



NC STATE
UNIVERSITY

Applied Ecology

2019–2020 ANNUAL REPORT

The **Department of Applied Ecology** exists to advance and share fundamental and novel discoveries in ecology and apply them to our greatest environmental challenges.

Our topics of interest span the scale from genes to ecosystems. Whether studying sunflower pollen or landscape function, we are passionate about understanding the living world in order to **serve the greater good**.



In a world almost singularly preoccupied with the coronavirus, it is easy to forget the other grand global challenges that we face, from adapting to a changing climate, to protecting human health and wellbeing and conserving the planet's biodiversity and natural resources. These are challenging times indeed, and now – perhaps more than ever – we are dependent upon good science, trustworthy guidance for people and policymakers, and a commitment to training the next generation of thought leaders, to lead us to a better tomorrow. And that is why, as I reflect on the last year, I am excited to share with you some of the many accomplishments of faculty, staff and students in the Department of Applied Ecology at NC State.

Within these pages you will be introduced to a small sample of the exciting, engaging and important work that we've accomplished. With the support of millions of dollars in external funding, and through hundreds of scientific papers, reports and presentations, the faculty, staff and students of Applied Ecology have produced outstanding ecological research that has – and will – directly influence the quality of the water you drink, the food you consume, and the natural habitat that surrounds you. In so doing, we have focused on some of the thorniest environmental problems that society faces, including, for example, how to manage and mitigate a changing climate, how to protect humans and wildlife from common and emerging contaminants, and how to conserve critters whose diminutive size belies their enormous influence on the ecosystems that they – and we – have come to depend upon.

We've accomplished this through individual efforts, lab collaborations, and state and federal partnerships, and we've relied on the expertise of close interactions with outstanding units housed within the Department: the Center for Applied Aquatic Ecology, Agromedicine Institute, Southeast Climate Adaptation Science Center, and NC Cooperative Fish and Wildlife Research Unit.

And while our productivity now places us among the best ecology departments in the nation, we remain committed to science, education and outreach that has direct influence on the health and wellbeing of our friends and neighbors, and of the environment that we inhabit.

On a personal note, I'm especially proud of the commitment that Applied Ecology has made to ensure that we create and maintain an environment that is diverse and inclusive, that creates a space in which all viewpoints are both welcomed and needed to tackle the problems we aim to address. This fall we will welcome a cohort of new Assistant Professors, all of whom are women, and we are energized by a new departmental Diversity, Equity and Inclusion Committee that is working with internal and external partners to ensure that our policies and procedures reflect our commitment.

It has been an exciting and productive year in Applied Ecology. Despite the uncertainties and challenges ahead, I'm grateful to work with a dedicated and committed group of scientists and I'm confident that the best is yet to come. I invite you to join us on our journey to understand the natural world, and in our endeavors to leave it a little better than we found it.



Prof. Derek Aday, Department Head

THE TEAM

The Department of Applied Ecology welcomes students, collaborators, and colleagues regardless of race, religion, gender identification, sexual orientation, age or disability status. The more diverse our department is the better we are; only diverse research teams are capable of solving the global environmental challenges faced by a diverse society. We are committed to self-evaluation, encouraging ongoing conversations and building an inclusive community, and have programs in place to produce meaningful outcomes. We also believe that actions speak louder than words, and we hope that you will be a part of our process to identify and undo structural racism in our institutions and research fields, and our progress towards anti-racism and equality.

