

Executive Branch Wildlife and Ecosystem Climate Change Adaptation: A Status Update

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Defenders of Wildlife

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Introduction

This report outlines various climate change adaptation efforts and processes moving forward at the federal level within natural resources related agencies. This document is by no means comprehensive, and there are many additional climate adaptation-related initiatives within the Obama administration that are relevant for wildlife and ecosystems. For example, this report specifically does not include agencies that do not have natural resources conservation responsibilities, but may nonetheless have programs and jurisdictions important for wildlife adaptation (or mal-adaptation) like the National Flood Insurance Program administered by FEMA.

Overall, there are many important pieces moving. However, as pointed out by the National Research Council's recent report, *America's Climate Choices – Adapting to the Impacts of Climate Change*¹, there is a clear need for a national adaptation strategy to guide and coordinate adaptation-related programs and activities.

White House Council on Environmental Quality (CEQ)

- Interagency Climate Adaptation Task Force. CEQ is co-chairing the Climate Adaptation Task Force with the Office of Science and Technology Policy (OSTP) and NOAA. The Task Force is a pan-federal and pan-sectoral (e.g. water, health, coasts, insurance) group comprised of over 200 federal agency staff, broken into various workgroups. The Task Force has been conducting public listening sessions throughout the country over the past summer. Though the Task Force started prior to the president's executive order on "Federal Leadership in Environment, Energy and Economic Performance"², that executive order called for "Within 1 year of the date of this order the CEQ Chair shall provide to the President, following consultation with the agencies and the Climate Change Adaptation Task Force, as appropriate, a progress report on agency actions in support of the national adaptation strategy and recommendations for any further such measures as the CEQ Chair may deem necessary." That report is expected in October, 2010. The report is expected to be relatively brief (on the order of 20 pages), high level, and general, though it will be important to further advance and accelerate climate adaptation policy development within the executive branch. See <http://www.whitehouse.gov/administration/eop/ceq/initiatives/adaptation>.

¹ Available at <http://americasclimatechoices.org/>

² Available at http://www.whitehouse.gov/assets/documents/2009fedleader_eo_rel.pdf

- NEPA and Climate Change. CEQ is also leading the development of guidance to agencies for incorporating climate change considerations into NEPA implementation. See <http://www.whitehouse.gov/sites/default/files/microsites/ceq/20100218-nepa-consideration-effects-ghg-draft-guidance.pdf>. For wildlife and ecosystem adaptation, there were several shortcomings with the draft. First, the guidance completely exempts federal land and resource agencies from the guidance. These agencies have a large impact on wildlife and ecosystem adaptation. There is a separate process to ultimately provide guidance to these agencies, but its timing has not been made public. From an adaptation standpoint, the guidance could be improved by strengthening language on how agencies should consider the impacts of climate change on the affected environment and the proposed action, and on the cumulative effects of the impacts of climate change and the proposed action on the affected environment.

Department of the Interior-wide Initiatives

The chief climate change policy development of the Department of the Interior was the issuance of Secretarial Order 3289 on September 14, 2009 addressing “the Impacts of Climate Change on America’s Water, Land, and Other Natural and Cultural Resources.”³ The Secretarial Order created the following:

- The Energy and Climate Change Council (Council) within the Office of the Secretary (formerly called the Climate Change Response Council in the original Secretarial Order) to coordinate all energy and climate change initiatives within the Department. The Council is charged with developing and implementing “an integrated strategy for responding to renewable energy efforts and climate change impacts involving the resources managed by the Department.” To date, no such strategy has been released to the public.
- Climate change planning requirements. This requirement is retained from a similar Secretarial Order issued by Secretary Babbitt in 2000, which requires Interior agencies to “consider and analyze potential climate change impacts when undertaking long-range planning exercises, setting priorities for scientific research and investigations, developing multi-year management plans, and making major decisions regarding potential use of resources under the Department’s purview.” To date, no Interior agency has released to the public any policy or guidance documents to implement this provision. Agencies seem to be implementing this *ad hoc*, generally under NEPA requirements associated with land management planning.
- DOI Climate Science Centers. The Secretarial Order elevated the regional “hubs” planned for the National Climate Change and Wildlife Science Center (NCCWSC) within the U.S.G.S. into a broader DOI climate science program. The Order and its implementation have created a somewhat confusing relationship between the NCCWSC and regional Climate

