

Building Conservation Leaders

PARTNERSHIP OF THE U.S. FISH AND WILDLIFE SERVICE

AND

OLD DOMINION UNIVERSITY



Background & History

- ❖ AD Denise Sheehan inspired to action -- 2014
- ❖ Memorandum of Understanding – 2015
- ❖ FWS Grant Awarded to ODU – 2015
- ❖ First Cohort of Interns and Service Learning students – 2017
- ❖ You're next!





GOALS

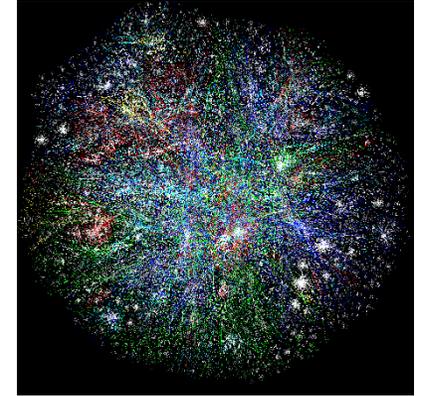


- ❖ Develop curricula
- ❖ Service learning
- ❖ Internship opportunities
- ❖ Student support
- ❖ Professional guidance and assistance

Preparing for the Future of Conservation

Desirable Traits/Competencies:

- Dedication to public service
 - Technical expertise
- Collaborating with diverse stakeholders
 - Data and Technologies
 - Communication Skills



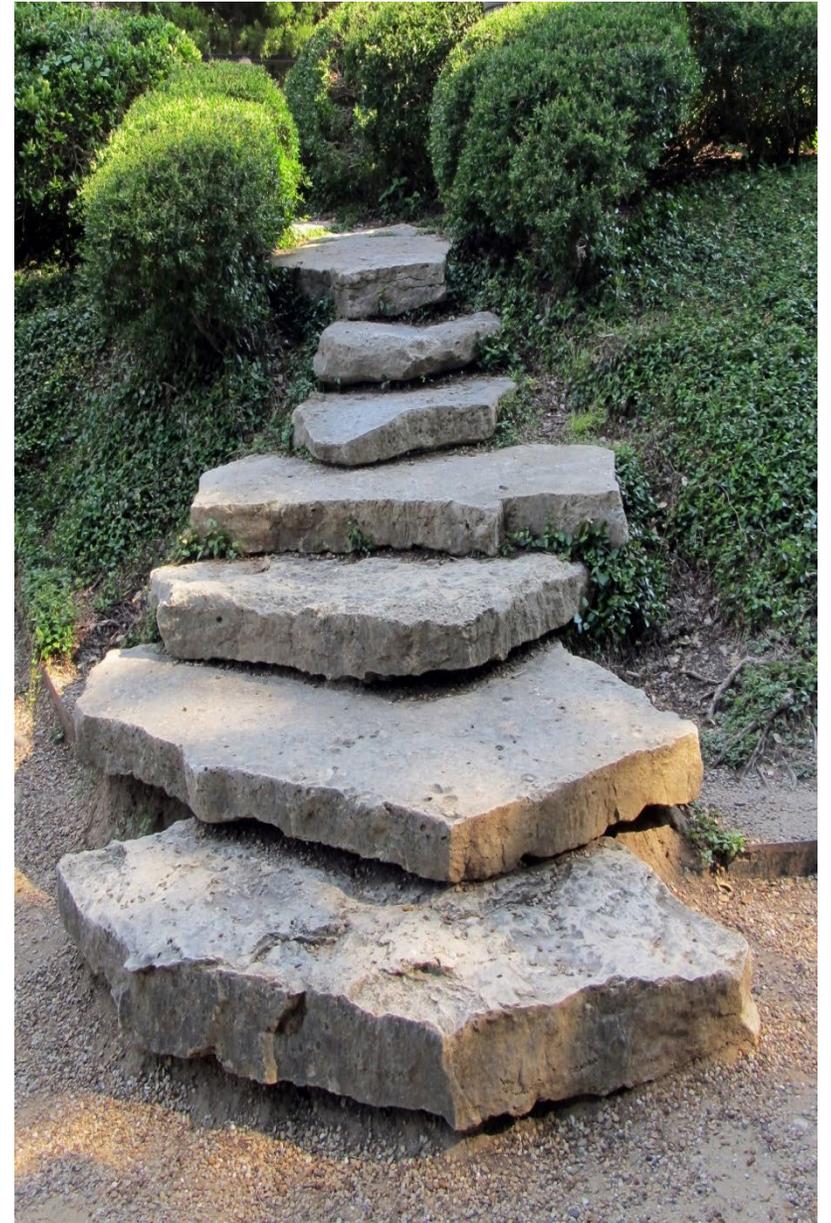
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Career Next Steps