21

*Research & Teaching
Faculty*

30

*M.Sc., Ph.D., & Post
Doctoral Students*

20

*Applied Ecology
Minor Students*

17

*Research &
Administrative
Staff*

88

*Total Full-Time
Departmental
Members*

WELCOME NEW FACULTY



Dr. Erin McKenney

Assistant Professor and
Director of Undergraduate
Programs



Dr. Skylar Hopkins

Assistant Professor in Global
Environmental Change & Human
Wellbeing



Dr. Khara Grieger

Assistant Professor in
Environmental Health & Risk
Assessment

PUBLICATIONS & FUNDING

Compared to NC State peer institutions,
Applied Ecology is:

- #1 in published articles per faculty member
- #6 in citations per faculty member
- #5 in federal grant dollars per faculty member
- #5 in 'scholarly index'

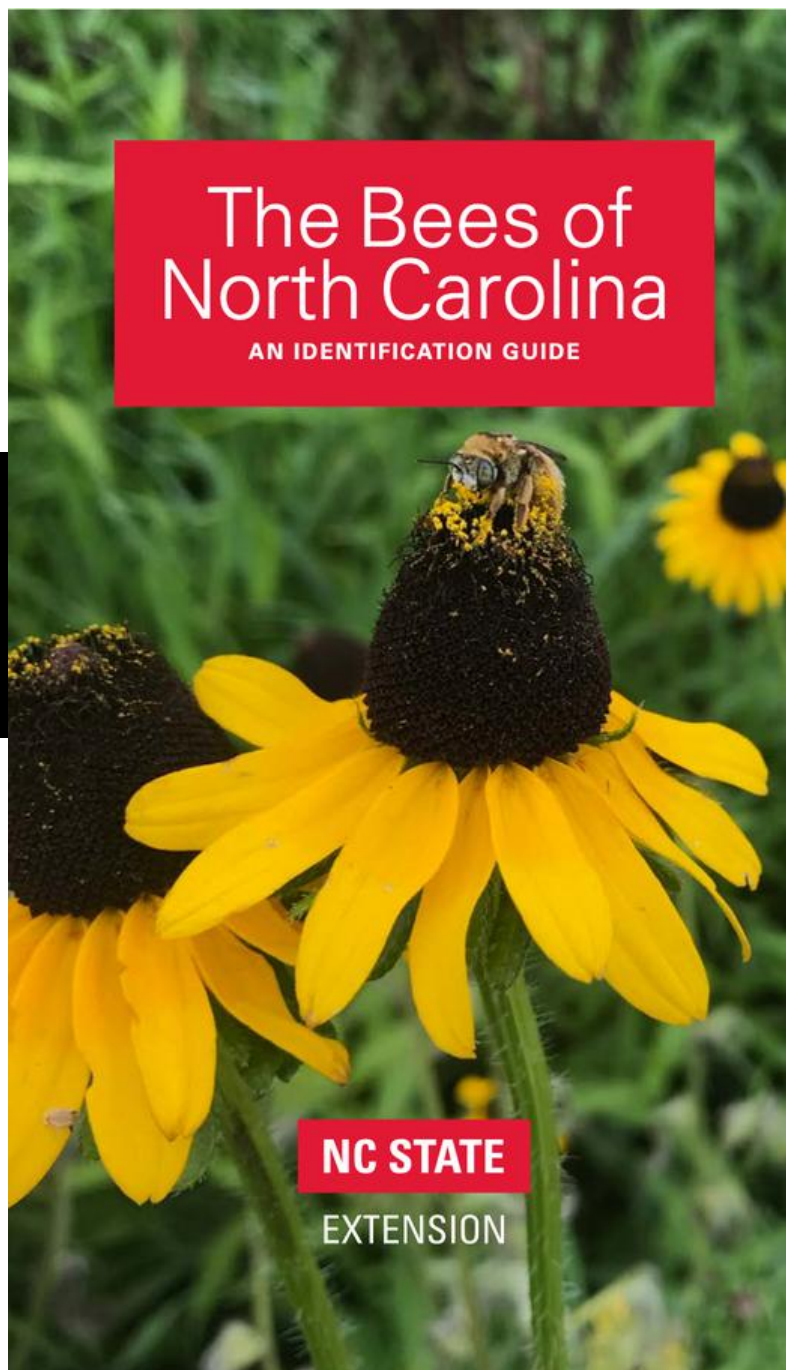
The department published
140+ peer-reviewed
articles and books.

