



Delivering Climate Science for the Nation's Fish, Wildlife, and Ecosystems: The U.S. Geological Survey National Climate Change and Wildlife Science Center

Changes to the Earth's climate—temperature, precipitation, and other important aspects of climate—pose significant challenges to our Nation's natural resources now and will continue to do so. Managers of land, water, and living resources need to understand the impacts of climate change—which will exacerbate ongoing stresses such as habitat fragmentation and invasive species—so they can design effective response strategies. In 2008 Congress created the National Climate Change and Wildlife Science Center (NCCWSC) within the U.S. Geological Survey (USGS); this center was formed to address challenges resulting from climate change and to empower natural resource managers with rigorous scientific information and effective tools for decision-making. Located at the USGS National Headquarters in Reston, Virginia, the NCCWSC has invested over \$20M in cutting-edge climate change research and is now leading the effort to establish eight regional Department of the Interior (DOI) Climate Science Centers (CSCs).

The mission of the NCCWSC is to provide natural resource managers with the tools and information they need to develop and execute management strategies that address the impacts of climate and other ongoing global changes on fish and wildlife and their habitats. NCCWSC is building cooperative partnerships with resource managers and scientists at Federal, State, tribal, local, academic, and nongovernmental institutions and at national, regional, and local scales.

NCCWSC goals will be achieved by supporting scientific activities that

- predict fish and wildlife population changes in response to climate change;
- assess the vulnerability of species and habitats to climate change;
- link climate model output (for example, temperature and precipitation) with models that predict ecological, habitat, and population responses to climate change;
- standardize approaches to monitoring and link existing monitoring efforts to models of climate and ecological and biological response; and
- develop data management policies and practices to ensure that data generated at NCCWSC and the DOI CSCs are shared and interoperable with other datasets.

Partnering closely with managers of natural resources will ensure that NCCWSC-supported science is founded on stakeholder needs and that research products are successfully



The California black rail (*Laterallus jamaicensis corturniculus*) is a California state threatened bird that lives in the salt marsh estuary of San Francisco Bay, the largest extent of tidal marsh in the Western United States. National Climate Change and Wildlife Science Center-supported research is helping resource managers protect the California black rail and other endangered species and their habitats by determining the impacts of sea-level rise on the tidal salt marshes. The interdisciplinary project is a joint effort of researchers and resource managers at the U.S. Geological Survey, University of California Davis, University of San Francisco, California Department of Fish and Game, and the U.S. Fish and Wildlife Service. (Photography by D. Tsao, USGS.)

delivered. Examples of current NCCWSC-funded research activities are

- predicting the effects of climate change on fish such as native trout species at national, regional and local scales;
- quantifying risks of extinctions of endangered birds and plants because of habitat loss from sea-level rise in the northwestern Hawaiian Islands and San Francisco Bay;
- measuring the effects of melting glaciers on freshwater and nutrient flows in the Gulf of Alaska;
- “downscaling” global climate model output to use as input for regional and local species, habitat, and ecosystem models in locations such as the Florida Everglades; and
- producing tools for resource managers to visualize tomorrow's climate on today's landscape.

Once established, the DOI CSCs will manage regional scale and landscape scale research projects, and NCCWSC will focus on addressing broader national and multiregion climate science priorities.

Establishing Regional Partnerships and Meeting Local Needs: NCCWSC, CSCs, and Landscape Conservation Cooperatives

The NCCWSC and CSCs will coordinate regional to national climate change research and will deliver research products to resource managers. Regional DOI CSCs are housed at universities with substantial capacity to conduct climate change research and leverage existing resource management partnerships (fig.1). Beginning in fiscal year (FY) 2010, the NCCWSC established three DOI CSCs at host universities in Alaska (University of Alaska), the Southeastern United States (North Carolina State University), and the Northwestern United States (a consortium led by Oregon State University). Eight CSCs will be established by FY2012, with two planned for FY2011 at universities in the Southwest and North-Central United States and three for FY2012 in the Northeast and South-Central United States and the Pacific Islands.

