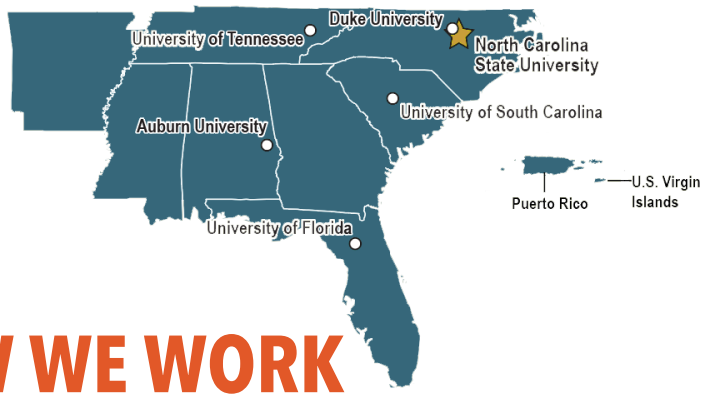
SOUTHEAST
Climate Adaptation Science Center

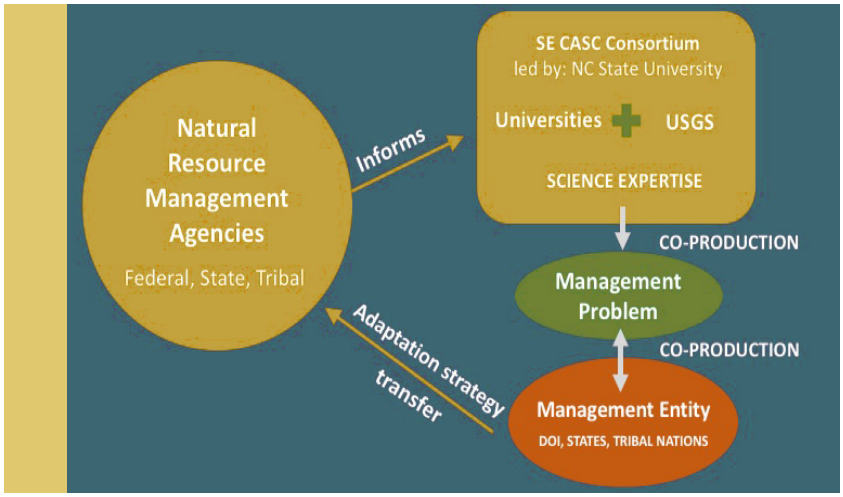
2018-19 ANNUAL REPORT

OUR MISSION

We work with natural and cultural resource managers to gather the scientific information and build the tools needed to help fish, wildlife, people and ecosystems adapt to the impacts of changing climate and land use.



HOW WE WORK



> MEET OUR CONSORTIUM PARTNERS

WORKING GROUPS LED BY CONSORTIUM MEMBERS *(below, left to right):* **LYDIA OLANDER** (*Duke*), Ecosystem Services and Global Change; **KAREN MCNEAL** *(Auburn)*, Coastal Resiliency to Global Change; **WENDY GRAHAM** (*UF*), Water Supply and Demand in a Changing Climate, Harmful Algal Blooms; **PAUL ARMSWORTH** (*UT*), Evaluation of Actionable Science; **NILS PETERSON** (*NCSU*), Southeast Conservation Adaptation Strategy.

FROM UNIVERSITY DIRECTOR, DEREK ADAY

The Southeast Climate Adaptation Science Center (SE CASC) completed another productive year, building on fruitful partnerships with state, federal and tribal agencies and adding new collaborators. These interactions allowed us to grow our network, improve our student training opportunities and increase the reach and influence of our science.

On the University side, our emphasis remained on the Global Change Fellows program, where we continue to recruit enthusiastic and engaged students interested in a one-year enhancement to their graduate research projects. In 2018-2019 we enhanced our Field Intensive experience through a partnership with the Tremont Institute in the Great Smoky Mountains, allowing us to connect students and practitioners with local resources and managers to get valuable, 'real world' experience addressing climate adaptation challenges in a biodiversity hotspot. Our student training was further enriched through a strong working relationship with our consortium partners. Students and scientists at those institutions participated in science meetings, networking events and the Field Intensive to help us ensure that the work of the SE CASC is delivered in meaningful ways across the region.

