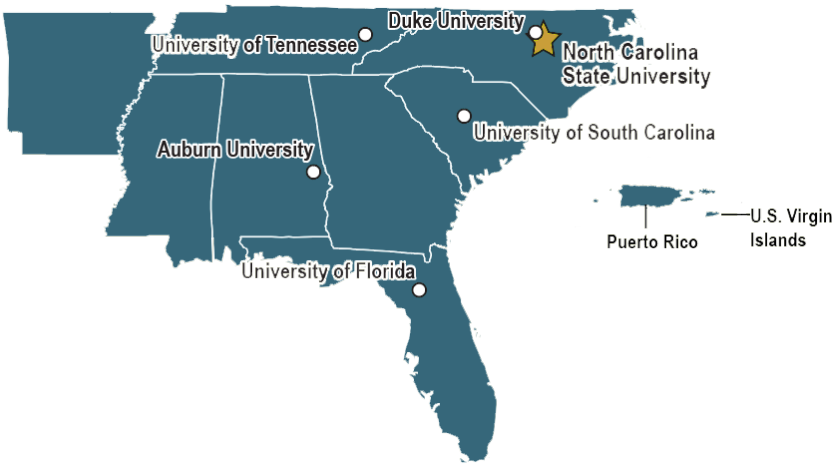
SOUTHEAST Climate Adaptation Science Center

2020-21 ANNUAL REPORT

Our Mission

Our mission is to deliver science to help fish, wildlife, water, land, and people adapt to a changing climate.



The Southeast Climate Adaptation Science Center (SE CASC) supports a range of science activities that contribute to understanding the exposure and impacts of global change on resources that matter to our partners and to framing decisions about adaptation strategies, while emphasizing principles of co-production. We place a large emphasis on training and developing the next generation of global change scientists by supporting a diverse cohort of graduate students as Global Change Fellows. Despite the various challenges presented by the ongoing pandemic during the 2020-21 academic year, we rose to accomplish many notable successes in conjunction with our partners, scientists, and students.

Seminars became webinars, classes and working groups met via Zoom, and conference presentations were given remotely. We developed innovative ways to connect in virtual space and expanded our geographic reach through remote technologies, while support that was intended for travel was used instead to enhance other science efforts.

Consortium and USGS scientists collaborated with partners from Tribal Nations, federal and state agencies, and others to provide actionable science important for managers of natural and cultural resources across our region. We invite you to connect with us as we continue our efforts to enable better climate-smart decisions in the changing landscapes of the Southeast.

– University Director, Derek Aday and USGS Director, Katherine Smith

OUR TEAM → secasc.ncsu.edu/home/about/people/staff

SE CASC STAFF

- DEREK ADAY / University Director
- RYAN BOYLES / USGS Deputy Director
- KRISTEN DONAHUE / USGS Research Coordinator
- MITCHELL EATON / USGS Research Ecologist
- CARI FURINESS / Program Manager
- MIKAYLA KERRON / BIA Pathways Intern
- ARANZAZU LASCURAIN / Assistant University Director
- CAROL MOREL / USGS Data Steward
- ASHLYN SHORE / Science Communications Specialist
- KATHERINE SMITH / USGS Director
- ADAM TERANDO / USGS Research Ecologist
- CASEY THORNBRUGH / Southeast & Northeast Tribal Climate Science Liaison

UNIVERSITY PRINCIPAL INVESTIGATORS

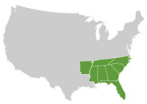
- PAUL ARMSWORTH / University of Tennessee
- WENDY GRAHAM / University of Florida
- JOHN KUPFER / University of South Carolina
- KAREN MCNEAL / Auburn University
- LYDIA OLANDER / Duke University
- SANKAR ARUMUGAMAN / NC State University
- ROB DUNN / NC State University
- RYAN EMANUEL / NC State University
- STEVE FRANK / NC State University
- KRISHNA PACIFICI / NC State University
- NILS PETERSON / NC State University
- ASTRID SCHNETZER / NC State University
- ERIN SEEKAMP / NC State University

Looking for a tool, dataset, or specific resource or information? Check out secasc.ncsu.edu/resources or contact our SE CASC staff.

