Written Statement of
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Before the
Oversight Subcommittee
Senate Environment and Public Works Committee
February 25, 2014

Mister Chairman and members of the subcommittee, my name is Noah Matson and I am the Vice President for Climate Adaptation for Defenders of Wildlife. Thank you for the opportunity to provide input to the Committee on "Natural Resources Adaptation: Protecting ecosystems and economies."

My organization was founded in 1947 and is a national non-profit organization with more than 1 million members and supporters dedicated to the protection and restoration of all wild animals and plants in their natural communities. I come before you today to express our profound concern that we stand at a crucial moment in our history when we must act, and act now, if we desire to protect this natural heritage – the nation's diverse fish and wildlife resources.

This hearing couldn't come at a more important time. As a nation we are unprepared for extreme weather events, "natural disasters", and the growing impacts of climate change. Luckily, the federal government, states, and local communities are beginning to take important steps to address this critical issue, but much more needs to be done.

CLIMATE AND EXTREME WEATHER EVENTS ARE ALREADY IMPACTING SOCIETY

Hurricane Katrina sent a wall of water almost 30 feet high crashing into the Gulf Coast, pushing its storm surge 12 miles inland, with disastrous consequences. It was one of our deadliest and costliest storms, responsible for taking almost 2,000 lives and leveling over $100 billion in economic damages. This damage was magnified by overheated ocean temperatures, rising sea levels, and degraded coastal ecosystems that were less able to absorb the powerful storm surge than in the past, not to mention years of ignoring New Orleans and other nearby communities' vulnerabilities to such

a storm event. And just last year, Hurricane Sandy inflicted damages almost as great in the Northeast, damaging over 650,000 structures and displacing thousands of residents, many for over a year.

Prolonged drought is crippling the nation's agriculture sector. Drought in 2011 and 2012 cost Oklahoma $2 billion in agricultural losses. The President recently visited California to survey the damage and commit federal resources to addressing the state's historic drought threatening a large proportion of the nation's fruit and vegetable crops. 2013 was the state's driest year on record, a third straight year of drought, and agricultural losses for 2014 are projected to reach $5 billion.

These impacts are only the "tip of the melting iceberg" of extreme events, from massive flooding to massive wildfires, the nation has recently experienced. In 2011, no fewer than 14 extreme-weather-related events—each one causing damages in the billion-dollar range—hit the United States, smashing the previous record of nine in 2008. These are disasters in large part because we have not developed appropriate systems and policies to deal with them, especially disasters that are outside historic average conditions.

ECOSYSTEMS CAN HELP US BE BETTER PREPARED FOR CLIMATE IMPACTS

We need to be better prepared for these and other climate-driven impacts and adapt to the new reality of more extreme weather and the other equally daunting challenges of a warming planet. One response to these impacts is technological – we can build bigger levees, higher dams and stronger seawalls. These might protect some areas from larger rains and floods, but could also put other communities at risk. Higher levees, for instance, funnel more water downstream, resulting in greater flooding there, as well as catastrophic consequences should a levee fail. Moreover, in an era of declining budgets at all levels of government, massive investments in "hard infrastructure" may not be forthcoming even in the face of serious climate threats.

By preserving and rebuilding our "green" infrastructure—floodplains, wetlands, forests and other natural components of our ecosystems that work together as a whole to provide "ecosystem services" such as flood control and water filtration—we can harness nature to help provide protection from extreme events.[1]

Harnessing the power of nature we can:

- Reduce the risk of flooding by restoring floodplains that naturally absorb and slow flood waters.
- Reduce the risk of water shortages and water quality degradation by maintaining and restoring water-system watersheds.

[1] For more information and detailed case studies of the use of ecosystems for building climate resilience, see Delach, Aimee. Harnessing Nature: The Ecosystem Approach to Climate Change Preparedness. 2012. Defenders of Wildlife. Available at http://www.defenders.org/sites/default/files/publications/harnessing-nature-the-ecosystem-approach-to-climate-change-preparedness.pdf

- Reduce the risk of heat stress associated with heat waves by planting shade trees, replacing impervious surfaces with green spaces and restoring forests near built-up areas to lessen the "heat island" effect.
- Reduce the risk of wildfire by restoring forests near residential areas to more natural fire-adapted ecosystems.
- Reduce the risk of sea level rise and storm surge by maintaining and restoring coastal wetlands and developing "living shorelines" instead of hard seawalls.

Natural ecosystems provide countless benefits and services to the nation, largely unnoticed. According to the Outdoor Industry Association, outdoor recreation alone, enjoyed in natural areas, supports over 6 million jobs and is a $646 billion industry, double the spending on pharmaceuticals ($331 billion).[2] Natural resources conservation supports over 660,000 jobs and stimulates $93 billion in direct economic activity.[3]

Nature matters. We pit jobs and industry versus the environment at our own peril. We directly depend on the environment for our survival, our quality of life, and our economy. We need to take a holistic view when planning for and responding to the impacts of climate change and increased risks of natural disasters.

