Quantifying it will help the Department achieve other climate-related budget objectives.

p. 69, Alaska Option 1 – Assess Vulnerabilities and p. 72, United States Option 1 – Local Knowledge Database. The importance of traditional knowledge is appropriately emphasized here. The local knowledge database mentioned in this context might be a useful model in landscapes not intensively utilized by native populations. Local knowledge of other rural residents might also be helpful in monitoring climate change impacts.

p. 71, Alaska Option 2 – Damage to Infrastructure. Land exchanges for village relocation and DOI collaboration with others to protect housing and other infrastructure are important areas of support for Native Alaskans. They may also be the subject of intense controversy as previously protected lands are used to relocate settlements. It will be important to involve multiple parties in these negotiations to ensure resiliency for nonhuman as well as human habitats.

p. 71, Alaska Option 3 – Pollutants. Information on pollutant transport and release from ice is an important area for future research that has not been well publicized to-date.

Pests/Invasives/Diseases

p. 80, Option 4 – Encourage Desirable Species. Assisted migration needs to be instituted in small incremental stages and closely monitored for undesirable effects. The following statement particularly begs the question of defining “desirable” species: “DOI could evaluate the effectiveness of using desirable non-native species as a place-holder,

competing against target invasive species, until natives can be established. DOI could allow the planting of different species (i.e. non-native) that are more adaptable to the types of environments resulting from climate change.”

Species Migration and Habitat Change

p. 81, Description of Issue. The challenges of climate shifts, which disrupt the complex web of existing natural communities, are described well in this section. Individual species ranges may shift at different rates, there are uneven barriers to range shifts, migratory species may lose critical staging areas, etc.

p. 84-5, Option 2 – Partnerships. This section emphasizes the importance of continuous and coordinated monitoring and partnerships with other agencies and landowners. It mentions FIA and NRI (both under USDA rather than DOI) as data sources on land use change, but it does not describe their basic incompatibility or important gaps in coverage (particularly in Alaska). There is an urgent need to rationalize data sources and fill critical gaps.

Nowhere in this section is it mentioned that additional fee purchase or easements may be necessary to protect habitat that will be suitable for species in the future or to provide corridors for species movement. This is a glaring omission.

Threatened and Endangered Species

p. 86-7, Description of Issue and pp. 89-90, Option 1 – Assess Vulnerabilities, and Option 2 – Classifying Endangered Species. This section faces squarely the coming challenges to protection of threatened and endangered species, including the need to identify candidate species, designate critical habitat, and develop species recovery plans based on pro-active forward-looking modeling rather than historic trends, likewise in designating critical habitat and species recovery plans. It understates the challenge, however, in failing to mention the likely dramatic expansion in the number of threatened and endangered species as climate change progresses.

p. 89, Option 2 – Use Climate Change Data when Classifying Endangered Species – In addition to reversing the midnight regulation restricting ESA consultation between the service biologists and action agencies pursuant to the ESA, the DOI should not shrink from the use of the best climate change science regarding the habitat of species.

p. 90, Option 3 – Reduce Stressors. This section specifically mentions that land and easement purchases might be required to remove impediments to species movement or ensure large enough reserves for viable populations. It also faces the possible need to restrict leases and public use in order to protect habitat and reduce stresses. It clearly treats assisted migration as a last resort. These measures are equally appropriate to the previous section on species migration and habitat change. Natural communities should enjoy these protections well before their individual species become threatened or endangered.

