

Alt: Two people stand outdoors under trees, looking intently at their surroundings. One wears a dark t-shirt, while the other has glasses and a light shirt with a backpack.

ACES program, scientists contribute human solutions to major environmental problems

URBANA, Ill. — When Danika Ford learned about the environmental impacts of fast fashion in high school, she started looking for college programs combining traditional environmental science with social science to understand how human motivations, behaviors, and policies affect environmental problems and solutions.

Sarah Castle wanted that too. Transitioning from a first career in mechanical engineering that didn't align with her values, Castle did a stint on a diversified organic farm in northern California. Wondering how she could influence policy to encourage more sustainable agricultural systems, she started looking for graduate programs.

College of ACES
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Like hundreds before them, Ford and Castle found an academic home in the Department of Natural Resources and Environmental Sciences (NRES), part of the College of Agricultural, Consumer and Environmental Sciences (ACES) at the University of Illinois Urbana-Champaign.

While the department trains students in conservation biology, restoration ecology, and other applied environmental sciences, it also offers a concentration in human dimensions of the environment. The interdisciplinary concentration integrates social science and environmental science with the goal of preparing students to understand and influence environmental behavior and policy.

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“The human dimensions concentration, also known as environmental social sciences, has always been part of the department, but it was somewhat separate from everything else until recently,” said Bob Schooley, head of NRES. “People are starting to realize that you can’t solve any kind of environmental problems unless you understand the human side.”

That’s why all NRES majors, regardless of their concentration, take two core human dimensions courses: Environment and Society and Natural Resources Policy and Management. Then, in their last year, all NRES students take a capstone course combining elements of all four concentrations: ecosystem stewardship and restoration ecology; environmental science and management; fish, wildlife, and conservation biology; and human dimensions of the environment.

“I haven't seen other departments using this model,” Schooley said. “I describe it as a tree, with the core courses as the roots, the concentrations as a braided trunk, and then bringing everything back together in the canopy with that capstone course.”

When she chose the human dimensions concentration, Ford was interested in learning how to change people's behavior and inspire them to act more sustainably. Fortunately, there was a research opportunity for that.

Ford joined the lab of Carena van Riper, a conservation psychologist and sustainability scientist who studies human values to understand decisions and behaviors related to conservation. For two years, Ford immersed herself in research investigating behavior change around aquatic invasive species spread among anglers and water-based recreationists. Results from this project recently appeared in *Biological Invasions*, Ford's first co-authored publication.

Ford wasn't alone; the majority of NRES majors, including those in the human dimensions concentration, get involved in research.

"Undergraduates are integrally involved in all of our labs. They're coming from NRES, but also from across campus, like the Department of Political Science and the School of Earth, Society, and Environment. They often work with our graduate students to do data collection or data management, gaining important practical skills," said McKenzie Johnson, an assistant professor who studies environmental security and justice.

Research experience doesn't just build technical skills. "Students who get involved in research learn how to engage with stakeholders, including farmers, policymakers, or landowners. It's invaluable experience," said Chloe Wardropper, who studies conservation decisions and policies on working landscapes, including agricultural land.

Ford's experience aligns with those descriptions. "My research experience and the program in general gave me a lot of technical and hands-on environmental science skills. The NRES faculty does a good job of prioritizing what you'll really need to know to be successful after graduation. I do feel prepared to go out into the workforce."

Although she hasn't quite settled on a career yet, Ford's degree should give her an advantage.

Johnson says a degree in environmental social sciences is highly desirable in today's market. "There's been a status shift, where this is very desirable knowledge to have. We're facing some pretty serious environmental problems. So, as we try to mitigate and adapt to climate change, that's opening up a lot of career opportunities."

Castle came into the program having already earned an engineering degree and related job experience. But pursuing a doctorate in environmental social science is preparing her for a career in academia or a nonprofit environmental agency that will better align with her values.

"The human dimension is so critical for understanding which policies are maintaining the status quo in agriculture and how those policies could be pushed to incentivize more conservation within the agricultural landscape," she said. "Not to mention helping to address the problems with our food system, climate change, water quality, and soil fertility in the long term for future generations."

Castle and her doctoral co-advisor, Wardropper, are seeing a trend toward greater integration between the social and environmental sciences, both within the department and more broadly.

"I really don't do any work in isolation these days," Wardropper said. "More and more, we're seeing opportunities to co-produce research questions with stakeholders, including growers from urban farms and big conventional farms, extension folks, and other external resource conservation groups. It makes for even more impactful work."

Van Riper is seeing the shift, as well. She says when social scientists collaborate with biophysical scientists at the outset of big environmental projects, they can help create a roadmap to identify key populations that can induce change and may be affected by the issue.

“If we really want to make change, we need to figure out who's being impacted, how they're involved, and what they can do in response to the findings,” she said. “And if you collaborate with people that think in different ways and represent different facets of a problem, you're more likely to develop sustainable solutions.”

The environmental social scientists in NRES have active collaborations with researchers in the department and across campus, tackling everything from human health effects of trees in urban landscapes; water table decline and sustainable agriculture; changing behavior and enhancing communication about aquatic ecosystems; forest economics; and peace-building and land use change in Colombia.

The intention and activity around these “sticky issues,” as Schooley calls them, should be heartening to those who might have lost hope about the future of our environment.

To those people, including many incoming NRES students, Johnson said, “Students come in with a very doom and gloom perspective. I think some of that is warranted, but then we can show them all of this stuff that's happening. Look at the meteoric rise in environmental justice and social sciences in the last 10 years. I think increasingly, people recognize this as a really critical perspective to address the most challenging problems we've probably ever faced.”

Castle agrees. “I think there's a lot of opportunity within human dimensions, and I'm excited to see how it continues growing.”

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Source:

Bob Schooley, schooley@illinois.edu

College of ACES
UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

News writer:

Lauren Quinn, 217-300-2435, ldquinn@illinois.edu

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