Actionable Science

SE CASC SCIENCE PROJECTS FY 2020

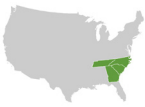
**Maps indicate project geography area, color indicates research priority*


Understanding Impacts on Southeastern Grasslands from Climate Change, Urban Expansion, and Invasive Species


Informing Management of Waterfowl Harvest in a Changing Climate

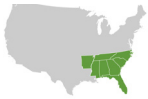

Science to Inform the Management of Mangrove Ecosystems Undergoing Sea Level Rise at Ding Darling National Wildlife Refuge, Sanibel Island, Florida


An Assessment of Invasive Species Range Shifts in the Southeastern US and Actions to Manage Them

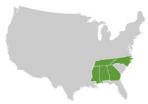

Brook Trout Population Responses to Climate Variation Across the Southeast


Clarifying Science Needs for Determining the Impact of Climate Change on Harmful Algal Blooms in the Southeastern United States


Assessing the Climate Vulnerability of Wild Turkeys Across the Southeastern US


Future of Fire: Towards a National Synthesis of Wildland Fire Under a Changing Climate


Evaluating Ecosystem-Based Adaptation Options for Coastal Resilience


Climate- and Land-Cover-Induced Shifts in the Distribution and Abundance of Invasive Fish and Their Impacts on Native Fish Communities in the Tennessee and Cumberland River Basins

PRIORITY 1 – EXPOSURE: Improve partner understanding of what climate and land use change processes and associated biophysical stressors will look like on the land and water they manage.

PRIORITY 2 – IMPACTS: Improve partner understanding of ecosystem, habitat, and species impacts of climate and land use change, as well as the understanding of how these changes affect resources of specific concern to resource managers.

PRIORITY 3 – ADAPTATION: Increase partner understanding of, and access to, practical guidance for framing and making smart climate and land use change adaptation decisions.

LEARN MORE: secasc.ncsu.edu/science/

WORKING GROUPS

ECOSYSTEM SERVICES AND GLOBAL CHANGE

Facilitated consortium student work on ecosystem services mapping case studies.

Worked with natural resource managers to apply NC Natural and Working Lands Action Plan datasets to more conservation lands in NC.

Completed coastal ecosystem services mapping for the mid-Atlantic, with pending publication on blue carbon. Extending coastal vulnerability and coastal blue carbon mapping to other SE states.

Products: Natural and Working Lands in North Carolina – Data and Methods Guide; Mapping Ecosystem Services for the Southeast United States: Conservation and Restoration Priorities for Water Purification; Testing ecosystem accounting in the United States: A case study for the Southeast.

CLIMATE CHANGE INTO STATE WILDLIFE ACTION PLANS

Monthly calls explored topics such as how states integrated climate into 2015 SWAPs; implications of RAWA for the SWAP process; SE Tribal Nations' approaches to wildlife action planning; different methods to assess species vulnerability.

COASTAL RESILIENCE TO GLOBAL CHANGE

Organized monthly presentations by university and USGS researchers on coastal resilience work, identifying key areas for further exploration.

Developed Coastal Resilience Working Group Summary Report including a literature review on impacts on watershed provisioning in estuaries. Produced an interactive database of organizations conducting coastal resilience work in the Southeast.

WATER SUPPLY AND DEMAND IN A CHANGING CLIMATE

Florida Water & Climate Alliance held 3 webinars with stakeholder groups on: water utility risk and climate resilience; water quality and climate change issues; hurricane season impacts on water management and climate science coproduction.

Contributed to The Florida Water and Climate Alliance (FloridaWCA): Developing a Stakeholder–Scientist Partnership to Create Actionable Science in Climate Adaptation and Water Resource Management.

EVALUATION OF ACTIONABLE SCIENCE

Organized monthly meetings on SE CASC-related evaluation issues, as well as a USGS-funded directed project evaluating Phase 1 SE CASC projects. Administered a survey for project users and a companion survey for SE CASC project PIs.