Wildland Fires

p. 91, Description of Issue. The text focuses exclusively on the negative impacts of wildland fires and fails to acknowledge both that fires are a natural and beneficial part of many ecosystems and that wildland fire is inevitable as long as wildland vegetation exists. Much of the discussion seems to suggest that fire is universally bad and that Hazardous Fuel Reduction Program can solve the problem. In fact, fuel reduction only changes the nature of fire; it does not remove it as a factor.

p. 92, Option 1 – Hazardous Fuel Reduction. Again, this section seems to suggest that expansion of the fuel reduction program is the only option, when, in fact, there are a number of changes that could aid in adaptation to climate change. First, the problem is not fire; it is the damage that fire does to people and valued objects, like communities, infrastructure, and rare ecosystem elements. Therefore, we should begin with a shift in perspective from “fight all fires” to “fight fires only where they do damage.” Rapid implementation – through enhanced training and performance incentives – of the recent changes in fire policy allowing individual fire events to be managed for multiple objectives will aid in adaptation by recognizing the need for fire in ecosystems, “treating” fuels *during* fire events (not just before), and saving scarce resources. Also, prioritizing suppression, preparedness, and hazardous fuels reduction resources to focus on communities and other resources, rather than on all DOI lands, will maximize the utility of scarce resources, stretching their availability for adaptation. Beyond communities, managers should focus on restoration of characteristic fire, especially in dry, high-fire-frequency forest types. Beyond a safe distance from communities, there is little need to fight fire, resource benefits of natural fire can be maximized, and the resources saved can be more effectively spent on resource protection and restoration elsewhere, without necessarily spending more. The second paragraph seems to acknowledge this by suggesting that “DOI could prepare for extreme fire events by restoring ecosystems and reducing uncharacteristic fuel levels...” but this philosophical shift needs to extend beyond the hazardous fuels reduction program to all aspects of fire management.

Another change that would aid in adaptation is to enhance communication with the public regarding fire management. The document rightly acknowledges the extensive social science research that can help managers gain community acceptance of fire. Earnest adoption of the principles identified through this research and other efforts, such as the Partners in Fire Education, aimed specifically at message development to enhance public acceptance of fire management would enhance the success of managers engaged in all aspects of fire management – not simply hazardous fuel reduction.

MITIGATION ISSUES AND OPTIONS

Terrestrial Carbon Sequestration

p. 96, Description of Opportunity. The phrase “partner with outside entities to reduce their carbon output while restoring high-priority wildlife habitat” is misleading. Offsets do not reduce the carbon “output” of partners; in fact they allow those entities to maintain or increase their carbon output while balancing that output with increased carbon uptake on other sites.

DOI needs to establish consistent protocols governing the interface of public land stewardship with private carbon markets. The Tensas River NWR project is one model for furthering public purposes (adding adjacent land to the refuge system) without unduly burdening the public stewards with priorities dictated by private capital markets (while the land acquired by the refuge system comes with a carbon easement, the cost of managing the land to achieve this private purpose is compensated and maintaining minimum carbon reserves is fully consistent with refuge objectives.) Other models have been tested, however, which appear to entangle the agency in carbon markets in ways that compromise the stewardship of existing public lands without adding to the public land base. DOI should guard against attempts to use public lands carbon reserves to subsidize private carbon markets, including insurance schemes that inappropriately restrict public lands management or impose administrative burdens on land agencies.

p. 96, Description of Opportunity. Restoration of mined coal lands is presented here as a mitigation opportunity, with the implication that reforestation of future mined lands can help OSM “balance the Nation’s need for continued domestic coal production while protecting the environment”. The net effect of the mining and burning of coal is extremely negative in its GHG impacts; restoration fixes a miniscule portion of overall emissions from this activity and cannot restore the full sequestration potential of undisturbed vegetation. OSM can best contribute to mitigating climate change by internalizing the full environmental costs of mining activities, hence increasing incentives to develop energy alternatives. For any future coal operation, full restoration should be a regulatory requirement, with costs fully financed by the mining operation and not eligible for restoration offset sales. Restoration projects on previously-mined lands might possibly be acceptable as an offset project but only where such projects are truly “additional” – that is, where past restoration efforts have failed to re-establish native vegetation and the responsible parties are no longer accessible,

p. 97, Option 1 – Terrestrial Carbon Sequestration Policy. A broad DOI-wide carbon sequestration policy is an ambitious and laudable concept. The policy must include some “side-boards” to ensure that sequestration is not pursued as a single objective to the detriment of other objectives – restoration, resilience and habitat protection should be primary.