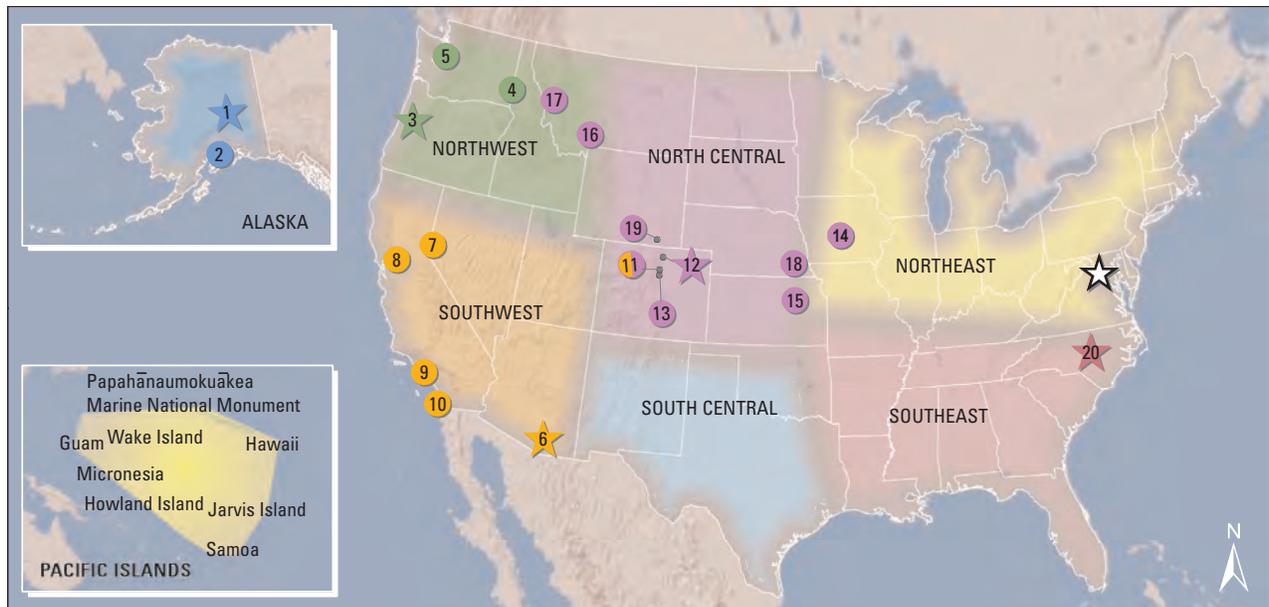
DOI Landscape Conservation Cooperatives (LCCs) are primary partners and clients of the DOI CSCs. LCCs are a network of public-private partnerships that provide applied conservation science to inform integrated resource management actions addressing climate change and other stressors at a landscape level. CSCs prioritize delivery of fundamental research, data products, and decision-support tools to meet the needs of the LCCs and other resource managers within their respective regions.

The DOI CSCs and LCCs provide complementary decision support for adaptive management of climate change impacts on natural and cultural resources. Each CSC will use formal and informal means to work with LCCs and other public and private resource management and science partners in the region to establish the Center's priorities. A formal stakeholder advisory committee in each CSC region will solicit input on priorities from LCCs, as well as from nongovernmental organizations, private landowners, and others. These stakeholder inputs will determine the scientific agenda of the CSC.

Guided by stakeholder needs and scientific research priorities identified by the DOI CSCs and LCCs, NCCWSC staff foster national partnerships and provide products that meet national or multiregional science needs. The NCCWSC National Partners Committee will be created to guide the overall direction of NCCWSC and the network of CSCs. The committee will include representatives from Federal, State, tribal, academic, nongovernmental, and private institutions. Together, NCCWSC, CSCs, and LCCs form the cornerstones of DOI's integrated approach to climate change science and adaptation.

For more information, contact

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Base from ESRI, 2009
 Albers Equal Area Conic Projection
 North American Datum of 1983

EXPLANATION

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|---|-------------------------------------|---|--------------------------------------|-------------------------------------|
| ★ National Climate Change and Wildlife Science Center | Alaska CSC | Southwest CSC | North Central CSC | Southeast CSC |
| ★ CSC Lead Institutions | 1. University of Alaska - Fairbanks | 6. University of Arizona | 11. University of Colorado | 20. North Carolina State University |
| ② CSC Institutions | 2. University of Alaska - Anchorage | 7. Desert Research Institute (Nevada) | 12. Colorado State University | Coming in 2012 |
| | Northwest CSC | 8. University of California - Davis | 13. Colorado School of Mines | Northeast CSC |
| | 3. Oregon State University | 9. University of California - Los Angeles | 14. Iowa State University | Pacific Islands CSC |
| | 4. University of Idaho | 10. Scripps Institute of Oceanography | 15. Kansas State University | South Central CSC |
| | 5. University of Washington | 11. University of Colorado | 16. Montana State University | |
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| | | | 18. University of Nebraska - Lincoln | |
| | | | 19. University of Wyoming | |

Figure 1. The shaded areas show approximate CSC regions. Scientific activities will be designed to address the full range of an issue and will not be limited by regional boundaries.