\$353K

*Average External Grants
per faculty member*

\$4.5M

Grant Expenditures



AWARDS

Faculty

Derek Aday

American Fisheries
Society Fellow

Jeff Buckel

Alumni Association
Outstanding Research
Award

Jaime Collazo

Ralph W. Schreiber
Conservation Award

Rob Dunn

William Neal Reynolds
Distinguished Professor &
AAAS/Subaru Prize for
Excellence in Science
Books

Jeff Hinshaw

World Aquaculture
Society Fellow

Becky Irwin

University Faculty
Scholar

Tom Kwak

President, Southern
Division American
Fisheries Society

Wilson Laney

Conservationist of the
Year Award (NC Governor)

Erin McKenney

UNCG/NCCC Engaged
Scholarship Prize

Alonso Ramirez

President, Society of
Freshwater Science

Ben Reading

University Faculty
Scholar

Staff

Elle Allen

Cover photo for Journal
of Phycology

Michelle Jewell

AIBS Face of Biology First
Place & Cover of BioScience
(top left of next page)

Students

Riley Gallagher

Richard L. Noble Best
Student Paper Award

Kate Gorman (incoming)

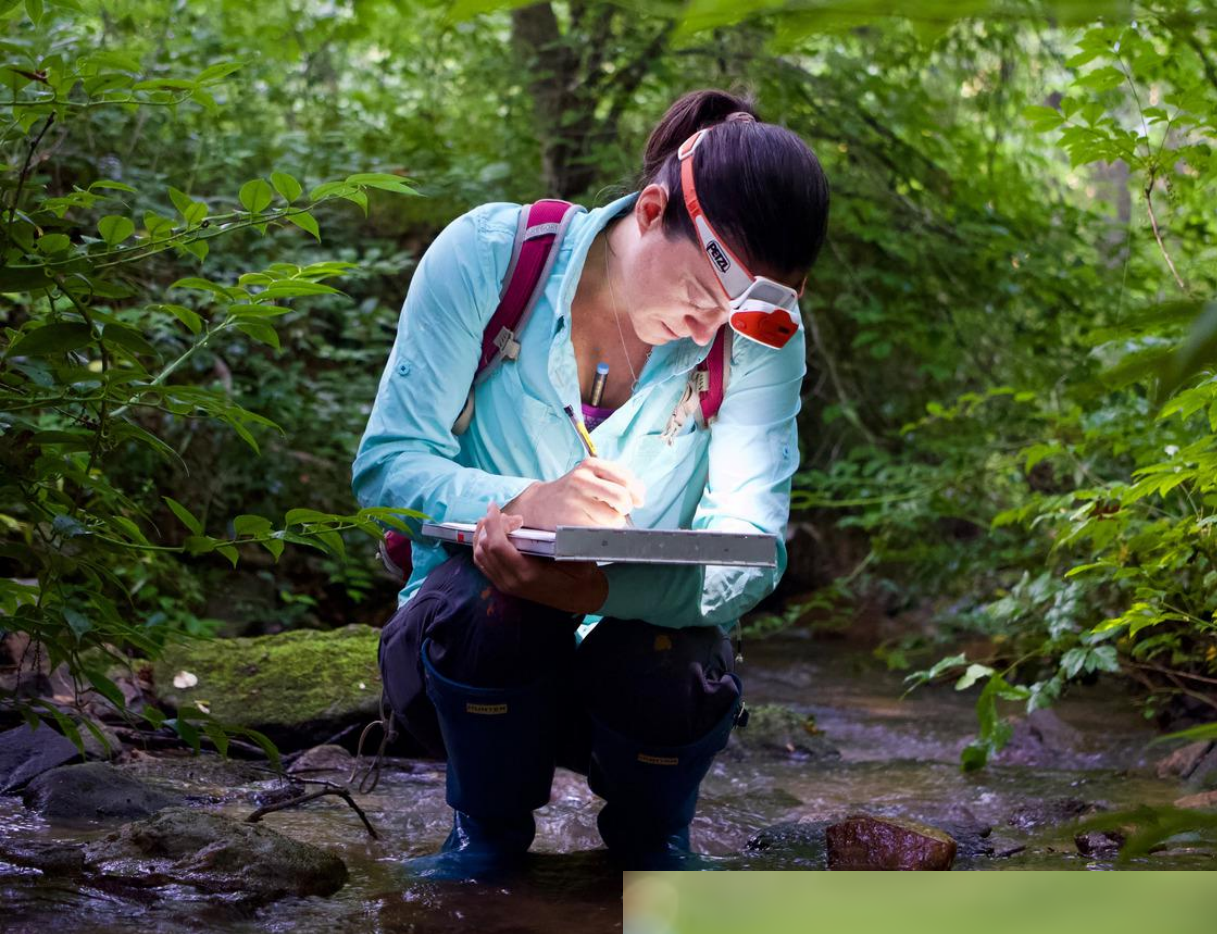
NSF Graduate Research
Fellowship

Brendan Runde

Conservation Leadership
Scholarship (NCWF)

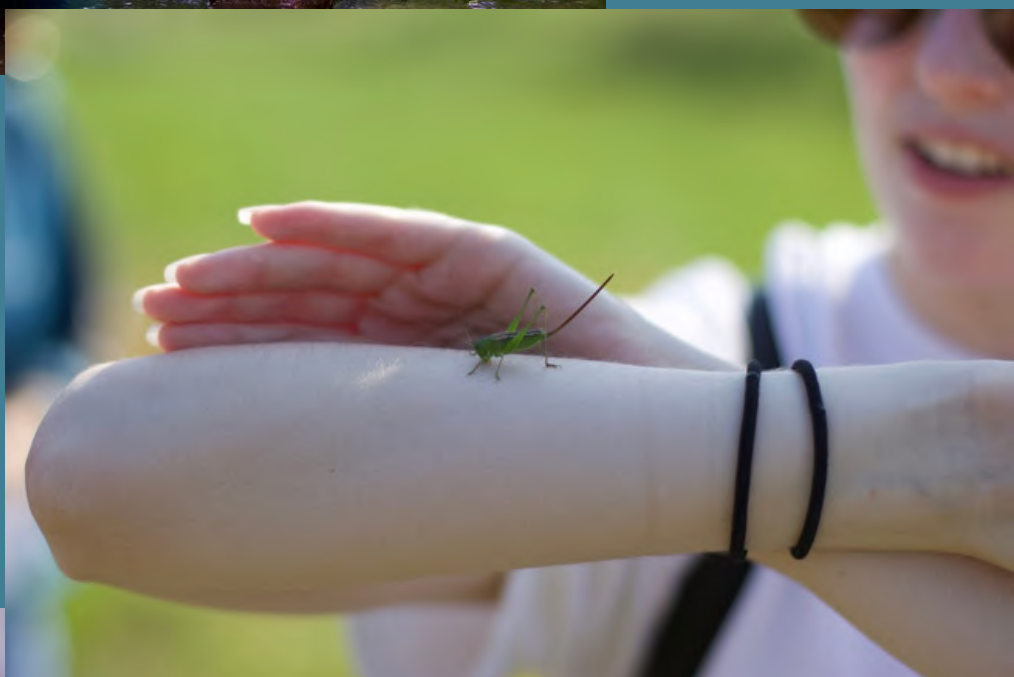
April Sharp

Dragonfly Pond Works
Scholar



M.Sc. student, Samantha Jordt, collects data in a natural stream in western North Carolina.

Field ecology class includes using sweep-nets to collect and quantify insects, but sometimes you don't need the net...



Dr. Ben Reading leads a dissection of a hybrid striped bass during a CAALS-3D lab visit for under-represented minority students.



Bee lab technician, Victoria Amaral, with one of tens of thousands of study bumble bees.