p. 99, Option 2 – Terrestrial Carbon Assessment. A carbon footprint assessment should be coordinated with other land management agencies across the federal government, to ensure consistent methodology and avoid duplicating effort.

p. 100, Option 3 – Habitat Restoration Partnership. Thank you for clarifying the point that mitigation is a tool and not the end goal, through the title of this section - “Strategic Habitat Restoration Partnership” - and through language such as “strategic habitat conservation through a well-conceived terrestrial carbon sequestration program”. That emphasis needs to be clearly sustained in the face of the potentially-conflicting financial motivations introduced by an offset marketing program. Public/private partnerships could buffer DOI reserved lands as well as protect corridors between them, as mentioned in this section. Existing voluntary GHG reporting programs (like DOE’s 1605(b)

program) need tighter standards if they are to serve as the basis for public carbon sequestration payments. Using public resources on private land also necessitates long-term or permanent agreements to ensure that benefits that are sustained through changes in management goals or land ownership.

Geologic Carbon Sequestration

p. 103, Options 1 – Inventory and Option 2 - Research. This section takes an appropriately cautious approach to geological sequestration, pointing out need for research into financial feasibility, retention, environmental effects.

Renewable Energy

p. 103, Statement of Opportunity. The first sentence declares that “Renewable energy directly offsets fossil fuel-based energy.” This is not completely true. The extent to which new renewable energy reduces fossil fuel use depends upon the pre-existing grid mix and may simply expand energy use beyond what would have occurred with more limited supply and higher cost (demand is not fixed or inevitably climbing – higher prices, more efficient technologies, and demand reduction incentives affect consumer and industry behavior). Few renewable energy options are completely “carbon neutral”, as most utilize fossil fuels in their production and transmission and/or remove natural vegetation with its sequestration capacity. Renewable energy siting on DOI lands needs to account for realistic GHG impacts.

p. 103, Description of Opportunity. Two statements introduce confusion about DOI’s energy analysis. The statement “some of these lands fall within the urban interface or are within close proximity to highly dense populations” appears to refer primarily to biomass. The following sentence, “some DOI-managed lands also have renewable resources, such as geothermal resources, on them” fails to acknowledge the substantial wind and solar as well as geothermal resource potential found on BLM lands, some of which are also within the WUI or close to highly dense populations. We suggest rewording to clarify that development of all renewable energy in an environmentally-responsible manner is the aim of DOI.

p. 104, Description of Opportunity. While the “use of renewable energy and its required developmental impacts create much lower amounts of greenhouse gas emissions than use of traditional fossil fuels,” the dispersed nature of the resources requires significant ecological disturbance to collect. In some cases, developing these resources would require severing wildlife migration corridors critical for species to adapt to climate change. In some cases, development would require removal of large tracts of carbon-trapping mature forest creating a carbon debt that would take years for the facility to “pay off”. We strongly support quick and intelligent development of these resources, but given the impacts of development, it will be imperative that the agency site renewable energy generation facilities and associated transmission infrastructure in a manner that does not exacerbate the causes or consequences of global warming.

p. 104, Description of Opportunity. Statement declares that “Some of the biomass resources on these lands would offset the need to import equivalent amounts of energy

from foreign sources.” It is unclear why biomass is singled out here, as this statement would be equally true of all domestic energy sources. Whether a source is foreign or domestic, however, is irrelevant to the climate change issue.

p. 105, Description of Opportunity – Biomass. Several sentences in this section are overly general and not strictly accurate. “Biomass used for biopower or biofuels reduces the demand for fossil fuels and can result in lower or no net gain in carbon emissions.” It is highly unlikely that biomass fuels will result in no net gain in carbon emissions, as their manufacture currently requires substantial fossil fuels, and their harvest reduces forest carbon stores, at least in the short run. We recommend striking the phrase “or no”.