We look forward to new opportunities to engage our stakeholders and collaborate with our partners. We encourage you to connect with us by whatever means are most useful and available, including through our website, social media, community events, webinars and other activities that are hosted by our Center or consortium partners throughout the region.

Looking for a tool, dataset, or specific resource? Contact our SE CASC staff.
> secasc.ncsu.edu/home/about/people/staff/

2018-19 Projects

SE CASC SCIENCE PROJECTS INITIATED IN 2018-19

*Maps indicate project geography area

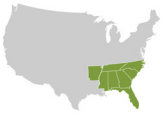
Synthesizing Climate Change Impacts on Wildlife Health and Identifying Adaptation Strategies
secasc.ncsu.edu/science/wildlife-health/

Ecosystem Services Mapping Datasets secasc.ncsu.edu/science/ecosystem-services/

Clarifying Science Needs for Southeastern Grasslands
secasc.ncsu.edu/science/se-grasslands/

Developing Future Habitat Condition Scenarios for Wildlife in the Imperiled Pine Rockland Ecosystem of South Florida secasc.ncsu.edu/science/pine-rocklands/

Communicating Future Sea-Level Rise Scenarios for Gulf Coast National Wildlife Refuge and National Park Lands
secasc.ncsu.edu/science/ngom-sealevelrise/



Effects of Urbanization on the Conservation Value of Forests
secasc.ncsu.edu/science/forest-fragments/

Identifying the Ecological and Management Implications of Mangrove Migration in the Northern Gulf of Mexico
secasc.ncsu.edu/science/mangrove-migration/

Enhancing Coastal Adaptation Planning at Gulf Islands National Seashore
secasc.ncsu.edu/science/gulf-islands-adaptation/

The Future of Culturally Important Species in North America
secasc.ncsu.edu/science/culturally-impt-species/

Improving Scenarios of Future Patterns of Urbanization, Climate Adaptation, and Landscape Change in the Southeast
secasc.ncsu.edu/science/se-future-urbanization/

Assessment of Water Availability and Streamflow Characteristics in the Southeastern U.S.
secasc.ncsu.edu/science/water-availability/

30 *new publications in 2018-2019*
HTTPS://GO.NCSU.EDU/SECASC-PUBLICATIONS

PROJECT HIGHLIGHT: CAPE LOOKOUT RESEARCH HELPS PARK MANAGERS

The problem: The National Parks Service (NPS) estimates that $40 billion of coastal cultural resources are at high risk from sea level rise but it is unlikely they will be able to preserve all of these assets. As a result, managers will need to make informed decisions about which cultural resources to prioritize for climate adaptation actions.

Project results: A measurement framework was developed that integrates the impacts of climate change on cultural resources with the realities of budget constraints and input from stakeholder groups and policy makers, to help the NPS make decisions on how to adapt these resources to the future in coastal areas.

Additional benefits: This project has resulted in continued financial support by the NPS to further develop these concepts, models, and applications for use in other park units around the country including funds for a postdoc to refine the models and most recently, a project to use the model in considering archaeological resources.

LEARN MORE: go.ncsu.edu/cape-lookout

SCIENCE PRIORITIES

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.

TRIBAL PARTNERSHIP UPDATE

SE CASC staff, led by Casey Thornbrugh, participated in the *Tribal Climate Resilience Summit* on the Oneida Nation at the end of August. The Summit was sponsored by The United South and Eastern Tribes (USET). Representatives and other partners convened for discussions and presentations covering climate change impacts on Tribal Nations within the USET region. Tribal climate adaptation plans as well as opportunities and resources for building resilience within Tribal Nations and communities was also a focus. Tribal youth, undergraduate, and graduate students gave oral and poster presentations on climate change research projects and examples of climate change resilience projects within their Tribal Nations and communities.

LEARN MORE: secasc.ncsu.edu/home/partners/tribal-partners/

Capacity Building

A core function of the SE CASC focuses on building capacity among our Global Change Fellows, Tribal Nations and communities, and natural and cultural resource managers — so they have the skills and tools for robust climate adaptation planning. We continue to provide training for Global Change Fellows on topics such as science communication, stakeholder engagement, climate science, decision analysis, and to connect them to a network of peers to support their career development. Additionally, SE CASC staff provided targeted presentations on climate exposure and impacts in the SE for state agency and Tribal audiences.