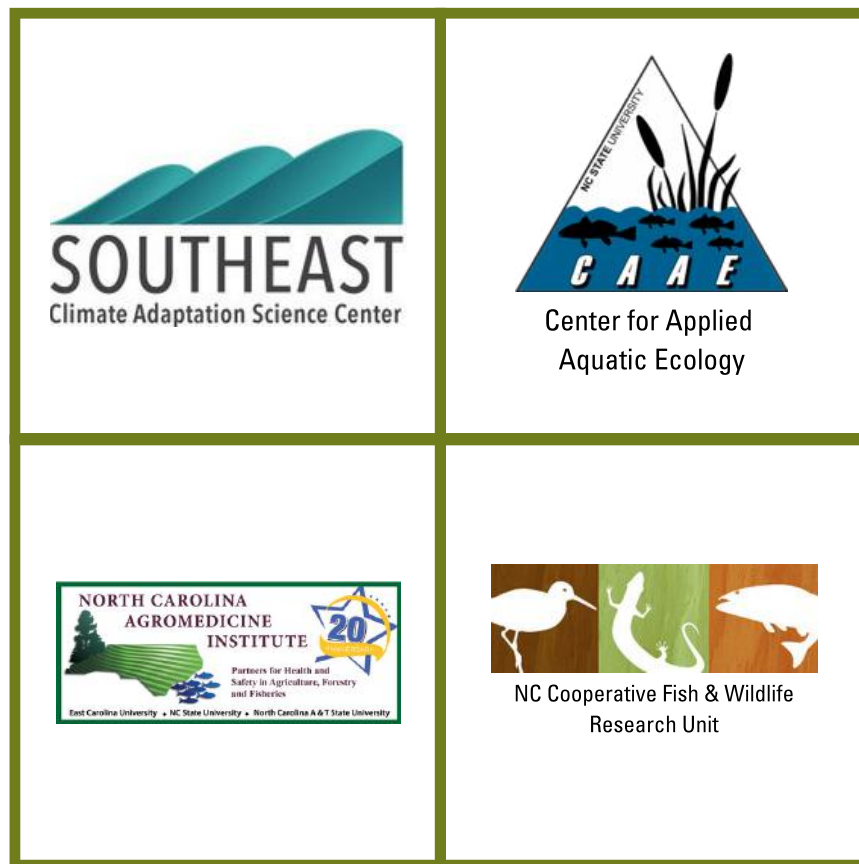
Emeritus Prof. James Rice tests the alkalinity of a freshwater impoundment, adding to a 30+ year dataset comparing water quality to recreational fish productivity.



Ph.D. student and 2019 alum, Elsita Kiekebusch, admires some of her study species.

UNITS

Housed on campus within the Department of Applied Ecology are four units that directly contribute to interdisciplinary research, resource management, and service to our communities. The expertise of each unit expands the opportunities available to our undergraduate and graduate students, who are able to get on-the-ground training in their career paths before entering the work force.








Learn more at:

go.ncsu.edu/UnitsInAEC

OUTREACH

Virtual communities are one of the most powerful spaces to form direct connections with stakeholders, advocates, and supporters. This past year, our commitment to creating accessible online content has been recognized by our growing number of subscribers and followers to various platforms:

	April 2019	April 2020
	0	102
	215	521
	0	242
	4	443
	42	160



The Blink of an Eye

Free public talk with author
Dr. Rikke Schmidt Kjærgaard



THE LAST BUTTERFLIES

AN EVENING WITH THE AUTHOR,
DR. NICK HADDAD



FIELD STORIES

at **ORVIS**



Exploring Science
In North Carolina,
From Coast To Ghost

with **science FRIDAY**



HOT EATS COOL SCIENCE

is a collaborative dinner hosted by

Department of Agriculture & Human Sciences
<https://cals.ncsu.edu/agricultural-and-human-sciences/>

Department of Applied Ecology
<https://cals.ncsu.edu/applied-ecology>



Join our next evening of decadent striped bass dishes
expertly paired with wines and science, at the
Dinah E. Gore Teaching & Research Kitchen!

