ANNUAL REPORT
2018

FEATURED TOPICS:
Informing moose management
Building resilience to flooding
Promoting safe fish consumption
Preparing for energy transitions
Responding to invasive species
PURPOSE OF REPORT

This 2018 annual report provides an overview of recent research, teaching, and outreach activities of the CCSS. The report is designed to reflect the work, interests, and capabilities of the CCSS. Publications listed in this report are available for download on the CCSS website: https://ccss.dnr.cals.cornell.edu or may be requested by emailing ccss@cornell.edu.

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INTRODUCTION

HDRU TO CCSS
In 2018, the Human Dimensions Research Unit (HDRU) at Cornell University became the Cornell Center for Conservation Social Sciences (CCSS). The HDRU had a long and productive track record of externally funded research and publications, teaching undergraduate and graduate students, and outreach and consultation to effect positive change in conservation and environmental management practices. Designation as the CCSS acknowledged that the group's long-term comprehensive focus on the human dimensions of natural resource management had effectively expanded since its inception in the 1970s to include a broader array of problems and methods.

The CCSS strives to expand the understanding of academicians, students, natural resources agency staff, non-governmental organizations and policy makers about the interactions of social and ecological systems. We apply theory and empirical findings to real-world, contemporary problems. Our research outcomes, which include empirical data, conceptual frameworks, and theoretical insights, are reported at conferences and in peer-reviewed journals, books, policy briefs, outreach publications, and reports of various types. CCSS research is used by a wide array of decision makers and natural resource practitioners, especially those in state and federal agencies, to develop, implement, and evaluate environmental policies and management approaches.

CCSS faculty and staff also contribute to the teaching and outreach functions of the College of Agriculture and Life Sciences and the Department of Natural Resources. We advise both undergraduate and graduate students, oversee internship and experiential learning programs, and teach courses concerning various aspects of the environment including sociology, policy, and planning.

While all CCSS faculty and academic staff engage in outreach, three of our faculty have Extension appointments from which we serve citizens of New York State and beyond.

CCSS AFFILIATIONS
The CCSS and cooperators comprise dozens of faculty, staff, graduate assistants, and undergraduate student technicians. Research and outreach programs are supported by grants and contracts from federal and state agencies, nongovernmental organizations, foundations, Cornell Cooperative Extension, and the Cornell University Agricultural Experiment Station. For 2018, the 5 primary CCSS faculty were PIs or co-Pis on projects with more than $6 million in funding.

CCSS graduate faculty hold membership in the graduate fields of Natural Resources, Development Sociology, Public Affairs, Global Development, and Water Resources. In 2018, graduate faculty committee members for CCSS graduate students came from a variety of departments: Earth and Atmospheric Sciences, Communication, Design and Environmental Analysis, Development Sociology, City and Regional Planning, Applied Economics and Management, Natural Resources and others.

The CCSS has earned an international reputation in the conservation social sciences. The oldest unit of its kind, the CCSS’s history dates from the early 1970s. The success of the CCSS has been greatly enhanced by a partnership of approximately 40 years with the NYS Department of Environmental Conservation's Division of Fish, Wildlife, and Marine Resources and a number of federal and state partners.
The stories in this section highlight five ongoing areas of work for the CCSS and their impacts.
ENHANCING CITIZEN INVOLVEMENT IN MOOSE MANAGEMENT DECISIONS

Moose are native to New York State, but the species vanished from the state in the late 1800s as a result of overhunting and habitat destruction. During the twentieth century, individual moose occasionally migrated into northern New York from Canada or Vermont, and by the late 1980s a breeding population of 25 to 50 moose inhabited the Adirondack region. Today, northern New York is home to about 400 moose. Since the moose’s return, CCSS has worked in partnership with the state’s Department of Environmental Conservation (DEC) at key points in time as it considered management decisions affecting the future of New York’s largest land mammal.

Re-establishment of moose in northern New York is generally viewed as a welcome sign of a more complete natural system, and many people would relish the opportunity to catch sight of a moose during a visit to the Adirondacks. But moose can endanger humans as they cross highways, and grazing moose can damage agricultural crops, private property, and regenerating forests. Public input is important to DEC’s understanding of how state residents view the benefits and potential drawbacks of a significant moose presence, so the agency has sought CCSS’s expertise at pivotal moments when future management decisions could benefit from public engagement.

Recently, DEC has been grappling with questions about the state’s future capacity to provide moose habitat. After conducting a five-year investigation of moose ecology and population size with the New York Cooperative Fish and Wildlife Research Unit and SUNY College of Environmental Science and Forestry (ESF), DEC asked CCSS researchers Bruce Lauber, Richard Stedman, and Nancy Connelly to help gather stakeholder input about moose management.

