Society for Conservation Biology
The North America Section of a global community of conservation professionals

18 September 2008

Attn: Eleanor Rollings
Special Assistant to the Under Secretary for Research, Education, and Extension
U.S. Department of Agriculture
Jamie L. Whitten Building
1400 Independence Avenue SW
Washington, D.C. 20250

RE: Federal Register: August 6, 2008. Volume 73, Number 152

Dear Eleanor Rollings:

The Society for Conservation Biology is a global community of more than 9,000 conservation professionals from 120 countries. Its mission is to advance the science and practice of conserving the Earth's biological diversity. Consequently, we believe that credible science should inform public policy and management decisions affecting biological diversity, particularly in addressing the key drivers of biodiversity loss globally and nationally. Because climate change has emerged as a major threat to the viability of our nation's ecosystems and native species, public policy decisions must address this issue expeditiously but in the context of sound science to minimize undesirable changes in ecosystems, losses of native species, and social and economic disruptions caused by climate change.

We commend the USDA for its efforts to begin to prepare for climate change at the federal level by identifying necessary actions and research direction as part of its Climate Change Strategic Plan for Research, Education, and Extension. We submit these scoping comments on those actions and direction with the aim of identifying effective and expedient approaches to addressing undesirable consequences of climate change.

The USDA outlined four goals in its draft strategic plan, including (1) understand the effects of climate change on natural and managed ecosystems, (2) develop knowledge and tools to enable adaptation to climate change and improve the resilience of natural and managed ecosystems, (3) develop knowledge and tools to reduce the contributions of agriculture, forestry, and other land management practices to the buildup of greenhouse gases in the atmosphere, and (4) deliver climate change science and technology to other USDA agencies, stakeholders, and collaborators for improved decision making. We agree that all four of these goals are important. We do, however, have suggestions for priorities and focal areas in the USDA's research, education, and extension plan as outlined below and we urge the Department to begin incorporating these goals, as amended, into all National Forest Plan revisions.

We suggest that all national and international divisions of the USDA communicate the results of their research with the State Department and the other agencies involved so as to contribute in a timely manner to the international negotiations under the United Nations Framework Convention

on Climate Change (UNFCCC). Under this program, the USDA would collaborate with other nations to evaluate the carbon sequestration capacities and potential responses to climate change of different types of ecosystems.

USDA GOAL #1: understand the effects of climate change on natural and managed ecosystems

While furthering our understanding of the potential effects of climate change on natural and managed ecosystems is important, we need to move ahead with the development of adaptation strategies based on existing knowledge of likely change in climate and the ecological and economic impacts of those changes. Uncertainty obviously exists, but natural and social scientists have relatively good understanding of the characteristics and probability of the most severe impacts to natural and managed ecosystems in response to climate change. Development of strategies to avoid and minimize specific effects of climate change should be a top priority because many undesirable consequences of climate change are likely to occur quickly, with cascading effects. Thus, we recommend making Goal #2 (below) a primary priority and Goal #1 a secondary priority.

USDA GOAL #2: develop knowledge and tools to enable adaptation to climate change and improve the resilience of natural and managed ecosystems

We offer specific suggestions about knowledge and tools that may enable adaptation to climate change and improve the resilience of natural and managed ecosystems.

(1) PRIORITIZE DEVELOPMENT OF SPECIFIC AND APPLICABLE ADAPTATION STRATEGIES

Land managers have voiced concern over the lack of region- or ecosystem-specific adaptation strategies available in the scientific literature and from federal agencies. Current strategies include such general prescriptions as increasing resilience, maintaining connectivity, controlling non-native invasive species, and collaborating across jurisdictional boundaries (Hansen et al. 2003, Hannah and Hansen 2005, Millar et al. 2007), but specific on-the-ground strategies are largely lacking. Managers are anxious to incorporate climate change into their management plans, but lack guidance and leadership on the issue.

