



**Testimony of
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Subcommittee on Fisheries, Wildlife and Oceans**

**Hearing on
“Planning for a Changing Climate and its Impacts on Wildlife and
Oceans: State and Federal Efforts and Needs”**

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Madam Chairwoman and members of the subcommittee, I am Jamie Rappaport Clark, Executive Vice President of Defenders of Wildlife. Founded in 1947, Defenders of Wildlife has over 1 million members and supporters across the nation and is dedicated to the protection and restoration of wild animals and plants in their natural communities.

I want to thank you for holding this hearing on what Defenders believes is the most important conservation challenge we face today, the impact of global warming on wildlife. With the recent listing of polar bears as a threatened species, even the Bush administration has grudgingly and belatedly recognized the reality that wildlife and wildlife habitat are being harmed due to global warming. Unfortunately, the Bush administration is still trying to avoid actually doing anything to help polar bears or other wildlife survive the impacts of global warming. For that reason, I am pleased that this subcommittee has chosen a better path, focusing attention on the issue by holding a hearing last year, on April 17, 2007, on the impacts of global warming on wildlife and habitat, and, today, holding a hearing on the even more difficult question of what should be done to help wildlife survive global warming.

As you know, at the subcommittee’s hearing in April 2007, Dr. Christopher Haney, Defenders of Wildlife’s Chief Scientist, testified on the myriad impacts of global warming on America’s fish, wildlife, and habitats. Rather than repeat what Dr. Haney said then, I will simply incorporate it by reference in my testimony today. I will focus my testimony today on what must be done by Congress and the Executive Branch to meet this critical conservation challenge.

Responding to Global Warming: A New Paradigm for Wildlife Conservation

Global warming increasingly will present unprecedented challenges to existing federal, state, tribal, local and private programs for conservation of wildlife, fish, plants and their habitats. Our system of conservation programs, ranging from land management and acquisition to regulatory and grant making programs, evolved with an assumption that the climate and the ways species and ecosystems functioned were relatively constant. Wildlife conservation efforts now must adopt a new paradigm, with new approaches and innovative strategies to manage the broader landscape, as well as wildlife populations, if we are to help species survive and adapt to these changes. Because impacts on wildlife and habitat from global warming already are here and will continue to grow, we must act boldly and immediately in order to help wildlife survive.

Our national approach to combating the impacts of global warming on wildlife must consist of two key approaches. First, we must take immediate steps to substantially reduce greenhouse gas emissions, to address the root cause behind climate change. Second, we must craft responses now to help wildlife navigate through a looming bottleneck of complex effects caused by global warming which are already occurring and will continue to occur for a century or more. These two approaches are usually referred to as mitigation and adaptation. Both approaches are absolutely essential for our nation to frame its policy response as we build a comprehensive strategy to protect fish, wildlife, and other natural resources. Some ways to address wildlife adaptation are suggested in the following pages of my testimony.

1. A Coordinated, Interagency Response is Essential for Wildlife Adaptation

The effects of global warming on wildlife, fish, plants and associated ecological processes will challenge current institutional structures and policies because these effects will occur at large scales and across jurisdictional boundaries. Global warming will literally “shuffle the deck” of existing ecosystems, reordering the assemblages of wildlife and habitats that comprise ecosystems. Species that exist together now will not necessarily do so in the future as habitats change in response to global warming and species move or become extinct in response to those habitat changes. The location of some crucial fish and wildlife habitats will likely shift over time in ways that are not currently predictable and opportunities to maintain these habitats may decline. Landscape scale planning, timely action and future human adaptation to changing patterns of wildlife and fisheries use will be increasingly important to protect crucial habitats and to prevent foreclosing options to conserve habitats that may become crucial.