Convened a national community of practice on evaluation topics across the CASC network and other institutions focused on actionable science.

SOUTHEAST CONSERVATION ADAPTATION STRATEGY

Contributed to SECAS FUTURES: Structuring Governance to Achieve Landscape-scale Conservation Outcomes.

Implemented a symposium at 2021 SEAFWA conference on SECAS and 30x30 Initiative.

Co-authored How decision makers view wildlife conservation challenges in the Southeast United States and analyzed why climate isn't a focus for wildlife agencies.

LEARN MORE: go.ncsu.edu/secasc-working-groups

Capacity & Partnership Building

PROJECT HIGHLIGHT

Clarifying Science Needs for Southeastern Grasslands

The Problem: Grasslands are important to the biodiversity of the southeastern United States and face a range of threats. Owing to decades of fire suppression, land-use change, and other human activities, the area of southeastern grasslands has decreased by 90% and emerging threats such as climate change and invasive species further jeopardize them.

Project results: Scientists and managers from State and Federal agencies, NGOs, and universities with expertise in southeastern grasslands conservation organized a workshop with the goals to identify major threats to grassland species in the Southeast as well as potential ways to make the Species Status Assessment process under the U.S. Endangered Species Act more efficient and effective. Identified threats included: (1) habitat loss and fragmentation, (2) climate change, (3) changes to disturbance regimes, (4) invasive species, and (5) localized impacts.

Impact: *"Grassland associated ecological systems collectively support a high proportion of Federal trust-responsibility taxa in the Southeast, involving many imperiled plants and animals. The workshop and the resulting report were generated to support the U.S. Fish and Wildlife Service's Species Status Assessment process by providing information that could constitute the types and severity of threats that many grassland taxa are subjected, along with identification of priority research needs to fill information gaps. The report is an important contribution for better thinking about ecosystem-level management and conservation of many imperiled associated taxa."*

— Chuck Hunter, Chief, Division of Strategic Resource Management, National Wildlife Refuge System, U.S. Fish and Wildlife Service

LEARN MORE: secasc.ncsu.edu/science/se-grasslands/

Tribal Partnership Update

Tribal Climate Resilience Camp: SE CASC staff helped plan for this camp hosted by United South and Eastern Tribes and Penobscot Nation for Tribal vulnerability assessment development.
COVID has pushed the event to summer 2022.

Rising Voices/NCAR/Relocation and Site Expansion Working Group: NCSU staff co-lead a working group focused on challenges for Tribal Nations that overlap with SE CASC conservation issues.

BIA Tribal Climate Resilience Program: NCSU staff served as expert reviewers for the 2021 RFP.

National Tribal and Indigenous Climate Conference: We presented along with other CASC staff during this week-long conference hosted by the Institute for Tribal Environmental Professionals and BIA Tribal Resilience Program.

Seminole Tribe of FL Climate Partnership: SE CASC staff partnered with the Seminole Tribe of FL supporting climate vulnerability assessment. Relationships developed during the project, The Future of Culturally Important Species in North America has led to ongoing vulnerability assessment work between the Tribe and NCSU.

→Climate Change Adaptation Resources for Tribes: secasc.ncsu.edu/tribal-resources/

GLOBAL CHANGE FELLOWS

In 2020-2021, we had an excellent cohort of 11 Global Change Fellows, from multidisciplinary academic backgrounds.

REBECCA ASSER | Department of Landscape Architecture and Environmental Planning
JIN BAI | Department of Forestry and Environmental Resources
TIRA BECKHAM | Department of Parks, Recreation and Tourism Management
GRETA EASTHOM | Department of Marine, Earth, and Atmospheric Sciences
KATE GORMAN | Department of Applied Ecology
KATHRYN JEWELL | Department of Forestry and Environmental Resources
MEGAN JOHNSON | Department of Civil, Construction, and Environmental Engineering
SAMANTHA JORDT | Department of Applied Ecology
HEMANT KUMAR | Department of Civil, Construction and Environmental Engineering
JUSTINE NEVILLE | Department of Forestry and Environmental Resources
ÁMBAR TORRES MOLINARI | Department of Applied Ecology