³ Available at <http://www.doi.gov/whatwedo/climate/strategy/>

Science Centers, or CSCs, whereas prior to the Order there was a clearer relationship and function between units. The CSCs are going to be housed in “host institutions”, generally universities, to be able to draw in expertise and resources outside of the federal government. To date, three CSCs have been officially established in Alaska, North Carolina, and the Northwest. Eight regional CSCs are planned in total nationwide, but that will depend on additional appropriations. The CSCs are supposed to provide relevant and timely science to assist resource managers in adapting to climate change. See <http://nccwsc.usgs.gov/> for more information about the NCCWSC.

- Landscape Conservation Cooperatives. The Secretarial Order elevated Landscape Conservation Cooperatives, or LCCs, from a Fish and Wildlife Service initiative to a Department-wide initiative. LCCs are “management-science partnerships that inform integrated resource management actions addressing climate change and other stressors within and across landscapes.” The conservation challenges of the 21st century, climate change and land use change in particular, require conservation to operate at landscape scales, well beyond traditional jurisdictional boundaries. There are 21 LCCs planned to cover the nation.⁴ Eight LCCs received funding in FY 10 through the Fish and Wildlife Service. Additional LCCs are being established with support from the Bureau of Land Management, the Bureau of Reclamation, National Park Service and the EPA. The Department is investing a large amount of resources (funding and staff time) into LCCs and they are a core part of its climate change program. It should be noted, however, that LCCs were originally designed, and in practice are forming, to be broader than focusing solely on climate change issues within a region. Each LCC is self-identifying the most important and urgent conservation challenges it faces at the landscape scale.
- America’s Great Outdoors. The America’s Great Outdoors initiative is an evolution of Secretary Salazar’s experience developing “Great Outdoors Colorado”, or GoCo, when he was with the state, and the Department’s earlier “Treasured Landscapes” initiative launched the first year of the Obama administration. America’s Great Outdoors is now a pan-federal initiative with Interior, USDA, EPA and CEQ as leading agencies in coordination with other federal agencies. The initiative will “promote and support community-level efforts to conserve outdoor spaces” and will promote “a national dialogue about conservation and reconnecting Americans with the outdoors.” The conservation community is hoping that a central component of the initiative, which is still forming, will include increased land protection efforts. Addressing the impacts of climate change has been a theme in many of statements and documents promoting the initiative. More information is available at <http://www.doi.gov/americasgreatoutdoors/index.cfm>.

⁴ See <http://www.fws.gov/science/shc/lcc.html> and <http://www.doi.gov/whatwedo/climate/strategy/LCC-Map.cfm> for a map and more information.