Climate change is, and will continue to have profound impacts on how wildlife managers at the state and federal levels manage our nation’s wildlife populations. However, federal agencies have been slow to include climate change’s impacts in their management planning and decision-making. A report released in September 2007 by the Government Accountability Office, *Climate Change: Agencies Should Develop Guidance for Addressing the Effects on Federal Land and Water Resources*, found that federal land and wildlife management agencies currently lack the capacity and guidance to effectively respond to the impacts of global

warming on our federal lands and wildlife. There is, thus, an urgent need to guide agencies' efforts through the development of climate change adaptation strategies at the federal and state levels and to provide significant resources to implement these strategies.

Many federal programs currently exist to protect and restore fish and wildlife habitat. These programs are not primarily designed to address the challenges posed by global warming; however, they are essential tools that need to be used more effectively to minimize and offset future impacts of global warming on wildlife and habitats. Federal land management agencies must make greater use of their existing authorities to address the wildlife impacts of global warming, and they must be given additional direction to consider these impacts in program planning, land and water management, and environmental analysis pursuant to the National Environmental Policy Act, the Endangered Species Act, the National Forest Management Act, the Federal Land Policy and Management Act, the National Wildlife Refuge System Improvement Act, the National Park Service Organic Act, and other relevant laws. Though the brunt of some global warming impacts may not be fully felt for a number of years, planning to address and ameliorate those impacts on wildlife and wildlife habitat must begin now.

Equally important, new governmental processes and structures need to be explored that will themselves be resilient and adaptive to the threats from global warming. While it is important for each federal agency to develop measures for protecting wildlife from the effects of global warming, it is insufficient for individual agencies, or even individual federal land units, to contemplate and plan strategies purely on their own. The problem is simply too complex.

An effective response to the impact of global warming on wildlife requires the kind of measures set forth in the Global Warming and Wildlife Survival Act, introduced as H.R. 2338 by Representatives Dicks, Inslee and Saxton and as S. 2204 by Senators Whitehouse and Boxer. The provisions of H.R. 2338 were included in Title IV of H.R. 2337, the Energy Policy Reform and Revitalization Act, introduced by Chairman Rahall, and passed by the House in July 2007 as Title VII of H.R. 3221, the comprehensive energy bill. Though subsequently dropped from the energy bill in conference with the Senate, the principal provisions of the Global Warming Wildlife Survival Act and the robust funding needed for implementation were also included in S. 3306, the Boxer-Lieberman-Warner Climate Security Act recently debated in the Senate. Additionally, recently introduced climate change legislation in the House – Representative Doggett's Climate MATTERS Act (HR 6316) and Representative Markey's iCAP bill (HR 6186) incorporate the Survival Act's policy foundation and dedicate funding to address climate change's impacts on wildlife and its habitat. However, Defenders believes the iCAP bill does not provide a sufficient level of investment to soundly implement these provisions. Nevertheless, the similarity of the policy prescriptions contained in these many bills indicates the strong policy consensus emerging on this subject.

The Global Warming Wildlife Survival Act provides for dramatically enhanced scientific capacity, a coordinated national strategy to ensure that wildlife impacts spanning government jurisdictions are effectively addressed, and a commitment of federal funds sufficient to carry out measures implementing the national strategy by federal, state, and tribal authorities. I will address below the need for, and purpose of, each of these measures.

A. Enhanced scientific capacity is essential.

The scientific capacity of federal agencies is, at present, woefully inadequate to address the magnitude of wildlife adaptation needs, due, in part, to the unprecedented nature of the global warming challenge and, unfortunately, to short-sighted cuts in science budgets and staffing. Effectively assisting wildlife adaptation in a changing climate requires first and foremost that adequate species and habitat data are available and that we understand the fundamental ecosystem processes that occur on the landscape.

From a research and management perspective, the way forward must be built upon a solid foundation of species and ecosystem inventories, as well as a system of monitoring to determine changes in species numbers or distribution, or declines of ecosystem structure and function. The coverage of biological inventories across federal, state and private lands is insufficient in many areas, but it provides a baseline to build upon.