p. 105, Description of Opportunity – Biomass. “Removing these products prior to wildland fire or prescribed burning reduces smoke and greenhouse gas emissions.” Removal of biomass and combustion off-site under controlled conditions probably reduces smoke, but it likely increases emissions due to more complete combustion compared to the residue of charcoal and unburned dead wood remaining after a wildland fire. We recommend striking the phrase “and greenhouse gas emissions”.

p. 105, Description of Opportunity – Biomass. “Compared to unmanaged forests and woodlands, active forest management can serve to reduce emissions and also sequester carbon.” For many forest types, “unmanaged” forest will sequester more carbon than “managed” (meaning harvested) forests over at least several hundred years. Frequency and type of disturbances has a large influence on the comparative carbon stores, as does the fate of the harvested wood and the accounting for emissions related to wood processing, transport, and disposal. We recommend removing this sentence.

p. 106, Description of Opportunity – Biomass. “Expanding the biomass utilization program on DOI lands could produce an additional annual capacity of approximately 51 megawatts of woody biomass.” Biomass is not measured in megawatts. Biomass is much more efficient in thermal uses than in electricity generation – there should not be a presumption it will be used to generate electricity. This degree of certainty about a specific numeric capacity seems out of place in this general discussion about options. Where did this number come from? What would be the impacts on resources of this level of use? The text mentions legal constraints of long-term supply agreements on BLM lands but not other potential constraints such as conflicting resource protection goals. We recommend removing the numeric goal.

p. 106, Option 1 – Renewable Energy Coordination. A Renewable Energy Coordination Policy should include a methodology for assessing the impact of energy development on other public land values. This should be done internally, rather than depending on the NEPA process to address these issues piecemeal as projects are proposed.

p. 106, Option 1 – Renewable Energy Coordination. “Significant revenues would be generated through royalties and use authorization fees.” Currently geothermal is the only land-based renewable resource for which royalties are assessed by DOI pursuant to 30 U.S.C. 23. Other resources, including solar, wind, and biomass, are addressed through

rights-of-way permits or other special use permitting authority. Like geothermal, other land-based renewable energy development constitutes an exclusive use of land for commercial development and should be permitted as such to ensure a fair return to the taxpayers for the exploitation of this resource. We strongly support the rationalization of other renewable resource development with this approach.

p. 106, Option 1 – Renewable Energy Coordination. Over the past 7 years, more than 35,000 permits to drill for fossil fuel resources were granted by the Department. In that time, fewer than 100 permits to develop renewable resources were processed. More than 135 solar permits languish in a queue that began forming in 2005. More than 300 permits for wind development are also pending review. Our conversations with DOI staff indicate that the primary reasons for this are (a) Departmental priorities, (b) resource availability, and (c) needed expertise. This option does not address any of these three limitations. An additional option should be developed that addresses the Department’s significant human capital shortcomings and identifies a plan to acquire the expertise required to effectively process these permits in a manner that protects taxpayers and fulfills the Department’s stewardship responsibilities.

Fleet Management

p. 109 - 111, Option 1, Engage DOE and GSA and Option 2, High-Efficiency Vehicles. Aside from improved fuel efficiency for the DOI fleet, DOI policy should also consider policies that reduce miles traveled, and also account for fuel use by visitors to DOI facilities and DOI units should plan for reducing use of cars/campers through alternative transportation. Incentives for visitors to reduce their use of fossil fuel based transport are mentioned in Education and Outreach section, implying vehicle use is a matter of individual choice only. DOI facility design and transport systems and access policies can also influence visitor vehicle use. DOI should strongly resist replacing a vehicle with a less efficient vehicle that is labeled “flex-fuel”. The practical effect in most circumstances (where there is no readily available alternative to gasoline) of such a purchase is to increase oil dependence and GHG emissions – exactly the opposite of the intended purpose.

