

Prospectus for Synthesis and Assessment Product 4.4
*Preliminary Review of Adaptation Options for
Climate-Sensitive Ecosystems and Resources*

Public Review Comments
12 June – 12 July 2006

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General Comments:

General Comment 1: On behalf of The Nature Conservancy, we would like to express our appreciation for the importance of this broad review of adaptation options for climate sensitive ecosystems and resources. Every ecosystem on the planet faces inevitable and dramatic adverse impacts from climate change. However, there are currently no widely accepted strategies to identify, plan, manage or monitor conservation areas on the basis of their vulnerability to the impacts of climate change. The Conservancy has staff working around the world on understanding the impacts of climate change on biological diversity and developing strategies to mitigate or adapt to those effects. We would be happy to help and support this federal effort.

Reviewer: Erika Feller (primary contact), Lynne Hale, Bill Stanley, The Nature Conservancy

Response: Thank you. We will call upon your expertise where appropriate. No change is needed to the prospectus.

General Comment 2: The Conservancy has been working to develop and test conservation strategies to address the threat of climate change to sensitive systems. We would be happy to share tools, scientific studies, our network of practitioners, or provide case studies. The Conservancy has developed a Reef Resilience tool kit designed to help marine protected area managers improve resilience of coral to the effects of bleaching and disease by:

- Examining factors that may help coral communities either to resist or recover quickly from bleaching events
- Identifying the locations of resistant communities as well as suggests specific actions to diminish the impacts of mass bleaching at different scales
- Protecting commercially and environmentally important spawning aggregations—places where teeming numbers of fish gather to mate at the same time each year.

Through training and outreach we have established a network of managers working to apply resilience principles in coral-based marine protected areas. Additionally, Conservancy staff have currently in press an article on resilience in mangrove systems.

We are also considering new management strategies within terrestrial and aquatic environments to increase resilience to climate change. These strategies range from re-establishing hydrological flows to reducing stressors such as invasive species that are likely to be exacerbated by climate change. Additionally, we are beginning to consider the vulnerability of habitats to climate change when identifying new geographies to prioritize for future conservation efforts, taking into account sea level rise and changes in temperature and precipitation.

Recommendations for case studies are included in our specific comments.

Reviewer: Erika Feller (primary contact), Lynne Hale, Bill Stanley, The Nature Conservancy

Response: Thank you. We will consider your expertise, tools, studies and recommendations for case studies as we select case studies and develop the content of SAP 4.4 more fully. No change is needed to the prospectus.

First General: By scoping this study to include only federally owned/managed places, it is far too narrow. Significant ecosystem services are found with wildlife inhabiting agricultural areas, wetlands and lakes large and small, and even urban areas. Places outside of federal lands need to be included as an important component of this study, and its audience needs to be defined as a broader group of people than only managers of federal lands. It needs to go beyond a how-to for these managers, and be a report to the nation on the potential impacts of climate change on ecosystems throughout the country.

Reviewer's name, affiliation: Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory

Response: We recognize that as this scope is written, SAP 4.4 will not be comprehensive. However, we did not think we could be, and so we were purposeful in limiting it through focusing on adaptation options for lands and waters considered important enough to protect now. However, our purpose is not just to provide information useful for managing federal lands and waters. It is also meant to be useful more broadly to managers of ecosystems and resources outside of federally protected and managed lands. We will strive to do this throughout SAP 4.4 to the degree that is possible. We disagree with the final point made by the commenter that this should be "a report to the nation on the potential impacts of climate change on ecosystems throughout the country." SAP 4.4 is not meant to be a report to the nation on the potential impacts of climate change on ecosystems throughout the country. The purpose of SAP 4.4 is to focus on adaptation options for climate sensitive ecosystems and resources. SAP 4.3 will focus on impacts on ecosystems and resources. No change is needed to the prospectus.

First General Comment: This prospectus describes an interesting, excellent and very important effort. It should certainly go forward and be well supported.

Reviewer's name, affiliation: Michael MacCracken, Climate Institute

Response: Thank you.