(2) DEVELOP METHODS TO REDUCE CURRENT ECOSYSTEM STRESSORS

The greatest impacts of climate change on natural and managed systems are expected to result from synergistic relationships among climate change and other current stressors (IPCC 2001). By minimizing many of the current stressors to natural and managed systems on federal lands, the USDA may help reduce the probability of many substantial impacts of climate change. These stressors include contaminants, non-native invasive species, unsustainable levels of grazing by domestic livestock, unsustainable timber harvest practices, post-fire salvage, thinning strategies that do not mimic natural fire disturbance patterns specific to the type of forest being thinned, construction and operation of roads that results in sedimentation and fragmentation of habitat for aquatic species, and noise, pollution, and

plant and soil disturbance by off-road vehicles and by oil and gas development activities. By reducing these stressors, and thereby reducing the synergistic impacts of climate change, natural and managed ecosystems will be more likely to remain resilient (able to recover after disturbance) and functional as the climate changes (Hansen et al. 2003, Joyce and Haynes 2006, Millar et al. 2007). If these stressors are not minimized, natural and managed ecosystems are likely to experience reductions in primary productivity, potential for carbon storage, richness and viability of native species, and extractive value as climate change progresses. Along with reducing greenhouse gas emissions, reducing the impacts of current stressors to natural and managed systems is the single most effective approach the federal government can take to combat the impacts of climate change. Existing knowledge and tools are sufficient to identify effective ways to reduce stressors.

Researchers will need to examine which changes in management practices or restoration activities are likely to provide the greatest benefits in terms of increasing the resistance (the ability to withstand change) and resilience of natural and managed ecosystems to climate change. For the sake of expediency, we recommend collecting data in a formal adaptive management framework (Holling 1978).

(3) IDENTIFY ECOSYSTEMS THAT ARE HIGHLY SENSITIVE TO CLIMATE CHANGE

Large and intense disturbances such as wildland fires or insect outbreaks are likely to catalyze ecosystem change under climate change, but so are many land management practices. Modeling and monitoring can assist us in determining which ecosystems are especially stressed due to changes in precipitation, temperature, timing and amount of runoff, and productivity. For example, the probability that forests will be converted to non-forested ecosystems after major disturbances can be reduced by reducing the level of human land use in areas that are experiencing high climate stress. Strategic fire management, such as prescribed fire or thinning (Joyce et al. 2008), might also be beneficial in climate sensitive areas, provided such actions do not facilitate colonization by forest pests and pathogens.

(4) IDENTIFY CLIMATE REFUGIA

We recommend identifying areas in which land cover and distributions of native species are projected to remain relatively stable as the climate changes. By retaining climate refugia across a rapidly changing landscape, we may conserve sources of native species that can disperse and colonize new areas. Climate refugia can be identified with currently available downscaled climate models.

(5) INVESTIGATE POTENTIAL IMPACTS OF MITIGATION (INCLUDING BUT NOT LIMITED TO BIOFUELS) ON RESILIENCE AND RESISTANCE TO CLIMATE CHANGE

To enable adaptation to climate change and improve the resilience of natural and managed ecosystems, we recommend conducting a full accounting of the economic and ecological costs and benefits of thinning forests and producing biofuels. Production of biofuels is

increasingly common in both agricultural systems, in the form of corn-based ethanol or switchgrass grown for fuel, and in forests, in the form of woody biomass harvested for combustion to create electricity. Much of the woody biomass that is produced when forests are thinned to reduce the probability of uncharacteristically severe wildfire could be used to generate electricity. However, large-scale thinning might emit more carbon than is saved by substituting biofuels for fossil fuels. Not only thinning in a strict sense but also infrastructure necessary to conduct thinning, such as road building, operation of large machinery, and transportation of woody biomass to electric plants, results in emissions of carbon dioxide. A full accounting of the economic and ecological costs and benefits of thinning and biofuels from forests needs to be conducted.

Agricultural production of biofuels also may emit more carbon than it ultimately saves, particularly if forests or other natural land-cover types are cleared for production of biofuels.

(6) DEVELOP NEW TOOLS TO ASSESS EFFECTIVENESS OF MANAGEMENT ACTIONS

Resource managers are facing a climatically uncertain future, making tools based on relatively stable periods of historical climate less useful. Managers will need assistance in adapting the tools they have and developing new ones for maintaining ecosystem function, controlling non-native invasive species, increasing ecosystem and species resilience and resistance, and maintaining viable populations of native animals and plants. Ecosystem-based approaches to wildlife management are unlikely to maintain individual species of interest, because climate change is expected to decouple current ecological communities as species respond individually to the changing climate (Williams and Jackson 2007). Managing within the historical range of variation will become increasingly difficult. Maintaining native species and their habitats on public lands will become more challenging as plants and animals adjust their ranges in response to climate change.