Facility Operations

p. 113, Option 1 – Energy Efficiency Technologies. We applaud the listing of energy efficiency as the first option to reduce GHGs at DOI facilities. As pointed out in the section about educating the general public, behavioral changes by DOI staff or changes in policy (consideration of telecommuting options, for instance) may also reduce fossil energy use through reduced use of light, heating and cooling.

p. 115, Option 2 – Renewable Energy. Biomass heat for DOI facilities should be listed with solar and wind as a practical local substitute for oil/gas/electricity.

p. 116, Option 3 – Policies on Fossil-Based Equipment. Despite the title of this option (“Policies”) the examples focus on purchase of new more efficient equipment, which may better fit under Option 1. Broader changes in policy and practice at DOI facilities should

be encouraged (e.g. is leaf blowing and edge trimming really necessary or can alternative landscaping reduce the need for this equipment?)

Education and Outreach

p. 116, Description of Opportunity. Text state that “DOI has a unique opportunity to education visitors and showcase both the positive and negative effects of climate change.” This is odd wording, as it is difficult to envision many positive effects.

p. 119, Option 2 – Incentives for Conservation. The proposal suggests reducing access fees for those arriving on foot/bicycle/public transit to provide incentives to avoid personal automobile use. An alternative approach might be to charge more for parking and vehicle access permits and use those additional funds for climate education programs or investments in energy efficiency. Possibly DOI fears a public backlash from imposing additional or higher fees, and hence prefers a rebate benefit. The fee approach would avoid the revenue impacts of rebates mentioned in the text, and influence the behavior of more visitors. Similar incentives might be offered employees of DOI or concessions.

COMMENTS ON THE REPORT OF THE SUBCOMITTEE ON SCIENCE

This DOI report addresses the need for scientific information pertaining to climate change impacts on lands and resources as well as effects on proposed adaptation and mitigation actions. An important component of this document is the recognition that DOI must partner with other agencies, researchers, etc. in order to effectively and broadly address science needs. We feel that the four components of the strategy outlined address the basic needs of DOI and other agencies, and we commend the DOI for their thoughtful collation of ideas and expertise to take this step forward.

GOALS AND OBJECTIVES: Recognize partnerships outside of DOI earlier

We believe that the goal stated in the Science Strategy captures the need to make information accessible and usable by land and resource managers within DOI, as well as for other public and private agencies. The five listed objectives of the science strategy are focused on DOI resources and abilities, yet it is important to consider how entities outside of DOI can contribute to these goals. An individual agency, department and perhaps not even a single nation cannot advance climate change science on its own. The expertise, data and funds needed to tackle the basic science needed to understand climate change are global and interdisciplinary in scale, as the IPCC has recognized.

Collaboration with other entities is not mentioned until page 12 of the document, and then is restricted to other federal agencies. As was observed at the recent USGS National Climate Change and Wildlife Study Center Workshop in December 2008, there are numerous researchers and stakeholders that can contribute to a national science strategy aimed at helping to manage DOI, USDSA and other public and private lands and resources. An important source of climate and environmental data will be the NSF-funded NEON program, which should be considered when implementing this Science Strategy. Universities are also an important source of data and expertise, and are not mentioned until even further into the document. We suggest that these partnerships be highlighted earlier so that they are integral to the entire Science Strategy.

GOALS AND OBJECTIVES: Good science fills many needs

The five objectives listed in the Science Strategy are designed to help land and resource managers understand and address climate change impacts. All of these objectives fit the basic science needs of managers as well, and could thus enhance the benefits of increased investment in scientific capacity. We hope that this climate change Science Strategy is not merely a theoretical repackaging of existing programs, but is indeed a strategy to be put into action for truly creating an inter-organizational, inter-disciplinary program. This program needs to be designed to advance our understanding of species and ecosystems, how they are changing as a result of anthropogenic activities, including but not limited to climate change, and reaches out to a variety of stakeholders, including managers, subsistence and recreational users, conservation and development interests, etc..