U.S. Fish and Wildlife Service

- National Fish, Wildlife, and Plant Climate Adaptation Strategy. In the Interior Appropriations bill for fiscal year 2010 (P.L. 111-88), Congress urged “the Council on Environmental Quality, working closely with the Department of the Interior as the lead department, to develop a national, government-wide strategy to address climate impacts on fish, wildlife, plants, and associated ecological processes.” The Fish and Wildlife Service is leading a collaborative effort for the Department of the Interior and CEQ to develop a national climate adaptation plan to safeguard fish, wildlife, and plants and their habitat from the impacts of climate change. The FWS has convened multiple federal, state, and NGO stakeholders in an ongoing dialogue to facilitate the development of the strategy, and has organized listening sessions at numerous scientific and wildlife-professional venues to solicit further input about what should be included in such a strategy. A draft of the strategy is targeted for the summer of 2011, with a final issued by the summer of 2012. More information is available at <http://www.fws.gov/nfwcas.html>.
- Fish and Wildlife Service Strategic Plan for Responding to Climate Change. On September 28, 2010, the FWS released its final strategic plan for responding to climate change. The strategic plan is divided into three overarching priority areas: mitigation, adaptation, and engagement, with activities to facilitate wildlife adaptation the centerpiece of the plan. The plan calls for capacity building within the agency to address climate change, increases in scientific capacity including ecological monitoring, assessment of species and ecosystem vulnerabilities to the impacts of climate change, and integration of climate change into all agency planning and budgeting. The draft plan along with a 5-year Action Plan for responding to climate change is available at http://www.fws.gov/home/climatechange/strategic_plan.html.
- Refuge System Inventory and Monitoring program. As part of the agency’s climate change initiative, the president’s budget included, and Congress appropriated, funding to develop and expand a biological inventory and monitoring program on the National Wildlife Refuge System. The FWS has created a national office for inventory and monitoring based in Colorado with close ties to the National Park Service “Vital Signs” program to allow for sharing of data and methodologies. FWS is also adding biologists throughout the refuge system to develop inventory and monitoring programs on the ground to better detect ecological changes associated with climate change and other issues and to facilitate adaptive management.
- Landscape Conservation Cooperatives. FWS is primary lead on LCCs and has invested the most resources into establishing and staffing them (See DOI-wide initiatives above). FWS recently (September 8, 2010) announced \$2 million in funding for 14 projects nationwide to increase adaptive science capacity in support of the LCCs.

- Endangered Species Program. FWS has responded to a number of petitions to list species under the Endangered Species Act due to the impacts of climate change, most notably polar bears. Not much progress has been communicated to the public about efforts to more proactively address climate change throughout the endangered species program.

U.S. Geological Survey

- U.S.G.S. reorganization. U.S.G.S. is currently restructuring its programs to better reflect new priorities identified in its strategic plan. The restructuring will create five overarching scientific focal areas including global climate change and land-use change, water resources, natural hazards, energy and minerals, and ecosystems. Science from all of these program areas will provide scientific information relevant to natural resources adaptation, but clearly the focal point is the global change activity area. Within the global change activity area will be the following sub-activities: Climate Effects Network/Science Applications, National Climate Change and Wildlife Science Center, Carbon Sequestration, Research and Development, Climate Change Science Support for DOI Bureaus, Land Remote Sensing, Geographic Analysis and Monitoring.
- National Climate Change and Wildlife Science Center. The Climate and Wildlife Science Center was created in 2008 and its 2010 budget was \$15 million. The Science Center is designed to increase understanding of the impacts of climate change on wildlife and ecosystems, and to help address critical management questions to ameliorate those impacts (See DOI-wide initiatives above).
- National Water Availability and Use Assessment Program. USGS proposes in FY2011 to establish a National Water Availability and Use Assessment Program as part of the larger WaterSMART (see WaterSMART below) program.

Bureau of Land Management

BLM does not have a heavy external presence on climate change adaptation. From discussions with BLM staff, BLM is not currently developing any national climate change policy guidance for its programs. BLM has received funding for its climate change initiative in support of the Department's climate change initiative in both FY 2009 and FY 2010. The primary focus of this funding has been through the wildlife program within the agency and supports on-the-ground climate-adaptation related projects and the development of Rapid Ecological Assessments.

- On-the-ground projects. These include projects that fall into the following categories: Resource monitoring, air quality and climate information, species adaptation, guidance and strategy development, water resources, and data management. In FY 2010, the BLM received approximately \$7 million in fish, wildlife, and plant adaptation project funding.
- Rapid Ecoregional Assessments. REAs are part of a broader landscape approach to BLM's work that they are still developing. REAs are designed to provide a baseline, or snapshot, of

an entire ecoregion or landscape's ecological values and potential risks from climate change, wildfires, invasive species, energy development, and urban growth. Four REAs have been contracted out and are expected to be completed by January of 2012. An additional three REAs are expected to be contracted out by the end of FY2010. These are expected to provide timely and useful information for making decisions on BLM lands in a broad, ecological context, though the BLM is just beginning to determine how exactly to best use and incorporate the REAs into decision-making. There is a clear nexus between REAs and some of the work of LCCs, and a number of LCCs are explicitly incorporating REAs into their programs. More information available at http://www.dmg.gov/documents/BR_Rapid_Ecoregional_Assessment_BLM_102809.pdf.