VITAL FUTURES PROJECT UPDATE

CONSERVATION ADAPTATION PLANNING FOR LANDSCAPE AND CLIMATE CHANGE IN THE SOUTHEAST

The problem: The Southeast has high rates of urbanization and land-use change and is experiencing climate changes that threaten wildlife and their habitats. Most conservation activities focus on maintaining systems in their current condition, or returning them to a historic state, rather than enabling them to adapt to change.

Results: Evaluation of State Wildlife Action Plans showed that: states shared a concern about the threat of climate change, adaptation strategies tended to be general and often vague, and wildlife management goals tended to emphasize persistence of species and habitats rather than managing for future system changes. The project team recommended regional planning for wildlife conservation under change, and facilitated state efforts for that planning through joint development of a Regional Species of Greatest Conservation Need list. They also mapped future impacts of urban development, fire hazards, and climate shifts to demonstrate how conservation goals and objectives are impacted by plausible scenarios of land and climate change impacts.

Outreach: *Climate Change and Conservation in the Southeast: A Review of State Wildlife Action Plans*, a fact sheet of these findings, has been distributed broadly to state agencies. Results are disseminated to managers and decision makers through conference sessions at wildlife and forest management professional meetings, SE CASC website, and via webinar to working groups of the Southeast Conservation Adaptation Strategy. **LEARN MORE: secasc.ncsu.edu/science/vital-futures**

GLOBAL CHANGE FELLOWS

In 2018-2019, we had an excellent cohort of 12 Global Change Fellows (GCF), from a variety of academic backgrounds.

- Chandramauli Awasthi | *Department of Civil, Construction, and Environmental Engineering*
- Emilee Briggs | *Department of Applied Ecology*
- Dol Chalise | *Department of Civil, Construction, and Environmental Engineering*
- Laura Hamon | *Department of Applied Ecology*
- Caitlin Kempski | *Department of Education*
- Zekun Lin | *Department of Forestry and Environmental Resources*
- Bonnie Myers | *Department of Applied Ecology*
- Deja Perkins | *Department of Forestry and Environmental Resources*
- Andre Taylor | *Department of History*
- Danielle Lawson | *Department of Parks, Recreation, and Tourism Management*
- Mike Madden | *Department of Marine, Earth, and Atmospheric Sciences*
- Tina Mozelewski | *Department of Forestry and Environmental Resources*

2018-19 Global Change Fellows hosted 6 public seminars:

- Fire Management Under Climate Change
- Food and Water Security in the Face of Climate Change
- Benefits and Rewards of Science Advocacy
- Current State of Sea Level Rise in North Carolina
- RISING: Human Story of Sea Level Rise
- Coastal Infrastructure in a Changing Climate

FORMER FELLOWS

- Gabrielle Corradino, *Knauss Fellow, NOAA Headquarters, DC; National Geographic Explorer*
- Adam Dale, *Assistant Professor, University of Florida*
- Shilo Felton, *Non-game wildlife biologist with the Rhode Island Division of Fish and Wildlife*
- Michaela Foster, *PhD at Yale School of Forestry and Environmental Studies*

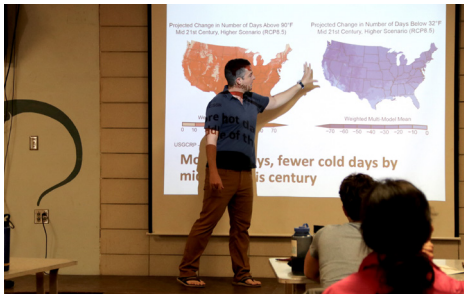
> **Being part of GCF was an extraordinary transformative experience.** Exposure to global and holistic approaches of high rigor, combined with interactions with colleagues from multiple disciplines, creates unique conditions to stimulate and develop critical thinking.
>
> ***– WILMER REYES, NEWLY APPOINTED PRESIDENT OF THE NATIONAL AGRICULTURAL UNIVERSITY OF HONDURAS, 2016-2017 FELLOW***

> **The GCF program has provided me with two crucial things that now distinguish me from my peers: opportunities and introductions.** As a Global Change Fellow I was given the opportunity to travel to Washington D.C. to participate in science briefings, to lead seminars hosting top researchers, and to pursue needed research unencumbered by other obligations.
>
> ***– TINA MOZELEWSKI, 2018-2019 FELLOW***