In addition to jurisdictional and regional benefits of increased scientific research, the objective to “better understand the dynamic nature of climate-induced changes to species,

ecosystem, and resources and determine how climate change may dampen or exacerbate the effects of other stressors” would be a welcome step towards developing a quantitative approach for assessing the cumulative effects of climate change and other anthropogenic stressors. DOI agencies, particularly BLM, have failed to advance their analytical analyses of impacts at the pace at which other research entities have advanced their integrated cumulative impacts assessment. This quantitative approach integrates climate change scenarios, habitat modeling, population viability analysis, resource selection models and disturbance/threshold coefficients. We believe this objective to be especially important to the Science Strategy, and we hope that DOI will work closely with the CEQ to improve guidelines for addressing climate change.

ORGANIZATION AND RATIONALE: Integrating science across DOI

The good work of the USGS is highlighted in the section titled Existing Climate Change Science, and reinforces the fact that good science fills many needs. However, it is unclear why the good work of other agencies is not included, such as the Inventory and Monitoring Network of the NPS and examples of species and ecosystem studies by the USFWS.

The task at hand is huge, and will truly require input and participation from all agencies to be effective. At the USGS National Climate Change and Wildlife Study Center workshop in December 2008, it became clear that the USGS was not going to be able to tackle all the science needed for addressing climate change, as these needs transcended funding, expertise and the multiple scales at which this work needs to be done (nationally and locally). Thus, recognizing that a truly interagency, interdepartmental approach is needed should be integral to this Science Strategy.

At the same workshop, there also seemed to be reluctance on the part of other DOI agencies to support concentrating climate change work and funding within the USGS. The DOI Science Strategy does not state that the USGS will be the lead of this work, but how this Strategy will be implemented is not clear. It will be critical to have the full support and participation of all the relevant agencies in implementing this Science Strategy. If they are not to be equal partners at the table, it seems that there will have to be added value to their existing programs as well as no loss of funding for existing and planned science to insure support.

Further, how will BLM be brought into the strategy? While they manage a large portion of DOI lands, they have not historically done research unless mandated to do so with regards to industrial development monitoring. The absence of data, both climatic and biophysical, from these lands would leave large gaps in our understanding of landscape and natural resource change.

COMPONENT 1: Evaluating Issues and Capacity, and setting priorities

Component 1 is an important component of the Science Strategy, and rightfully acknowledges that there is a lot of good research already happening in DOI, other federal agencies, states, academic institutions and non-profit organizations. Inventorying this

research will be very valuable, but this is a lengthy process so it is critical to move ahead with other components of the Science Strategy simultaneously.

It is important to remember that much of what we need to know about helping species and ecosystems adapt to climate change, we already know. The basic tenants of Conservation Biology apply to species experiencing stress due to a number of factors, from habitat fragmentation, to competition with invasive species, to climate change. The simplest and most significant action we can take is to expand and enhance the conservation status of DOI and adjacent lands. Giving species the time and space to adapt, free from other anthropogenic stressors, is likely to be the most effective strategy. And the least expensive!

With regards to Options for Implementation, it is difficult to know what the ecosystems of immediate concern are and so deciding this could add further delay if DOI were to begin with Option 1: Conduct Inventories of Ecosystems of Immediate Concern. We know that many ecosystems in Alaska would be at the top of this list, but there are likely to be other ecosystems that face as great of or greater threat with the cumulative impacts of climate change and other anthropogenic stressors, including housing sprawl, industrial development, increasing water demands, etc.. Thus, it seems that the best option for moving ahead rapidly would be to develop a framework for taking data from Option 2: Conduct Multiple Regional Inventories to ultimately fulfill Option 1: Conduct a National Inventory.

Regardless of the approach, it will be important to take advantage of existing regional efforts to address climate change, as important steps have been taken in many regions to complete this sort of assessment. Regional expertise needs to be captured in every aspect of climate change science, and there is great value in scaling this information up to the National scale as well as downscaling to the land unit.