National Park Service

- Climate Change Response Program and Strategy. The National Park Service recently released its Climate Change Response Strategy⁵ in September, 2010. The Strategy will guide the Park Service's overall Climate Response Program which is coordinated around four areas of emphasis: science, adaptation, climate mitigation, and education. More information is available at <http://www.nature.nps.gov/climatechange/index.cfm>.
- Vital Signs: National Park Service Inventory and Monitoring Program. The primary role of the Park Service Inventory and Monitoring Program "is to collect, organize, and make available natural resource data and to contribute to the Service's institutional knowledge by facilitating the transformation of data into information through analysis, synthesis, and modeling."⁶ The Inventory and Monitoring Program is increasingly collecting and analyzing information to detect ecological changes associated with climate change.⁷ The Park Service is also developing NPScape, a "landscape dynamics monitoring project" to provide information about changes and trends in landscape-scale indicators, including human population trends, road density and land cover. There appears to be strong overlap between NPScape and BLM Rapid Ecological Assessments (see above), but no formal linkages between the programs are made in external documents of either program.

Bureau of Reclamation

- WaterSMART. The Bureau of Reclamation and U.S. Geological Survey are the lead agencies for the Department's WaterSMART Program. In February of 2010, Secretary of the Interior issued Secretarial Order 3297⁸ launching the program, which stands for "Sustain and Manage America's Resources for Tomorrow". The purpose of the program is to "secure and stretch

⁵ Available at http://www.nature.nps.gov/climatechange/docs/NPS_CCRS.pdf

⁶ See <http://science.nature.nps.gov/im/index.cfm>

⁷ The Park Service has a series of "Climate Briefs" about climate change monitoring in Park ecoregions of the country available at <http://science.nature.nps.gov/im/climate/index.cfm>.

⁸ Available at <http://www.doi.gov/news/pressreleases/upload/WaterSMARTOrder.pdf>.

water supplies for use by existing and future generations to benefit people, the economy, and the environment, and identify adaptive measures needed to address climate change and future demands.” A key aspect of the Bureau of Reclamation’s program is its Basin Studies Program.

- **Basin Studies Program.** The Basin Studies Program is a matching grant program to conduct future water supply and demand analyses in Western river basins to create water management plans in order to meet changing conditions. The Basin Studies Program is one of the chief avenues for the Bureau of Reclamation to implement the SECURE Water Act (see below). To date, three basin studies are underway (Colorado River, Yakima River, and St Mary and Milk Rivers) and \$3.3 million in matching funding was recently announced to undertake an additional six basin studies. Most emphasis to date has been on assessing supply changes associated with climate change. More information is available at <http://www.usbr.gov/WaterSMART/basin.html>.
- **SECURE Water Act.** The SECURE Water Act passed in the 2009 Omnibus Public Lands Act (P.L. 111-11 Subtitle F). The SECURE Water Act is the first U.S. law requiring climate change adaptation planning, and specifically requires the consideration of the environment and ecosystems within river basin water adaptation plans. In each river basin where the Bureau of Reclamation operates, the Bureau is to assess the climate-related risks to water supplies and the associated impacts on water delivery, hydropower, fish and wildlife habitat, endangered species, and ecological resilience, and develop “strategies at watershed and aquifer system scales to address potential water shortages, conflicts, and other impacts to water users located at, and the environment of, each service area.”
- **LCCs.** The Bureau of Reclamation is also involved in the Department’s LCC, and is co-leading the development of those LCCs overlaying the Colorado River and Rio Grande basins, potentially providing a nexus between the Basin Studies Program and the LCCs.
- **Climate Change and Western Water Group.** The U.S. Geological Survey, Bureau of Reclamation and National Oceanic and Atmospheric Administration have formed the Climate Change and Western Water Group, a federal research and development group. Their goal is an interagency, coordinated research and development plan that is steered by user needs, incorporates expert review, delivers research and development products to users, and assimilates user feedback to steer the next research steps. Reclamation has also empanelled the Climate Technical Work Group to provide information on climate science and future climate conditions and their potential impact on the Colorado River.