- ❖ Additional internships and fellowships
- ❖ Graduate Degrees and certifications
 - ❖ Mentoring and Networking





A Partnership of the U.S. Fish and Wildlife Service and Old Dominion University

Partnership Background:

In May, 2015, the U.S. Fish and Wildlife Service's Office of Budget, Planning and Human Capital (BPHC) signed a Memorandum of Understanding (MOU) with Old Dominion University's Mitigation and Adaptation Research Institute (MARI). The goals of this partnership are to provide education, professional development, and research and learning opportunities to both ODU students and Service personnel, in order to expand and improve the skills of current and future workforce charged with tackling complex issues such as global change, climate change, and sea level rise.

Benefits to Service:

- Highly motivated, educated and conservation-minded students available to complete no cost internships and service learning projects at Service locations nationwide
- Access to the knowledge and expertise of ODU faculty working to address the complex issues related to mitigation and adaptation in a changing world
- The unique opportunity for Service personnel and ODU faculty to collaborate on a research agenda that will assist Service staff in carrying out duties related to changing landscapes and sea level rise
- Cultivation of relationships with individuals that possess well-rounded, multidisciplinary backgrounds, making them uniquely qualified to fill available positions with the Service. (Especially important as 4/10 federal workers will be eligible for retirement within the next 5 years)

Project Goals

- Develop Curricula for conservation-related undergraduate, graduate and continuing education certificates, including leadership certificates, with a strong focus on competencies required for conservation and environmental careers in the federal sector
- Define and implement a service learning program that includes projects at Service locations as part of the course work
- Develop an internship program that will complement the Service's efforts to recruit top-notch talent with in-demand competencies needed for conservation-related careers
- Provide students with support to pursue practical work experience in conservation biology and related fields, and improve their skillsets for careers in the public sector
- Co-design a research agenda with FWS to meet the practice-relevant knowledge needs related to real world conservation work

Climate Change

Possible Impacts on Fish and Wildlife in the United States

A Summary of the Intergovernmental Panel on Climate Change Fourth Assessment Report

With the weight of scientific data pointing to the changes in the environment due to increasing concentrations of greenhouse gases—called climate change—the U.S. Fish and Wildlife Service (Service) has begun monitoring and analyzing impacts of climate change on fish and wildlife and working toward solutions to help species adapt to their changing habitats. Representing a compilation of the work of hundreds of the world's top scientists, the Intergovernmental Panel on Climate Change (IPCC) Assessment Reports are important to the Service's understanding about how it can meet this challenge.

The IPCC is a scientific organization set up by the World Meteorological Organization and the United Nations Environmental Program. It assesses, analyzes, and reports on the latest science on climate change and its human and environmental impacts. Hundreds of the world's most respected scientists have contributed to the IPCC's Assessment Reports of the state of knowledge on climate change. Many U.S. scientists have contributed to the findings in IPCC Assessment Reports, and these reports are a highly credible source of information on climate change science.

What does the IPCC say about the impact of climate change on natural systems and what does it mean for the future of our fish and wildlife?

In its most recent Assessment Report* the IPCC recounts the best and most current evidence of the effects of warming on natural systems on all continents and most oceans. Of more than 29,000 observational data series around the world, examined by the IPCC, more than 89 percent are consistent with the direction of change expected in response to global warming.

- Reduced sea ice in the Arctic is linked to reduced body condition and reproductive success of polar bears because they cannot remain on the ice long enough to obtain an adequate quantity of their favored prey – ringed

seals. Because of this threat to its habitat, the polar bear has been listed as threatened under the Endangered Species Act.