This public input will complement the ecological studies, enabling the agency to take into account how stakeholders might respond to uncertainties around moose population dynamics, especially in the context of impacts from climate change.

This current work is informed in part by CCSS’s previous research on citizen participation in DEC’s decisions about moose management.

DESIGNING A PROCESS FOR CONSTRUCTIVE CITIZEN ENGAGEMENT

Back in the early 1990s, when New York’s moose population was still quite small, DEC considered a proposal to accelerate the naturally occurring increase in moose by actively introducing additional animals to the state. The agency invited constituents statewide to participate in the decision through public meetings, letter writing, and a survey. Afterward, DEC asked CCSS researchers to study this citizen engagement
process with an eye toward learning how they could improve it. Bruce Lauber and Barbara Knuth drew on social psychology to explore participants’ perceptions of fairness in the process and resulting decision, and on political theory to understand whether the process encouraged citizens to develop informed opinions that would enhance the value of their feedback.

A key insight of their study was that certain aspects of the process (in particular, a telephone survey of northern New Yorkers) failed to consider citizens’ awareness and knowledge of moose-related issues and did not provide an opportunity for dialog that might have enhanced citizens’ understanding as they prepared to weigh in. Some type of exchange of ideas, Lauber and Knuth argued, can encourage people to reflect on what they believe is best for the state as a whole, shifting their perspective from the narrow question of “what do I want?” to “what should DEC do?” They suggested that future input be gathered in ways that prompt deeper reflection on the issue, which could better operationalize the underlying value of citizen participation in management decisions.

**Evolving Priorities and Future Scenarios for Moose Management**

Today, DEC faces a different set of challenges involving potential moose management actions under a broad range of conditions that could result from climate change. The agency is preparing for future moose management decisions it may have to make, and it is working closely with CCSS to gather public input to help guide those decisions. CCSS will engage three major stakeholder groups: New York State residents, residential landowners in northern New York, and owners and managers of large tracts of forest land in northern New York. With Lauber and Knuth’s earlier findings in mind, CCSS is now designing public engagement strategies that encourage participants to reflect on the complexity of management decisions in the age of climate change.

The strategy includes a survey asking respondents to react to various future scenarios that could affect the moose population. One possible scenario, for example, is that northern New York’s climate might remain inhospitable to the winter tick (an especially large tick that in sufficient numbers can kill moose) while tick populations explode in surrounding states. In this case, New York might become an important refuge for moose populations, even while increased numbers of hungry moose threaten to take a toll on regenerating forests or agricultural crops. In another scenario, warmer winters could contribute to moose population decline, an outcome that could negatively affect the economies of Adirondack communities that promote moose sightings as a tourist attraction. After pondering such scenarios, survey participants might better grasp the complexity of the issue and the range of concerns that DEC must consider.

DEC’s moose management planning effort has also benefitted from a broader partnership involving the Wildlife Conservation Society (WCS), Cornell, the New York Cooperative Fish and Wildlife Research Unit, and SUNY ESF. With funding from the US Geological Survey, WCS conservation social scientist Heidi Kretser—who also serves as an affiliated faculty member with CCSS—is coordinating conversations among scientists and representatives of key stakeholder groups on how moose management in New York might change in the future as the climate changes, and how DEC could respond. This work is driven in part by a more general interest in how to create management plans that both reflect public input and acknowledge the uncertainties inherent in climate change. “If we can create one management plan that is both ‘climate smart’ and also really considers people in the equation,” Kretser explains, “then that plan could serve as a model for future plans focused on other species or habitats in different geographic settings.”
EXPANDING COMMUNITIES’ CAPACITY TO ADAPT TO CLIMATE CHANGE

As extreme weather events become more frequent with climate change, vulnerability to flooding is a growing concern for communities across the globe. The capacity to withstand and recover from floods, known as flood resilience, is often tied to a community’s past land use and economic decisions, which both reflect and influence how people relate to waterways and the land around them. If future decisions are to produce a more flood resilient environment, then communities will need to transform the way they envision waterfronts and development within watersheds.

CCSS professor Shorna Allred has spearheaded several projects focused on empowering communities to understand these issues and think creatively and collaboratively about the future. Allred is working with community leaders, nonprofits, students, and researchers at local institutions to explore these dynamics in ways that can help communities conceive new visions for their waterways and develop problem-solving skills to avoid repeating old patterns that would increase vulnerability to flooding.

RUST BELT REVITALIZATION: SPARKING CREATIVE THINKING IN UPSTATE NEW YORK COMMUNITIES

The rust-belt city of Binghamton, New York, is perched at the confluence of the Susquehanna and Chenango Rivers. Devastating floods in 2006 and 2011 heightened community leaders’ interest in increasing the city’s capacity for resilience. Allred launched the Living with Water project with local and campus Extension staff, the city’s economic development office, and public administration faculty at Binghamton University. The project is supported by USDA National Institute of Food and Agriculture (Hatch) funding, a grant from the Office of Engagement Initiatives at Cornell University, and in-kind contributions from the city.