Contact: Michelle Jewell
majewell@ncsu.edu | 919-515-3766

NC STATE UNIVERSITY

ENGAGEMENT

We brought the public, alumni, and researchers together for 7 events this past year by collaborating with partners such as the NC Museum of Natural Science, Science Friday, WUNC, and Orvis!

7

public events

600+

participants

EXTENSION

from the desk of Dr. Elsa Youngsteadt

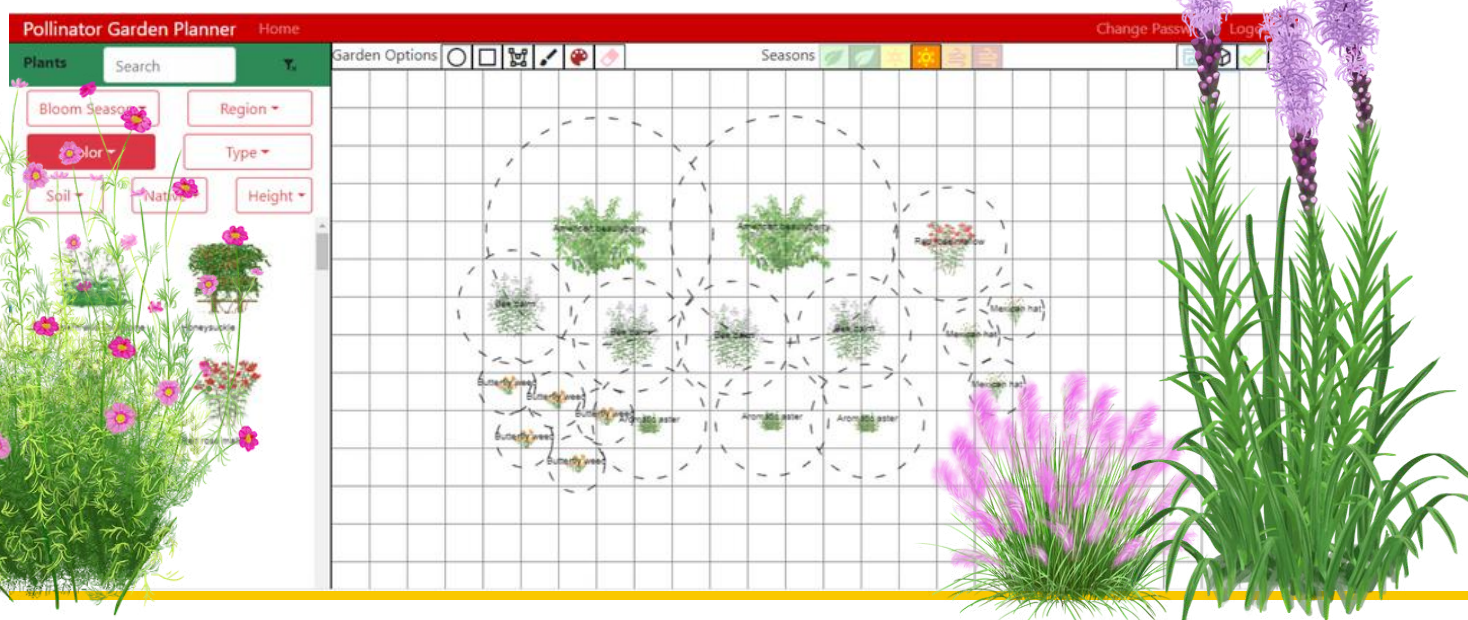


"This past year, we've been able to reach hundreds of people who are passionate about pollinator conservation. In addition to co-hosting the national Protecting Pollinators in Urban Landscapes conference in October, colleagues and I presented at several events statewide. These included the State Extension Conference, Master Gardener workshops, and Pollinator Field Days. These multidisciplinary events combine the latest horticultural science with applied ecology to educate the community on bee diversity and sustainable plant choices for their gardens and pollinators. We have also hosted workshops on the best practices for bee hotel maintenance to keep gardens a-buzz.