Inventory and trends analyses generated through a comprehensive monitoring program can be applied to analytical and predictive models. Based on trends and predictions, federal and collaborative researchers can then propose new tools, practices, and strategies on a limited pilot or experimental basis to help identify promising approaches to assisting wildlife and habitat adaptation to global warming. In addition, building rigorous scientific inventory and monitoring programs within each federal land management agency to evaluate the effects of management decisions and to adapt management responses accordingly is essential to successful management of wildlife and its habitat in a world undergoing continual change due to global warming.

Last year, Congress recognized this urgent need for enhanced and coordinated scientific capacity to assist in addressing the impacts of global warming on wildlife and in developing effective measures to respond to those impacts by initiating, through appropriations, establishment of a new National Global Warming and Wildlife Science Center within the U.S. Geological Survey. Once fully established and funded, this national, interagency global warming scientific support center will conduct research, develop monitoring protocols and downscale models, and directly support federal land management and wildlife agencies in responding to global warming. The National Global Warming and Wildlife Science Center is to be responsive to the research needs of federal and state agencies in conducting scientific research on national issues relating to the impact of global warming on wildlife and wildlife habitat and mechanisms for adaptation to, mitigation of, or prevention of global warming impacts. A key function of the Science Center, integrated with climate change research programs throughout the federal government, is the detection of changes in wildlife abundance, distribution, and behavior related to global warming.

The Science Center will play a pivotal role in many wildlife adaptation responses to global warming that have been identified by the scientific community, including the protection and restoration of habitat corridors to assist species in shifting their ranges and the protection of climate “refugia,” areas that are not as vulnerable to the effects of a changing climate and are better able to preserve biodiversity in the face of climate change. Implementation of these and other strategies will require the assistance and direction of the Science Center in collecting and integrating many types of data, such as current native

species distributions, behavior, and habitat requirements, regional estimates of how the climate will change, as well as estimates of how native species and habitats will respond to changing climate. The Science Center also will assist in development of downscaled climate-change projections – critical for land managers' decision making – that will be needed to predict shifts in vegetation and individual plant and animal species distributions in response to global warming.

B. A national strategy for wildlife adaptation to global warming must be developed.

A national strategy for addressing the impact of global warming on wildlife must be developed, with the express purpose of helping wildlife navigate the bottleneck of global warming impacts over the next century and beyond, until the benefits of reducing greenhouse gas pollution and, consequently, global warming, are fully realized. The complex threat to wildlife from global warming requires strategic planning at a large scale. It makes little sense for each coastal national wildlife refuge or national park or state wildlife area, for instance, to develop in isolation its own strategies for assessing and adapting to rising sea levels. Instead, it would be much more effective and efficient to assemble a framework that considers the national picture of our changing climate, to ensure common tools and approaches at state and local levels are coordinated and meaningful and to ensure that funds provided for wildlife adaptation to global warming are spent strategically and effectively. An interagency national strategy for assisting wildlife in adapting to global warming will deliver this coordination.

This national strategy should examine management issues common to geographic areas and threat type (e.g. coastal habitats, sea level rise, increased hurricane frequency and intensity; arctic habitats, melting pack ice; desert habitats, shifts in precipitation patterns). It should ensure that federal agencies develop and implement plans to reduce the impact of global warming on wildlife and habitat by including prioritized goals and measures to—

- Identify and monitor wildlife populations likely to be adversely affected by global warming;
- Identify and monitor coastal, marine, terrestrial, and freshwater resources and habitat at greatest risk of being damaged by global warming;
- Assist species in adapting to the impacts of global warming;
- Protect, acquire, and restore wildlife habitat to build resilience to global warming;
- Provide habitat linkages and corridors to facilitate wildlife movements in response to global warming;
- Restore and protect ecological processes that sustain wildlife populations vulnerable to global warming; and
- Incorporate consideration of climate change wildlife adaptation strategies into the planning and management of Federal lands and waters.