Education & Outreach Highlights

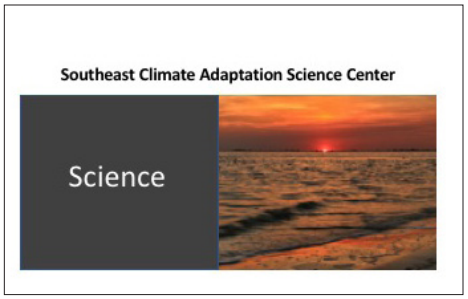
RISING: *Perspectives of Climate-Related Change Along North Carolina's Coast*

This exhibit and series of programming events was a semester-long effort leading up to the public exhibit of RISING NC (March 2019), a collection of images displaying climate impacts on NC's coast. These events included participation by >500 people from the university and community, and used art, science, and food to convey the complex set of conservation and management along North Carolina's coast. Partnership with the African American Cultural Center allowed us to engage with a highly-underrepresented group in these topics and discussions.



CLIMATE ADAPTATION FIELD INTENSIVE

Held in the Great Smoky Mountains, the Field Intensive provided a cohort building experience for 12 Global Change Fellows and 4 consortium graduate students. This included instruction in climate and decision science, science co-production and communication, and Tribal engagement including interaction with natural resource managers from the NPS and Eastern Band of Cherokee Indians. As a result of this annual event, we have developed a collaboration with the GRSM Institute at Tremont, the NGO site that hosts the field intensive, and established fruitful partnerships with several DOI agencies.



WEB REDESIGN

This year, we completed a redesign of the SE CASC website which streamlined our web presence to allow our partners and the public to more easily engage with our science and outreach materials. Some of the highlights from our new website include:

- Enhanced Tribal resource page: secasc.ncsu.edu/tribal-resources/
- More robust science planning page: go.ncsu.edu/secasc-science-planning
- NCA4 resources page: go.ncsu.edu/nca4-resources

Looking Forward

SAC MEETING–SCIENCE PLANNING

The Stakeholder Advisory Committee (SAC) plays an instrumental role for the SE CASC, serving as a valuable interface to a broader community of partners. The SAC, through annual meetings, helps inform annual and multi-year science priorities and helps to connect researchers and resource managers to improve the impact of our science.

REGIONAL SCIENCE SYMPOSIUM

The SE CASC is hosting a Regional Science Symposium from November 13-15, 2019 in New Orleans, LA. The symposium is designed to engage the research and resource management communities and provides the SAC a timely opportunity to reflect on the climate-related management issues raised by decision makers in the region, which will inform future science priorities and research directions of the SE CASC.

WE WELCOME DAVID REIDMILLER, who began serving as the Acting Federal Director of both the SE and NE CACSC starting in October 2019. Dave comes to us from the U.S.Global Change Research Program where he served as the Director of the Fourth National Climate Assessment.

NOMINATIONS FOR THE 2020-21 GLOBAL CHANGE FELLOWS PROGRAM

The program is designed to train the next generation of global change scientists by providing financial, scientific, and professional development support for graduate students who are interested in multi-disciplinary research. Fellows are nominated by a NC Faculty Affiliate; nominations will open in January 2020. For more info see: secasc.ncsu.edu/home/about/people/global-change-fellows/

NCA4 WEBINAR SERIES

The SE CASC is hosting a six-part webinar series which will take an intensive look at the Southeast, U.S. Carribbean, and Tribes & Indigenous Peoples chapters of the Fourth National Climate Assessment. Presentations by Paul Schramm (CDC, Climate Science Team Lead), Doug Marcy (NOAA), Mike Osland (USGS), Kirstin Dow (USC/CISA), and Bill Gould (Director, USDA Caribbean Climate Hub) are included in this informative series. Recordings of each presentation and additional NCA4 related materials can be viewed at: secasc.ncsu.edu/nca4-webinar-series-the-southeast/

USGS science for a changing world

NC STATE UNIVERSITY

OUR CONSORTIUM PARTNERS

UF UNIVERSITY of FLORIDA

Duke UNIVERSITY

THE UNIVERSITY OF TENNESSEE KNOXVILLE

AUBURN

UNIVERSITY OF SOUTH CAROLINA