Living with Water focuses on residents’ perceptions of the city and its rivers, with a goal of understanding current attitudes and promoting the rivers as a community asset.

Given the city’s industrial history and recent severe flooding, residents might feel challenged to envision the area’s future as vibrant, welcoming, and green. Project leaders used a combination of qualitative and quantitative techniques to understand residents’ perceptions, including chalkboard exercises to stimulate creative brainstorming and a sense of possibility.

Students have been an important part of this effort: summer scholars created a project website and a video about the city’s relationship to the rivers, past and present. They also interviewed residents and surveyed them about their sense of place and their preferences for the future of the riverfront.
URBAN WATERSHEDS RE-ENVISIONED: USING AN ONLINE ENGAGEMENT TOOL TO EXPAND RESILIENCE IN NEW YORK CITY

Neighborhoods in New York City’s Jamaica Bay watershed were heavily impacted by Hurricane Sandy in 2012, an event that sparked community interest in boosting flood resilience within this densely populated area. With funding from the National Park Service, Allred worked with a team of researchers from the Wildlife Conservation Society and New York Sea Grant to deploy an online participatory visioning tool called Visionmaker. NYC, which enabled the communities to investigate how changes to the built environment, lifestyle choices, and climate scenarios might improve resilience. Groups of residents with varied affiliations—nonprofits, public agencies, community boards, and educators—interacted through a workshop to create designs and examine how choices such as replacing parking lots with green infrastructure could enhance future resilience.

Although Visionmaker offers an extensive range of scenarios and environmental metrics that could factor into future landscape and lifestyle changes, most participants envisioned only small-scale, incremental modifications that could be made either close to home or along the water’s edge. Researchers are using this insight to plan how future workshops could be formatted to help participants think more expansively and make fuller use of the technology’s capabilities to vision across long time horizons and acreages.

RURAL TRANSFORMATION IN SOUTHEAST ASIA: UNDERSTANDING ADAPTIVE CHALLENGES FOR FLOOD-PRONE VILLAGES

Vulnerability to climate change is a characteristic of all communities seeking improved flood resilience, but for economically disadvantaged rural and indigenous populations, the threat also includes a loss of culture and local knowledge. Allred has worked in partnership with Cornell’s Public Service Center and Southeast Asia Program to create the Global Citizenship and Sustainability Program, which offers students opportunities for community-based research. In the Malaysian Borneo village of Long Lamai, students have engaged with the community on issues related to water supply and sustainable energy using hydroelectric technology.

Allred also conducted research in the Nakon Pathom province of Thailand, where agricultural villages were overcome by flooding during the 2011 monsoon season. Through narrative interviews, she and her students explored the evolution and transfer of local flood knowledge that could contribute to resilience. Findings revealed that community members’ adaptive strategies are transferred largely through observation, and that villagers could be interested in acquiring better information about hydrologic variables such as water velocity and volume.

Social vulnerability was a particular concern for these rural communities, where villagers are increasingly reliant on government, and younger generations are leaving to find work or study in cities, which could ultimately lead to a loss of local wisdom. Allred is sharing her insights at international conferences and forums, where she has discussed a community resilience model that could guide further research to understand how resilience can be expanded in these socially and biophysically vulnerable communities.

Funding for these rural transformation initiatives was provided by Cornell’s Office of Engagement Initiatives, the Southeast Asia Program, the Einaudi Center for International Studies, Universiti Malaysia Sarawak, and Mahidol University in Thailand.
STRIKING A BALANCE: BENEFITS AND RISKS OF EATING FISH FROM THE GREAT LAKES

About 1.8 million recreational anglers fish in the Great Lakes each year, and many eat the fish they catch. Fish consumption yields a range of health benefits; for example, studies have shown that eating fish two to three times per week during pregnancy boosts babies’ brain development. But chemical contaminants, including PCBs and mercury, can accumulate in the tissues of Great Lakes fish—more so in some species than others—so eating too much or the wrong kinds of fish can result in toxic exposures for humans. CCSS researchers are exploring ways of encouraging consumers to eat fish in healthy amounts.

All eight Great Lakes states have produced fish consumption advisories since the 1970s to raise awareness of the risks associated with eating contaminated fish. CCSS has delved deeply into how to craft and deliver these advisories so they enable people to make decisions to consume fish in healthy ways. The most recent focus has been on outreach to populations that may be especially vulnerable: women of child-bearing age, and low-income urban anglers who fish in areas that may be prone to higher levels of contamination.