WILDLIFE AND ECOSYSTEMS ARE FEELING THE IMPACTS OF CLIMATE CHANGE

Nature is also in trouble. Some of the first signs of our changing planet are apparent through changes we are seeing in wildlife populations. It is no exaggeration to say that all of the work that is being done to conserve wildlife and its habitat, in North America and around the globe, is put at risk by the potential consequences to wildlife of climate change.

Species are the proverbial canaries in the coal mine. And it is not just polar bears that are losing ground. For example, moose populations from Maine to Minnesota have plummeted – driven down by warm winters that have allowed ticks and other parasites to thrive.

The impacts on species are often complex. Exotic, introduced mosquitoes in Hawaii are finding more favorable conditions further upslope of Hawaii's volcanic mountains, spreading deadly avian malaria to many of Hawaii's endangered birds. Plants are blooming earlier, like Washington's cherry blossoms, but species that depend on certain flowers aren't always emerging from the winter at the same time causing mismatches in timing of these important life cycle events. Snowshoe hares turn white in the late fall and brown in the spring in response to light, but with winters coming later and snow melting earlier than in the past, researchers are finding white hares on brown earth, making them easy prey.

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[2] Outdoor Industry Association. The Outdoor Recreation Economy. 2012. Available at http://www.outdoorindustry.org/advocacy/recreation/resources.php

[3] Southwick Associations. The Conservation Economy: Direct investments and contributions. 2013. Prepared for the National Fish and Wildlife Foundation. Available at http://www.avcrp.org/wp-content/uploads/2013/04/NFWF-Conservation-Economy-Rpt-Southwick-3-11-2013.pdf

Commercially important species are also in trouble. Oyster farms in the Pacific Northwest saw a 60 percent drop in 2008 and crashed by 80 percent in 2009 as oyster shells were dissolved in the acidic waters created by too much CO2 in the atmosphere. In the Norwest Atlantic Ocean, two thirds of the commercially important fish stocks shifted their latitude and depth significantly between 1968-2007 in response to increased sea temperatures, forcing fishing fleets to shift along with them at great costs.[4]

Habitat is also being lost. In 2009, a storm punched a breach through coastal dunes at Primehook National Wildlife Refuge in Delaware, spilling saltwater into the refuge's freshwater marshes, critical migratory stopover for tens of thousands of ducks, geese and other migratory birds. The saltwater killed the marsh - 4,000 acres of freshwater marsh grasses were converted to open water - limiting the ability of the refuge to provide for the migratory birds dependent on that habitat.

The impacts of climate change on species include:

- Direct effects of higher temperatures
- Sea and land ice and snowpack meltdowns
- Habitat shifts
- Heightened risks from invasive species and disease
- Rising sea levels
- Longer droughts
- Greater extremes in precipitation and/or flooding patterns
- Disruptions to the timing and patterns of seasonal cycles and migrations
- Excess carbon dioxide and ocean acidification
- Changes in ocean circulation patterns

Land and fish and wildlife managers need more resources to be able to detect and plan for these types of changes and clear policy direction to implement necessary protective measures.

GROWING AWARENESS OF THE NEED FOR VIGOROUS POLICY RESPONSE

The good news is that the federal government, and many states and local communities are already taking action.

The Obama administration is taking this issue seriously. Not only is the administration tackling the causes of climate change head on, limiting greenhouse emissions from power plants and vehicles and improving energy efficiency, the President has also issued an executive order (E.O. 13653) on preparing for climate impacts. This important policy statement requires federal agencies to integrate climate change preparedness into their programs, to evaluate and reduce the risks of climate change on their missions and local communities, to coordinate their actions, and to support state, local,

[4] Nye JA, Link JS, Hare JA, and Overholtz WJ. 2009. Changing spatial distribution of fish stocks in relation to climate and population size on the Northeast United States continental shelf. Mar Ecol-Prog Ser 393: 111–29.

tribal and private-sector efforts to improve climate preparedness and resilience. The executive order recognizes the importance of "natural infrastructure," safeguarding natural resources, and managing lands and waters for climate resilience. Too many of our federal lands and water projects have not assessed or planned for the impacts of climate change, and this executive order is a critical first step in addressing this deficiency.

The administration also released the National Fish, Wildlife and Plants Climate Adaptation Strategy. This unprecedented effort was led by a steering committee of over 16 federal agencies, 5 states fish and wildlife agencies, and 2 tribal conservation commissions making it the first national-level intergovernmental climate adaptation strategy in the country. Since wildlife don't know when they have crossed jurisdictional boundaries, this intergovernmental approach is critical if we are going to have any chance of helping species respond to climate change, especially as they attempt to shift their ranges across the landscape. For too long, individual land and fish and wildlife managers have been struggling with responding to the real-time impacts of climate change on their own. This strategy is the beginning of an effort to develop, coordinate, and implement shared approaches to dealing with climate change impacts. In addition to calling for integrating climate change into land and species management, one of the critical components of the strategy is to accelerate the conservation of an interconnected network of conservation lands, including increasing habitat connectivity for species that are on the move. The administration now needs to put leadership and resources behind implementing this important national strategy.