COMPONENT 2: Researching and Monitoring Climate Change Effects must start now

Of all the components in the Science Strategy, research and monitoring is perhaps the most important. Without data, we have no idea of baseline conditions, there is no understanding of critical thresholds, and we can't attribute causes to effects. Thus, implementation of research and monitoring programs across DOI lands and resources should be done as quickly as possible. Integrating new programs with existing and expanded research and monitoring programs should also be a priority.

With regards to the Options for Implementation, any one of these options could be a great addition to local, regional and/or national databases. However, the time needed to design and implement an Inventorying and Monitoring program has proven to be 5 to 10 or more years, and many times these programs don't make it out of the design stage or ultimately prove to costly to implement properly. The NPS has spent many years designing the I&M network, and should be looked to for leadership and guidance in implementing any of these options. The NSF funded NEON, inc. is also well along in its design, and has spent years surveying and evaluating ideas for monitoring climate, ecosystems and

environmental change from a broad spectrum of researchers. Any DOI sponsored I&M research is likely to have greater benefits if it is complimentary to existing programs.

Further, the three options listed in the Science Strategy may not be appropriate for addressing agency or unit specific needs. It appears that the committee behind the DOI Science Strategy recognizes the cost associated with implementing a large scale monitoring network, and the options identified are an attempt to create a realistically sized network. However, the scale capture through 13 ecoregions nationally is not fine enough to address the needs of land managers, one of the primary objectives of this Strategy. Where does this ecoregional classification come from? NEON has 20 ecoregional domains and the NPS has identified 32 ecoregions across the US. The Unified Ecoregions of Alaska: 2001 identifies 31 ecoregions within Alaska alone. Thus, how valid is it to assume that 13 generalized ecoregions could be characterized by selected by 6 CORE sites? Not very, unfortunately. However, it is important to get more monitoring started, so we encourage DOI to further refine these options or consider adding new ones.

An alternative option would be to approach this through regional agency programs linked through a national synthesis program. Much like the NPS has implemented unit specific monitoring that then feeds into ecoregional analyses, this approach could be taken across units (NWRs, NPs, BLM lands) and then be integrated ecoregionally across agencies. Developing a common protocol for climate monitoring, such as deploying Remote Automated Weather Stations (RAWS), within each conservation/land unit would allow local expertise to guide the site selection and to tailor data collection to other research needs, such as species studies, hydrology, permafrost stability, etc.. This type of distribution would provide not only locally useful data, but also data critical for refining climate data needed to downscale Global Circulation (Climate) Models (GCMs), such as the PRISM dataset. Other monitoring studies (habitat change, fire, active layer depth, glacial recession) could also be implemented at the conservation unit scale, improving not only local understanding of current conditions, but also helping to calibrate larger scale models that capture ecosystem-climate relationships. This approach builds on existing expertise within the agencies, enhances that capacity through additional research funding for the conservation unit, and contributes to broader science goals by integrating into regional and, ultimately, national programs. New programs can be implemented without much delay because most of the staff and expertise is in place, and existing research programs remain supported, contributing to the long-term data needed to understand ecosystem processes and climate change impacts.

With regards to the Additional Considerations for Implementation for Component 2, it is intriguing that while the USGS has chosen a watershed within the Yukon River Basin to be the first CORE site that is the same land that the USFWS has been considering trading to Doyon, Inc. to allow oil and gas development. It is sincerely hoped that not only will monitoring sites be chosen and implemented for the long-term, but that in the face of climate change, the DOI will prioritize expansion and enhancement of conservation lands over fragmentation and industrial development.