Department of Agriculture-wide Initiatives

Secretary Tom Vilsack has stated that climate change is a central issue for the USDA. Addressing climate change is a core aspect of the Department’s strategic plan. USDA was the lead agency involved in the USGCRP Synthesis and Assessment Product 4.3 on “Agriculture, Land Resources,

Water Resources and Biodiversity in the U.S” (see USGCRP below). USDA (in conjunction with the Interagency Climate Adaptation Task Force) hosted a meeting in Denver in July 2010, “to present the science behind climate change and its impacts on agriculture, highlight the potential for adaptation, layout Federal adaptation efforts and future plans, and solicit much needed input from agricultural producers.” Timeline and content for a USDA adaptation strategy are unclear.

Forest Service

The Forest Service was the first federal land management agency to issue a formal framework for addressing climate change in 2008. Secretary of Agriculture Tom Vilsack has made addressing climate change a core focus of the National Forest Service. There are a number of Forest Service climate change research and adaptation activities underway:

- Policy direction. Forest Service Chief Tom Tidwell issued a memo in November of 2009 outlining steps to “Respond to Climate Change: Developing Integrated Plans for Landscape Conservation.”⁹ Specifically, the memo called for the development of “well-coordinated landscape conservation action plans for specific geographic areas and major landscapes” to address climate change to assist in implementing the Forest Service’s Framework for responding to climate change (see below). A critical element of the memo is conjoining the management and research arms of the Forest Service in a partnership to marry science and management together.
- Strategic Framework for Responding to Climate Change. The 2008 Framework identified the overarching threats and challenges imposed by climate change to the Forest Service achieving its mission. The Framework provides a vision for the Forest Service in responding to climate change (e.g. “Ecosystem services are sustained as forests, grasslands and communities are successfully adapting to changing climate.”) and principles to guide the Forest Service in achieving the vision (e.g. “Continual monitoring and incorporation of new science into planning, policies, and decision processes are essential to adaptation and mitigation in a changing climate.”) Finally, the Framework outlines seven overarching goals: science, adaptation, mitigation, policy, sustainable operations, education, and alliances (or partnerships). Each of these goals is described, but actual actionable items are relegated to an appendix of recommendations, not directives. The Strategic Framework is available at <http://www.fs.fed.us/climatechange/documents/strategic-framework-climate-change-1-0.pdf>.
- National Roadmap for Responding to Climate Change. In July, 2010, the Forest Service released its Roadmap to provide additional guidance to the agency in implementing the Framework for Responding to Climate Change. The Roadmap holds the Forest Service accountable for progress in four “key dimensions”: organizational capacity, partnerships and

⁹ Available at <http://www.fs.fed.us/sustainableoperations/documents/tidwell-climate-change-memo-112009.pdf>

education, mitigation, and adaptation. The crosswalk between these “dimensions” and the goals of the previous Framework is not explicitly described. Creating additional confusion, the Roadmap is not organized around these dimensions, rather three “modes of action”: *assessing* current risks, vulnerabilities, policies, and gaps in knowledge, *engaging* internal and external partners in seeking solutions, and *managing* for resilience, in ecosystems as well as in human communities, through adaptation, mitigation, and sustainable consumption strategies. For example, all of the “assessing”-related actions for all the dimensions are combined in one section, all the “engaging”-related actions for all the dimensions are combined in another, etc. The Roadmap included a “scorecard” to provide measures of successfully implementing the Roadmap. The Scorecard¹⁰ includes simple metrics organized around the four dimensions (e.g. one metric for adaptation is, “Is an adaptation strategy in place that helps incorporate the vulnerability of resources and places into priority setting and land treatment actions?”). The Roadmap is available at:

<http://www.fs.fed.us/climatechange/pdf/roadmap.pdf>.