State wildlife adaptation strategies are also needed. Every state has already completed a wildlife action plan, which identifies at-risk habitats and species that need special conservation attention. State wildlife adaptation strategies should build on, and be incorporated into, those set forth in state wildlife action plans to address global warming

impacts on wildlife, and they should be coordinated with the national strategy. Individual federal and state agencies and land management units could then coordinate their management activities with these national and state strategies.

Coordination among federal, state, and tribal natural resource agencies is essential in planning and carrying out strategic, watershed and landscape scale adaptation activities to maintain or re-establish connectivity. Wildlife adaptation activities should be conducted in accordance with the national strategy, state adaptation strategies and wildlife action plans, and other fish and wildlife conservation strategies, including the National Fish Habitat Action Plan, the North American Wetlands Conservation Act, Partners in Flight plans, coastal zone management plans, regional fishery management plans, and recovery plans for threatened and endangered species.

C. Adequate funding to address global warming's impacts on wildlife must be provided.

Development and implementation of a national strategy to address global warming's impacts on wildlife, providing the necessary science to underpin that strategy, and taking action to reduce other stressors on wildlife will require substantially more money than is currently provided for natural resources conservation. With many of the federal land management agencies already facing a fiscal crisis, Congress must increase appropriations for federal, state, and tribal conservation efforts, and allocate substantial dedicated funding from the sale of greenhouse gas pollution allowances to federal, state, and tribal conservation agencies, in order to meet the challenge posed by global warming.

The U.S. Fish and Wildlife Service (FWS) has lost nearly 800 staff from 2004-2007, an 8 percent reduction. Another 250 staff may be cut from the Refuge System alone in the next few years if substantial increases in funding are not available. Many wildlife refuge biological programs have been reduced or cut altogether, staff has been eliminated from entire refuges, and over 200 refuges have no biologists on staff.

The National Forest System has lost 35 percent of its staff, including a 44 percent reduction in inventory and monitoring staff and a 39 percent reduction in biologists and biological technicians. Almost half of the Forest Service's budget is now consumed by wildfire costs, which will only be exacerbated by global warming. Restoring forests ecosystems to reduce fuel loads will be increasingly important to protect wildlife habitat and human communities. However, the Forest Service estimates that 132 million acres of national forests alone are in need of restoration, at a cost of billions of dollars.

A 2000 report estimated that the cost to acquire inholdings in national parks, wildlife refuges, and other public lands was \$10 billion. Since then, national real estate values have climbed 72 percent. Climate change will require additional land protection efforts, including partnering with private landowners on term easements and leases outside existing federal lands boundaries and will cost billions of dollars.

As Congress develops legislation to cap greenhouse gas emissions, it is likely to create a system of emissions credits that can be traded. In the process, there is an opportunity to auction these credits, producing substantial revenue for the federal Treasury.

Because a responsible national response to climate change must both reduce greenhouse gas emissions and address the impacts of global warming, a portion of the revenue generated from the auction of emissions credits should be dedicated to federal, state, and tribal programs to assist wildlife adaptation to global warming. In the long run, this will benefit not only wildlife, but also people and communities which derive economic benefits and ecosystem services from conservation of wildlife and its habitat. Special emphasis should be given to providing funding to address federal responsibilities for wildlife and land conservation in the face of global warming. In the absence of a new revenue source, however, Congress should increase appropriations to agencies to address the threats of global warming to wildlife and habitat.

2. Federal Agencies Can Act Now to Address Wildlife Adaptation to Global Warming

Even while Congress works toward enactment of comprehensive global warming legislation, including enactment of the measures contained in the Global Warming Wildlife Survival Act, there is much that federal agencies can and should be doing using their existing authorities to address wildlife adaptation to global warming. As many businesses are now doing, federal agencies should conduct a top to bottom assessment of federal resources at risk of adverse impacts from global warming. Agencies should use this assessment to establish priorities for maintaining their mission and protecting federal assets. While much is still unknown, there are still concrete actions each agency can take.