Second General Comment: That this prospectus does not reference or apparently intend to build upon the many components of the US National Assessment (so including the various regional and sectoral components as well as the national summary) is wholly unacceptable. Not only does the text not draw up those results, but Section 7 also does not even list the US National Assessment as a possible resource. In that the draft of prospectus 4.6 did include drawing upon the results of the USNA, I had hopes that this period of trying to erase history was over, but I guess not (especially given that its findings are the basis of the official US Government submission to the UNFCCC, a submission approved by virtually all government agencies, ignoring it is an egregious oversight). And then indicating that the report will draw from the IPCC 2001 assessment and relevant NRC reports, both of which have endorsed the US National Assessment is at best hypocritical. And then to not even have the biographies of the scientists who led parts of the US National Assessment mention these as relevant expertise is outlandish.

Reviewer's name, affiliation: Michael MacCracken, Climate Institute

Response: Leaving out reference to the U.S. National Assessment was an unintended omission. Thank you for pointing it out. We certainly intend to build on the information from that body of work and will include this reference in the Prospectus. (Section 7, page 13, line 23)

Third General Comment: On page 9, section 3.3, and or on page 12, section 6, in that it will help to ensure the credibility of the report, it would be helpful to make a bit more explicit in the first paragraph that at each stage in the review process the FACA panel will prepare a collective written review (e.g., letter or report—but more than the minutes of the meeting) that will be made available to the public rather than just holding a meeting to discuss the report and having the authors prepare a response to what might well be their recording of the oral comments.

Reviewer's name, affiliation: Michael MacCracken, Climate Institute

Response: Done (see Section 3.3, page 9, lines 16-19 and Section 6, page 12, lines 7-8 and 11-12).

Fourth General Comment: At the request of Congress, the GAO is presently conducting an assessment with a quite similar scope to this one. It might well be useful for there to be some coordination. The GAO contact is Anne Johnson, Natural Resources and Environment Team, U.S. Government Accountability Office, 441 G Street, N.W., Room 2T23A, Washington, D.C. 220548, Tel. (202) 512-6188.

Reviewer's name, affiliation: Michael MacCracken, Climate Institute

Response: Thank you. We have already met with GAO about our respective reports and will do as you suggest – coordinate with them throughout the production of SAP 4.4. No change is needed to the prospectus.

First General: The Division of Environmental Biology at NSF is not responsible for managing climate-sensitive ecosystems; we therefore are not directly involved in the activities discussed. We do wonder, however, why the Bureau of Land Management is not included as a Lead Agency (e.g., pages 7 & 10). The BLM is responsible for oversight of many Federal lands, including large tracts of arid and semi-arid lands that potentially are very sensitive to climate change. This seems to be a fairly significant oversight.

Reviewer/affiliation: James W. Raich, NSF, Directorate for Biological Sciences

Response: The CCSP is a collaborative interagency program designed to improve the government wide management of climate science and climate-related technology development. The Bureau of Land Management (BLM) is not a participant in the U.S. Climate Change Science Program (CCSP) and therefore was not present to volunteer their support for SAP 4.4. However, the U.S. Geological Survey (USGS) -- as the Department of Interior's (DOI's) science organization and representative on the CCSP – is a supporting agency for this product. Having said that, BLM may be a participant in forming the content of SAP 4.4 through their management of the National Landscape Conservation System, in particular, Wild and Scenic Rivers. No change is needed to the prospectus.

Specific Comments:

Page 5, Line 35 et seq.: With regard to case studies we feel that the attributes described for case studies are appropriate although the process for selecting them is unclear (Section 1.5.2). We recommend broad representation of difference climate-sensitive systems, including:

- **Coral Reef Resilience (Florida Keys National Marine Sanctuary):** Conservancy scientists have joined with the National Oceanic and Atmospheric Administration and the Florida Department of Environmental Protection in a project to study reef systems in south Florida and the Florida Keys National Marine Sanctuary in an effort to determine what makes some corals resistant to damage from catastrophic events like hurricanes and coral bleaching through development of the Florida Reef Resilience Program FRRP. The project includes evaluation of bleaching and disease on user groups who will be affected, ecosystem services provided by reefs, conflicts, and development of management actions. Additionally, World Wildlife Fund's LEADS (Linking Environmental Analysis to Decision Support) is working with NOAA to advance effective coral reef resilience strategies through use of an innovative meta-analysis of the relationship between coral bleaching and water quality in Florida. Through the LEADS project, and with NOAA SARP support, WWF will collect decision maker and stakeholder input, synthesize existing water quality/reef data, GIS technologies, and integrate with the The Conservancy's FRRP and a host of other regional partners.
- **Beach / Estuarine / marsh complexes (North Carolina):** Conservation action strategies for coastal wetlands and their tributaries recognize that these systems are dynamic, but do not usually take rising sea levels into account. Mean sea level is expected to rise about 2 feet along most of the U.S. Gulf and Atlantic Coast in the next century. North Carolina has 1,435,725 acres of coastal lands between 0 and 5 feet. Due to the impacts of storms, and the rapid rate that peat soils decompose in the presence of seawater, much of these lands may disappear even faster than the mean rate of sea level rise would suggest. The impacts of rising sea levels on wetland ecosystems of the Albemarle Sound will be dramatic but slow. The conservation community, major land holders and the insurance industry have a common interest in maintaining the resilience of these ecosystems so that they will continue to maintain biodiversity, sustain production of farm and forest products and mitigate the risk of catastrophic loss from extreme weather events.
- **Polar systems (Alaska)** The Alaska-Yukon Arctic is the focus of an ecoregional assessment underway by The Nature Conservancy and its partners. The goal of the project is to integrate the best available information about the ecology of the region to identify the lands and waters most necessary for the maintenance of the ecoregion's biodiversity. The result will be a working answer, to be improved on and refined over time. The results, as well as the integrated information inputs, will be available to all parties interested in the stewardship of the Alaska-Yukon Arctic.

Current methods for ecoregional planning assume that climate will remain stable over the next 50 to 100 years. However recent experience at high latitudes confirms climate model predictions of substantial changes in nighttime and wintertime temperatures on a scale of decades. Warming in the Arctic will melt the surface permafrost, lengthen the growing

season, increase the productivity of freshwater ecosystems and cause the early and prolonged retreat of sea ice from the coast. Climate change and ecosystem responses to them will vary across the ecoregion. The Arctic Coast Ecoregion Plan can identify and prioritize landscape features where environmental conditions will remain relatively stable. These conservation areas will function as refugia for arctic biodiversity.

Response: We agree that there needs to be a broad representation of different types of climate sensitive ecosystems. The general process for selecting case studies is described in section 1.2 and articulates the criteria for selecting case studies. The actual selection of case studies from among all candidates will be up to the Lead Authors and the process they develop in collaboration with their chapter teams, EPA, and the Contactor. One of those criteria – “the Chapter Lead Authors and the Lead Agency will also consider the following desirable characteristics of the group of case studies: 1. Address a reasonable cross section of important, climate-sensitive ecosystems and/or ecosystem services and features...” – corresponds exactly with your recommendation. Thank you for your suggestions for case studies. We will consider them as we begin to develop SAP 4.4. No change is needed to the prospectus.

Page 10, line 6: We wholeheartedly support the nomination of Dr. Peter Kareiva as lead author for the Synthesis Chapter.

Reviewer: Erika Feller (primary contact), Lynne Hale, Bill Stanley, The Nature Conservancy

Response: Thank you.

First Specific: p. 2, line 18: The reference to riparian buffer strips as a means of adaptation seems to belie the general bent of this prospectus toward looking at federally managed lands, as I think of riparian strip as offering protection from non-point-source pollution from farmland entering streams, not something that is a concern in National Parks, National Forests, etc. Additionally, I don't see this as an adaptation plan that is particular to climate change issues.

Reviewer's name, affiliation: Brent Lofgren, NOAA/Great Lakes Environmental Research Laboratory

Response: The example has been changed slightly to show the relevance of riparian buffer strips to one federally managed type of system – Wild and Scenic Rivers – some of which may be in need of protection from nonpoint source pollution (page 2, lines 19-20). Because climate influences the distributions, structures, functions, and services of ecosystems, management practices may already be established to deal with the effects of climate variability or the effects of the interaction of climate variability with existing stressors (e.g., intense rain events and pollutant runoff). Some adaptation options are likely to be modifications to, or adjustments in those types of management practices.