Drawing on insights from the field of risk communication, CCSS’s main emphasis has been to convey risks and benefits in ways that have been shown to influence fish consumers’ behavior.

DECADES OF IMPACT THROUGH LONG-TERM PARTNERSHIPS

CCSS professor Barbara Knuth has been engaged on this topic since the mid-1980s, when she initiated a Cornell research program funded by Sea Grant, the Great Lakes Protection Fund, and later the US Environmental Protection Agency in partnership with states that were working to develop science-based protocols for fish consumption advice. Knuth worked closely with health, environmental, and fisheries experts who were developing consumption guidelines for purchased and caught fish at state and federal levels. During this period she formed important relationships for CCSS that have continued through current collaborations with the Great Lakes Consortium for Fish Consumption Advisories. With a shared goal of enhancing state advisory programs, the Consortium, with funding from the USEPA’s Great Lakes Restoration Initiative, has supported CCSS’s ongoing research to evaluate the effectiveness of advisories, synthesize current knowledge, build on past research to improve understanding, and hone messages so they are more influential as time goes on.

FINDING THE HOOK: HOW CAN FISH CONSUMPTION ADVISORIES GET PEOPLE TO MAKE HEALTHIER CHOICES?

CCSS’s most recent projects explore whether the advisories are making a difference to vulnerable populations. Knuth and her colleagues Bruce Lauber and Nancy Connelly have been collaborating with
communications professor and CCSS affiliated faculty member Jeff Niederdeppe:

- Are the fish advisories getting people to eat fish in accordance with guidelines?
- How can we reliably know how much fish people are eating, and what kinds?
- Which media are most effective at reaching key audiences?
- If scientists are uncertain about some risks, is it beneficial to convey that uncertainty in advisories?
- Which rhetorical styles are more likely to influence the behavior of target audiences?
- Are people’s fish eating habits evolving in ways that will produce health benefits and minimize risks?

One striking facet of the study involved conveying complex messages to women of childbearing age: while consuming fish provides important health benefits to women and developing fetuses, consuming too much contaminated fish can lead to a variety of problems, including birth defects and learning difficulties. Fish advisories have long provided specific information to help women strike the right balance—eating enough fish to achieve benefits while avoiding excessive, potentially harmful amounts—but women tended to perceive the risk from contaminants as the overriding message. As a result, many women avoided fish altogether and missed out on the health benefits of adequate fish consumption.

The CCSS team tested new brochures that reflected some of the best current thinking about how to communicate such nuanced information. In one study, they distributed multiple versions of a brochure encouraging women to eat fish while following the guidelines. Previous studies suggest narratives may engage readers more fully, so one version of the brochure presented a personal narrative of a hypothetical character coming to conclusions about eating fish when pregnant, while the other used a “frequently asked questions” format to convey key messages. They also tested rhetoric conveying varying degrees of certainty about the impacts of fish consumption. One version, for example, stated “Most fish are a healthy food, but eating some types of fish raises health risks over time,” whereas the other version stated some types of fish “may raise” health risks. They found that both the narrative format and the less-certain language had a greater impact, leading women of childbearing age to achieve the desired balance: increased fish consumption in accordance with guidelines.

These findings are being used by Great Lakes states as they consider how to further enhance outreach about the risks and benefits of fish consumption.
THE INTERPLAY BETWEEN PEOPLE, COMMUNITIES, AND EMERGING ENERGY TECHNOLOGIES

New York State has been at the forefront of debates about energy transitions and has recently set aggressive targets to expand its renewable energy infrastructure. Residents’ view of this transition will influence the state’s ability to reduce dependence on fossil fuels. CCSS professor Richard Stedman has been engaged in social science research around energy issues for nearly a decade, engaging social science theories about community, risk analysis, and place attachment to deepen our understanding of factors influencing individual and community perceptions about the benefits and drawbacks of various energy systems. Insights from these studies have informed research by students and colleagues that has broadened our understanding of the social dynamics—support, opposition, impacts—surrounding various energy technologies, creating a foundation for both action and further study.

Stedman’s exploration of these topics dates back to his days as a sociologist with the Canadian Forest Service, where he studied the relationship between resource dependence and community well-being in areas dominated by industries such as mining, forestry, and energy. He became interested in systematizing our understanding of community well-being, and was convinced of the importance of learning about community members’ subjective perceptions of resource dependence along with more conventional external, quantitative measures like poverty or unemployment.