- National Forest Planning Rule. The Forest Service is revising its forest planning regulations which will guide the management of the nation’s 155 national forests and grasslands. The original rules from 1982 are still in effect on most national forests. Attempts by the Clinton and George W. Bush administrations were largely thwarted¹¹, and the Obama administration is attempting to finalize the revised regulations within its first term. Key elements of the Forest Service planning regulations will drive climate adaptation planning, decision-making, and monitoring on the national forests. For example, the regulations will dictate the nature of assessments of current and projected ecological conditions, including habitat for wildlife, that will inform agency actions to sustain biological diversity. Maintaining and restoring forest ecosystem resilience to climate change and other threats is a top management priority for the agency. Developing monitoring strategies that can measure those elements of forest ecosystems that are integral to building such resiliency will be a key issue. The proposed rule due in December. For more information available at: <http://fs.usda.gov/planningrule>.
- Planning guidance for addressing climate change. In the absence of a final revised planning rule, the Forest Service has issued interim guidance for how to incorporate climate change into forest planning under the current regulation framework and within documents prepared under NEPA. The planning guidance calls for a collaborative assessment between the Forest System and Forest Service research stations of scientific information relevant to climate change for land management planning in the geographic region of the planning area. The information is to be used to “identify risks and vulnerabilities within the planning unit, discussions of ecological adaptations likely on the planning unit, and discussions of how management of the unit can also adapt.” The guidance provides direction for integrating

¹⁰ Available at http://www.fs.fed.us/climatechange/pdf/performance_scorecard_final.pdf

¹¹ For more information about the history of the planning rule and legal challenges to the Bush rules, visit: http://www.defenders.org/programs_and_policy/in_the_courts/legal_docket/national_forest_management_plan_bush_administration_revisions.php

climate change information into forest plans. The guidance is available at http://www.fs.fed.us/emc/nepa/climate_change/index.htm.

- NEPA guidance for addressing climate change. The Forest Service issued guidance for “Incorporating Climate Change Considerations in Project Level NEPA Analysis” in January of 2009. The NEPA guidance provides details on including the effects of agency actions on global climate change and the effects of climate change on the proposed project, mitigating the effects of climate change on ecosystems, sequestering carbon, quantifying greenhouse gas emissions, and how to evaluate alternatives. The guidance will likely have to be altered when and if CEQ develops NEPA guidance for considering climate change that applies to federal land management agencies (see CEQ above). The guidance is available at http://www.fs.fed.us/emc/nepa/climate_change/index.htm.
- Forest Service Climate Science and Tools. The Forest Service includes a robust research and development branch with regional research stations conducting on-the-ground research on many adaptation-related topics. The Forest Service has developed a comprehensive website to provide a resource center of information and tools at <http://www.fs.fed.us/ccrc/>.

Natural Resources Conservation Service

NRCS describes climate change as “an Agency strategic initiative and an important cross-cutting activity.”¹² However, while their various conservation voluntary programs, such as the Wildlife Habitat Incentives Program, the Wetlands Reserve Program, and the Environmental Quality Incentives Program, have considerable potential to be used to further natural resources adaptation objectives, much of the information on the programs' benefits is framed in terms of their greenhouse gas reduction benefits (carbon sequestration, nitrogen reductions, etc.). It does not appear that USDA or NRCS has yet undertaken any strategic planning related to adaptation efforts. Indirect linkages may be operating, however, since previous Farm Bill language allows prioritization of conservation program funding for projects that address conservation priorities identified by federal, state or local planning efforts.

EPA

In the climate arena EPA is best known for its responsibilities under the CAA for mitigating emissions of greenhouse gas pollution. EPA, however, does have a number programs related directly to wildlife and ecosystem climate change adaptation.

- Climate Ready Estuaries. The EPA has unique responsibilities under the Clean Water Act to maintain and restore the water quality and habitat conditions of estuaries of national importance. In response to the acute vulnerability of estuaries to the impacts of climate

¹² NRCS climate information at http://soils.usda.gov/survey/global_climate_change.html

change, the EPA established the Climate Ready Estuaries program to provide information and tools to help communities and decision makers prepare for the impacts of climate change on their estuaries. See <http://www.epa.gov/climatereadyestuaries/>. As part of the program EPA released a synthesis of adaptation options for estuaries and coastal areas available at

http://www.epa.gov/climatereadyestuaries/downloads/CRE_Synthesis_1.09.pdf.