- Reduced snowpack in the mountains, combined with earlier seasonal melting caused by rising temperatures, is projected to increase winter flooding, increase the intensity and length of late summer droughts, and reduce the availability of water, especially in the western United States. Having enough water is becoming an increasingly difficult challenge for western fish and wildlife species.
- Spring is arriving earlier, and plants and animals are being found farther and farther north of their historic ranges in the U.S. Wildlife biologists are concerned that this will mean some migratory bird species may not arrive in their breeding habitats when — or where — their particular food species is available.
- Oceans, lakes and streams are changing — warming is evident and is linked to changes in distribution of algae, plankton, and fish, as well as changes in salinity, oxygen levels, and circulation. These changes are happening much faster than species can adapt, and some changes will have profound consequences for the future of aquatic life.
- Because of changes in the contributions of Greenland and Antarctic ice flow and feedback mechanisms that cause warming of the atmosphere to be influenced by warming of the oceans, the future rate of sea level rise remains uncertain. But it is a real phenomenon linked to climate change. Sea level rise is causing increased loss of coastal lands to erosion, washing away wetlands and other habitat for coastal fish and wildlife species.
- Increasing uptake of carbon from the atmosphere by the ocean is changing ocean chemistry, causing surface waters to become more acidic. This threatens sea creatures with external, carbon-based shells, including corals

and many plankton species that support the ocean's entire food chain.

- Warming of waters in rivers and streams may make these habitats less able to support the spawning of salmon, trout, and other anadromous fish species that have significant economic value to recreational and commercial fisheries.

In addition, the IPCC identifies other ecosystems likely to be affected by climate change, including tundra and boreal forest and mountain regions (because of sensitivity to warming); Mediterranean-type ecosystems because of reduction in rainfall; and tropical rainforests where precipitation declines.

The IPCC concludes that warming and sea level rise would continue for centuries even if greenhouse gas emissions are stabilized now, making climate change the greatest single conservation challenge we face in the new millennium. The U.S. Fish and Wildlife Service is working to anticipate and address this challenge to fulfill its unique role in protecting fish and wildlife habitats and maintaining biodiversity in our world—today and into the future.

* IPCC, 2007: Summary for Policymakers. In: *Climate Change 2007: Impacts, Adaptation and Vulnerability.*

Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate

Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 7-22.

For more information on how the U.S. Fish and Wildlife Service is working with others to conserve the nature of America in a changing climate, visit <http://www.fws.gov/home/climatechange>



An Overview

Climate Change Strategic Plan

Accelerating climate change will affect our nation's fish, wildlife, and plant resources in profound ways. While many species will continue to thrive, some populations may decline and in some instances, go extinct. Others will survive in the wild only through direct and continuous intervention by wildlife and fisheries managers. This defining challenge for the conservation community requires the U.S. Fish and Wildlife Service and its partners to apply the skill, determination, creativity and commitment to conserving the nation's natural resources that have defined the American conservation movement since its inception more than 160 years ago. The Service's Climate Change Strategic Plan establishes a basic framework within which the agency will work as part of the larger conservation community to help ensure the sustainability of fish, wildlife, plants and habitats in the face of accelerating climate change. The plan is also an integral part of the Department of the Interior's strategy for addressing climate change, and will enable the Service to play a key role in achieving Departmental objectives related to climate change.

Our Principles

The Service will follow six guiding principles in responding to climate change:

- We will continually evaluate our priorities and approaches, make difficult choices, take calculated risks and adapt to climate change.
- We will commit to a new spirit of coordination, collaboration and interdependence with others.
- We will reflect scientific excellence, professionalism, and integrity in all our work.
- We will emphasize the conservation of habitats within sustainable landscapes, applying our Strategic Habitat Conservation framework.
- We will assemble and use state-of-the-art technical capacity to meet the climate change challenge.

- We will be a leader in national and international efforts to address climate change.

Our Strategy

The result of more than 18 months of intensive work and thorough discourse within the agency and input from the public, the Service's Climate Change Strategic Plan employs three key strategies to address climate change: **Adaptation, Mitigation, and Engagement.**

Adaptation is defined by the Intergovernmental Panel on Climate Change (IPCC) as an *adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.* For the Service, adaptation is planned, science-based management actions that we take to help reduce the impacts of climate change on fish, wildlife, and their habitats. Adaptation forms the core of the Service's response to climate change and is the centerpiece of our Strategic Plan. This adaptive response to climate change will involve strategic conservation of terrestrial, freshwater, and marine habitats within sustainable landscapes.

Mitigation is defined by the IPCC as *human intervention to reduce the sources or enhance the sinks of greenhouse gases.* Mitigation involves reducing our "carbon footprint" by using less energy, consuming fewer materials, and appropriately altering our land management practices. Mitigation is also achieved through biological carbon sequestration, the process in which CO₂ from the atmosphere is taken up



Seedskaadee NWR by J and K Hollingsworth

by plants through photosynthesis and stored as carbon in tree trunks, branches and roots. Sequestering carbon in vegetation such as bottomland hardwood forests or native prairie grasses can often restore or improve habitat and directly benefit fish and wildlife.