ENTER “FRACKING”: COMPARISON OF SHALE GAS DEVELOPMENT PATTERNS ENRICHES OUR UNDERSTANDING OF TRANSITIONS

Stedman’s interest in social dynamics around energy systems carried over to his work at Cornell University, where he and graduate students have studied support/opposition and community impacts of shale gas development via hydraulic fracturing (more commonly known as “fracking”). Natural gas extracted from shale has been hailed by some as a “bridge fuel” that can create jobs and replace coal as a cleaner source of electricity as we pursue aggressive targets for renewable energy in the coming decades, while critics have pointed to environmental risks associated with shale gas extraction. According to Stedman, “the dialogue about impacts of shale gas development was far too narrow, cast in terms of economic benefits versus environmental risks. What was missing were careful analyses of social impacts to community well-being, as well as analyses of how benefits and risks might be distributed throughout the population.”

Patterns of shale gas development provided a “natural experiment” of sorts for Stedman and his graduate students: while Pennsylvania aggressively moved forward on shale gas development, New York State engaged in a protracted debate that ultimately resulted...
in a statewide ban on hydraulic fracturing. Comparative study of support/opposition across geographic areas has been a very rich area for training students, and several former CCSS graduate students who are now faculty at other institutions have continued to pursue the topic individually and in collaboration with Stedman. Here are some of the research questions they’ve explored:

• How does place matter? In a study of the divergent stances taken by Pennsylvania and New York State on utilization of shale gas, Stedman and former student Jeffrey Jacquet (now a faculty member at Ohio State) discovered robust differences between residents in support/opposition, trust, perceived risk, and other elements. Additional analyses with other former students, among them Christopher Clarke (now at George Mason University) and P. Sol Hart (University of Michigan), found that as geographic distance from areas experiencing significant development increased, political ideology became more strongly associated with support/opposition.

• How do new energy development projects influence people’s sense of place and community? Jacquet led a research review showing that perceived risks to a community’s social fabric may fuel local opposition to land use changes associated with energy development projects.

• Does increased knowledge about a specific technology tend to make people more supportive or more opposed to it? An international comparison showed that in the United Kingdom increased knowledge of hydraulic fracturing was associated with greater support, whereas in the United States the level of knowledge was unrelated to support. This finding by Stedman and former student Darrick Evensen (now at University of Edinburgh) suggests a need for more research to understand how information about energy technology is received and interpreted in different cultural or geographic contexts.

• How do the terms of lease agreements between landowners and industry influence the pace and outcomes of energy development and its impact on communities? Cornell PhD candidate Dylan Bugden (soon to be a faculty member at Washington State University) found that—counter to popular narratives of shale gas development as a “game changer”—a majority of those signing gas leases felt as though they and their communities had been minimally impacted. Where impacts had been experienced, they were largely positive, rather than negative (as commonly surmised).

LOOKING AHEAD: PREPARING FOR—AND TEACHING—NEW YORK’S RENEWABLE ENERGY TRANSITION

The shale gas boom is but one key transition in state and regional energy initiatives. Looking forward, New York’s Reforming the Energy Vision (REV) initiative aims to boost energy efficiency and generate 50 percent of the state’s electricity from renewable sources, including solar, geothermal, and wind power. This vision relies upon state residents’ willingness to use efficiency technologies like smart meters and devote private land to solar installations and wind farms. Consequently, an understanding of the perceptions and attitudes that influence readiness to embrace new technologies will be crucial to the success of the transition plan. Insights from Stedman and colleagues’ past studies could reveal potential opportunities and barriers facing New York’s REV initiative.

Students have expressed interest in learning more about social dynamics around energy technologies, so Stedman is developing an upper-level undergraduate course that will be team taught by faculty in engineering, biological and physical sciences, social sciences, and humanities. A faculty fellowship from the Atkinson Center for Sustainable Futures is supporting development of this new course and also funded an international research workshop in 2018 to generate additional comparative research on energy transitions. Forums like these will help to ensure that future researchers, policy makers, and energy sector professionals attend to the complex social facets of energy transitions informed by past lessons and poised to advance our understanding so it can be applied to new scenarios.
Invasive species are costly to manage and can have devastating effects on ecosystems, the economy, human health, and quality of life. Policymakers need help determining which public expenditures on invasive species control are most likely to be cost-effective, and which messages will prompt behavior change that slows or stops the spread of nuisance plants and animals. CCSS has organized interdisciplinary teams of researchers to study the region-wide effects invasive species are having or could have in the future. Their work is providing insight into how we can encourage communities and individuals to respond effectively.

REGIONAL DECISIONS: THE COMPLEX, HIGH-STAKES CHALLENGE OF MANAGING INVASIVE SPECIES IN THE GREAT LAKES
Invasive species pose an especially complex challenge in North America’s Great Lakes and the Mississippi River basin, a sprawling interconnected system spanning international, state, tribal, and local jurisdictions and agencies. Invasives in these waterways can spread through multiple pathways, threatening commercial navigation, water supplies, hydropower, fishing, and tourism. Of particular concern to the Great Lakes recreational fishery are bighead and silver carp, voracious eaters that reproduce quickly and can outcompete native fish, disrupting the balance of important freshwater ecosystems.