Congress has also taken some important steps that will help make our wildlife and ecosystems more resilient to the impacts of climate change and extreme events.

Last year, Congress recognized the importance of planning and preparing for future conditions in The Hurricane Sandy Disaster Relief Supplemental Appropriations Act of 2013. Thanks to strong bipartisan support, particularly evident in the House, the measure included $360 million to Department of the Interior programs to "increase the resiliency and capacity of coastal habitat and infrastructure to withstand future storms and reduce the amount of damage caused by such storms." The Interior Department is now busy restoring wetlands, marshes, beaches and other coastal areas from Virginia to Rhode Island to Maine that will help buffer communities from future storms.

The Hurricane Sandy supplemental appropriation gave $2.9 billion to the Army Corps of Engineers for planning and constructing flood-reducing projects that support the long-term sustainability of coastal ecosystems. It also set down some new ground rules: the bill requires the Army Corps of Engineers to reconsider projects that were authorized before Hurricane Sandy and other extreme weather events. These and all future project plans must take current scientific projections of climate-related risks into account. This is a big step towards making climate planning a part of all building decisions, and will help ensure the success of future projects.

And thanks to congressional direction and funding, the National Climate Change and Wildlife Science Center has been established within the U.S. Geological Survey to help provide ongoing

critical scientific and technical information to land and wildlife managers in order to understand and plan for the impacts of climate change.

At the state level, many fish and wildlife agencies have conducted climate vulnerability assessments of the wildlife in their states and have amended their State Wildlife Action Plans and other species management plans to address climate adaptation. More broadly, state, county and city governments have developed over 100 climate adaptation plans to reduce the risks of climate change.

MOVING FORWARD TO A MORE RESILIENT FUTURE

We are already experiencing the impacts of climate change.[5] We absolutely need to reduce the levels of greenhouse gas emissions that cause global warming. Even if the human-induced emissions of greenhouse gases are stabilized in the very near future, however, our nation will continue to feel effects for centuries to come due to the timescales associated with climate processes and feedbacks. Simply put, we need to radically change our approach to natural resources, disaster mitigation and recovery, infrastructure, and other types of long-term planning to account for an ever changing climate.

Despite the important legislative developments noted above, Congress must do more to ensure an effective response to this ongoing challenge. Additional actions by Congress should include:

- **Enact the Securing America's Future and Environment (SAFE) Act.** Introduced by Senator Sheldon Whitehouse (RI) and former Senator Max Baucus (MT), the SAFE Act, S. 1202, is designed to protect American communities, wildlife and natural habitat from the increasingly destructive effects of climate change. This non-regulatory bill, supported by Defenders of Wildlife and sportsmen, conservation and recreation organizations, recognizes the countless benefits that healthy natural resources provide to our country's health, safety, economy and well-being, underscores the urgent need to help them adapt to a more rapidly changing climate and provides a road map to do so. The SAFE Act codifies the National Fish, Wildlife and Plants Climate Adaptation Strategy into law and encourages full agency implementation. The bill legislatively authorizes the National Climate Change and Wildlife Science Center, within the U.S. Geological Survey. The bill also provides context for directing any future resources Congress may choose to allocate to the states to help with addressing climate adaptation challenges, and ensures continuity of natural resources climate adaptation programs through changing administrations.
- **Provide funding.** Congress should provide adequate funding to maintain and expand key federal programs supporting adaptation efforts and natural resources conservation. Federal, state, and tribal agencies are starving for critically needed funds for both basic operations and for assessing, planning for, and implementing future-oriented adaptive actions.

[5] IPCC 2013. Summary for Policy Makers. Working Group I Contribution to the IPCC Fifth Assessment Report Climate Change 2013: The Physical Science Basis. Found that warming of the climate system is *unequivocal* and that it is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century.

- **Prepare for Disasters**. Protecting and restoring natural systems is often the least expensive method of buffering human communities against disaster and therefore must be considered in disaster preparation and recovery. Preparing for extreme climate impacts will save lives, property and tax dollars. Congress should build on the foundation laid by the Hurricane Sandy emergency supplemental appropriations and ensure federal natural disaster-related programs account for and mitigate climate risks. Federal disaster programs should anticipate future climate changes and build them into disaster planning, mitigation and recovery projects.
- **Integrate climate change into all relevant programs and activities**. In addition to disaster response programs, climate change places great risk to the achievement of many agency missions and programs. Even though the administration has released high-level adaptation policies, many federal agencies still aren't accounting for climate change when planning their programs.
- **Protect large, connected landscapes**. Climate change is highlighting the value of protecting and reconnecting large landscapes that serve as critical watersheds, carbon storage banks, and wildlife habitat. Climate change forces species to move, but movement is restricted unless we protect a network of conservation areas connected by wildlife habitat corridors that allow species to respond to climate impacts. These natural areas will in turn provide us with clean water, flood protection, replenishment of our groundwater, open space and recreation.

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 this subcommittee and others in Congress to develop effective measures to help our wildlife and ecosystems adjust to the impacts of climate change and buffer our communities from climate risks.