Engagement involves reaching out to Service employees; local, national and international partners in the public and private sectors; key constituencies and stakeholders; and everyday citizens to join forces and seek solutions to the challenges to fish and wildlife conservation posed by climate change.

By building knowledge and sharing information in a comprehensive and integrated way, the Service and its partners and stakeholders will increase our understanding of global climate change impacts on species and their habitats and use our combined expertise and creativity to help wildlife resources adapt in a climate-impacted world.



Adaptation

The Service will:

- Work with the Interior Department and conservation partners to develop a *National Fish and Wildlife Climate Adaptation Strategy* to be the conservation community's shared blueprint to guide wildlife adaptation partnerships over the next 50-100 years.
- Help create a *National Biological Inventory and Monitoring Partnership* that facilitates a more strategic and cohesive use of the conservation community's monitoring resources. The Partnership will generate empirical data needed to track climate change effects on the distribution and abundance of fish, wildlife and their habitats; model predicted population and habitat change; and help us determine if we are achieving our goals.
- Build regional and field technical capacity by working with partners to provide cutting edge science and information through partnerships called Landscape Conservation Cooperatives (LCCs). LCCs will be the primary vehicle through which the Service, other federal bureaus, and our partners acquire and apply the best climate change science to biological planning and conservation design for fish and wildlife management.
- Deliver conservation to the most climate-vulnerable species through various activities, including but not limited to identifying priority water needs, addressing habitat fragmentation, managing genetic resources, reducing non-climate stressors, and other resource management actions.
- Inform stakeholders on wildlife conservation issues related to energy development and energy policy and help facilitate development of renewable energy sources in a manner that helps conserve species and avoids or minimizes significant impacts to sensitive fish, wildlife, and plant species.



UL Bend National Wildlife Refuge by J and K Hollingsworth

Mitigation

The Service will:

- Reduce the carbon footprint of its facilities, vehicles and workforce and become carbon neutral by 2020.
- Develop expertise in biological carbon sequestration — sequestering greenhouse gases in plant biomass, while also creating or restoring priority native fish and wildlife habitats — and foster efforts to sequester carbon on lands it manages.
- Facilitate habitat conservation through carbon sequestration at the international level. By working with international partners and stakeholders to help reduce deforestation rates in key areas, such as tropical forests, the Service will help preserve areas critical to biodiversity conservation and support greenhouse gas mitigation.

Engagement

The Service will:

- In conjunction with conservation partners, develop useful and accessible information resources to help Americans fully appreciate the significant implications of climate change on species and their habitats, and to engage these constituencies in seeking solutions.
- Inspire key stakeholders and the broad public to join in a national effort to address accelerating climate change and ensure a natural resource legacy for future generations.

The Service's Strategic Plan for Climate Change is a blueprint for action in a time of uncertainty. It calls for the Service to rise to the challenges at hand, lay the foundation for wise decisions in the future and take steps right now to ensure our nation's fish and wildlife resources will thrive in the years to come.

For more information on how the U.S. Fish and Wildlife Service is working with others to conserve the nature of America in a changing climate, visit <http://www.fws.gov/home/climatechange>.



fact sheet

OUR CLIMATE IS CHANGING, and these changes are already impacting the nation's valuable natural resources and the people, communities and economies that depend on them. Changes are expected to significantly increase over time, challenging our ability to manage and sustain these resources and the essential services they provide Americans every day. By taking steps now to help safeguard the nation's natural resources against the impacts of climate change, we will be better able to limit future damages and their associated costs, and more effectively take advantage of beneficial opportunities.

GOALS

The *Strategy* identifies seven goals to help fish, wildlife, plants and ecosystems cope with the impacts of climate change. These goals were developed collectively by diverse teams of federal, state, and tribal technical experts, based on existing research and understanding regarding the needs of these valuable resources.

Goal 1

Conserve habitat to support healthy fish, wildlife and plant populations and ecosystem functions in a changing climate.

Goal 2

Manage species and habitats to protect ecosystem functions and provide sustainable cultural, subsistence, recreational, and commercial use in a changing climate.

Goal 3

Enhance capacity for effective management in a changing climate.

Goal 4

Support adaptive management in a changing climate through integrated observation and monitoring and improved decision support tools.

Goal 5

Increase knowledge and information on impacts and responses of fish, wildlife and plants to a changing climate.

Goal 6

Increase awareness and motivate action to safeguard fish, wildlife and plants in a changing climate.