Responsibility for responding to such threats falls to many agencies, including the US Army Corps of Engineers, which faces pressure to re-engineer waterways in ways that will minimize species transfer. With funding from the Corps of Engineers and the Great Lakes Fishery Commission, CCSS researchers Bruce Lauber, Richard Stedman, and Nancy Connelly collaborated with economists from Cornell University and Montana State University to develop a tool to predict the possible impacts of bighead and silver carp on recreational fisheries. Cost estimates for preventing the transfer of species between the two basins have ranged as high as $18 billion. What was missing was an economic analysis of the costs of failing to prevent the spread. CCSS assembled a team of economists, aquatic ecologists, and natural resource policy experts to predict the economic harm invasive carp might cause to recreational fisheries if no action were taken. They developed a model to estimate potential loss in value to the recreational fisheries.

Asian carp species were introduced to the southern US during the 1970s. Since then, they have migrated toward the Great Lakes, threatening to crowd out native fish and kill off native freshwater mussels.

Right: CC Image courtesy of mark6mauno on Flickr. Chicago, Illinois
Uncertainty is a major issue in assessing the effects of invasive species in a system as large and complex as the Great Lakes, where the range of possible scenarios is staggering. Rather than trying to develop a single estimate of how bighead and silver carp could affect the recreational fishery, CCSS’s interdisciplinary team accepted that uncertainty as unavoidable and aimed to narrow the range of impacts that policymakers should take most seriously. Through a collaboration involving multiple institutions and agencies (the National Oceanic and Atmospheric Administration’s Great Lakes Environmental Research Laboratory, Fisheries and Oceans Canada, the US Geological Survey’s Great Lakes Science Center, Cornell University, and land-grant universities from several other states), CCSS brought diverse theoretical perspectives to the table and a wide range of knowledge of specific lakes and species taxa. They produced a set of plausible scenarios that reflect the uncertainty inherent in trying to predict the impacts of invasive species, but still allow agencies to focus on the most likely impacts invasives could have on Great Lakes fisheries. The outcome is an economic model with practical relevance for decisions about multi-billion-dollar expenditures to prevent the spread of invasives. Now Lauber, Stedman, and Connelly are applying the model to reveal how other aquatic invasive species—such as the aquatic weed hydrilla, the northern snakehead fish, and the quagga mussel—might affect recreational fishing and the value of that fishing.

COMMUNITY ACTION: PROTECTING ASH TREES IN URBAN AREAS

The emerald ash borer (EAB) poses an existential threat to New York State’s ash trees, a staple of urban and suburban landscapes. The first line of defense against this invasive insect originates at the community level, where falling limbs from dead trees can pose a risk to public health, roads, and electrical infrastructure. Local governments, land managers, and homeowners need knowledge, resources, and labor to combat the threat, which can involve treating infestations, removing infested trees, and planting replacements. Many communities, however, feel constrained in their ability to respond to EAB infestations, focusing only on the most pressing needs, such as locating and removing ash trees. CCSS’s Bruce Lauber and William Siemer are exploring how EAB task forces can contribute to a community’s capacity to respond. Preliminary results of this project, which is supported by USDA National Institute of Food and Agriculture (Hatch), suggest that communities engaged with the task forces will in fact take more actions that would help to prevent losses, restore trees, and replace trees that have been killed.

INDIVIDUAL BEHAVIOR: PREVENTING HUMANS FROM SPREADING INVASIVE SPECIES

Invasive species can be spread to new areas unwittingly by individuals whose contaminated hiking boots, fishing lines, or unwashed boats carry seeds, plant fragments, or insect eggs into previously unaffected terrain or freshwater systems. Much of this transfer is avoidable, and outreach programs across many states aim to raise public awareness of risks in the hope that this will prevent spread. Bruce Lauber, Nancy Connelly, Richard Stedman, and Barbara Knuth received funds from the Great Lakes Fishery Commission and USDA National Institute of Food and Agriculture (Hatch) to examine the effectiveness of outreach to groups whose actions are quite likely to be influential, including Great Lakes anglers and bait dealers. They found that although outreach often focuses on promoting awareness, awareness alone does not necessarily produce behavior change. While most anglers are aware of and concerned about aquatic invasive species, they are less likely to take action when doing so involves time, labor, and inconvenience—like disinfecting or rinsing equipment with hot water. This insight guides practical steps programs can take to change anglers’ behavior, such as making more boat washing stations available and crafting outreach messages that emphasize easy ways anglers can help to prevent the spread of invasives.