NOAA

The National Oceanic and Atmospheric Administration is one of the leading agencies studying and modeling the physical climate system, as well as researching and managing coastal and marine resources.

- **Climate Services.** NOAA is proposing to establish a National Climate Service to provide increasingly accessible climate change information to decision-makers and the public. The restructuring would consolidate a number of climate change functions throughout the agency and expand its outreach and communications capabilities. NOAA has already established a comprehensive website as a gateway to their climate change information at <http://www.climate.gov/>.
- **Coastal Services Center:** NOAA's Coastal Services Center is developing and providing tools, information, data, and assistance to coastal managers. Not solely focused on wildlife and ecosystem needs, the Services Center's resources are incredibly valuable for coastal natural area managers. The Services Center website is <http://www.csc.noaa.gov/index.html> The program recently released "Adapting to Climate Change: A Planning Guide for State Coastal Managers" which can be found at <http://coastalmanagement.noaa.gov/climate/adaptation.html>.

Army Corps of Engineers

The Army Corps is a leading and supporting agency in many large-scale ecological restoration projects (e.g. Everglades restoration), responsible for important aspects of Clean Water Act permitting of wetlands filling, and involved in hundreds of levee, dredging, and other construction projects with potentially large ecosystem adaptation or "mal-adaption" implications.

- **Climate Change Response Program.** Recognizing the potentially large impacts of climate change on the Corps' mission and water management projects, the Corps has created a Climate Change Response Program to "develop, implement, and assess adjustments or changes in operations and decision environments to enhance resilience or reduce vulnerability of USACE projects, systems, and programs to observed or expected changes in climate." More information available at <http://www.corpsclimate.us/index.cfm>.
- **Corps sea level rise guidance.** The Corps released guidance on "incorporating sea-level change considerations in civil works programs" in July of 2009. The guidance requires the

analysis of a range of scenarios from low to intermediate to high increased sea levels. Importantly, the low end of the scenarios must incorporate historic trends in sea level, which means that all alternatives will include sea level rise. In addition, the high-end scenario is not limited to the high-end published in the 2007 IPCC report, which is widely recognized to inadequately incorporate dynamic melting of the polar ice caps. The guidance is available at http://www.dbw.ca.gov/csmw/pdf/EC_Sea_Level_Change.pdf.

U.S. Global Change Research Program (USGCRP)

The USGCRP is a Congressionally-authorized consortium of 13 federal agencies responsible for various aspects of global change research, including research on climate change. USGCRP has produced a number of important products related to climate adaptation for wildlife and ecosystems and maintains a comprehensive website providing one-stop shopping for a variety of climate change science resources and publications at <http://www.globalchange.gov/>.

- Global Climate Change Impacts in the United States. The USGCRP released “Global Climate Change Impacts in the United States” in June of 2009. It was the most comprehensive and up-to-date synthesis of climate change information for the United States at the time (and largely still is). It is built off of years of work including the Synthesis and Assessment Product series (see below) on a range of scientific topics related to climate change.
- Synthesis and Assessment Products (SAPs). From 2006 to 2009, USGCRP released a series of 21 SAPs. Of particular interest for wildlife and ecosystem adaptation are SAP 4.4 *Preliminary Review of Adaptation Options for Climate-Sensitive Ecosystems* and SAP 4.3 *The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity*. All of the SAPs are available at <http://www.globalchange.gov/publications/reports/scientific-assessments/saps>.
- National Climate Assessment. The US Global Change Research Act requires the USGCRP to reports and interprets the findings of the research conducted by the agencies every four years. USGCRP has not regularly produced these national assessments (the last formal National Assessment was released in 2000), however, a new national climate assessment is planned for released in 2013. The national assessment will “act as a status report on climate change science and impacts” and “will help evaluate the effectiveness of our mitigation and adaptation activities and identify economic opportunities that arise as the climate changes.”¹³

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¹³ See <http://globalchange.gov/what-we-do/assessment>.