Goal 7

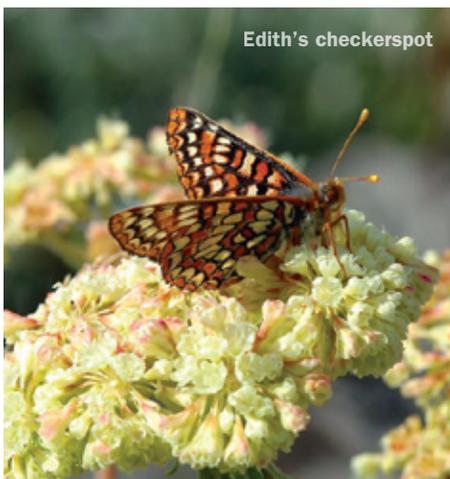
Reduce non-climate stressors to help fish, wildlife, plants, and ecosystems adapt to a changing climate.

VISION Ecological systems will sustain healthy, diverse, and abundant populations of fish, wildlife and plants. Those systems will continue to provide valuable cultural, economic and environmental benefits in a world impacted by global climate change.



GARY WISE

PURPOSE The purpose of the *Strategy* is to inspire and enable natural resource professionals and other decision makers to take action to conserve fish, wildlife, plants and ecosystem functions, as well as the human uses, values and benefits these natural systems provide, in a changing climate. The *Strategy* provides a basis for sensible actions that can be taken now, as well as guidance on climate adaptation measures to safeguard natural resources against future climate change impacts. It also describes mechanisms for encouraging collaboration among all levels of government, conservation organizations and private landowners.



Edith's checkerspot

SHELLEY ELLIS/NWF

WHAT IS IT?

The National Fish, Wildlife and Plants Climate Adaptation Strategy is a comprehensive, multi-partner response to the threat of climate change in the United States. It is a call to action—a framework for effective steps that can be taken, or at least initiated, over the next five to 10 years based on climate change projections for the next century. It is designed to be a key part of the nation’s larger response to a changing climate, and to guide responsible actions by natural resource managers and other decision-makers at all levels of government.

How the Strategy is structured

The Strategy has five major chapters supported by ecosystem-specific background papers:

Chapter 1: Introduction explains the origins, vision, guiding principles, and development of this effort.

Chapter 2: Impacts of Climate Change describes major current and projected impacts of climate change on the eight major ecosystems of the United States, and on the fish, wildlife and plant species they support.

Chapter 3: Goals & Strategies lays out the goals, strategies, and actions that can help natural systems become more resilient in the face of climate impacts.

Chapter 4: Opportunities for Multiple Sectors describes opportunities for multiple sectors to increase the resilience of fish, wildlife and plants while promoting adaptation of infrastructure, businesses and communities.

Chapter 5: Implementation discusses implementation and integration, outlining how stakeholders at all levels of government can use this Strategy as a resource.

WHO IS INVOLVED?

The U.S. Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration (NOAA), and the New York Division of Fish, Wildlife, & Marine Resources (representing state fish and wildlife agencies more broadly) co-led development of the Strategy. The Association of Fish and Wildlife Agencies also provided support for the effort.

The Strategy was developed with input from a wide variety of federal, state, and tribal representatives, along with active engagement and input from non-government organizations, industry groups, and private landowners.

An intergovernmental Steering Committee has provided input and oversight for development of the Strategy. Co-chaired by USFWS, NOAA, and the State of New York, the Steering Committee consisted of representatives from 15 federal agencies with management authorities for fish, wildlife, plants, or habitat, as well as representatives from five state fish and wildlife agencies and two inter-tribal commissions. The Steering Committee was supported by a Management Team composed of staff from the co-chairing organizations, as well as five Technical Teams of managers and researchers who were primarily responsible for drafting the Strategy.



JAMES JORDAN

BACKGROUND During the past decade there has been an increasing number of calls by government and non-governmental entities for a national effort to better understand, prepare for and address the impacts of climate change on natural resources and the communities that depend on them. These calls helped lay the foundation for development of this Strategy.

In 2009, Congress urged the White House Council on Environmental Quality and the Department of the Interior (DOI) to develop a national, government-wide climate adaptation strategy to assist fish, wildlife, plants, and related ecological processes in becoming more resilient, adapting to, and surviving the impacts of climate change as part of the Fiscal Year 2010 Department of the Interior, Environment and Related Agencies Appropriations Act Conference Report.



ASSOCIATION OF FISH AND WILDLIFE AGENCIES

Please visit www.wildlifeadaptationstrategy.gov