These findings echo work that CCSS has been doing for several years, and the importance of promoting behavior change in public outreach is now finding its way into statewide policy. In a 2015 study commissioned by the NYS Department of Environmental Conservation, CCSS surveyed a broad range of New York residents about awareness of invasive species and willingness to change behavior to prevent the spread, especially among groups whose actions were likely to be most influential. In November 2018, New York released a multi-agency, statewide Invasive Species Comprehensive Management Plan that draws specifically on CCSS findings as it guides invasive species priorities and expenditures into the future.
The success of the CCSS depends on its faculty, staff, and graduate students – and the people who collaborate with us.
**FACULTY AND STAFF**

**SUPERVISORS OF CCSS ACTIVITIES**

**Director**
Bruce Lauber

**Associate Directors**
Shora Allred, Barbara Knuth, Richard Stedman

**Director Emeritus**
Daniel Decker

**Faculty Collaborators**

**Administrative Assistant**
Brian Hutchison

**PROJECT STAFF**

**Graduate Assistants**

**Research Associate**
Bill Siemer

**Research Specialist**
Nancy Connelly

**Research Aide**
Karlene Smith

**Temporary Staff**

**Research Assistant**
Meghan Baumer

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**CENTRAL FOR CONSERVATION SOCIAL SCIENCES ORGANIZATIONAL CHART**

**CORE FACULTY** (as of January 2019)

**T. Bruce Lauber**, Senior Research Associate and CCSS Director

Specializations: Risk management and communication related to fisheries management; invasive species management; conflict and collaboration in natural resource management; stakeholder engagement in decision making; Great Lakes.

**Shorna B. Allred**, Associate Professor, House Professor and Dean (Alice Cook House), and CCSS Associate Director

Specializations: Human dimensions of natural resource management; natural resource policy; community-based methods, community resilience, and environmental attitudes and behaviors with emphasis on forest and water resources.

**Barbara A. Knuth**, Professor and CCSS Associate Director; Dean of the Graduate School

Specializations: Risk communication and risk perception related to chemical contaminants in fish; ecosystem-based approaches to fisheries management; Great Lakes and marine fisheries policy and management.

**Richard C. Stedman**, Professor and CCSS Associate Director

Specializations: Sense of place; community resilience; impacts of social and environmental change on wildlife recreation and community; risk and policy; environmental attitudes and behaviors; community-based resource management; landowner attitudes and behaviors; coupled human/ecological systems.

**Daniel J. Decker**, Professor Emeritus and CCSS Director Emeritus

Specializations: Integration of human dimensions insights into wildlife management decision making, policy, planning, and practice; stakeholder involvement in wildlife management.
AFFILIATED FACULTY (as of January 2019)

Paul D. Curtis, Professor and Department Extension Leader

Specializations: Resolving conflicts between people and wildlife; citizen participation in decision making; outreach and policy education.

Heidi Kretser, Adjunct Assistant Professor, Conservation Social Scientist - Americas, Wildlife Conservation Society

Specializations: Land-use development and patterns; how human activities in rural landscapes influence wildlife and human-wildlife conflicts; how communities, groups of actors in a conservation issue, or a single organization move from process and discussion of an issue to on-the-ground conservation impacts.

Katherine A. McComas, Vice Provost for Engagement and Land-Grant Affairs and Professor, Department of Communication

Specializations: Risk, science, and environmental communication; community involvement and public participation; trust and credibility related to science communication.

Jeff Niederdeppe, Associate Professor, Department of Communication

Specializations: Health and environmental communication; public communication campaigns; public opinion and social policy.

Amanda D. Rodewald, Professor, Department of Natural Resources and Director of Conservation Science, Cornell Lab of Ornithology

Specializations: Wildlife population and community ecology; conservation biology; landscape ecology; socioecological interactions in tropical working landscapes; forest management; urban ecology.

CENTER STAFF (as of January 2019)

Meghan S. Baumer, Research Assistant

Specializations: Environmental psychology; environmental education; volunteer management; human dimensions training program assistance.

Nancy A. Connelly, Research Specialist

Specializations: Incorporating human dimensions perspectives in natural resources management; risk perception and communication related to fisheries management; survey research methods.

Brian Hutchison, Administrative Assistant

Specializations: Unit office management; website maintenance; administrative assistance.

William F. Siemer, Research Associate

Specializations: Motivations and satisfactions associated with wildlife-dependent recreation; program evaluation; risk perceptions associated with human-wildlife conflicts; mass media effects on wildlife-related perceptions.

Karlene K. Smith, Research Aide

Specializations: Survey implementation; interviewing; database management; content analysis.
**GRADUATE STUDENTS** (as of January 2019)

**Gloria Blaise**, Gates Millennium Fellow

Specializations: Socio-ecological systems; community-based agroforestry outcomes, and community development; environmental education in developing countries.

**Dylan Bugden**, Cornell Fellow

Specializations: Energy development and public policy; sense of place; social movements; partisanship and polarization.