The assessment of risks and potential conservation problems is already generally required of each federal land management agency in developing land use plans, and agencies should begin addressing the risks of global warming in those plans now. Unfortunately, few federal land units, including national wildlife refuges, are addressing this serious issue. For example, national wildlife refuges are currently developing comprehensive conservation plans (CCPs). Defenders of Wildlife conducted exhaustive, site-specific scientific literature reviews of the impacts of global warming on wildlife and habitat on and surrounding particular national wildlife refuges developing CCPs. Defenders synthesized this information for FWS and developed recommendations for each of these refuges to address the impacts of global warming in their CCPs.

One of the refuges Defenders addressed, the Merritt Island National Wildlife Refuge in Florida, is one of the few refuges with a draft CCP that mentions climate change and associated impacts. The refuge is an overlay with NASA's Kennedy Space Center and protects low-lying coastal marshes as well as beach property. Yet the threat of global warming is given only scant treatment in the plan. The CCP states briefly that sea level rise could negatively impact the refuge with increased flooding, beach and dune habitat loss, saltwater intrusion into freshwater habitats, and inundation and accretion deficit, as well as exacerbate erosion and transform upland areas into coastal wetlands and high marsh into low marsh. Yet, the CCP proposes no actions to address this threat. The CCP does not recognize other impacts of global warming beyond sea level rise including the spread of invasive species, the range shift of terrestrial habitats, the increased risk of red tide algal blooms, and the risks of increased temperatures on the breeding success of endangered sea turtles and other reptiles.

As an example of the types of activities and strategies that individual land units should now be including in their land management plans, Defenders provided the following recommendations regarding the land management plan for Merritt Island Refuge:

- The impacts of global warming on the refuge's wildlife and habitat must be included throughout the land management plan.
- The FWS should consider the present and future impacts of global warming when developing objectives and management actions in the land management plan. In the face of uncertainty, the FWS should build natural resilience to global warming by focusing resources to reduce non-climate related ecological threats.
- FWS should convene a panel of experts to assist Merritt Island NWR and other coastal refuges in developing adaptation strategies for coastal marshes and other habitats.
- FWS should establish a sea turtle monitoring and research network with other Atlantic coast refuges and other agencies to detect population changes associated with global warming.
- The FWS land management plan for the refuge should include comprehensive research on, and monitoring of, the impacts of global warming and their relation to non-climatic stressors to ecological systems and management actions, including:
 - Upland habitat shifts
 - Changes in fire regime
 - How fresh and saltwater marshes respond to global warming
 - Changes in seagrass habitat and the relationship to manatee populations
 - How southeastern beach mouse responds to sea level rise
 - Changes in the timing of ecological events, including horseshoe crab spawning and shorebird migration.
- Global warming should be incorporated into refuge infrastructure design and planning.
- Global warming should be incorporated into the refuge's environmental education and interpretation programs.

While these and similar measures are examples of steps national wildlife refuges and other federal land management agencies can take under existing law to address wildlife adaptation to global warming, they are not enough. As set forth in the Global Warming Wildlife Survival Act, a coordinated national strategy among federal, state, and tribal conservation agencies; expanded, coordinated science capacity at the federal level; and adequate dedicated funding for federal, state, and tribal measures to assist wildlife adaptation to global warming are critically important.

Conclusion

Global warming is the conservation challenge of our time. The success of our efforts to conserve and recover fish, wildlife, and other natural resources for future generations of American citizens will depend on how well we respond to this challenge. We must act immediately to substantially reduce greenhouse gas emissions to halt and eventually reverse the changes we are causing to our planet from global warming. At the same time, we must

take immediate steps as set forth in the Global Warming Wildlife Survival Act and which I have outlined here today in order to assist wildlife to survive the now unavoidable impacts of global warming.

Madame Chairwoman and members of the subcommittee, on behalf of Defenders of Wildlife, thank you for the opportunity to share our perspective on this critical issue. We look forward to working with you to meet the challenge of reducing global warming's impact on wildlife and wildlife habitat so that our children and grandchildren will be able to enjoy the abundance, diversity, and wonders of nature that we have enjoyed.