Global Change Fellows hosted 4 seminars:

- Climate Policies and COVID-19
- Disaster Recovery During a Global Pandemic
- Environmental Justice in North Carolina: Then, Now, and the Future
- Intergenerational Learning: How Children are Changing Past Generations' Environmental Perceptions

Global Change Fellows produced 9 publications from their research, including:

- Jewell, K, MN Peterson, M Martin, KT Stevenson, A Terando, R Teseneer | How Decision Makers View Wildlife Conservation Challenges in the Southeast United States
- Davis, C, H Aldridge, R Boyles, KS McNeal, L Maudlin, R Atkins | Visually Communicating Future Climate in a Web Environment
- Chalise, DR, A Sankarasubramanian, A Ruhi | Dams and Climate Interact to Alter River Flow Regimes Across the United States

"The SE CASC Global Change Fellows Program has provided me with the privilege of learning from so many incredible experts in their field, as well as some valuable perspectives from individuals with lived experiences of global change impacts. The knowledge that I have gained about environmental inequality and the inherent value of traditional knowledge has forever changed the way that I will conduct my research."

—Kate Gorman

Education & Outreach

2021 Science Seminar Series

We had fantastic engagement during our previous Science Seminar Series presentations and organized a Summer Seminar Series in June-August 2021. We'll again take advantage of a partnership with the USFWS South Atlantic Blueprint team to co-sponsor a webinar in September, and we'll hold a fall/winter series to highlight SE-CASC funded science that informs resource management actions across the region.

Climate Adaptation Science Field Intensive

This intensive training experience was held the week of August 9-13, 2021. We used a hybrid teaching model based out of the NC State campus (due to ongoing travel restrictions) and included 2-3 students from each consortium institution along with students from Auburn's Climate Resilience NRT. The Intensive focuses on introducing tools and research to address emerging challenges in conservation and climate change impacts in the Southeast.

SE CASC Regional Science Symposium

Planning is underway for our second SE CASC Science Symposium scheduled for March 29-31, 2022 in Gulf Shores, AL. The symposium will convene university and USGS researchers with the cultural and natural resource management communities from Tribal, federal, state agencies, and other organizations. We'll engage Global Change Fellows and other students in an interactive poster and tools networking session. The event will feature work of the Working Groups and a meeting of the SE CASC Advisory Committee.

Video Outreach

YouTube: To promote our science more broadly and maintain longevity of our video resources, we archive seminar recordings and other videos on our YouTube channel.

Priority Science Videos: Global Change Fellows produced video interviews with a scientist whose expertise includes a science priority for the SE such as HABs, TEK, habitat transformation, droughts, corridors. Videos and associated blog posts are intended to support managers who may not have easy access to scientific journals.

Other partnerships & outreach

- River Cane Alliance
- NOAA Community Outreach Projects
- NSF-funded PROGRESS Program
- Climate and Conservation Coffee
- Southeast and Caribbean Disaster Resilience Partnership

LOOKING FORWARD

We welcomed Rebecca Irwin, who became our Interim University Director in September 2021. Becky is a Professor in Applied Ecology working on pollination mutualisms and responses to environmental change and is a long-time SE CASC faculty affiliate. Also joining the SE CASC team are **Marie Schaefer**, USGS Tribal Climate Strategies Research Scholar; **Jennifer Cartwright**, USGS Science Coordinator; and **Kristen Fontana**, NCSU Student Intern.

Global Change Fellows: We have recruited a diverse group of 11 talented students for the 10th annual cohort of Global Change Fellows, who will regularly interact with SE CASC staff and network scientists throughout the coming year.

Seminar Series: The incoming cohort of Fellows will plan and implement two Global Change Seminars in the fall and two in the spring on co-developed topics. And we will continue our Seminar Series focused on SE CASC actionable science.

Working Groups: SE CASC is facilitating expanded Working Group activity through FY22 directed funding, including creation of a new Working Group on invasive species.

32 new publications in 2020–2021
go.ncsu.edu/secasc-publications

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