**Santiago Garcia**

Specializations: Leadership; governance; conflict resolution skills; strategic organizational planning and management; fundraising and donor development; biodiversity conservation; human dimensions in natural resources; ecosystem services; climate change and community-based adaptation; REDD+.

**James Goetz**

Specializations: Political ecology of natural resource and protected area management. Social and environmental outcomes of payments for ecosystem services. Participative, adaptive conservation planning and management.

**Ted Lawrence**

Specializations: International development and natural resource conservation in Latin America, specifically Yucatan, Mexico; coupled human and natural systems; common-pool resource regimes; landscape ecology and eco-agriculture.

**Sarah Naiman**, National Science Foundation Fellow

Specializations: The application of sense of place and theory to predict pro-environmental behaviors; social psychology.

**Roberta Nilson**

Specializations: Rural studies; public policy; energy; natural resource dependent communities; public engagement.

**Carrie Simon**

Specializations: Institutional dimensions of ecosystem-based management; communication theory.

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**GRADUATE STUDENTS RECEIVING DEGREES IN 2018**

**Catherine Doyle-Capitman**

Ph.D., Natural Resources (D. Decker, advisor). Bridging the Gap between Planning and Implementation in Collaborative Landscape Conservation.

**Darragh Hare**

Ph.D., Natural Resources (D. Decker, committee member). Ownership, Morality, and Wildlife Conservation.

**Santi Sapayana**

Ph.D., Natural Resources (R. Stedman, co-advisor). A Performance of Social Marketing Campaign on Wildlife Conservation in Nam Et – Phou Louey National Protected Area, Laos.
CCSS collaborates with a wide variety of organizations, universities, and governments (recent examples listed). Without the assistance of these and other collaborators, much of the work we do would not be possible.

GOVERNMENT

UNIVERSITIES
Columbia University, Michigan State University, Montana State University, North Carolina State University, Stockholm University, The Ohio State University, University College of Technology Sarawak, Universiti Malaysia Sarawak, University of Edinburgh, University of Alberta, University of Maine, University of Massachusetts, Virginia Tech, Yale University

PRIVATE/PUBLIC ORGANIZATIONS

CORNELL UNIVERSITY
Atkinson Center for a Sustainable Future, Charles H. Dyson School of Applied Economics and Management, Community and Regional Development Institute, Cornell Cooperative Extension, Cornell Institute for Climate Smart Solutions, Cornell Laboratory of Ornithology, Cornell Southeast Asia Program, Cornell Survey Research Institute, Cornell University Agricultural Experiment Station, Office of Engagement Initiatives, Public Service Center

Departments of: Biological and Environmental Engineering, Civil Engineering, Communication, Development Sociology, Earth and Atmospheric Sciences, History of Art and Visual Studies, Landscape Architecture and Natural Resources
In 2018, the CCSS produced 23 peer-reviewed journal articles and 13 other publications.


OTHER CCSS PUBLICATIONS


In 2018, CCSS faculty were PIs or co-PIs on grants and contracts with more than $6 million in funding.
CCSS FUNDED PROJECTS ACTIVE IN 2018


Catanzaro, P., Markowski-Lindsay, M., Bell, K., Kittredge, D., Markowitz, E. Leahy, J., Butler, B., & Allred, S.B. Understanding and informing family forest owner decisions of land transfer to enhance the viability and competitiveness of our forested landscapes. USDA NIFA. 2/15/2015-2/14/2020.


Cowen, E. A., Daziano, R., Schultzze, R., & Stedman, R. C. Achieving the hype: Leveraging storage to turn smart meters into a smart service system. National Science Foundation. 9/1/2016-8/31/2019.


Kraft, C., Stedman, R. C. & Bugden, D. E. Proposal to support active learning in CALS. Proposal to support active learning in Introduction to Environmental Science and Sustainability and Society and Natural Resources. Cornell University, College of Agriculture and Life Sciences. 7/1/2018-6/30/2019.


Lauber, T. B. Communication to promote recovery of an important species for agriculture: perceptions of risks and benefits of bats. Cornell University College of Agriculture and Life Sciences Agricultural Experiment Station. 10/1/2017-9/30/2020.

Lauber, T. B. Increasing local capacity to protect environmental resources from invasive species. Cornell University College of Agriculture and Life Sciences Agricultural Experiment Station. 10/1/2015-9/30/2018.


Stedman, R. C. Understanding angler behaviors the influence the spread of aquatic invasive species. University of Illinois at Urbana-Champaign. 1/1/2018-12/31/2020.


Steinschneider, S. & Stedman, R. C. Rapid response: Developing and distributing a flood damage reporting protocol for communities along the southern shore of Lake Ontario. New York Sea Grant Institute. 5/15/2017-1/31/2018.