Dr. Elsa Youngsteadt, Assistant Professor

"With funds from the NC State Extension Innovation Grant, we have laid the foundation for an online garden planning site for home gardeners. This web-based platform will contain over 200 hand-illustrated plants that gardeners can place in their virtual gardens that will change colors and blooms throughout the growing season, giving users an interactive space to plan bold gardens that are not only beautiful, but also sustainable (see below screenshot of the program in development). Next year, we're aiming to get the garden planning site into the hands of its users, and publish best practices for managing urban pollinator habitat."



RESEARCH

from the desk of Prof. Jeffrey Buckel

"Research within the department focuses on our ability to give communities the best footing possible to address environmental challenges in a shifting future. Our work along the coastline this past year has followed that focus, and the main highlights have included addressing climate change and urbanization, using new technology to advocate for release tools, and providing critical data for fishery stock assessments.



The breadth of our study sites spanned from the open ocean to parking lot-adjacent marshes. For example, we found that growing urban development over marsh habitats led to a direct decrease in mummichog, a small fish that plays a large role in coastal food chains. We determined that two anadromous fishes are now spending less time on spawning grounds, likely because of faster spring warming. We used underwater video equipment to record how effective descender tools (left) are in reviving and increasing the survival of several deep water groupers. Using new tagging and tracking equipment, we were also able to provide fisheries managers up-to-date mortality data on specific, important fisheries species, giving a higher degree of certainty to stock assessments.

"Lastly, I was incredibly humbled and honored to be selected for an Outstanding Research Award and inducted to the Research Leadership Academy at NC State. I intend to use this opportunity to develop resources for junior research faculty, and hope to use my experiences to encourage them to take on editorial roles and assist their ability to work off-campus effectively.

"The future of our work will continue to 'Think' with our stakeholders and 'Do' the research needed to address the mounting challenges experienced by communities reliant on the ocean."



Prof. Jeffrey Buckel

ACADEMICS

from the desk of Dr. Erin McKenney

"Experiential learning is a core component of the Applied Ecology curriculum and Applied Ecology minor program. Here are a few specific examples from the classes I teach:

"I designed our gateway course in Global Conservation Ecology (AEC 295) using a flipped approach to maximize time for hands-on activities and independent research projects. Students applied concepts to personal, local, and global contexts, and presented posters to address current conservation issues in the NC State Undergraduate Research Symposium. My Field Ecology (AEC 460) students completed a series of collaborative field projects, culminating in an independent study of their own design. These projects challenged students to collect, analyze, and interpret original data sets using current field, lab, and computational methods. We also hosted panels and guest speakers to further extend concepts beyond assigned readings and lectures. In Applied Ecology (AEC 400), students extended fundamental concepts to novel situations, including published research, traditional practices, and current grand challenges. I implemented Universal Design for Learning to offer a variety of ways for students to both engage with the material and to apply their understanding to personally relevant topics, for example, students might convey their research by writing a blog post, creating a figure, writing a research paper and/or recording a podcast. This fall, I am revising the class so that students assignments will contribute to a collaborative open-source textbook!

"Field work, lab work, and applying fundamental ecology to address real world problems all increase students' self efficacy and sense of belonging in science, and prepare students for life after college by building transferable, marketable skills. For example, one of my former students recently got a job with the Department of Environmental Quality, by applying the skills she learned in AEC 460 last fall! Together, these teaching strategies increase student engagement and help address reported gaps in undergraduate job preparedness, enabling students to Think and Do."

Dr. Erin McKenney, Assistant Professor
Academic Programs Coordinator



The Department of Applied Ecology has a longstanding tradition of conducting research that addresses important ecological questions while also producing tangible results that affect environmental and human well-being. It is in our very nature to discover, share and apply results, and we practiced the same methodical approach to our strategic plan.



View the entire plan at:
go.ncsu.edu/AECPlan



Help us fill these spots! Your support creates more opportunities for future ecologists.
Please consider donating to our program:

go.ncsu.edu/SupportAppliedEcology

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