COMPONENT 3: Science Applications and Decision-Support Tools need to get more specific, not more generic

The need to make climate change science available to land managers is a critical need. DOI could play a leading role in this field by expanding its scientific staff to address the many issues in this component of the Science Strategy. Again, it is critical that DOI consider partnerships with other entities, especially academic researchers, where much of this expertise currently resides. Further, many researchers working with climate projections are interested and available to partner with agencies towards addressing regional needs. Thus, a regional approach, at least initially, will allow the DOI to move forward with integrating the best available climate change science while assessing its availability nationwide.

Option 1: Develop a DOI National Science Applications and Decision Support Team has merit for evaluating large-scale models and their implications. However, experts at the national level are unlikely to be adequate resources for regional issues and vice-versa. A coupled ecosystem-climate model that performs well for Northeastern forests is unlikely to be useful for a land manager contemplating fire x climate x vegetation x permafrost in Alaska. Even the selection of GCMs requires a regional perspective; some models capture certain processes better than others and the driving processes vary regionally. A national team could help provide guidance on standards, downscaling options, vulnerability assessment, but this is also likely to be within the purview of regional experts.

Option 2: Develop National Science Applications and Decision-Support Capacity has merit in that it relies on partnerships to develop science capabilities, again, taking advantage of programs that are in place and allow faster startup. Perhaps the most effective approach would be to create this capacity regionally. Land managers could more easily connect with scientists in the region and the tools would be adapted to local conditions. Gathering these regional experiences through national workshops or a National Climate Change Center would be an effective way of sharing methods and developing national capacity.

General predictions from IPCC models and regional assessments by the USCCSP and other entities have provided probable scenarios upon which current research and monitoring actions can be based. Generic strategies, tactics and methods are unlikely to be of much use to land managers in the next stages of climate change science and conservation planning, and are likely to yield the same results as the existing tools. To truly understand climate change impacts on lands and resources, we must work at the scale at which the driving processes occur. If we are interested in the impacts of climate change on a particular species, we must understand the species environment, physiology, population dynamics, and critical thresholds. Thus, the next stage of research designed to help managers needs to be at finer scales, not broader ones. Experts need to be invited to the table by DOI agencies, not generalists.

COMPONENT 4: Integrating, Interpreting, and Disseminating Information

The importance of sharing information couldn't be better stated: "Since the impacts of climate change will be seen across landscape and jurisdictional boundaries...effective resource management should go beyond conservation of individual jurisdictions."

Many land management plans are at the scale of the conservation unit, but these units may transcend ecosystem boundaries. In the face of habitat change as a result of climate and fire interactions, it is critical that managers look beyond the boundaries to understand the extent of habitat and how it should be managed. A regional approach among diverse agencies will likely provide the greatest benefits for the least cost.

Again, moving forward in steps rather than leaps is likely to provide the most benefit the soonest. Establishing a National Interagency Climate Change Science and Learning Center would be an ambitious endeavor that is likely to be difficult to define and harder to fund in the current economic climate. That does not mean it is not worthwhile, and indeed, if it could truly be an interagency center (including non-DOI agencies) like the National Interagency Fire Center, it may serve to meet the needs of the 3 aforementioned components in the Science Strategy. An alternative model could be that of the National Center for Ecological Analyses and Synthesis (NCEAS, Santa Barbara). NCEAS supports science synthesis projects, bringing together interdisciplinary groups of scientists to create information useful to researchers, resource managers, and policy makers. Either of these models can be used to create a knowledgebase that transcends conservation jurisdictions, but which can begin with projects of immediate need to managers or regional teams.

Finally, establishing a national clearinghouse for data is an idea which needs further refinement. Is it best to gather data in one central location, or is there a benefit to having links from a central interface to data stored "at home" where it may be more readily updated and which may provide more contextual and contact information? Is this clearinghouse DOI data only, or are there data from other agencies and entities that are critical pieces of climate change analysis? How will these data be evaluated for completeness, accuracy and updates?

CONCLUSION

We appreciate DOI's efforts to develop plans to address climate change and its impacts on our lands and natural resources. We hope that the DOI will further develop these plans and strategies, and work quickly towards effective implementation.

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