In addition to developing new tools for managers, we recommend that the USDA identify and monitor the status and trend of a small set of species that are highly sensitive to climate change. This can be accomplished by revising National Forest management plans to incorporate climate sensitive species as Management Indicator Species. To enable adaptation of native species to climate change and improve ecosystem resilience, we recommend that the USDA reinstate the viability provisions of the National Forest Management Act, particularly as it pertains to climate sensitive species.

USDA GOAL #3: develop knowledge and tools to reduce the contributions of agriculture, forestry, and other land management practices to the buildup of greenhouse gases in the atmosphere

We offer specific suggestions about knowledge and tools that may reduce the contributions of agriculture, forestry, and other land management practices to the buildup of greenhouse gases in the atmosphere

(1) INCREASE OUR UNDERSTANDING OF THE RELATIVE NET LEVELS OF GREENHOUSE GAS EMISSIONS ASSOCIATED WITH DIFFERENT TYPES OF LAND USE AND LAND CONVERSION

Estimates of the contributions of standing forests and other ecosystems, loss or restoration of those systems, agriculture, and other land management practices to emissions of greenhouse gases vary widely. However, most data indicate that human land use can contribute substantially to emissions of carbon, methane, and other greenhouse gases. We recommend additional research on the contribution to carbon storage and emissions of soils, ground cover, woody debris, animal husbandry, and different crop types.

(2) RESEARCH THE ROLE OF ROADLESS AREAS IN SEQUESTERING CARBON

Only two percent of land in the United States remains roadless (http://roadless.fs.fed.us/), yet roadless areas provide extensive benefits to people and wildlife alike (Trombulak and Frissell 2000), including carbon storage. With the recent repeal of the 2001 Roadless Conservation Rule, carbon storage on these lands is at risk. We encourage the USDA to evaluate the costs and benefits of developing roadless and near-roadless areas for multiple use versus leaving these areas intact for carbon sequestration and, in accordance with Goal #2, facilitating adaptation to climate change and improving ecosystem resilience.

(3) COMPARE THE ECONOMIC VALUE OF INTACT FOREST AND OTHER NATIVE ECOSYSTEMS FOR CARBON SEQUESTRATION AND OTHER LAND USES

Forests in the United States contain substantial carbon reserves, and public lands store more carbon, per hectare, than private lands (Ingerson and Loya 2008). Public lands may be more valuable, ecologically and economically, as national carbon stores and sinks than for resource extraction (Knowler and Dust 2008). We recommend that knowledge be developed on the direct and indirect costs and benefits of forests as carbon sinks and as timber resources. Developing harvest strategies that store considerable quantities of carbon across the landscape also would be of value.

We recommend increasing the extent to which the contribution of late-successional forests to long-term carbon sequestration and the effects of timber harvest practices on release of carbon reserves from soils and vegetation are addressed in forest management plans. Notably, old-growth forests in the Pacific Northwest store more carbon per hectare than any other forests on Earth (Smithwick et al. 2002), and the efficacy of old-growth forests in continuing to sequester carbon over long time scales has recently been demonstrated (Luyssaert et al. 2008). Specifically, the coastal temperate rainforests of the Tongass and Chugach national forests represent some of the most intact old-growth forests in the world. Protecting these forests and extending timber harvest rotations, in general, are keys to shifting managed forests from a net carbon source to a carbon sink.

We also encourage the USDA to increase knowledge of the relative economic and administrative efficiency and reliability of conserving and restoring existing ecosystems in

comparison with other greenhouse gas mitigation approaches such as domestic and international offsets and trades.

USDA GOAL #4: deliver climate change science and technology to other agencies, stakeholders, and collaborators for improved decision making

We are in strong agreement with this goal. Sharing of information on climate change science and technology is vital as all sectors of the United States grapple with changes in climate and its associated impacts on ecological, social, and economic systems. We encourage complete transparency of information on climate change science and technology from the USDA as well as timely output of study results; collaboration with nongovernmental organizations, other agencies, state governments, and private citizens; results and inferences based on sound science, produced and reviewed by scientists; and a spirit of communication and group effort. Climate change is an all-encompassing challenge that cannot be addressed successfully by any single agency, department, or sector. Without collaboration, climate change adaptation efforts developed by one sector may compete and conflict with efforts in other sectors. Communication and a cohesive approach among different sectors, departments, regions, agencies, and individuals is absolutely vital to responsibly plan for climate change.

Thank you for the opportunity to provide comments on the USDA Strategic Plan for Climate Change Science.

Sincerely,

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